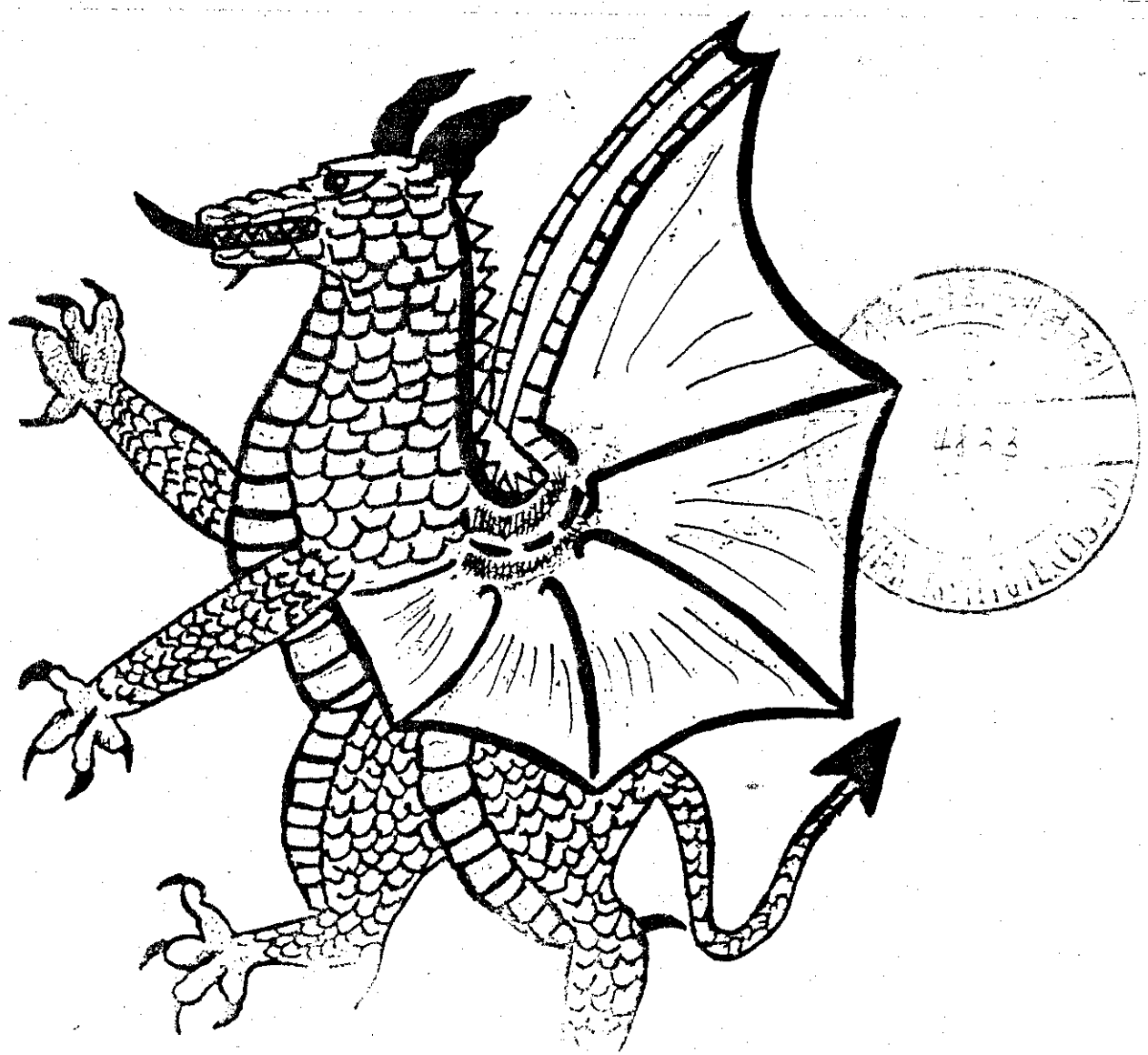
UNITED STATES FORCES KOREA

EIGHTH UNITED STATES ARMY

NON-DIVISIONAL

NBC DEFENSE SCHOOL

SUPPLEMENTAL TEXT



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IN CASE OF EMERGENCIES: DUTY - Call 38th Chem Det: 293-4544/4186
AFTER DUTY - Call HHC EUSA, CQ: 293-6567/6371

CLASS POLICIES AND INFORMATION

1. Inprocessing.

a. Registration. All students, to include stand-by students, will fill out the Student Inprocessing Sheet. Please fill out as completely as possible and return it to the instructor.

b. Entrance-Exam. The entrance-exam you will be taking covers basic map reading skills to include resection and intersection methods, 12th grade math skills, and NBC common skills. It is not a "hands-on" equipment test and if you reviewed these areas you should have no problems passing it.

c. Equipment. You should have brought with you the required equipment, manuals, batteries, solutions, etc. Please place your locked duffle bag or foot locker in the room to the right of the latrine (as you are facing the latrine). This bldg will be secured at night and you are welcome to leave your locked bag/locker overnight. 38th Chemical Detachment will not be responsible for any loss or damage.

d. Release. You may be released from the course for various reasons outlined in the Information Bulletin and EUSA Pam 350-10. Prior to your release you will be interviewed and told the specific reason.

2. Course Information.

a. Questions. Instructors welcome your questions because they increase student knowledge and assist other students. If you have a question not relevant to the class please ask it during a break time.

b. "Work" Book. The student "work" book consists of outlines and questions covering course subjects. The work book is yours to keep and you may make notes/comments in it.

c. "Text" Book. The student "text" book consists of publication extracts, FM, TMs, etc. This is for your reference and reading during school but must be turned in after graduation. Please do not mark in it or take out pages, other students must use it.

d. Graduation. You must receive 70% of total points from 3 quizzes and final exam to pass the course. One enlisted will be selected as the honor graduate and when more than 3 officers are attending, one officer will be honored.

e. Study Hall. If requested, a study hall will be available. Coordinate with your class leader.

3. Administrative.

a. Start Time. Classes start promptly at 0800 hours. Students will be seated and ready for class activities. Your class schedule will tell you which item of equipment is required for each class.

b. Appointments. Any student who has an appointment should attempt to reschedule it. Inform the instructor of any appointments which must be kept.

c. Absences. Absences from class must be approved by the instructor or Detachment NCOIC.

d. Attendance. Students cannot miss more than 4 hours of class or any part of FRIDAY or they will be dismissed from school.

e. Entrance. Students enter the classroom thru the side entrance and not thru the office. Students are not allowed in the office area without the approval of the instructor.

f. Conduct. Tardiness or misbehavior will not be tolerated. Military standards for appearance will be enforced. There will not be any reading of magazines, comic books etc. during class. Student will not sleep during class. Repeated offenders will be dismissed from school.

g. Hats. The area inside the fence (picnic area) is designated as hats not required. You may visit the snack truck without your hat. During summer months the removal of fatigue/BDU jacket is authorized during class.

h. Visitors. Visitors are not allowed in the classroom except for emergencies or VIPs.

i. Telephone. A class "C" line is available in the back of the building by the latrine. This is also the detachment's office phone so please limit calls to 2 min. A class "A" line is available, see the instructor.

j. Messages. Messages for students will be given to the instructor. Students may call back during break times. However, we are not an answering service.

k. Sick Call. E6 and below will obtain a sick slip from the instructor and E7 and higher will notify the instructor prior to reporting to sick call at Yongsan Health Clinic, Building #1664. Students may ride to the clinic with the detachment admin run each morning, but must use post bus on return.

l. Severe Weather. During severe weather (ice-storm/snowstorm) the post buses may be delayed. Students will attempt to report to the detachment as soon as practical. Once 80% of student class is present, classes will begin. Any time lost will be made up after duty or on Saturday.

m. Safety. Safety warnings will be observed at all times. Students should become familiar with the location of fire extinguishers and fire evacuation plan.

n. Lunch. Classroom is open during lunch. Students will be seated ready for class promptly at 1300 hours. Suggested places to eat are:

Dining Facility:	Inside Gate 51, Bldg #5454
Snack Bar:	Inside Gate 51, Bldg #5485
Frontier Club:	Top of hill (open for both off & Enl during lunch), Bldg #4763
Rod & Gun Club:	Top of hill (requires membership), Bldg #4894

Travel by post bus to main post area is not a legitmate reason for tardiness.

o. Eating and Drinking (Soda's, Coffee) is permitted during class as long as the area remains presentable. Smoking is allowed only during breaks. Designated smoking area for students is outside. Do not throw cigarette butts on the ground or trash cans, place them in the red "butt" cans.

p. Coffee. The instructor will announce coffee availability.

q. Snack Truck. A snack truck usually visits at 1000 [redacted] and 1500 [redacted] for your dining pleasure.

r. Water. Water is available in the break room from the faucet.

s. Latrine. The latrine is in the back to the left as you leave the classroom. This is the only latrine so please observe the sign on the door. If an emergency should arise, the office next door has both a male and female latrine.

t. Class Leader.

The senior Non-Commissioned Officer will be designated as Class Leader and is responsible for classroom appearance, clean-up, and general supervision of personnel (behavior, student area, attendance, etc).

Please insure you have completed the Inprocessing Sheet and return it to the instructor.

BIOLOGICAL WARFARE

Information on Biological Agents and Defensive measures.

a. Biological Agents are germs that cause disease.
b. Best protection is to "Clean up your act."
c. Point to remember: It takes 4 people out of action to take care of one sick person, but only the chaplain to notify the next of kin. Biological Agents are meant to maim, not to kill.

1. What is the U.S. policy on Biological warfare?

   a. The U.S. will not use biological agents including toxins and all other methods of biological warfare, under any circumstances.

   b. U.S. biological research will be strictly limited to defensive measures.

2. What are the four natural decontaminates?

   (a) Weather

   (b) Earth

   (c) Fire

   (d) Water

3. List and define the bodies natural defenses against biological agents:

   (a) Physical Barriers. The body's physical barriers are the unbroken skin and the mucous membrane. The mucous membrane produces a moist, sticky substance called mucus, that traps and holds microorganisms.

   (b) Natural Immunity. This line of defense is present at birth. It consists of white blood cells that attack microorganisms and produces enzymes that disolve microorganisms.

   (c) Acquired Immunity. Active acquired immunity is obtained when the body produces antibodies after exposure to a disease. Passive acquired immunity results from antibodies that are produced in another body and are transferred to the individual by immunization or vaccination.

4. The basic protection against a biological agent attack is wearing the protective mask with hood, gloves, boots, and overgarment.

5. Indications of a biological attack:

   (a) Low-flying aircraft that appear to be producing a mist or spray.

   (b) The functioning of any type of spray device.

   (c) The functioning of a munition, such as a bomblet, that appears to have no immediate effect.

   (d) Unusual types of bomblets found in the area.

   (e) Swarms of insects, such as mosquitoes, suddenly appearing after aircra have dropped containers that did not appear to have any immediate effect.

6. The vocal signal for biological attack is MASK .

7. Personnel can decontaminate themselves by showering with soap and water .

8. The ability of biological agents to survive in the atmosphere as an aeroso is influenced by many factors. Some of the specific factors are:

   (a) Light. Most biological agents are destroyed by exposure to sunlight.

   (b) Temperature. Many biological agents die more rapidly in high temperatu than in low temperatures.

   (c) Moisture. Many biological agents die more rapidly when the moisture (humidity) in the air is low than when it is high.

9. The respiratory tract is the most susceptible to invasion by a biological agent.

10. The skin gives excellent protection from biological agents if it is unbroken.

11. The digestive tract is the least susceptible to invasion by a biological agent.

12. The basic methods of disseminating biological agents are:

   (a) Aerosols

   (b) Vectors

   (c) Covert

13. The most favorable conditions for employing biological agents normally at night, from about 1 hour before sunset to 1 hour after sunrise.

BIOLOGICAL OPERATIONS

SECTION I: GENERAL

There are few military subjects about which more misunderstanding exists than "biological operations" or, as it is usually termed in civilian publications, "germ warfare". These words seem to project mental images of contaminated food and water, uncontrollable epidemics, and mad scientists. All of these images are exaggerations if not totally incorrect.

In November 1969, President Nixon renounced the use of or research and development in any form of biological weapons that either kill or incapacitate. Since that date, United States programs have been confined to pure defensive research including development of immunizations and detection devices. Let there be no misunderstanding, the United Stated is out of the "germ warfare" business. We do not have an offensive capability. We do not develop or stock any biological agents or delivery systems. We do not have any biological warfare production facilities. If attacked with biological agents this county will not and cannot retaliate with biological agents. There is no absolute guarantee, however, that other nations will refrain from biological operations in future conflicts. Military leaders at all levels must understand how these agents might be used and what defensive techniques are required to protect against them.

1. Definition of Biological Operations.

a. For simplification of this chapter, biological operations is defined as the military use of living microorganisms to attack man, his animals, or his crops. This definition excludes natural disease outbreaks such as malaria in Vietnam. As this definition suggests, man can be attacked directly with microorganisms or he can be attacked indirectly through food animals and food crops. In this chapter only anti-personnel biological agents and operations are discussed as this type of biological attack is of primary interest to the small unit leader.

b. The term "microorganism" includes four major groupings: (1) bacteria, (2) viruses, (3) rickettsia, (4) fungi. There are over 200 natural diseases of man produced by these four groups of microorganisms and many of these natural diseases are capable of selection and use as military biological agents.

2. Contamination of Food and Water. Perhaps the most common misconception concerning biological operations is that microorganisms would be used primarily to attack man through contaminated food and water. While this is not impossible, it is unlikely for several reasons.

a. Typical civilian city reservoirs hold billions of gallons of water which greatly dilute biological agents placed into the reservior.

b. Approved water, both military and civilian, is purified by filtration and/or chemical treatment to reduce the number of disease-producing microorganisms.

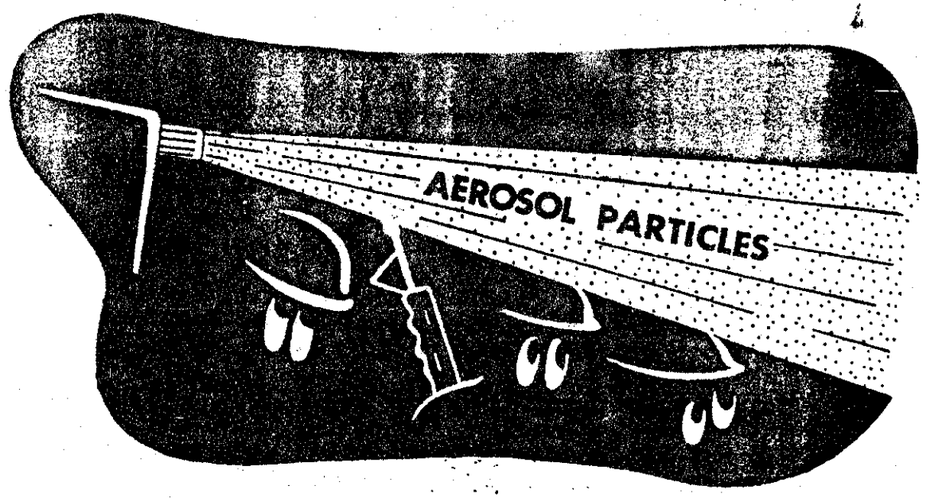
c. The highly acidic stomach is a hostile environment for many microorganisms where they are killed before they can cause an infection.

d. There are many separate water supplies for civilian communities. Likewise, in combat, many separate water points provide water for soldiers.

It is conceivable, with careful planning, to dangerously contaminate limited water supplies with microorganisms, but the number of soldiers or civilians affected by the contaminated water would be relatively small in number.

SECTION II: THE AEROSOL ATTACK

4. Concept of an Aerosol. At the present time the most feasible means of infecting a target population with biological agents is by establishing an aerosol cloud of living microorganisms over the target area and infecting people in the target area when they breathe the microorganisms into their lungs. An aerosol is a suspension of tiny solid or liquid particles in the air. Dust, smoke, and mists are examples of aerosol particles of relatively large size. Ordinary air always contains many invisible aerosol particles; this can be easily demonstrated by shining a beam of light through a dark room. In the beam of light can be seen millions of tiny specks moving in the beam. These are aerosol particles, such as dust and mold spores, which are invisible under normal light.



5. Infection by Aerosol Particles.

a. By the use of specially designed spray tanks, munitions or other devices, it is possible to release living microorganisms (usually viruses, bacteria, or rickettsia) into the air as aerosol particles. As an example, if you sneeze and do not cover your mouth, some "common cold" viruses are expelled from your mouth as aerosol particles and become an inhalation health hazard to people around you. Of course, sneezing is a crude and inefficient way of generating aerosol particles, but the prihciple is the same; living microorganisms can be put into the air as aerosol particles and can infect other people by inhalation.

b. Aerosol particles can be disseminated into the air either as tiny solid particles (such as dust or smoke) or as tiny liquid particles (such as mist or fog). Living disease microorganisms can be in or on either solid or liquid aerosol particles.

c. When biological agents in aerosol form are breathed, they must reach the depths of the lungs to cause an infection. However, the human body has natural defenses to keep aerosol particles out of the lungs. There are small hairs and other mechanisms in the passages to the lungs which can trap aerosol particles before they reach the depths of the lungs. A logical question, then, is whether enough aerosol particles can reach the depths of the lungs to infect large numbers of people. Careful research shows that relatively large aerosol particles go down to the depths of the lungs but come right back out with the exhaled breath. There is a certain optimum aerosol particle size, however, which penetrates to the depth of the lungs, impacts there, and stays there. If this optimum size particle is carrying live disease microorganisms, these microorganisms can thus be effectively introduced into the body by inhalation to cause an infection.

d. The unit of measure for very tiny particles is the "micron" which is one millionth of a meter in length. Aerosol inhalation experiments have shown that aerosol particles of one to ten microns in diameter are the optimum size for penetration and retention in the depths of the lungs. This means that devices or munitions which disseminate aerosols for attacking human populations are designed to produce aerosol particles of one to ten microns. Aerosol particles of this size are completely invisible to the naked eye.

. Characteristics of Biological Aerosol Attacks. Disease organisms nd aerosol attacks have certain characteristics which affect their se in wartime and defense against them. These characteristics are:

a. Infectious Dose. When inhaled into the lungs, disease organms must multiply and overwhelm the body's disease defenses. It is re that a single disease "germ" or microorganism can do this; ually many more than one is requied. The number of microorganisms eded to overwhelm body defenses and cause an infection is called the nfectious dose". For some highly infectious diseases, a relatively w organisms (10 to 20) will constitute and infectious dose; for her less virulent diseases, an infectious dose may require inhalaon of thousands of microorganisms to cause an infection. Thus, if ghly infectious diseases are disseminated in an aerosol, an infecus dose may be inhaled in a few breaths. Other less infectious eases may require inhalation of microorganisms for minutes or hours acquire an infectious dose.

b. The Incubation Period. When an infectious dose of microganisms is inhaled, sickness does not occur immediately. There is ays a lag time between inhaling an infectious dose of microorganms and the victim becoming sick. This lag time is called the cubation period". Depending on the type of disease microorganisms d, the incubation period may be from two days to two weeks. This ns that biological agents are not used where immediate casualties needed. More likely, biological agents would be used to cause rition over a period of time and are especially suitable for acking rear areas such as ports and large logistical complexes.

c. Range of Effects. Some diseases are more serious than ers; people seldom die from "flu" but many people die from plague smallpox or yellow fever. The same is true of biological agents ch might be used in war. There are many natural disease microanisms which can be exploited by an enemy in wartime with effects ging from mild sickness for some agents to great lethality for ers. Low lethality biological agents could be chosen where it ld be advantageous to produce incapacitation in a target population for example, where soldiers are intermixed with large civilian ulations. The ability to produce wide spread incapacitation with death rates is a unique capability which only chemical and logical agents have.

d. Decay of Biological Agents.

(1) All living things eventually die, and this is true of disease microorganisms also. The rate of dying of microorganisms is called their "decay rate".

(2) The decay rate of microorganisms can be slowed down by several means to prolong their storage life. Freeze-drying of microorganisms preserves them for long periods in almost suspended animation. Refrigeration also slows down the decay rate of microorganisms.

(3) The destruction of microorganisms by sunlight means that aerosol attacks may occur at night to increase downwind drift and area coverage. It also means that the hazard from an aerosol attack is much reduced after about two hours of sunlight (two hours after the sun is at least 10^{o} above the horizon). On cloudy days more time is needed to reduce the aerosol hazard because the ultraviolet rays from the sun are decreased by clouds.

e. Large Area Coverage Capability.

(1) Even though a sizeable number of microorganisms may be required for an infectious dose, one infectious dose is still a very tiny amount of material by weight and volume. This means that a relatively small amount of biolcgical aerosol material can cover very large areas. For example, in a field trial, 450 pounds of a harmless aerosol material was disseminated from a boat off shore from a state on the east coast of the United States. The aerosol cloud was blown onto the land areas and was sampled by prepositioned sampling devices. The sampling revealed that the aerosol cloud eventually covered several thousand square miles.

(2) The large area coverage capability of a biological aerosol means that this weapons system is capable of attacking large targets; therefore, a biological aerosol attack can be used for large scale strategic attack against homeland targets.

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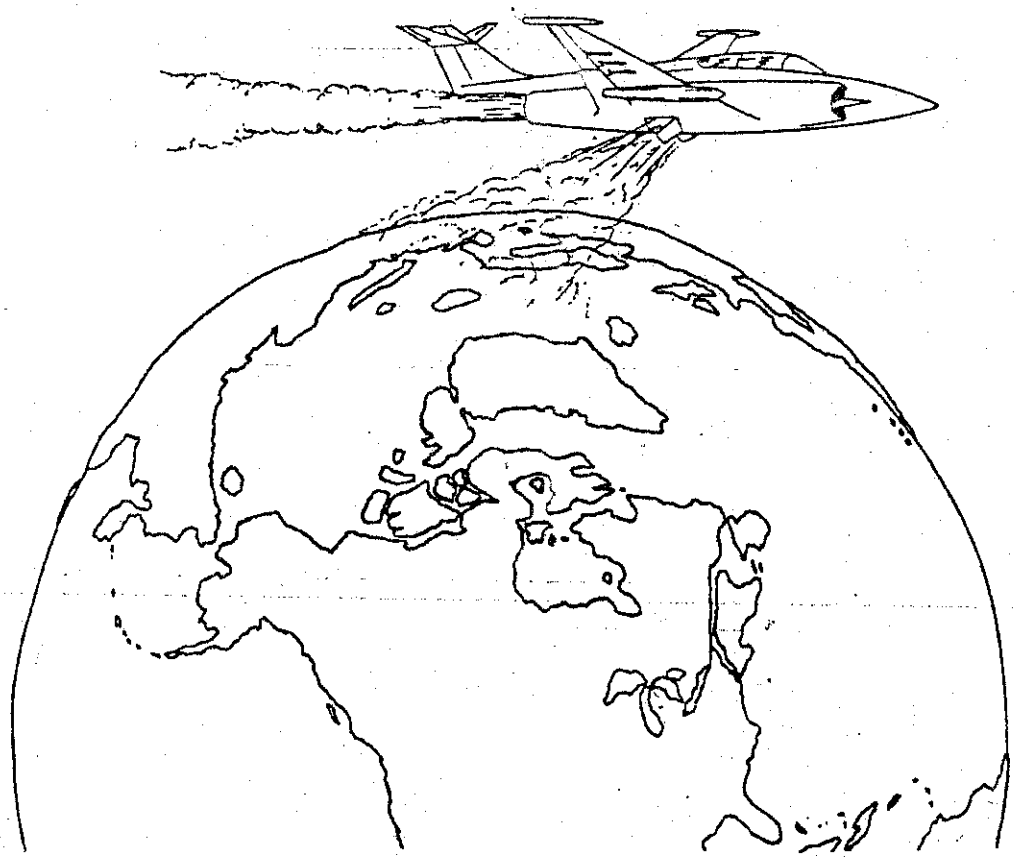
LARGE AREA COVERAGE

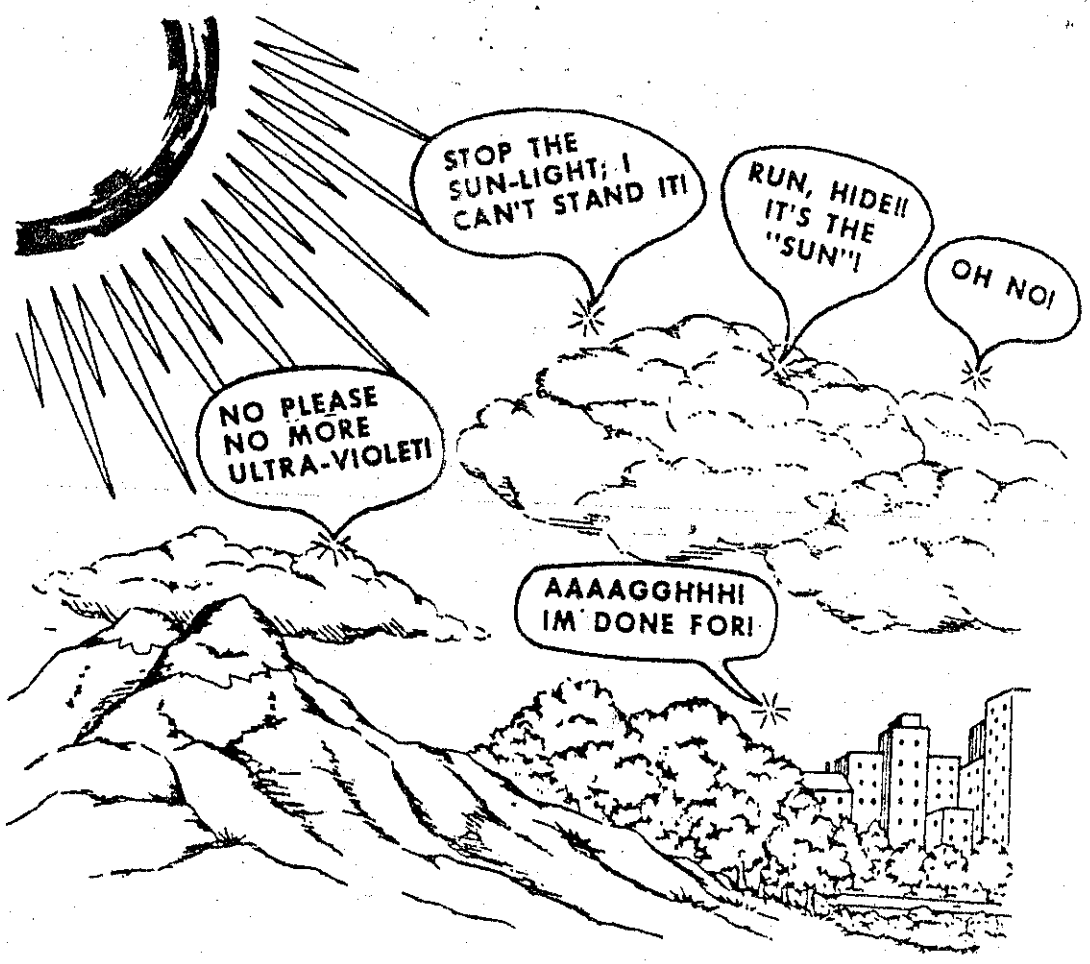


(3) Biological aerosols can be delivered to the target area by a variety of means including rockets, missiles, bombs, spray from high performance aircraft and generators. Once released, the aerosol cloud of living microorganisms is affected by the weather in the target area and blows downwind. Since most disease microorganisms are killed by ultraviolet light, if the sun is shining, the ultraviolet light of the sun kills the microorganisms at a predictable rate. This can provide the means whereby an attacker can deliberately reduce or limit the area coverage of a biological aerosol attack, since an aerosol cloud released during daylight hours will travel only a relatively short distance downwind before the microorganisms are killed by the ultraviolet rays of the sun.

f. Epidemic Not Necessary:

(1) A widespread misconception about biological agents is that their use would automatically trigger widespread epidemics which would spread the disease outside of the population in the target area. An epidemic is an uncontrollable situation and is seldom desirable militarily. For this reason, specific disease organisms could be chosen to minimize the probability of an epidemic. An epidemic requires disease organisms to be spread, directly or indirectly, from person to person. Certain disease organisms cannot be transmitted directly from person to person but requires a specific vector (usually an insect) intermediate host. Examples of this are:

(a) Malaria and yellow fever which require specific types of mosquitoes for spread of the disease from one person to another.



(b) Rocky Mountain Spotted Fever which requires a tick.

(c) African Sleeping Sickness which requires the tsetse fly.

(2) It is possible to disseminate disease microorganisms of yellow fever or Rocky Mountain Spotted Fever as an aerosol and infect people who inhale an infectious dose. However, if the required insect vector is not found in the target area, there is no mechanism for the natural spread of the disease outside of the initial target population; thus an epidemic is extremely unlikely. Careful selection of the disease to be used in an aerosol attack, using those which require a vector such as an insect for natural spread, can greatly reduce the probability of an epidemic in an area where the vector is not found.

CTION III: DEFENSE AGAINST A BIOLOGICAL ATTACK

Detection and Respiratory Protection. Defense against an aerosol ack is simple; wear the protective mask to filter out the aerosol rticles before they are inhaled into the lungs. The problem, how-er, is knowing when to don the mask since aerosol particles are detectable by human senses when properly mixed with the air. An rosol alarm, currently under research and development, is not yet ailable. In the interim, leaders must rely on intelligence esti-es of the enemy's biological attack capability and on visual ghting of spraying aircraft or unusual munitions. Most biological tacks will be at night to mazimize area coverage, which complicates ual detection. If, for any reason, a biological aerosol attack is spected as imminent or taking place, all personnel must mask and main masked until at least two hours of sunlight has occurred. On loudy days, personnel should remain masked for as long as the mission d endurance permit.

Decontamination. There is no agreement concerning the need for contamination after a biological aerosol attack. Evidence indicates at aerosol particles which have settled out of the air and are lying the ground or other surfaces seldom become airborne again in mbers capable of causing casualties by inhalation. A common-sense caution after a biological aerosol attack is to wash with hot soapy ter all in interior surfaces (walls, floors, tables, curtains, etc.) interior rooms or areas used extensively by personnel.

Field Sanitation and Personal Hygiene. Field sanitation and rsonal hygiene are essential to reduce the occurrence and spread of tural diseases. These measures, however, have little or no effect reducing infection in a population attacked with aerosolized ological agents.

Insect or other Vectors.

(1) Although aerosol attacks are the primary means of dissemi-ating biological agents, it is possible to use infected vectors such insects to deliberately spread disease. This requires the release infected mosquitoes or other infected vectors to bite people in the rget area and infect them with a specific disease.

(2) The use of infected vectors is feasible for attacking small rgets. One advantage is that infected vectors produce a lasting isease threat for as long as the vector stays alive. Defensive easures include field sanitation, good hygiene, and vector control easures.

NOTES:

CHEMICAL AGENTS

1. US Policy concerning Chemical Warfare:

   - Renounces first use of lethal and incapacitating agents.
   - Restricts offensive use of CW Agents to retaliation in response to first use by an enemy.
   - Renounces the use of toxins as a method of warfare.
   - Restricts use of riot control agents and herbicides.
   - Confines military programs for toxins to research and defensive purposes only.

2. Authority for US forces to employ chemical agents comes from the President.

3. Definitions:

   a. Chemical Agent. A chemical compound which through its chemical properties produce lethal or incapacitating effects on man.

      Includes: Nerve, Blood, Blister, and Choking

      Excludes: Riot control agents, Herbicides, Smoke, and Flame.

   b. Persistency. The time duration of lethality. Is dependent upon Physical and chemical properties, method of dissemination, and weather.

   c. Rate of Action. The rate at which the body reacts to a chemical agent, It could be minutes or hours.

d. Routes of Absorption. Respiratory tract, digestive tract, eyes, skin pores, and open wounds.

e. Toxicity. The property in the chemical agent that causes it to inflict injury.

f. On-Target Attack. Munition lands directly on target.

g. Off-Target Attack. Munition is employed upwind from target so that by the time the target is reached a well developed cloud has formed.

Operational Characteristics of Chemical Weapons.

a. Methods of Dissemination. Artillery, mortars, rockets, bombs, and aircraft spray.

b. Target Coverage. Depends on characteristics of agent being used.

c. Weather influence. Weather conditions in the target area that have a significant impact on the number of casualties produced by chemical agents and determining predicted downwind hazard distance.

Wind. High winds dissipate clouds, increase evaporation of agents

Atmospheric Stability - (Temperature Gradients)
INVERSION
LAPSE
NEUTRAL

Precipitation (rain and humidity). Humidity has little effect on chemical agents. Heavy rain washes away chemicals Lasting rain washes away clouds.

Temperature. HIGH: Effective, less clothing worn.
LOW : Less effective, more clothing worn.

5. Classification of Chemical Agents.

a. Physical State. Solid, Gas, or Liquid.

b. Use. Immediate or delayed casualties.

c. Physiological. How your body reacts to a particular agent.

6. Specific Agents.

a. Chemical Agents (Nerve, Blood, Blister, and Choking)

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(1) NERVE

Agent Symbols

GA- (TABUN)

GB- (SARIN)

GD- (SOMAN)

VX

VR- 55

General

- Nerve agents are toxic in both liquid and vapor form.

- Their rate of action is rapid.

- Nerve agent poisoning is systemic meaning the damage accumulates (adds-up) after each exposure. Repeated numerous low dose exposure will result in damages equivalent to high exposure.

- The major areas effected by nerve agent poisoning is the Central Nervous System and the muscles that control the eyes, respiratory tract, gastrointestinal tract, bladder, secretory glands, sweat glands, and cardiac muscles.

nts inhibit the vital enzyme cholinesterase thereby interfering with transmission of nerve impulses.

haracteristics of agents GA, GB, and GD:

re of absorption is by inhalation.

required:

: Not normally persistent although there have been reports of D agents.

aracteristics of agent VR-55:

te of absorption by skin penetration.

required:

mmon to all nerve agent poisioning:

oms:

toms:

equired: Nerve Agent Antidote Kit (NAAK)

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(2) Blood Agents

Agent Symbols: AC and CK

General.

- Primary route of absorption is by inhalation.

- Blood agents cause casualties by preventing the normal utilization of oxygen by cells. Cells die due to oxygen starvation.

- Rate of Action: Rapid

- Persistency/Volatility: Very volatile, gasses dissipate quickly.

- Blood agents break down filter elements/cannisters ability to protect against chemical agents. They must be changed after every blood agent attack.

- Protection: Protective Mask.

Specific characteristics.

- AC: Speeds up breathing.

- CK: Additional choking effect which slows down breathing.

Symptoms of blood agent poisoning:

First Aid:

---

(3) Blister Agents: (specifics on each agent is beyond the scope of this class)

- Blister agents effect the eyes, respiratory tract, and skin causing primarily delayed casualties. Some agents produce immediate pain on contact.

- Most agents are persistent.

effects on the different parts of the body:

es:

spiratory tract:

in:

eatment/First Aid:

tion required:

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(4) Choking Agents

Primary route of absorption: respiratory tract

Casualties are from lung damage, "Dry Land Drowing".

Rate of Action: Delayed.

First Aid:

(5) Other Agents

- Incapacitating Agents

- Riot Control

(6) Trichothecene mycotoxin:

Individual/Collective Protection

General: MOPP is a flexible system of protection against chemical or biological agents which is used in chemical or biological warfare situations to facilitate mission accomplishment.

MOPP: M mission

O oriented

P protective

P posture

MOPP LEVEL

0- Protective mask, skin decon kit, and detector paper are carried on the soldier's person. Overgarment, overboots, and gloves are carried or stowed nearby (work area, vehicle, foxhole, or the like).

1- Overgarment is worn. In hot weather jacket may be worn open.

2- Add the overboots. In hot weather the jacket may be worn open.

3- Add protective mask. In hot weather the jacket and protective mask hood may be worn open.

4- Add protective gloves. In this mopp level the hood is zipped, drawstring drawn, shoulder straps secured. The overgarment is zipped, strings tied, and all buttons buttoned.

MASK ONLY- Only the protective mask is worn with all skin covered with ordinary clothing.

The commander establishes MOPP based on the following considerations:

(1) The chemical threat.

(2) The workrate imposed by the mission.

(3) The temperature.

over possible, the commander should specify, before the start of a
ion, the MOPP level that individuals will adopt. He may later direct
this level of protection be increased, decreased, or varied among
viduals or elements within the unit according to his evaluation of
current situation and operational limitation. He must consider that
he temperature and work rate increase, the level of individual protection
be reduced, work pacing options must be taken, or he must accept
possibility of greater numbers of heat casualties.

mmander can reduce stress and fatigue by:

) Rotating heavy work among individuals.

) Allowing more frequent rest periods.

) Making maximum use of mechanical aids.

) Providing adequate water supply.

NOTES:

The Chemical Protective Ensemble is the term used to refer to all the items an individual would carry/wear to survive a chemical or biological attack. These items consist of:

(1) Protective mask
(2) Protective overgarments
(3) Protective gloves
(4) Protective overboots
(5) M258A1 skin decon kit
(6) M9 detector paper
(7) Antidotes for blood and nerve agent poisoning

The Chemical Protective Overgarment is designed to protect you for 6 hours after an exposure to vapor or liquid chemical agents. The overgarment is permeable which means it will "breath".

The Chemical Protective Overgarment is serviceable for 14 days after the bag has been opened.

The Chemical Protective Overboots and Gloves are made of butyl rubber and will prevent agent penetration if the items are not damaged such as torn or punctured.

The cold weather "Mickey Mouse" boots are also made of butyl rubber and will protect against chemical agents.

Work Rates: The overgarment may trap a persons body heat and reduces human senses thereby affecting an individual's ability to perform their job.

A. Low work rate examples:

(1) Motorized movement

(2) Clerical tasks

(3) Command Post activities

B. Heavy work rate examples:

(1) Infantry attacks

(2) Preparing defensive positions

(3) Forced foot marches

ver possible, the commander should specify, before the start of a on, the MOPP level that individuals will adopt. He may later direct this level of protection be increased, decreased, or varied among iduals or elements within the unit according to his evaluation of urrent situation and operational limitation. He must consider that e temperature and work rate increase, the level of individual protection be reduced, work pacing options must be taken, or he must accept ossibility of greater numbers of heat casualties.

mander can reduce stress and fatigue by:

- Rotating heavy work among individuals.
- Allowing more frequent rest periods.
- Making maximum use of mechanical aids.
- Providing adequate water supply.

NOTES:

PROTECTIVE MASKS

1. The protective mask provides protection to the wearer's respiratory tract and eyes from all known chemical and biological agents.

2. Protective mask authorization

3. Protection provided by the mask does not include:

   Do Not call it a "GAS MASK"

4. Major Components are:

   Face Blank

   Clip & Buckle Assemblies

   Temple pins

   Inlet Valves

   Outlet Valve

   Carrier

   M1/M1A1 Waterproof bag

ies Include:

ation Kit

ation Kit

serts

and M17A2 masks are available in 4 sizes.

ting of the protective mask:

Parts) requirements are described in EA Reg 725-360, Appendix B.

The M24 Protective Mask:

The M25/M25A1 Protective Mask:

NOTES:

CHEMICAL AGENT DETEC

Items available at the company lev
emical agents include:

- M256 Chemical Agent Detection Kit

- M8 Chemical Agent Detection Paper

- M9 Chemical Agent Detection Paper

- M8 Automatic Chemical Agent Alarm System

In addition to these items you should always observe the wildlife and
antlife in the area.

M256 Chemical Agent Detection Kit:

M8 paper:

Detects agents in liquid form.

M8 paper Characteristics:

M9 paper:

uto Chemical Agent Alarm:

abilities:

M8 Auto Chemical Agent Alarm System consists of
nt: (1) M43 detector (2) M42 alarm (3) BA-3517/U batte.
(5) M10 power supply

ories: (1) M168 cable (2) BB501/U battery (3) vehicular mounts

Detector Unit maintenance:

Alarm unit maintenance:

The Chemical Downwind Message (CDM
encies every 6 hours and contains a
ded for the chemical hazard area
ur periods. The CDM contains the

a. Date-time group for basic data and period o.

b. Representative downwind direction and downwind speed.

c. Air stability category.

d. Surface air temperature.

e. Humidity.

f. Significant weather phenomena.

The CDM message format and an example of a CDM are as follows:

Changes to Chemical Downwind Me

Impact on Warning and Reportin

in the chemical downwind message (CDM) ;
system (NBCWRS) are incorporated in the
mination Avoidance.

now contains 12 digits in each line, ...
oud cover, previously included in the eleventh digit.
coded 3 through 9 and the twelfth digit is coded 0 through 2. A da...
ding position means either that the information is unavailable or that
ists. For example, no code exists for a sunny day because current
no provision for good weather.

position of line ZA in the NB CWRS now incorporates the CDM information.
of line ZA exactly duplicates the six digits for air stability,
e, humidity, significant weather phenomena, and cloud cover in the CDM
vailing local conditions are different from those predicted in the CDM.

al conditions are different, the NBC Center must use the codes for
conditions rather than those predicted in the CDM.

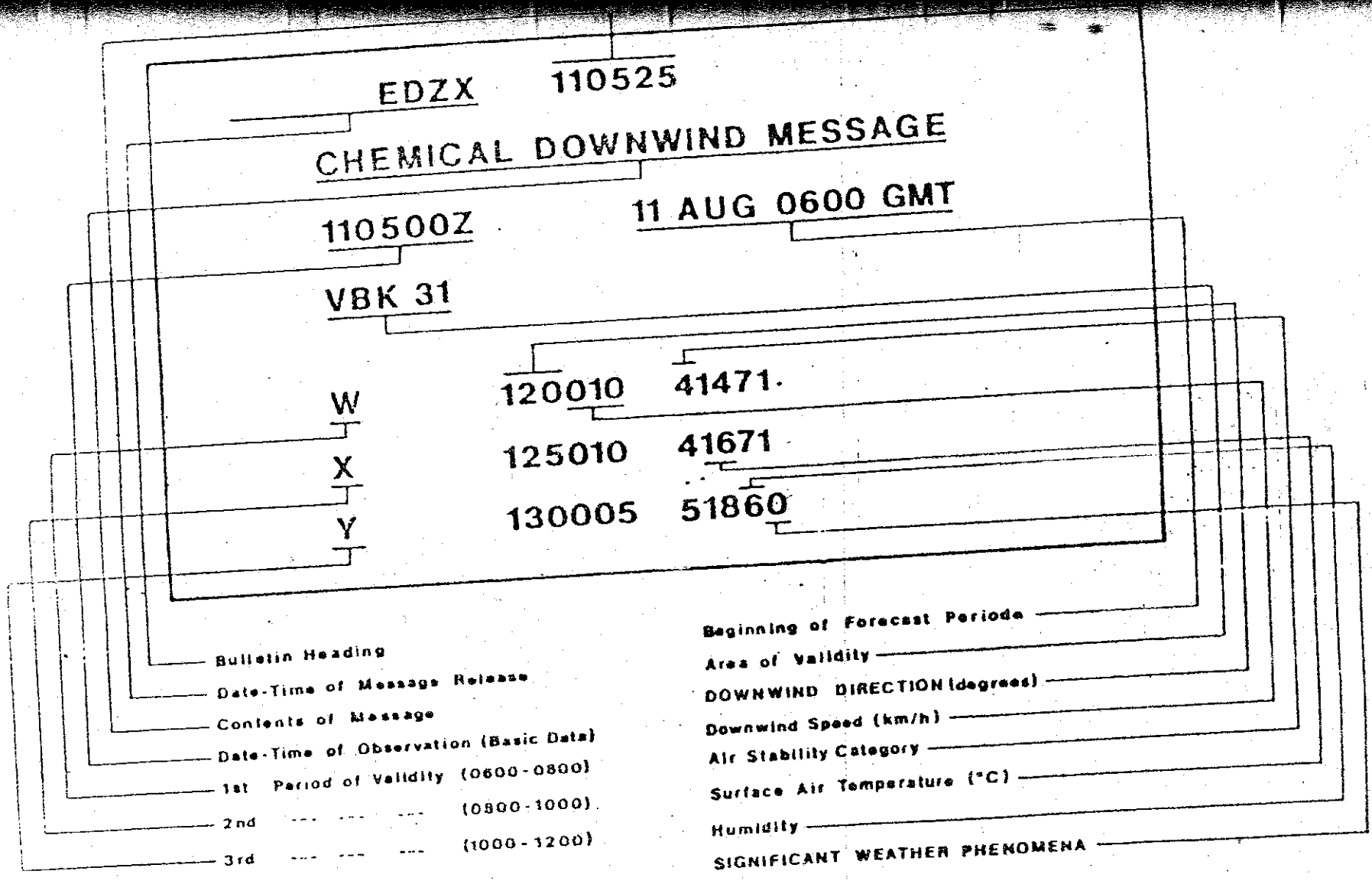


Figure 1 Example Chemical Downwind Message (CDM).

Chemical Downwind Message – CDM.

1. Format of Chemical Downwind Message:

ZCZC (nnn)
TTAA (ii) CCCC YYGG$_{gg}$
CHEMICAL DOWNWIND MESSAGE
DDiiii Y_1Y_1 MON $G_1G_1g_1g_1$ GMT
I(I)X
W: dddFFF bTTUw
X: dddFFF bTTUw
Y: dddFFF bTTUw
NNNN

2. Meaning of Letters and Numerals:

ZCZC	=	Starting Line.
(nnn)	=	Message Number.
TTAA(ii)	=	Meteorological Title of Message.
CCCC	=	International Call Sign of the originating meteorological Centre.
YYGGgg	=	Date-time Group of Dispatching.
DDiiii	=	Date-time Group of the Observation of basic Data.
Y_1Y_1 MON $G_1G_1g_1g_1$	=	Beginning of Forecast Period.
Y_1Y_1	=	Day of the Month.
MON	=	First three Letters of the Month
$G_1G_1g_1g_1$	=	Time (Hours and Minutes).
GMT	=	Greenwich Mean Time (gmt).
I(I)X	=	Area of Validity.
W	=	Forecast Values for the 1st and 2nd Hour after the beginning of Forecast Period.
X	=	Forecast Values for the 3rd and 4th Hour after the beginning of Forecast Period.
Y	=	Forecast Values for the 5th and 6th Hour after the beginning of Forecast Period.

ddd = Effective Downwind Direction in Degrees

FFF = Effective Downwind Speed in km/h

b = Air Stability:

UNSTABLE
- 1 = very unstable
- 2 = unstable
- 3 = slightly unstable

NEUTRAL
- 4 = neutral

STABLE
- 5 = slightly stable
- 6 = stable
- 7 = very stable

TT = Air Temperature in °C.

00 = 0°C	51 = −1°C
01 = + 1°C	52 = −2°C
02 = + 2°C	53 = −3°C
03 = + 3°C	54 = −4°C
– –	– –
– –	– –
– –	– –
20 = +20°C	60 = −10°C
21 = +21°C	61 = −11°C
etc.	etc.

U = Relative Humidity:

0 = 0 – 9%
1 = 10 – 19%
2 = 20 – 29%
– –
– –
9 = 90 – 100%

0 = Less than Half the Sky covered by Clouds
1 = Half of Sky covered by Clouds.
2 = More than Half of sky covered by clouds
3 = Blowing Snow, Sand Storm, Snow Storm.
4 = Fog, Ice Fog or thick Haze (Visibility less than four km).
5 = Drizzle.
6 = Rain.
7 = Snow, or Rain and Snow mixed (no Shower).
8 = Showers of Rain, Snow, Rain and Snow mixed, or Hail.
9 = Thunderstorm, with or without Precipitation.

NNNN = End of the Message.

table 2

Meaning of Letter Items used in an NBC Message
(Only Z/LU times are to be used in these reports)

Nuclear Forms	*Chemical and Biological Forms*
A. Strike serial number.	Strike serial number.
B. Position of observer (co-ordinates or place).	Position of observer (co-ordinates or place).
C. Direction measured clockwise from grid north, true north or magnetic north (state which) of the attack from observer (degrees or mils – state which).	Direction measured clockwise from grid north, true north or magnetic north (state which) of the attack from observer (degrees or mils – state which).
D. Date-time of detonation.	Date-time attack started.
E. Illumination time.	Date-time attack ended.
F. Location of attack (co-ordinates or place) (actual or estimated – state which)	Location of area attacked (co-ordinates or place) (actual or estimated – state which).
G. Means of delivery.	Kind of attack (guns, mortars, multiple rockets, missiles, bombs, spray – state which).
H. Type of burst (air, surface, or unknown – state which), including height.	Type of agent. Height of burst.
I.	Number of munitions or aircraft (state which).
J. Flash-to-bang time (seconds).	
K. Crater present or absent and diameter (meters).	Description of terrain/vegetation.
L. Nuclear burst angular cloud width measured at H + 5 minutes (degrees or mils – state which).	
M. Stabilized cloud-top angle and/or cloud-bottom angle (state which) or cloud-top height and/or cloud-bottom height (state which) measured at H + 10 minutes (degrees, mils, meters or feet – state which).	Enemy action before and after attack. Effect on troops.
N. Estimated yield (KT).	
O. Reference date-time for estimated contours when not H + 1 hour.	
P. For radar purposes only: P. A. Co-ordinates of points to outline external contours of radioactive cloud.	P. A. Predicted hazard area (co-ordinates). (1)
P. B. *Downwind direction* of radioactive cloud (in degrees or mils – state which).	P. B. Duration of hazard (days). (1). Note: If representative downwind speed is 10 km/h or less, the letter item P. A. of the NBC 3 CHEM will

Forms

consist of three (3) digits i.e. the radius of a circle around the centre of the attacked area, in km.

Q. Location of reading.

Location where sample(s) taken and details of type of sample.

R. Dose rate cGy/h (rad/h)
The words »Initial«, »Increasing«, »Peak« or »Decreasing« may be added.
When decay rate is reported, the words »Decay Normal«, »Decay Fast« or »Decay Slow«, or the actual value of decay constant may be inserted.

S. Date-time of reading

Date-time contamination detected.

T. H + 1 date-time

Date-time of latest survey of contamination in the area.

U. 1000 cGy/h (rad/h) contour line co-ordinates (red)

V. 300 cGy/h (rad/h) contour line co-ordinates (green)

W. 100 cGy/h (rad/h) contour line co-ordinates (black)

Forms

X. 10 cGy/h (rad/h) contour line co-ordinates (black)

Area of actual contamination (yellow).

Y. Direction measured clockwise from grid north to the left and then to the right radial lines (degrees or mils – state which), 4 digits each.

Representative *downwind direction*, 4 digits (degrees or mils – state which).
Representative wind speed, 3 digits (km/h or knots – state which).

Z. Effective wind speed (km/h or knots), 3 digits; downwind distance of Zone I (km or nautical miles), 3 digits; cloud radius (km or nautical miles), 2 digits. (1)

Z. A. Temperature, 2 digits (Centigrade); Cloud cover, 1 digit. Significant weather phenomena, 1 digit.
Air stability conditions, 1 digit.
(Use information contained in para 1220 and in Annex C).
Note: NBC 1 CHEM – normally use plain language, but code may be used. NBC 2 CHEM and NBC 3 CHEM – normally use code, but plain language may be used.

(1) Note: If effective wind speed is less than 8 km/h, the NBC 3 NUC will contain only 3 significant digits, i.e. the radius of Zone I.

ZI. *Used only for friendly bursts.*
Effective wind speed, 3 digits (km/h). Downwind distance of Zone I (in hundreds of meters), 4 digits. Downwind distance of Zone II (in hundreds of meters), 4 digits. Cloud radius (in hundreds of meters), 3 digits.

Z. B. Remarks.

TYPE »A« ATTACK
DOWNWIND DISTANCE OF HAZARD AREA

Means of Delivery	Distance from Centre of Attack Area along Downwind Axis, when Stability Condition is:		
	U	N	S
Artillery, Bomblets and Mortars	10 km	30 km	50 km
Multiple Rocket Launchers, Missiles and Bombs	15 km	30 km	50 km

Note: When information is not available concerning the nature of the munitions used in the attack, use the figures given for multiple rocket launchers, missiles, and bombs.

Table 3.

TYPE "B" ATTACK

Daily Mean Surface Air Temperature	Within Attack Area (number of days)	Within Hazard Area (number of days)
<0°– 10°C	3 to 10 days	2 to 6 days
11°– 20°C	2 to 4 days	1 to 2 days
21°–>30°C	up to 2 days	up to 1 day

Notes: 1. The estimates assume ground contamination densities of up to 10 g/m².

2. In making hazard estimates, vapour has been considered to be the determining factor within the attack area as well as in the downwind hazard area. The duration of hazard from contact with bare skin is, however, difficult to predict. The duration can only be determined by the use of chemical agent detection or confirmation devices.
3. When temperatures are consistently low, the duration of contamination may be longer than indicated in the Table. The absence of vapour does not preclude the presence of contamination
4. Daily mean surface air temperature may be obtained from the local MET offices.

Table 4

CHEMICAL HAZARD PREDI ng the se b,

hemical downwind hazard area prediction
-26 of FM 21-40 should be superseded by

The prediction of downwind chemical hazar
istency, wind speed, and for ground contam
k area.

Agent persistency is addressed by classifying all agents as either air
minating agents, or ground contaminating agents.

Air Contaminating Agents: Agents which are normally expected to be dispersed as an aerosol or vapor cloud with little or no contamination on the ground.

Ground Contaminating Agents: Agents which are normally expected to be dispersed in liquid form to contaminate surfaces.

For the purpose of downwind hazard area prediction two types of chemical
cks are recognized:

TYPE A attack: Disseminating air contaminating agents.
case a, and case b

TYPE B attack: Disseminating ground contaminating agents.
windspeed 10 km/hr or less, case a, case b, and case c

attacks will be assumed to be TYPE A attacks unless there is unmistakable
dence of ground contamination.

Type A attacks, two cases must be considered when plotting the d hazard area: case a, windspeed 10 km/hr or less; and, case b, eed exceeds 10 km/hr.

procedure for plotting a Type A, case a, attack is as follows:

(1) Derive the location of the attack from NBC 1 CHEM or NBC 2 nd plot the location on the map or template (preferably UTM scale 0).

(2) Draw a 1 km radius circle around the center of the location of ack. The area within the circle represents the attack area.

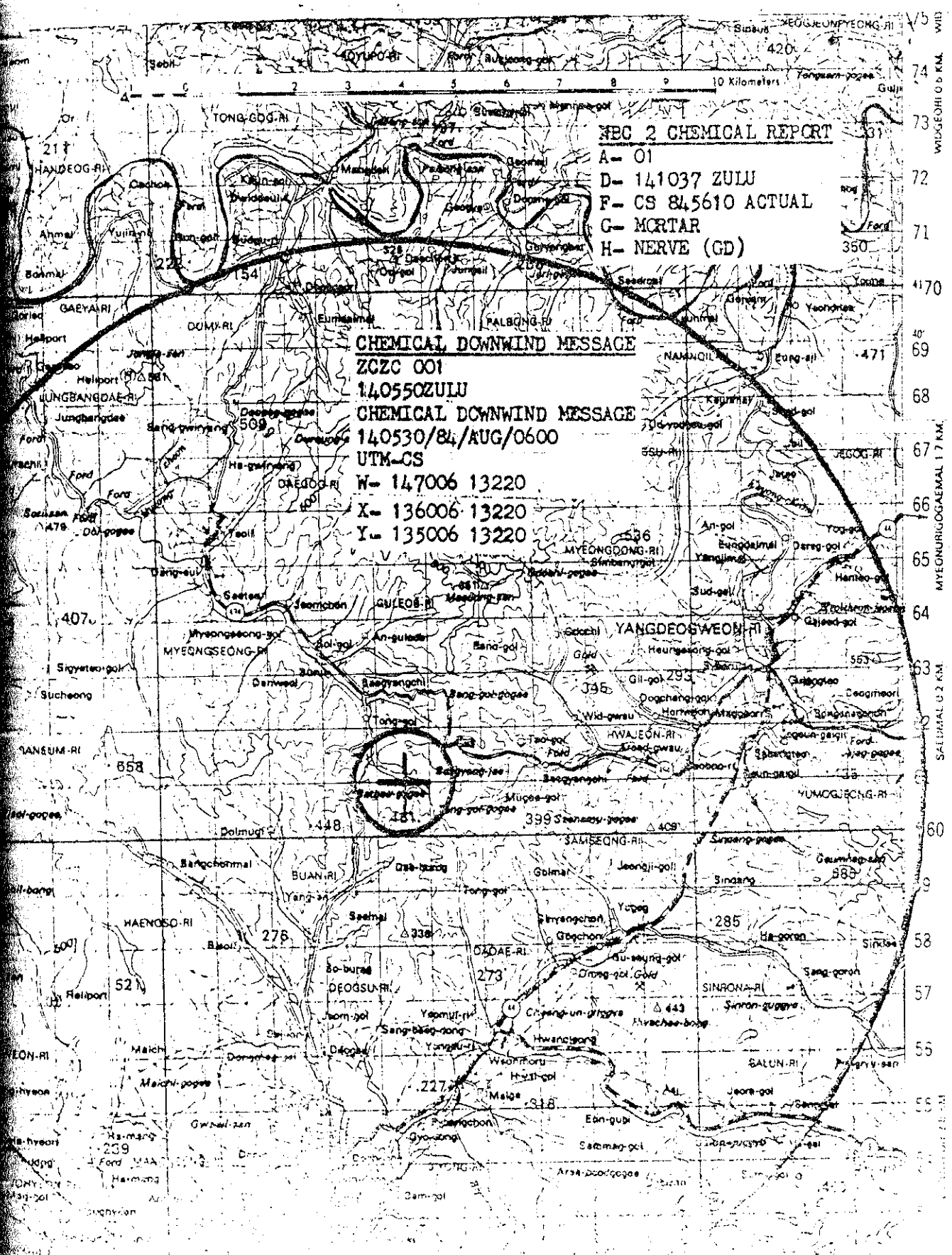
(3) Draw a 10 km radius circle concentric with the 1 km radius around the center of the attack area. The area within the 10 km circle represents the hazard area.

(4) When plotting the prediction directly onto a map labeling is essery. When plotting prediction onto an overlay, label prediction nes (A,D, and F) from NBC 1 CHEM or NBC 2 CHEM.

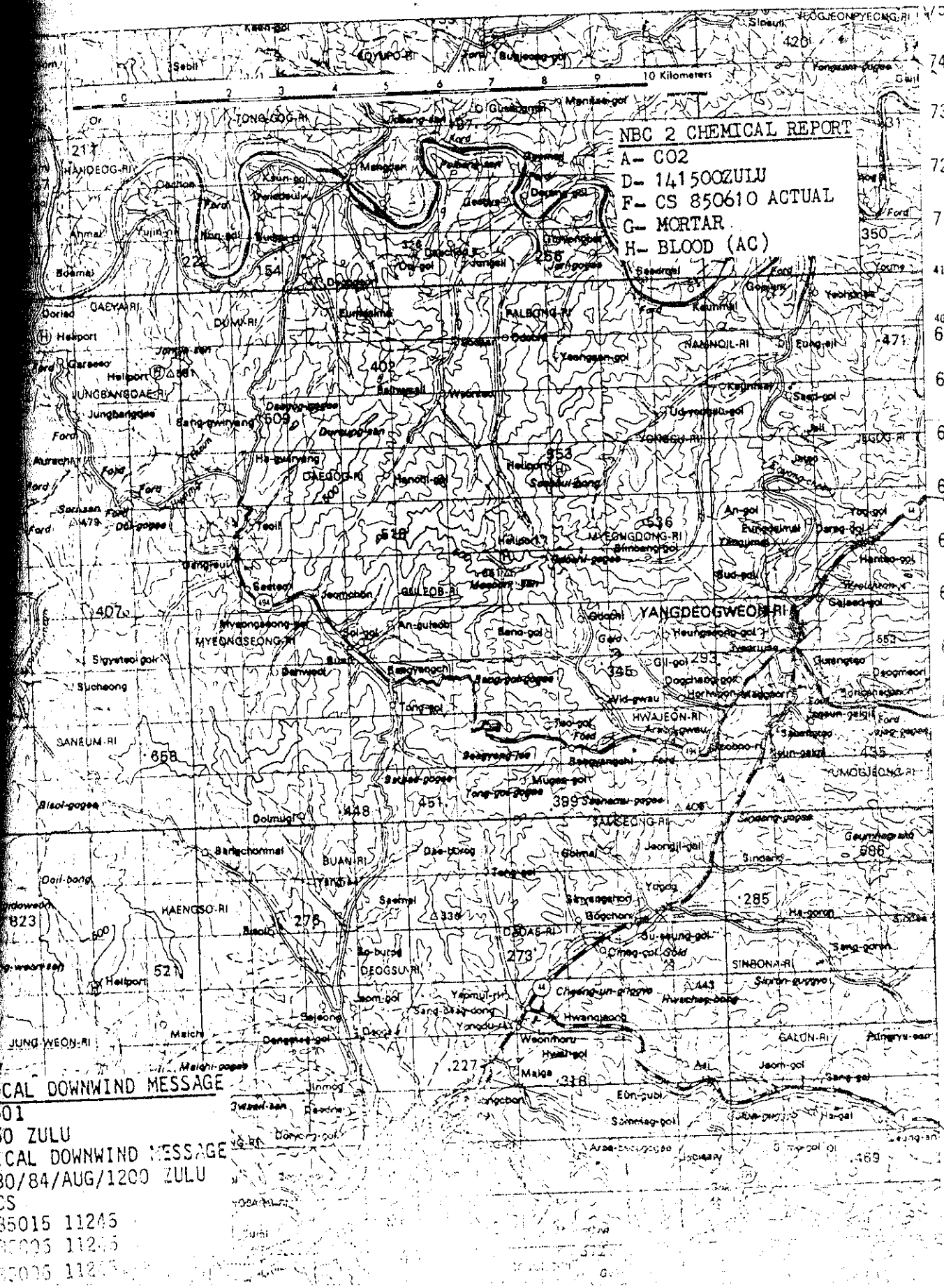
(5) Pass information to units in the hazard area.

NOTES:

TYPE A, CASE A
AIR CONTAMINATION
WINDSPEED 10 km/hr OR LESS



PRACTICAL EXAM
TYPE A, CASE A



CAL DOWNWIND MESSAGE
001
50 ZULU
ICAL DOWNWIND MESSAGE
30/84/AUG/1200 ZULU
CS
35015 11245
35015 11245
35015 11245

The procedure for plotting a Type A, case b, attack is as follows:

(1) Derive the location of the attack from NBC 1 CHEM or NBC 2 CHEM, and plot the location on the map or template (preferably UTM scale 1:50,000). If prediction is plotted onto a template (overlay) draw a grid north line.

(2) Using the center of the attack as center, draw a circle of 1 km radius. The area within this circle represents the attack area.

(3) From the valid Chemical Downwind Message (CDM) or from locally measured weather data, obtain information on air stability category (see Table 1 and Table 2), and representative downwind direction and downwind speed.

(4) From the center of the attack area, draw a line representing the representative downwind direction.

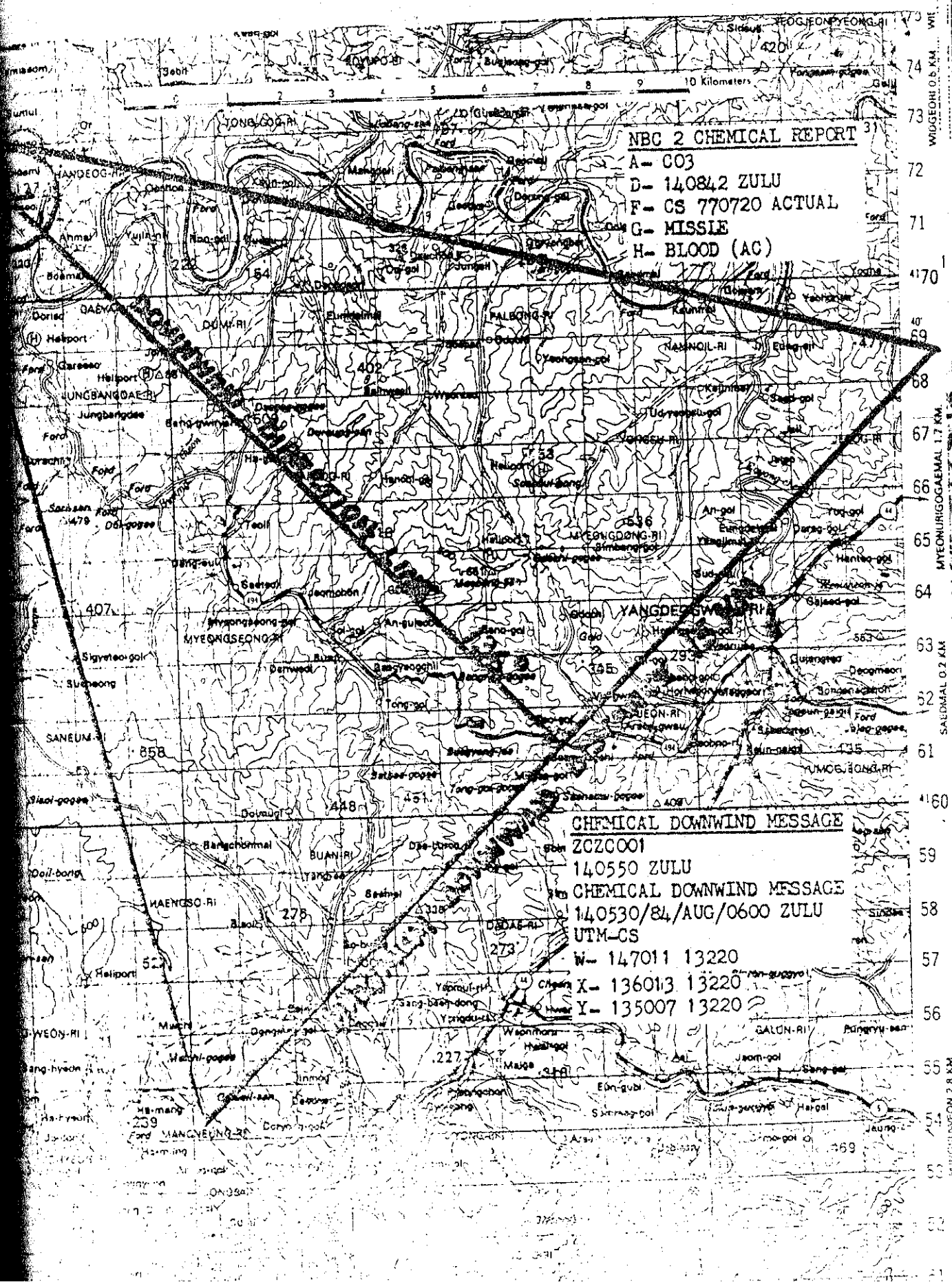
(5) Enter Table 3 with the appropriate air stability category and means of delivery, in order to determine the maximum downwind distance of the hazard area. Plot the maximum downwind distance point from center of the attack area on the line representing the representative downwind direction.

(6) Extend the representative downwind direction line upwind from the center of the attack area for a distance equal to twice the radius of the attack area (2 km). From the upwind end of this line draw two lines which are tangent to the attack area circle and extend them to intersect with the maximum downwind distance line (see (7) below). These two tangent lines form angles of 30 degrees on either side of the representative downwind direction line.

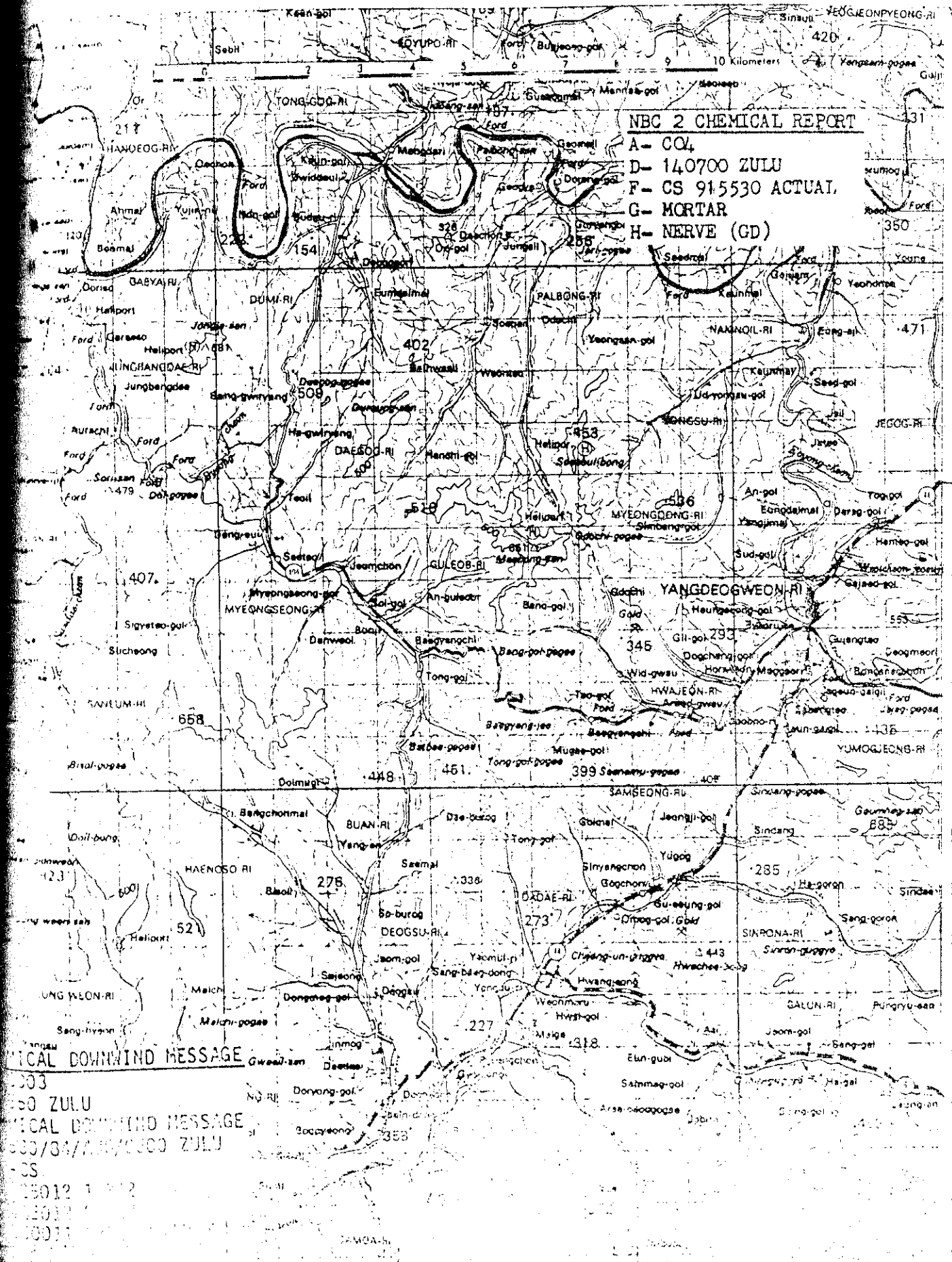
(7) Complete the hazard area plot by drawing a line through the labeled point for maximum downwind distance, perpendicular to the downwind direction line. The hazard area is then limited by the 1 km circle arc, the two 30 degree tangents and the maximum downwind distance line. If prediction is plotted on a template (overlay), label with lines (A, D, and F) from the NBC 2 CHEM.

(8) Pass information to units in the hazard area.

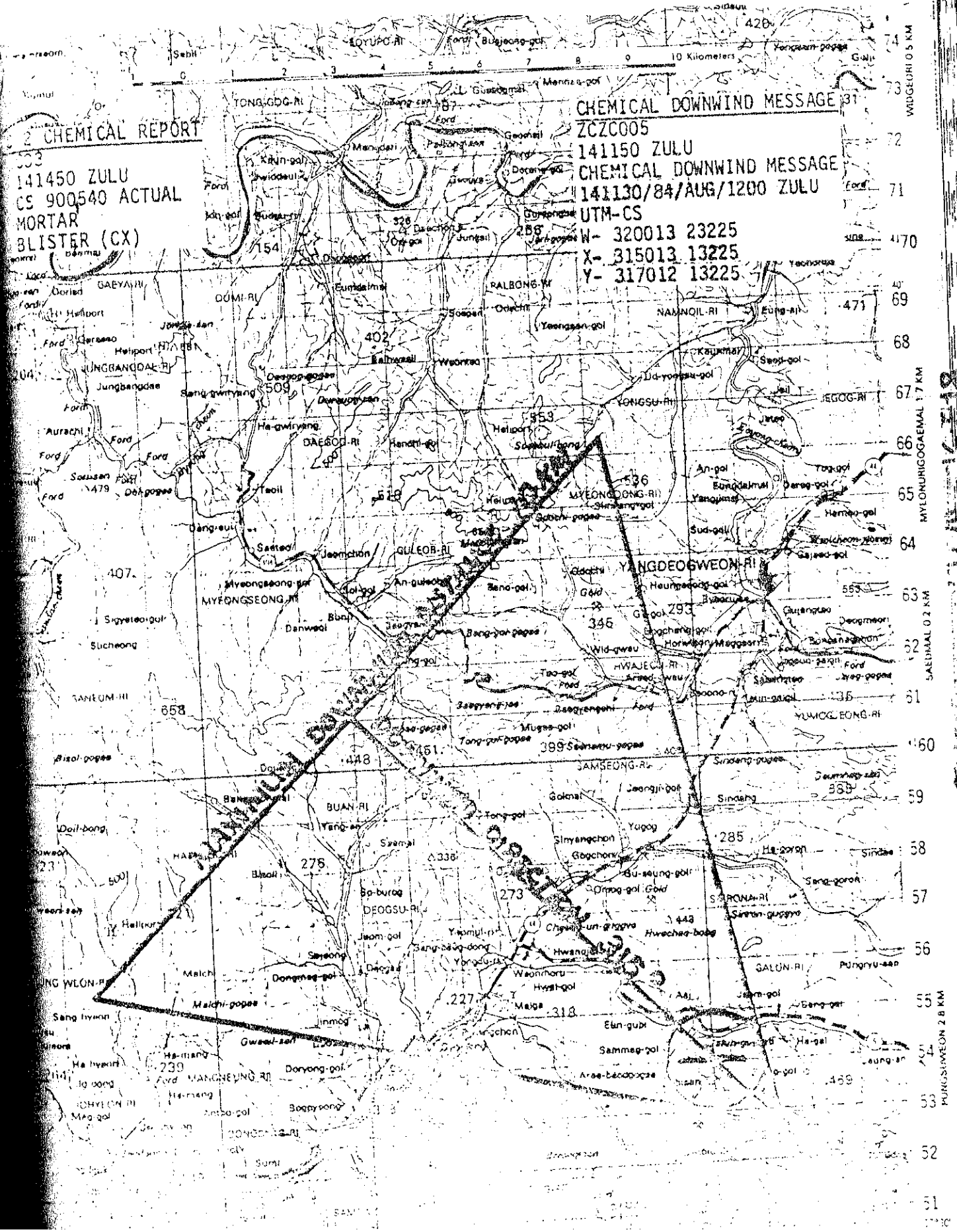
TYPE A, CASE B
AIR CONTAMINATION
WINDSPEED EXCEEDS 10 km/hr



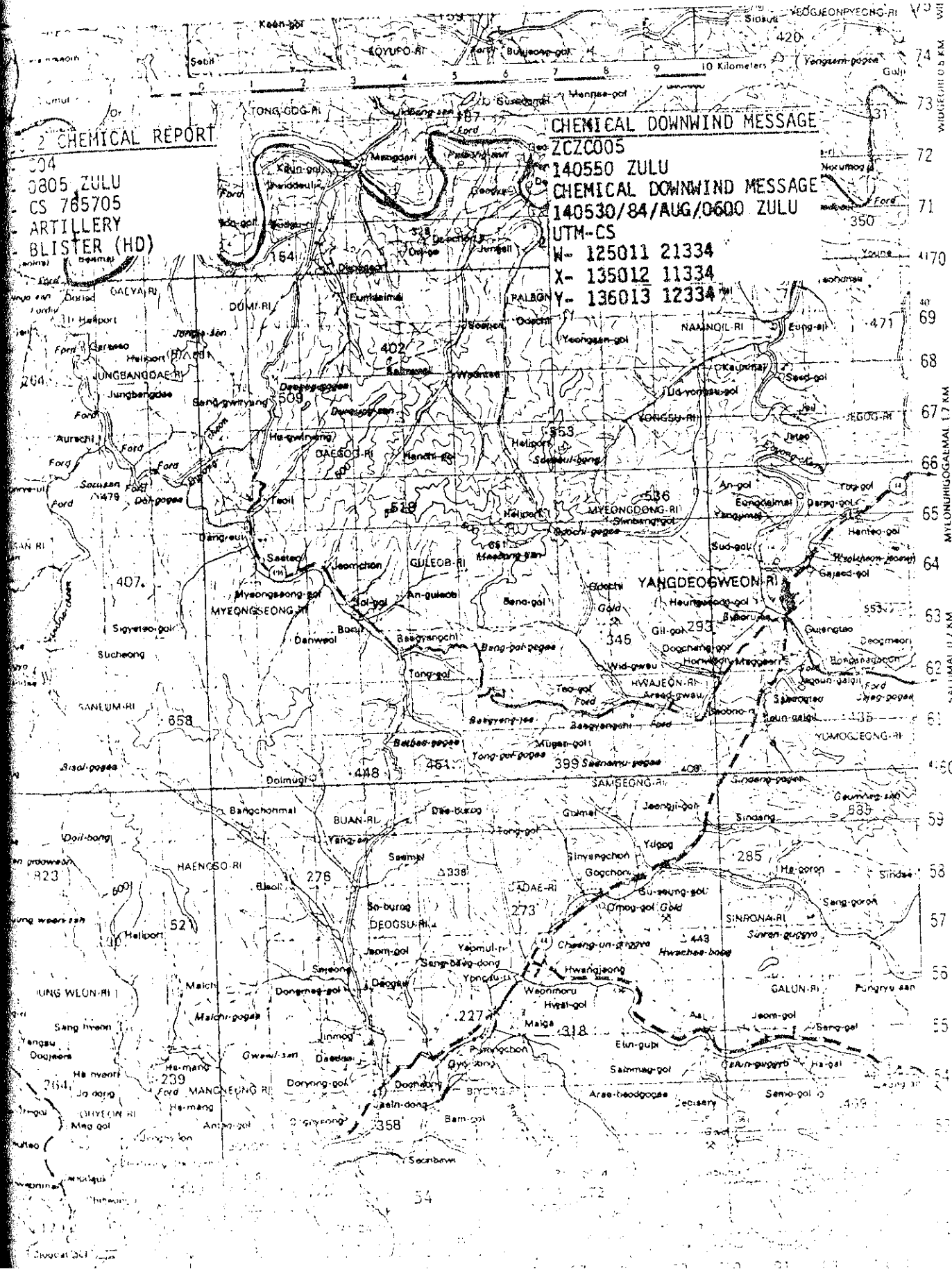
PRACTICAL EXAM
TYPE A, CASE B



TYPE B, CASE A
GROUND CONTAMINATION
ATTACK AREA LESS THAN 1 Km



PRACTICAL EXAM
TYPE B, CASE A



The procedure for plotting a Type B, case b, attack is as follows:

(1) Derive the location of the attack from NBC 1 CHEM or NBC 2 CHEM and plot the location on a map or template (preferably UTM scale 1:50,000). If prediction is plotted on a template draw grid north line.

(2) Draw a 2 km radius circle, the center of which being the center of the attack area.

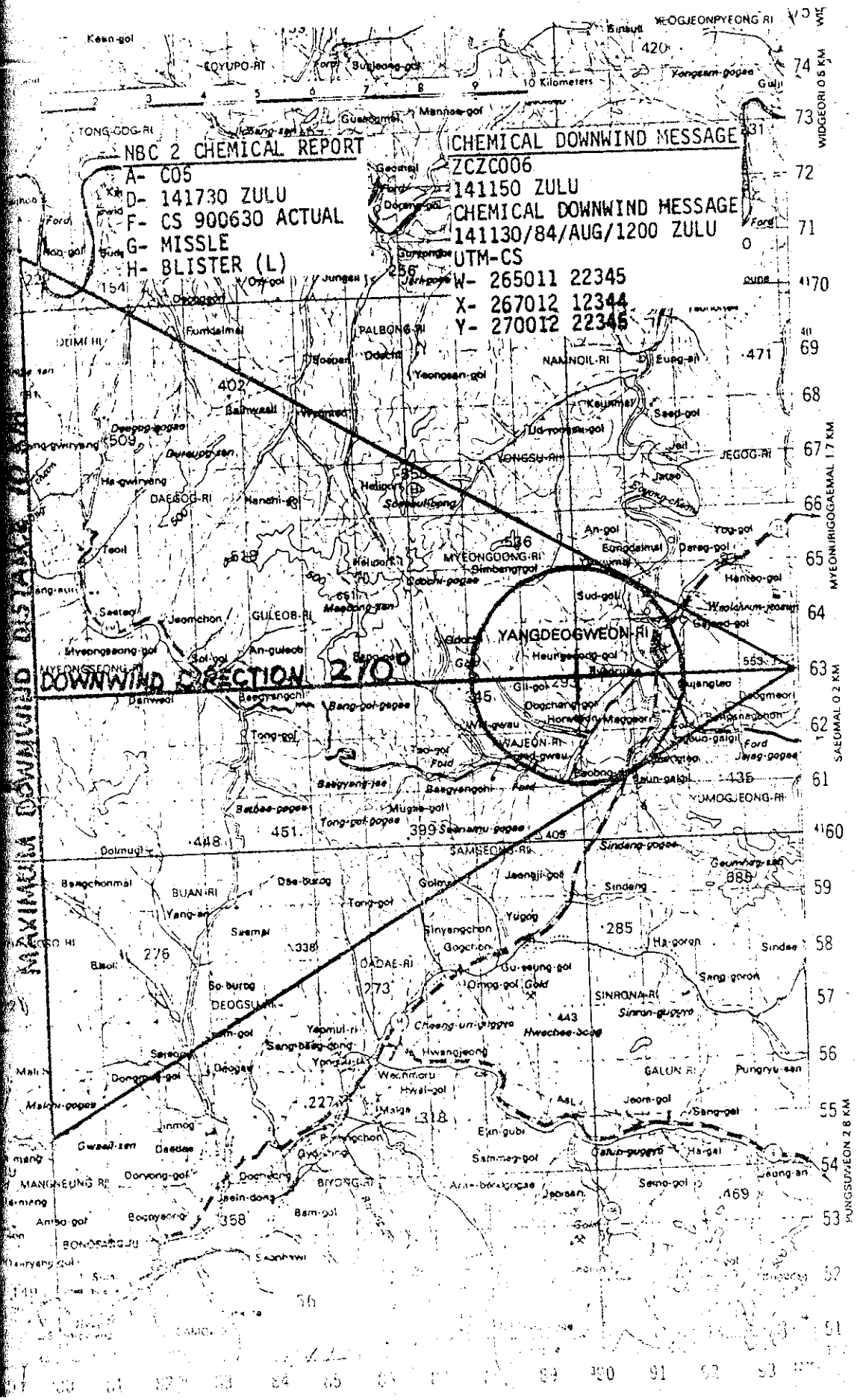
(3) Draw a line from center of the attack area, representing the representative downwind direction. Mark the 10 km point.

(4) Extend the representative downwind direction line upwind from the center of the attack area for a distance equal to twice the radius of the attack area (4km). From the upwind end of this line draw two lines which are tangent to the attack area circle and extend them to intersect with the maximum downwind distance line (10 km).

(5) Complete the hazard prediction by drawing a line through the labeled point for maximum downwind distance, perpendicular to the downwind direction line. The hazard area is then limited by the 2 km circle arc, the two 30 degree tangents and the maximum downwind distance line. If prediction is plotted onto a template label with lines (A,D, and F) from the NBC 2 CHEM.

(6) From table 4 find the probable time after ground contamination at which personnel may safely remove masks. Pass information to units in the hazard area.

, CASE B
CONTAMINATION
OF ATTACK AREA GREATER THAN 1km BUT LESS THAN 2km



PRACTICAL EXAM
TYPE B, CASE B

The procedure for plotting a Type B, case C, attack is as follows:

(1) Plot the estimated attack area as reported in NBC 1 CHEM or NBC 2 CHEM on a map or template (preferably UTM scale 1:50,000). If prediction is plotted on a template draw grid north line (GN)

(2) At the extreme edges of the plotted estimated attack area establish two points. Using the two points as centers draw two 1 km radius circles.

(3) From the center of the two attack area circles draw two lines representing the representative downwind direction. Mark the 10 km point on both lines.

(4) Extend the two downwind direction lines upwind from the centers of the attack areas for a distance equal to twice the attack area circles (2 KM). From the upwind end of this line draw two lines which are tangent to the attack area circles and extend them to intersect with the maximum downwind distance line (10 km). Draw a line connecting the top edges of the attack area circles.

(5) Complete the hazard prediction by drawing a line through the labeled point for maximum downwind distance, perpendicular to the downwind direction line. The hazard area is then limited by the two attack area circle arcs, the two 30 degree tangent lines, and the maximum downwind distance line. If prediction is plotted onto a template label with lines (A, D, and F) from the NBC 2 CHEM.

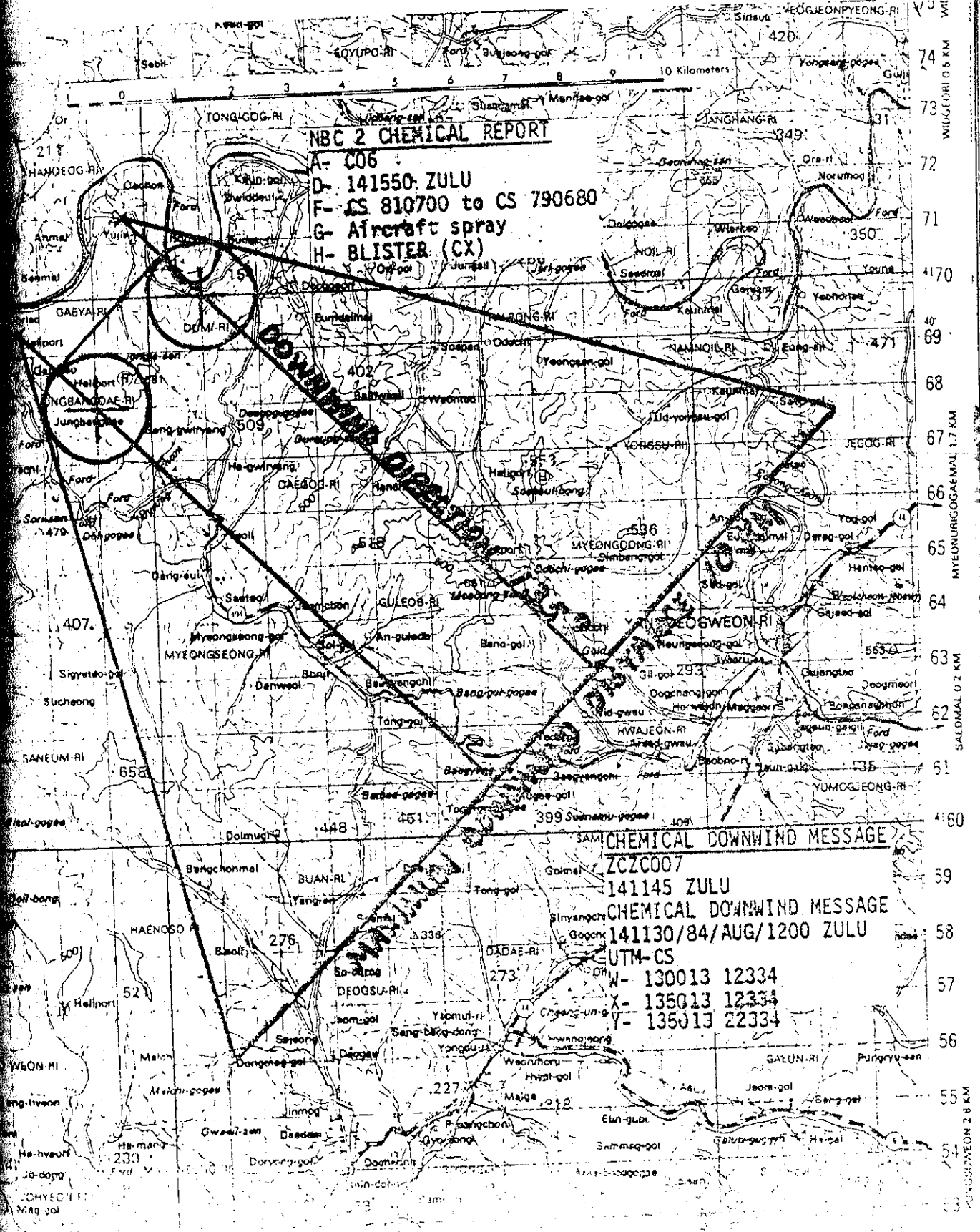
(6) From Table 4 find the probable time after ground contamination at which personnel may safely unmask. Pass information to units in the hazard area.

The procedures described above for both Type A and Type B attacks are based h the environmental conditions remaining constant. After a change in these onditions, it may be that the Chemical Downwind Message based on previous eteorological data no longer applies.

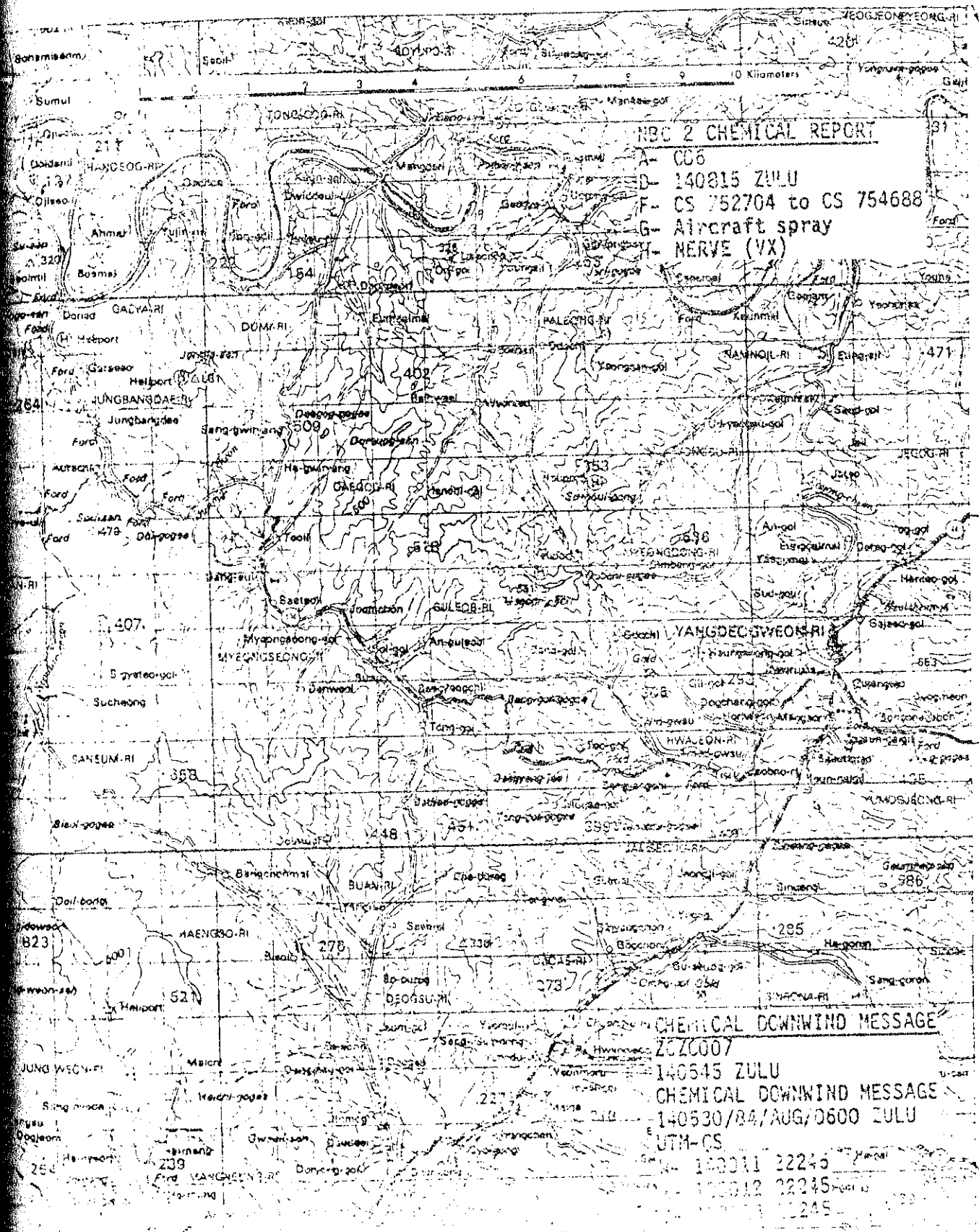
ignificant changes are:

(1) Change in the air stability from one category to another.
(2) Change in wind direction by 30 degrees or more.
(3) Change in windspeed by 10 km/hr or more.
(4) Combinations of the above.

TYPE B, CASE C
GROUND CONTAMINATION
ATTACK AREA EXCEEDS 2 km



PRACTICAL EXAM
TYPE B, CASE C



ALFA	AF002CHEM
DELTA	028030 Zulu
FOXTROT	PG 560750
GOLF	Artillery Bursting
HOTEL	Nonpersistent Nerve
PAPA ALPHA	PG 556751
	PG 559754
	PG 632774
	PG 610694
	PG 558747
YANKEE	0015 degrees 15100

MEANING FOR CHEMWARN LINE ITEMS

ter		
A	Strike serial number code word.	Indicate that this is a chemical attack.
D	Date-time group of attack.	Only the date and time of the attack is given. This should be encoded.
F	Location of attack.	Grid coordinates of center of attack. If attack is spread over large area, a series of coordinates may be given to indicate the center of mass of the attack. This should be encoded.
G	Delivery means.	Tell how delivered and how disseminated.
H	Type of agent.	Classify agent by physiological effect and duration of effectiveness.
PA	Attack area and predicted hazard area.	When wind speeds are 10kmph or less this line will be 010, the radius of hazard area in km. When wind speeds are higher than 10kmph, 6-digit coordinates will be given.
PB	Duration of hazard	In days.
Y	Downwind direction.	4 digits in degrees or miles (state which).
	Wind speed	2 digits in kmph.

NBC DECONTAMINATION

ntamination

Definition: The deposit of or absorption of biological or chemical agents iological materials on a surface or on personnel.

Effects of Contamination.

1.

2. Reduction of efficiency of troops.

3. Loss of Time.

4. Lack of logistical support.

arking contaminated areas.

Chemical Contamination Marker.

1. Yellow on both sides.

2. Gas on front in Red - 2" Letters.

3. Information

   a. Agent

   b. Date & Time

Biological contamination marker.

1. Blue on both sides

2. BIO on front in Red - 2" Letters.

3. Information.

   a. Agent

   b. Date & Time

logical contamination marker.

White on both sides.

ATOM on front in Black - 2" Letters.

Information

a. Dose Rate

b. Date & Time of Reading

c. Date & Time of Burst

decontamination.

definitions: Sufficiently reducing the hazard caused by NBC contamination in order to allow mission accomplishment.

Decontamination

Emergency: M258A1 skin decon kit

Complete: Decontamination unit

Personnel: Personnel Decontamination Station (PDS)

Equipment: Equipment Decontamination Station (EDS)

types of decontaminants.

Natural: Weather, Earth, Fire, and Water

Standard: DS2 and STB

DS2 and STB mixed is a fire hazard. STB is corrosive to metal.

a. Supertropical Bleach - (STB).

(1) description.

(2) neutralize:

(3) mixtures

- Slurry (liquid): Equal parts water and STB (by weight) for example 50 lb can STB + 6 gal water.

- Dry Mix

b. Decontamination Solution 2. - DS2

(1) Description:

(2) Decontaminates: All chemical and some biological agents.

(3) Use:

1. Reduces hazards in 5 minutes

2. Requires a 30 minute contact time

3. Non-Standard Decontaminants:

Chlorine containing compounds (i.e. clorox), alkaline compounds, disinfectants, detergents and soaps, solvents and fuel.

C. Levels of responsibility.

1. Individual: Performed as soon as the mission will allow by the individual on their equipment.

2. Unit: Performed by the unit's decon tecon team.

3. Support:

a. Beyond capabilities of unit.
b. Performed by special units, i.e. Chemical platoon.
c. Will reduce hazard to as low a level as possible.

hods of decontamination.

1. Covering {1 foot of earth}

2. Removing

3. Scraping

4. Sealing { asphalt}

5. Burning

6. Chemicals

con Apparatus

actors in planning decontamination operations.

(A) Detection and Identification: The Nature and extent of the contamination st be known so that the proper decontamination procedure may be used. An agent ould de identified if possible before attempting decontamination.

(B) Priorities for Decontamination: Personnel will decontaminate themselves and their individual equipment immediately upon contamination or as soon as the tactical situation permits. Priorities must be established by the commander for the equipment and areas to be decontaminated. Those items needed first will be decontaminated first.

(C) Selection of Decontamination Site: Sites selected for either equipment or personnel decontamination should have certain characteristics in common. the selected site should be--

(1) Accessible to a suitable water source.
(2) Located downwind from friendly personnel.
(3) Located so that disposal of contaminated waste may be accomplished (TM 3-220, para 20d (3)).
(4) Capable of providing tactical protection to troops engaged in decontamination.
(5) Site must be accessible to vehicles and personnel.

(D) Vital areas that have been decontaminated should be Camouflaged: For example, STB is white and noticeable when applied to terrain, etc;. Uncontaminated earth of the same color may be mixed with STB for camouflage.

(E) Protection of personnel: Personnel performing decontamination operations should wear protective clothing and equipment and when finished with unit he should go through the PDS.

(F) Prompt action: Decontamination operations should begin as soon as possible after being contaminated.

(G) Conservation of Effort: Methods of decontamination must significantly reduce the hazard with a reasonable expenditure of time and effort.

(H) Confinement: Contamination must be contained within a given area.

(I) Materiel to be Decontaminated: Method of decontamination will be based on contamination and decontaminates used.

(J) Weather: The weather will play an important part in any decontamination operation.

(K) Completness: Periodic checks must be made to insure that the hazard does not exceed the acceptable level.

Personnel Decontamination Station - PDS.

NUCLEAR

CHEMICAL

BIOLOGICAL

(1) In a contaminated area: The unit mission may dictate that the unit tay in a contaminated area for a considerable time. It is possible to the overgarments in a contaminated environment. The key point is the mask be changed or the filter element unless a collective protection shelter is

(2) When unit has moved into a clean area:

(3) Weather effects:

pment Decontamination - EDS.

uclear:

ve materials can not be destroyed.

procedures for the decontamination of a dry contaminant, as fallout, are rocedures such as brushing or vacuuming.

emical:

iological:

A. Emergency/Partial: M11 Decon apparatus

B. Unit/Complete:

1. General:

s used on wood surfaces and rubber tires; and DS2 is used on metal of equipment.

rceful, a steam cleaner, lots of soap and water, clorox, etc can be used ely to decontaminate equipment.

2. Special Equipment:

ation equipment, helicopters, canned food, ammunitions etc. require attention and many times the standard decontaminants cannot be used.

mbined PDS/EDS

Established by support level decontaminating units:

Responsibilities of unit:

Availability of sites:

Suggested equipment to support decontamination operations

/EDS

NOMECLATURE	NSN	QTY
ontaminating Agent, STB (50 LB)	6850-00-297-6653	2
ontaminating Agent, DS2 (5 Gal Pail)	6850-00-753-4870	2
ontaminating Agent, DS2 (1 1/3 Qt Can)	6850-00-753-4827	2 Per
1 canvas 10 Qt (Per Ten Indiv)	8465-00-224-9505	1 Per 10

te: Refill kit for M58A1 consist of 30 each packets (15, No1 - 15, No2) enough for 10 Kits

uipment you should have in your NBC Room.

Extra M8 Paper (M9 if available)

QTY

(2) IM-93
(2) M256 Kit
(1) AN/PDR 27
(1) Chemical Alarm (M8 System)

80 Contamination Markers
1 Immersion Heater (can be obtained from your unit supply.)

quipment obtained from your Unit Supply & Self Service.

Shovels
3 (5 Gal) Cans
2 MOP'S
Rags
8 Brushes
Axes
5 LB Soap
10 Sets Rubber Gloves
Log/Bench
10 Small Cont.
40 Plastic Bags
30 Pallets

OTE: Required materiels may be lessened depending on size of units. Use of eadily available decon materials, ie. A tree branch (esp. Pine) can make a very ood brush. Bleach is found in nearly every home.Chlorine for swimming pools and ater purification's more effective.

TOXIC CHEMICAL AGENT DECONTAMINATION

SECTION I: GENERAL

1. The Need for Decontamination.

a. Liquid toxic chemicals remain dangerous in the area of their release for hours or days after their dissemination. These agents can interfere with tactical operations because of:

(1) Casualties or the threat of casualties.

(2) Decrease of troop efficiency and morale caused by wearing the protective mask and clothing for long periods of time.

(3) Time lost in bypassing or avoiding the hazard.

b. If possible, use of contaminated terrain or equipment should be avoided, even if it means considerable inconvenience. There will be many instances, however, when contaminated terrain or equipment must be used. These situations usually require some type of decontamination to reduce the threat of casualties.

c. In a tactical situation it is not feasible to completely remove all liquid toxic chemicals from contaminated equipment or terrain. This would require techniques, time and materials not available to most units. Decontamination, therefore, means to reduce the amount of contamination to an acceptable level. The limiting factor in any decontamination operation will be time and materials. A good decontamination operation makes the best use of these limiting factors.

d. Not all toxic chemical agents require decontamination, only those released in liquid form. In this group of agents, the ones that present the greatest hazard are blister agents, such as HD, and the liquid nerve agents, such as VX.

2. TYPES OF DECONTAMINATION

There are three types of NBC Decontamination operations, emergency, partial, and complete. The types of decontamination are based on the following information:

a. The risk of taking casualties if decontamination is not performed.

b. The time and resources required to perform decontamination.

c. The capability of the unit or individual soldier to perform decontamination procedures.

d. Impact of decontamination on the mission.

Emergency Decontamination

Emergency decontamination is the removal of chemical contaminants from exposed parts of the body. It must be done to enable the individual soldier to survive. Liquid chemical contamination must be removed or neutralized before it penetrates the skin. Emergency decontamination can be done quickly by the individual soldier using his M258A1 decontamination kit. It can be done without adversely affecting the mission, and it must be done to reduce the risk of taking excessive casualties.

All soldiers must be able to perform individual chemical decontamination tasks described in Soldier's Manuals and FM 21-40, NBC Defense, in order to survive toxic chemical attacks.

Partial Decontamination

Partial decontamination is the partial removal of nuclear, biological, and chemical contaminants from individual clothing and equipment and unit equipment in order for soldiers and their units to continue operations in a NBC environment for more than 4 to 6 hours after the attack. It can be done quickly using equipment that is carried by the soldier and the unit. It has minimum impact on the mission and significantly reduces the chances of taking casualties later in the operation. It also significantly reduces complete decontamination requirements.

Partial decontamination is performed by all units and all soldiers within the units. Individual soldiers partially remove chemical and biological contaminants from their protective hood, gloves, overboots, weapon, and individual combat gear using the M258A1 decontaminating kit. All soldiers remove nuclear or radiological contaminants from their person and combat gear by brushing, shaking, or washing away dust and debris.

Selected individuals in all units, partially neutralize chemical and biological contamination from unit equipment by spraying DS2 decontaminating solution on areas that are frequently touched or used by personnel. Selected soldiers in all units remove radiological hazards from unit equipment and supplies by brushing or sweeping away contaminated debris.

Partial decontamination minimizes or reduces the hazard, limits the spread of contaminants, and makes complete decontamination easier at a later time.

Since it is hard to determine where NBC contamination is and is not located, decontamination units use specialized decontaminating equipment to quickly remove NBC hazards from unit equipment. It is done by decontamination units using the power-driven decontaminating equipment. All of the equipment is washed with hot soapy water not just the areas that are frequently touched.

Partial decontamination can be done quickly using the concepts described in FM 3-87. When partial decontamination is used to decontaminate unit equipment contaminated biological or radiological hazards, no other decontamination will normally be required. When partial decontamination is used to decontaminate unit equipment contaminated by persistent chemical agents, additional decontamination may be required. However, the time and effort to do a complete job will be greatly reduced. In many cases, partial decontamination plus natural weathering may complete the decontamination job in a few hours.

To increase the chances of success, units should use the M11 sprayer within 30 minutes after attack. Then decontamination units should finish the partial decontamination job within the next 90 minutes. If units wait any longer, liquid chemical agents are absorbed into paint, rubber, wood, and other porous materials so that they cannot be washed away. Partial decontamination permits units to reduce their mission-oriented protective posture (MOPP) earlier than if it were not done. This action enhances the probability of accomplishing the mission, limits the spread of contaminants, and reduces the requirements for complete decontamination. If complete decontamination is required, partial decontamination reduces the time, personnel, and supplies needed to do the job.

5. Complete Decontamination

Complete decontamination is the removal of most or all of the NBC contaminants from personnel, equipment, terrain, and facilities. It is done by specialized decontamination units as described in FM 3-87. It is the most demanding type of decontamination, and it requires help from other units.

Complete personnel decontamination is done at a personnel decontamination station. Complete equipment decontamination is done at an equipment decontamination station. Combined personnel and equipment decontamination operations may be established as described in FM 3-87.

Complete decontamination is a difficult and resource intensive method of decontamination. It has a severe impact on the mission. It takes a long time to do. It takes soldiers from both the decontamination unit, the contaminated unit, and other support units to accomplish. However, when accomplished it improves combat effectiveness. Units can conduct sustained operations without having to continuously wear protective clothing. It provides individual soldiers with an opportunity to shower, shave, eat, and satisfy other personal needs on a contaminated battlefield. Complete decontamination helps commanders cope with the problems created by NBC warfare.

Complete decontamination of terrain and facilities involves the removal, neutralization, or covering of NBC contaminants from terrain or facilities. It is the most difficult of types of decontamination to do. It takes the longest time to complete. Therefore, decontamination resources are not normally assigned to do this job because they can be better utilized doing other types of decontamination. Contamination will normally be left to weather or decay.

SECTION II: DECONTAMINATION MATERIALS

6. Natural Decontaminants.

a. Weather - liquid chemical agents are removed after a period of time by the effects of weather such as sunshine, wind and rain. Warm weather or sunshine evaporates some liquid agents. Rain tends to wash away or destroy liquid agents (however, liquid agents may be washed into low or swampy places and still be hazardous). Weathering is by far the simplest decontamination method and should be used whenever possible. Lack of time, unfavorable weather conditions, or proximity of contamination to critical areas may prevent its use.

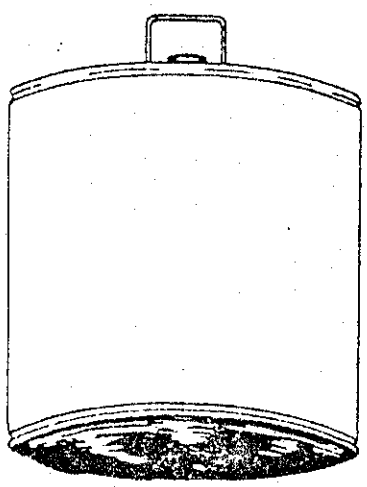
b. Water - water decontaminates liquid chemical agents in two ways. First, water flowing over a contaminated surface mechanically removes or flushes the agent off. Water under pressure, hot water, or water with a soap or detergent added are much more effective in flushing contaminated surfaces. Secondly, water reacts chemically with some chemical agents to form non-toxic or less toxic products. This chemical action is called "hydrolysis". With hot water or steam the hydrolysis reaction is faster. Alkaline materials such as lye, baking soda, or GI soap, when added to water, will speed up hydrolysis.

c. Earth - earth can either be scraped off or piled on to aid in terrain decontamination. Contaminated terrain, such as dirt roads, can be effectively decontaminated by scraping off three or four inches of the contaminated soil or by dumping three or four inches of uncontaminated soil or gravel over the contaminated surface.

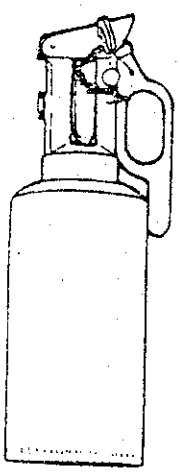
d. Fire - fire (or heat) either burns or vaporizes liquid chemical agents. Some agents, such at HD, will actualy burn and, upon burning, are converted into relatively harmless products. Fire will also vaporize liquid agents very rapidly. If the liquid chemical agent is in a wooded area or dry field, it is a simple matter to set fire to it by igniting the combustible wood or grass. If the contamination is on a non-flammable surface such as a dirt road, it can be soaked down with gasoline and ignited. The burning of liquid chemical agents always produces toxic vapor hazards downwind. HD vapors may go 1,350 meters or more and nerve agent vapors can be dangerous for 17 KMs downwind under certain extreme weather conditions. To partly overcome this downwind hazard, contaminated areas should be burned during periods of sunshine when vapors will have a tendency to be carried up in the air and dissipated. The battalion S3 must be consulted before contaminated areas are burned.

7. Standard Decontaminants.

a. DS2 (Decontaminating Solution Number 2) - DS2 is a liquid issued in 1 1/3 quart and 5 gallon cans. The 1 1/3 quart can is for use with the M-11 decontaminating apparatus used mainly for partial decontamination of vehicles and crew-served weapons. The 5 gallon can is for the bucket and swab method of decontamination



5-GALLON DRUM

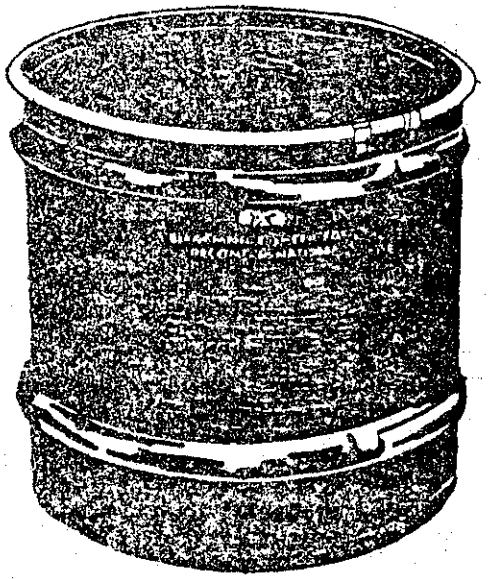


ABC-M11

DS2 is effective against all toxic chemicals. It is slightly corrosive to metals and may soften or remove paint. DS2 is also slightly irritating to the skin but does not cause harmful effects if quickly washed off with water. DS2 is flammable and should not be

used on hot engines or near open flames. When used on metal surfaces, DS2 should be washed off after 30 minutes.

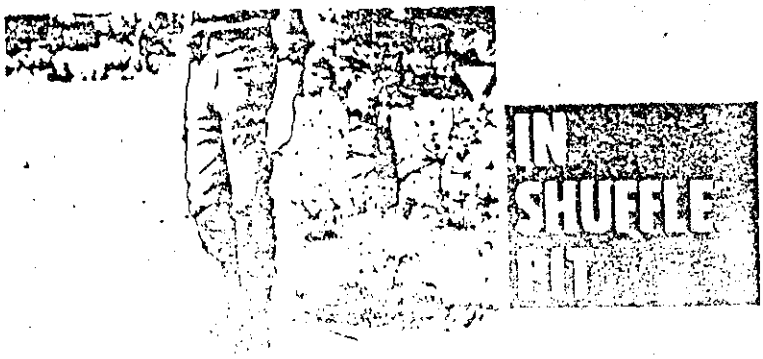
b. STB (Supertropical Bleach) - STB is a white powder with a strong chlorine odor. It is issued in 50 pound metal drums.



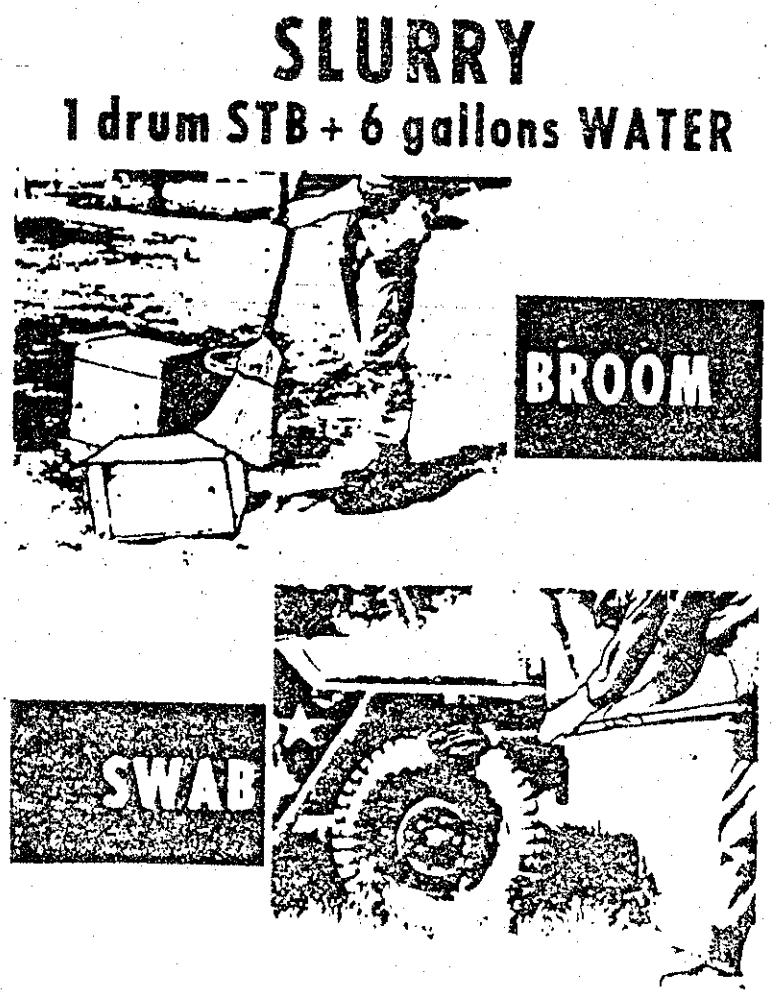
STB destroys blister agents and nerve agents or converts them into less toxic compounds. It can be used directly from the container; however, pure STB reacts violently with liquid HD or DS2 and will produce heat and flames. STB is also more difficult to spread as a pure powder. For these reasons, STB when used dry, should be mixed with earth, sand or ashes in the proportion of two parts bleach to three parts of earth. This dry mix can then be spread over liquid contamination or the ground with shovels or it can be used in a shuffle pit for men to use to decontaminate their boots.

DRY MIX

2 shovels STB + 3 shovels EARTH



Another effective way of using STB is as a wet mix or slurry. Slurry is made by mixing equal parts (by weight) of STB and water to make a thick liquid with about the consistency of pancake batter. Slurry is best used to decontaminate rubber, wood, or canvas but can be used to decontaminate metals if DS2 is not available. STB slurry is swabbed or brushed on contaminated surfaces and then rinsed off. STB is very corrosive to metals and must be washed off thoroughly within one hour and the surface oiled or greased.



c. See Section V this chapter, for discussion of the M258A1 kit.

d. Miscellaneous decontaminants.

(1) Alkalies react with liquid blister agents and speed up the hydrolysis of nerve agents. Some alkalies which may be used for decontamination are:

(a) bleach.

(b) lye.

(c) sodium hypochlorite.

(d) washing soda.

(e) quicklime.

(f) baking soda.

(g) ammonia.

NOTE.

1. Disposition instructions for M13 kit.

Upon receipt of M258A1 and overgarment, the M13 Kit is considered obsolete.
(CDR, ARCOM msg 201100Z Jan 82)

2. New M258A1 skin decontaminating kit, (replaced M258 & M13).
NSN: 4230-01-101-3984

Training Aid - M58A1
NSN: 6910-01-101-1768
Refills for M58A1
NSN: 6910-01-113-2434

(2) Soap and detergents help water to loosen and flush off contamination. In addition, soap, being a mild alkali, speeds the hydrolysis of liquid nerve agents. Soapy water is effective as long as the suds can be maintained.

(3) Organic solvents - solvents such as GUNK, gasoline and JP-4 decontaminate by dissolving oil and grease films which tend to hold liquid chemical agents on surfaces. They do not destroy the agent. When using solvents, care must be taken not to spread the contamination.

(4) Heat - heat vaporizes liquid blister and nerve agents. Steam, especially under high pressure, hydrolyzes anad evaporates the agent. Low heat is usually the only method practical for decontaminating certain types of delicate optical and communication equipment.

(5) Explosives - explosives are of special value for blasting paths through contaminated vegetation such as high grass. Explosives only partly remove liquid contamination, because the ground and adjacent vegetation remain contaminated, but troops may travel the exploded path with reduced danger. Mine clearing devices (snakes), bangalore torpedoes, detonating cord and TNT are the most commonly used explosives for decontamination.

SECTION III: DECONTAMINATION METHODS

8. Partial Equipment Decontamination

As previously described, partial decontamination is conducted by both contaminated units and decontamination units. Partial decontamination destroys, neutralizes, or removes most of the NBC hazards from personal gear and unit equipment. It can be done quickly. It also extends the time that personnel can wear their contaminated clothing without processing through a personnel decontamination station. In addition, it substantially decreases the amount of time it takes for natural weathering or aging to reduce an NBC hazard on personal and unit equipment to a safe level.

Contaminated units conduct partial decontamination operations as described in FM 3-87. Decontamination units help other units partially decontaminate vehicles and other large items of equipment since they are equipped to do a faster and better job. Decontamination units conduct partial equipment decontamination operations by quickly washing contaminated equipment with hot, soapy water. These operations are done at a decontamination site that is selected by NBC reconnaissance units as described in chapter 4, FM 3-87.

Battalion and brigade chemical officers coordinate with operations officers to obtain the needed decontamination support. Commanders determine the need for partial decontamination. They also determine the effect of decontamination on current and future operations and risks associated when partial decontamination is not done. There is no check to see if the contaminants are completely removed. Moreover, NBC protection is still needed after decontamination. The purpose of partial equipment decontamination is to --

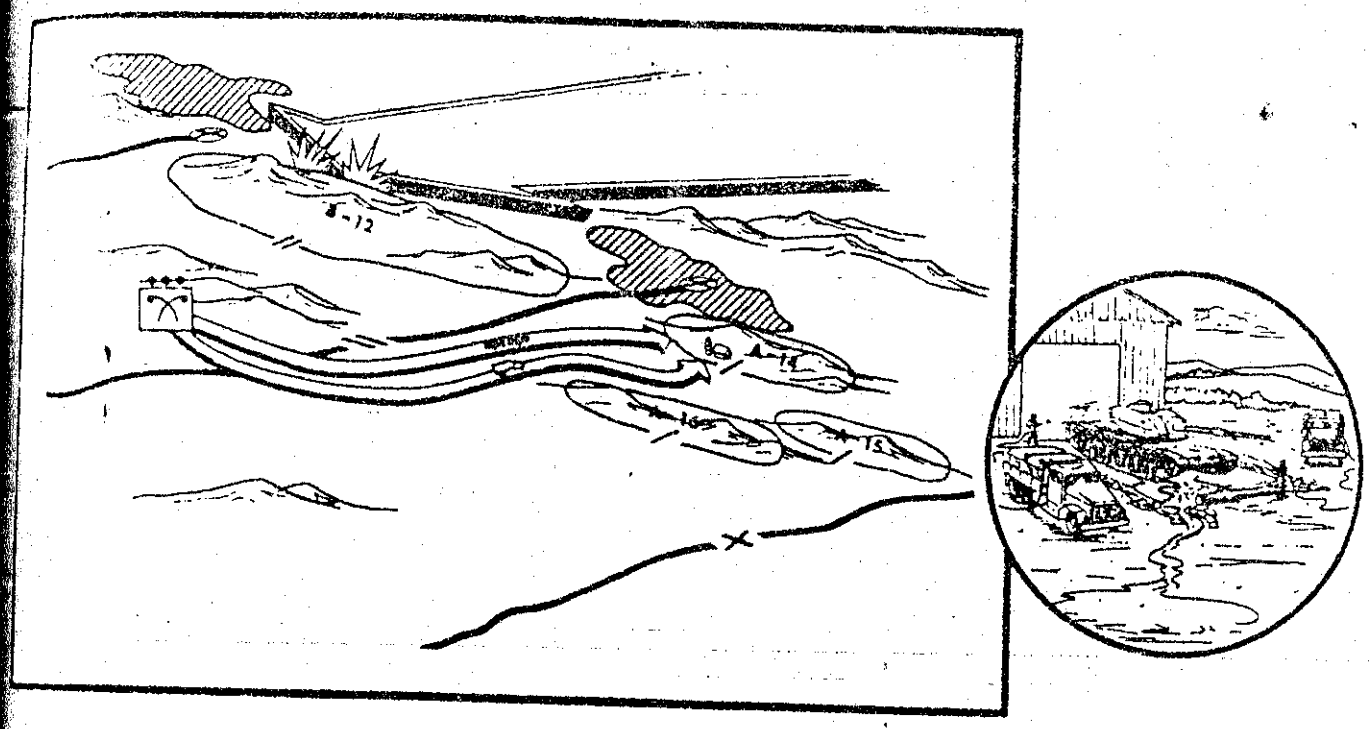
Limit the spread of contamination on the battlefield.

Minimize the hazard.

Make complete decontamination easier and quicker.

Partial decontamination normally reduces radiological and biological contamination to acceptable levels. However, persistent chemicals cannot be completely removed or neutralized through this process. Persistent chemicals penetrate grease, dirt, rubber, canvas, and painted surfaces. The quicker these agents are washed away, the easier it is to completely remove them as discussed later in this chapter. Hot, soapy water is best suited for use as a partial decontaminant. The hotter the water, the better the decontamination process. Hot, soapy water helps to remove persistent chemicals before they are absorbed deep into porous materials. To be effective, partial decontamination of chemical contaminants should begin within 1 hour after contamination.

Partial equipment decontamination is conducted as far forward as possible. Decontamination units quickly wash contaminated equipment with hot, soapy water. Normally, 1 or 2 minutes are spent on each item. To speed up the operation, contaminated vehicles are driven between two or more decontamination apparatuses, so both sides can be decontaminated at the same time. The equipment is not checked for contamination after the operation is complete. However, onboard radiacmeters are used to measure radiological contamination quickly.



A brigade is defending with three battalions abreast. During the covering force battle, the enemy uses a persistent nerve agent to protect his flanks as he launches a main attack in the center sector. The battalion in the center effectively delays the enemy's advance. However, one tank platoon on the right flank is grossly contaminated by the chemical attack.

The NBC defense platoon, in direct support of the brigade, is given the decontamination mission. The brigade chemical officer and the NBC defense platoon leader locate a small farm to the rear of battle position A14. Two three-men reconnaissance teams move to battle position A14 to locate a hasty decontamination site. One decontamination squad moves to battle position A14 to conduct partial decontamination operations.

The NBC reconnaissance team directs contaminated tanks into the decontamination point. The decontamination squad sets up its truck, land trailer-mounted, power-driven decontamination apparatuses; one on each side of concrete hardstand located near a barn. Contaminated tanks are driven between the apparatuses as each unit washes one side of the tank with hot, soapy water.

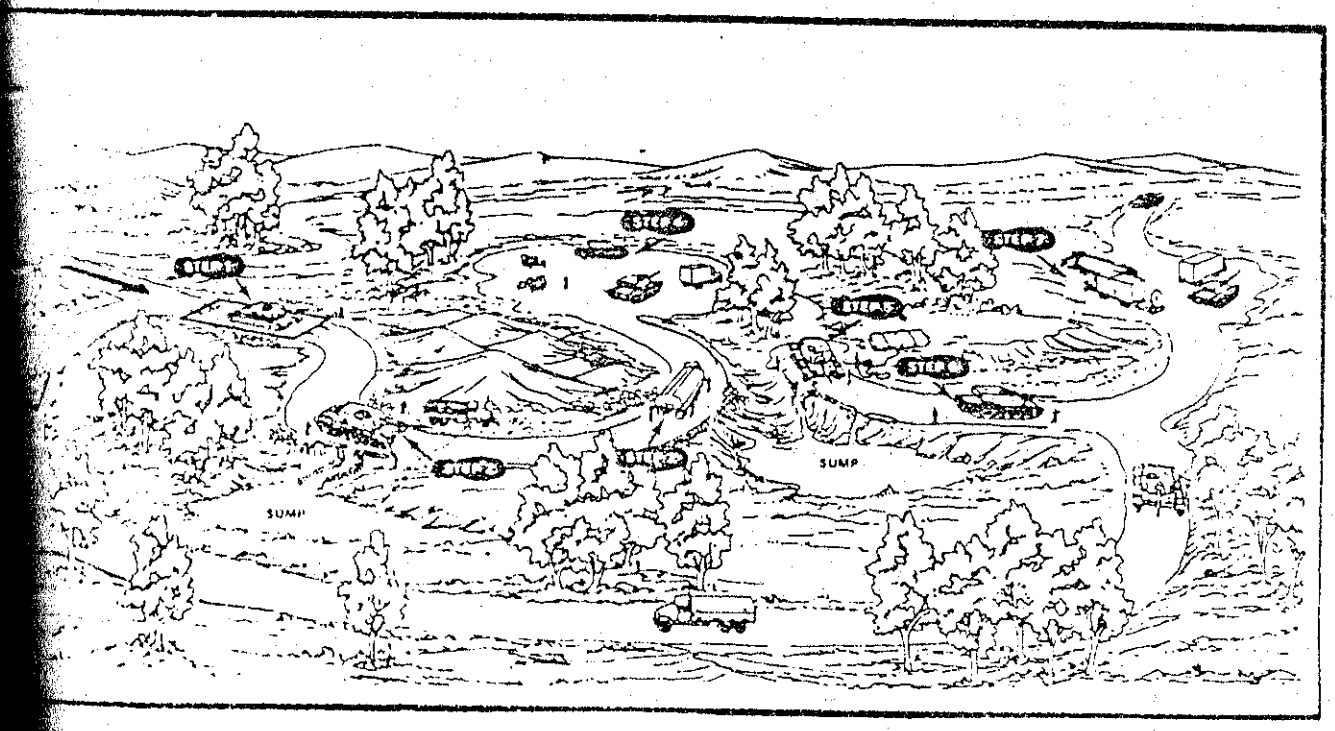
Chemical contamination washed from the tanks is decontaminated by dry STB. Runoff is channeled by logs and sandbags into low areas treated with STB. The decontamination squad does not check the tanks

:r contamination because speed is important. The entire operation ·kes only a few minutes.

'. Complete Equipment Decontamination

Complete equipment decontamination lowers the amount of chemical :ontamination to a level in which soldiers can operate equipment ·ithout protective clothing and masks. Complete equipment decontami-:ation is done at an equipment decontamination station (EDS). The EDS is established as far forward as possible. Both the decontamination unit and the contaminated unit work together to perform the operation. Uncontaminated crews operate the clean equipment.

Complete equipment decontamination may be done in rear areas to decontaminate combat replacement equipment before it is moved forward. It may also be done in forward areas when equipment has been contaminated with chemicals and the crews are clean. When both crews and equipment are contaminated, combined complete personnel and equipment decontamination operations are normally scheduled as described later in this chapter. In any event, complete decontamination operations take time. Therefore, they are only scheduled as the situation and mission permit.



STEP 1 - Equipment crosses the hotline, enters the station (downwind), and passes through a shallow pit filled with a decontamination solution. The solution decontaminates the undercarriage and running gears. Rocks or logs are added to the pit to give the vehicles traction. The supported unit prepares the pit, and the decontamination unit adds water and decontaminants to produce the solution.

STEP 2 - Equipment moves to a hot, soapy-water wash to remove grease, dirt, gross contamination, and the decontaminant. The decontamination unit works at this point, using a power-driven decontamination apparatus.

STEP 3 - Supported unit soldiers apply DS2 to equipment for CB contamination. Scrubbing may be necessary to remove a thickened agent. This also improves the effectiveness of the DS2.

STEP 4 - The equipment stays in a holding area to let the DS2 work. A full 30 minutes is necessary to completely decontaminate mustard agent. For all the chemical agents, 20 minutes is sufficient. The supported unit is responsible for traffic control at the holding area.

STEP 5 - Decontamination unit soldiers rinse DS2 (soap for radiological contamination) from the vehicles, using clean water pumped through high-pressure hoses. To do this, they use trailer-mounted pump and water heater units. Water is pumped from a natural water source or a collapsible tank.

STEP 6 - Decontamination unit soldiers check vehicles for contamination. They use chemical agent detector kits for chemical contamination and radiacmeters for radiological contamination. Vehicles that exceed specified decontamination standards are recycled.

STEP 7 - The supported unit dries and oils the equipment. This is necessary to prevent rust, since DS2 softens and removes paint.

10. Personnel Decontamination Procedures

Detailed procedures are followed to insure that all contamination is neutralized or removed from each soldier, his personal equipment, and his outer clothing. Specific tasks must be completed at specific times, so contaminants from exposed clothing and gear do not contact the skin of undressing soldiers. More information on undressing and showering procedures can be found in TM 3-220.

CAMOUFLAGE, CONCEALMENT, AND SECURITY ARE CRITICAL DURING DECONTAMINATION OPERATIONS.

...ers are extremely vulnerable to enemy fires during complete ... decontamination operations. Therefore, camouflage, ...nt, and operational security are essential. Smoke is ...ly used to conceal complete personnel decontamination ...ns.. Automatic chemical agent alarm systems are also placed ... the station to warn of chemical attacks.

...R CONDUCTING COMPLETE PERSONNEL DECONTAMINATION OPERATIONS ARE ...ED AS SHOWN

...rsonnel Decontamination Station.

... A personnel decontamination station is an orderly system for ...ng large numbers of soldiers emerging from contaminated areas ...no may have contamination on their clothing and equipment. If ... people were allowed to enter a unit assembly area at random, ... clothing whenever and wherever they please, there is a definite ... of spreading the contamination. One man, having just removed ...oots, might step barefooted into a puddle of liquid agent from ...wn or another man's contaminated boots. Several men might wear ...minated clothing in a tent for several hours which could collect ...m vapors to cause them all the become casualties.

... A personnel decontamination station is normally organized for ...tion when large numbers of contaminated personnel are expected. ...tation is as far forward as is tactically feasible. Sources of ... and camouflage are important considerations in locating the ...n. (A decontamination squad, (NBC Defense Company) or one ...tamination team, (Decontamination Detachment), with the ...ance of the supported unit,) is given the responsibility of ...ting the station for a battalion size element. See the diagram ...xt page for a typical battalion personnel decontamination ...n.

... A company-size unit can operate a simple expedient field ...mination station for small groups of soldiers, such as patrols, ...amination teams, etc, which are suspected of being contaminated. ... station should be located outside of and preferably downwind ...the unit's perimeter. Location near water is not necessary since ...r trailer can supply water for small groups of people.

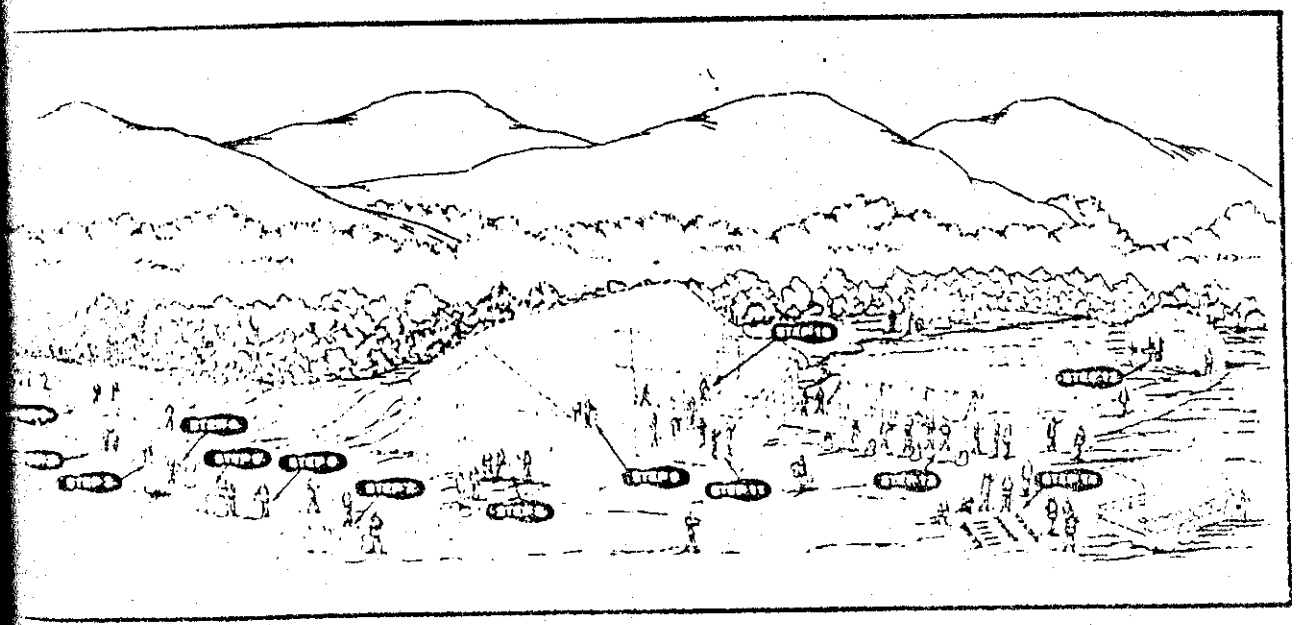
...e PDS line can handle two soldiers at the same time. It takes ... 30 minutes for a soldier to complete the entire operation. ...r, normal field conditions cannot sustain this rate indefi- ... Soldiers working at the station need rest while wearing full ...tive clothing. Water and clothing resupply problems may slow ...ximum decontamination rate. In addition, mechanical breakdowns ...contamination equipment may stop the operation completely. ...re, decontamination unit leaders must coordinate with supported ...manders to determine--

Realistic personnel decontamination rates.

Potential problem areas.

Maintenance requirements.

When the decontamination operation is completed, unusable contaminated overgarments and unserviceable undershirts are buried. Containers from the undressing line are emptied into a pit by personnel from the decontamination unit. Super tropical bleach (STB) is spread over the garments. The pit is then covered with dirt and marked with appropriate NBC contamination markers by decontamination personnel. Usable garments are sealed in bags and taken to a corps-level laundry facility equipped to deal with NBC contaminated clothing. Bags must be clearly marked as containing hazardous material. This backhaul operation is coordinated through combat service support channels.



STEP 1 - Contaminated soldiers enter the station from the downwind end and decontaminate their combat gear (weapon, pack, harness, and web gear) by submerging it in buckets of slurry mixture. Slurry is prepared by the decontamination unit. One decontamination specialist supervises this point. Once gear is decontaminated and rinsed in water, clean soldiers from the contaminated unit move it to the assembly area at the opposite end of the PDS.

STEP 2 - Two soldiers move into a small pit containing a solution that decontaminates any chemical hazards on their protective overboots. They wash gross contaminants from each other's mask and hood using hot, soapy water. The hot, soapy water is supplied by the decontamination unit. They then wash their protective gloves in hot, soapy water and move to the next station.

STEP 3 - Soldiers remove their overboots and discard them. They then decontaminate their combat boots by thoroughly scrubbing them twice with hot, soapy water and then rinsing them in clean water. The decontamination unit furnishes water and brushes.

STEP 4 - Soldiers remove their combat boots and hand them to members of the supported unit who transport the boots, along with personal items and combat gear (steps 1 and 7), to the clean assembly area.

STEP 5 - Soldiers remove protective overgarments and place them in a container furnished by the decontamination unit.

STEP 6 - Soldiers remove gloves and place them in a container.

STEP 7 - Soldiers are given personal effects bags in which they place their wristwatches, wallets, or rings. Personal effects bags are furnished by the decontamination unit. Bags are identified by the soldiers' dog tags. This step is supervised by one soldier from the supported unit. The supported unit also transports effects bags to the clean assembly area.

STEP 8 - Soldiers remove fatigue shirts and trousers and place them in a container. This step is omitted in hot weather when fatigues are not worn.

STEP 9 - Soldiers remove underwear and socks and place them in a container. The undressing supervisor helps soldiers by cutting the backs of their undershirts.

STEP 10 - Soldiers enter the shower, still wearing their masks and hoods. The soldiers rinse their masks and hoods by placing their heads in the shower. They hold their hands over the mask inlet valves so water does not damage the filter elements. The soldiers then leave the shower and go to the holding area. There, they take a deep breath and remove their masks and hoods. Then, they return to the shower quickly and wash their bodies with soap. After showering, they return to the holding area to pick up their masks and hoods.

STEP 11 - For nuclear contamination, soldiers are monitored after their shower. If still contaminated, they shower again and are

remonitored. This cycle is repeated until contamination is reduced to an acceptable level. A soldier from the decontamination unit supervises this step.

STEP 12 - After drying, the soldiers enter the clothing exchange and dressing point. Here, they receive underwear and NBC protective clothing. The decontamination unit and the contaminated unit work together to supply both protective and regular clothing. Fatigues are issued in cool climates. In addition, replacement filter elements for the masks are issued if needed. The filter elements are supplied from the supported unit's prescribed load.

STEP 13 - Soldiers needing medical treatment go to the medical treatment facility (MTF) or triage point. Patients needing emergency medical aid prior to decontamination are cared for as described in FM 8-9. Patients who cannot decontaminate themselves are assisted by others in the unit. The MTF commander or his representative works with the decontamination unit. They organize the decontamination station so that it can accommodate casualties.

STEP 14 - After leaving the MTF or the clothing exchange and dressing point, soldiers move to an assembly area and retrieve their personal effects bags, boots, and individual equipment.

A. One decontamination specialist controls flow of personnel into the station.

B. One decontamination specialist supervises decontamination of individual gear.

C. Two soldiers from the supported unit assemble individual gear, personal items, and decontaminated boots. They then carry these items to the clean area, close to the station exit. Soldiers pick up their gear at this point when leaving the station.

D. One soldier from the supported unit works on the decontamination line. He collects personal items from soldiers as they undress, places them in individual bags, and gives them to the loader-transporter soldiers.

E. One decontamination specialist supervises the undressing line. He briefs contaminated soldiers on proper undressing procedures. He also cuts the backs of their undershirts so they can pull them forward over their arms. This eliminates the need of unmasking to remove the shirt over the head.

F. One decontamination specialist operates either the truck-mounted or trailer-mounted decontamination apparatus which is connected to a shower rail. Water is pumped directly from a collapsible tank or a natural water source. When it is impossible to locate the PDS close to a natural water source, high capacity pumps are used to fill collapsible tanks which, in turn, supply water to decontamination equipment.

G. One decontamination specialist supervises the shower stage. He briefs contaminated soldiers on proper procedures for rinsing the mask and hood, and for decontaminating their bodies.

H. One decontamination specialist monitors soldiers that exit the shower for radiation. He also inspects them and their masks for cleanliness.

I. The decontamination NCO works with an NCO from the supported unit. They give towels and clothing to soldiers as they leave the shower. They also direct soldiers to the aid station or to the clean assembly area.

J. The decontamination squad leader supervises personnel decontamination station operations.

12. Tentage and Canvas Decontamination.

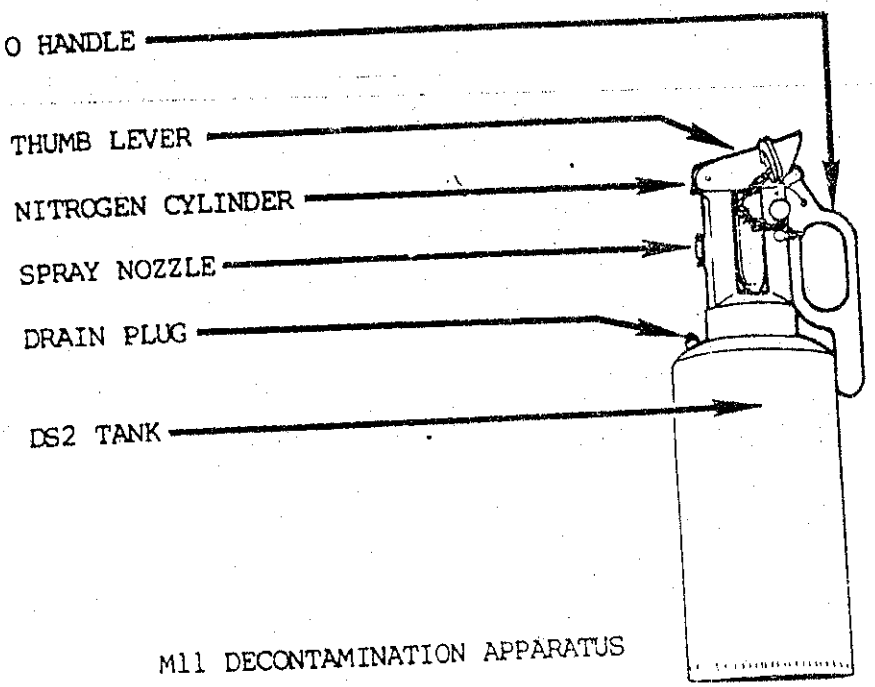
a. Tentage and canvas items can be decontaminated by aeration, preferably in the direct sunlight and where air can circulate around them. This method may take from four hours to two days depending on the extent of contamination.

b. A second method is to use STB slurry. Use brooms or swabs to apply it to the canvas and then rinse it off promptly as slurry is injurious to cotton material.

c. Small items like shelter halves can be decontaminated by spreading STB Dry Mix over the contaminated parts of the canvas.

SECTION IV: DECONTAMINATING APPARATUS, PORTABLE, DS2, 1 1/2 QUART, M11

13. Description. The M11 decontaminating apparatus is somewhat similar in appearance to a carbon dioxide fire extinguisher. It is essentially a steel container with aluminum spray head assembly and a nitrogen gas cylinder which provides the pressure. The M11 is pressurized by pulling the large "O" handle up into position and the contents are released as a spray by pressing the thumb lever on top to expell the DS2 decontaminating solution. The unit is about 13 inches high and weighs approximately six pounds when filled. The maximum spray range is 6-8 feet. After each use the M11 can be refilled with DS2, fitted with a new nitrogen cylinder and used again.



M11 DECONTAMINATION APPARATUS

14. Use.

a. The M11 is mainly for partial decontamination of vehicles or crew-served weapons. It is not intended for decontamination of an entire vehicle but rather for those contaminated parts which may be easily touched by the vehicle occupants. For example, one filling will decontaminate the steering wheel, gearshift lever, pedals, dashboard and seats of a 1/4 ton truck.

b. The M11 looks somewhat like a fire extinguisher; however, the DS2 decontamination solution is flammable. Personnel must be made aware that the M11 cannot be used as fire extinguisher and it should not be used on a hot engine or exhaust of a vehicle.

. Availability. The M11 apparatus is authorized one per tactical ..icle. Each M11 has a mounting bracket, necessary bolts and screws mount the bracket to the vehicle, and two nitrogen cylinders. The ..les in the mounting bracket take 1/4 inch diameter screws or bolts.

. Inspection of the M11.

a. Mounting bracket not rusted or damaged.

b. All mounting hardware on hand.

c. Extra nitrogen cylinder clipped on bracket.

d. Nozzle tight - cannot be loosened by hand.

e. Nozzle hole unobstructed.

f. Nozzle uncorroded.

g. One nitrogen cylinder in place in spray head assembly.

h. Preformed packing in nitrogen cylinder well not damaged.

i. Container not rusted or damaged.

j. Drain plug has a copper washer and is screwed in tight, cannot be loosened by hand.

k. Two-strand copper wire threaded through:

(1) Small hole in large "O" handle.

(2) Small hole in handle pivot pin.

(3) Pull ring of safety pin.

l. Two strand copper wire drawn tight enough to safety pin cannot be withdrawn without breaking wire.

m. Lead seal tightly crimped so copper wire cannot slip.

n. 1/4 teaspoon corrosion inhibitor in steel container.

o. Anti-sieze compound on threads where spray-head assembly screws into steel container and on drain plug.

SECTION V: THE M258A1 SKIN DECONTAMINATION KIT

17. General. The M258A1 skin decontamination kit is to be used in giving the individual soldier the ability to decontaminate liquid chemicals on his skin including the face, his mask, protective gloves, weapons, and personal effects. The M258A1 kit has a strap and clip to allow it to be attached to the web gear or the mask carrier. The large external pocket of the carrier for the M17-series masks or the old packet for the M13 kit on the other masks can be used to store the M258A1.

18. Components of the M258A1 Kit.

a. Plastic case.

b. Packet pouch #1.

c. Packet pouch #2 (has glass ampules inside).

19. Using the M258A1 Kit. If it is suspected that a liquid toxic chemical agent is on the skin, first stop breathing and mask. Then use the M258A1 kit as follows (M58A1 for training - never open M258A1 for training):

STEP 1. Open your decon kit. Pull out one DECON 1 WIPE packet by its tab.

STEP 2. Fold packet on solid line marked BEND, then unfold. Tear open quickly at notch, remove wipe and fully unfold.

STEP 3. Wipe skin for one minute.

(1) Start with hands.

NOTE:

If you do not have agent on your face, skip steps (2), (3), (4), and (5). Do steps (6) and (7).

(2) Hold breath, lift hood and mask from chin.

(3) Continue to hold your breath. Quickly wipe lower part of your fface, including tip of nose.

(4) Quickly wipe inside of mask which touches your face.

(5) Put on mask immediately and clear it.

(6) Using same DECON 1 WIPE, wipe neck and ears.

(7) Drop wipe to ground.

STEP 4. Pull out one DECON 2 WIPE packet. Crush inclosed glass ampoules between thumb and fingers or smash glass ampoules with palm of hand.

(1) Fold packet on solid line marked - CRUSH AND BEND, then unfold.

(2) Tear open quickly at notch and remove wipe.

(3) Fully open wipe. Let the encased crushed glass ampoules fall to the ground.

STEP 5. Wipe skin for 2 to 3 minutes.

(1) Start with hands.

NOTE:

If you do not have agent on your face,
skip steps (2), (3), (4), and (5).
Do steps (6), (7), and (8).

(2) Hold your breath and lift hood and mask from chin.

WARNING

Poisonous and caustic hazard.
Keep out of eyes and mouth.

(3) Continue to hold your breath. Wipe lower part of your face, including tip of nose.

(4) Quickly wipe inside of mask which touches your face.

(5) Put on mask immediately and clear it.

(6) Using same DECON 2 WIPE, wipe neck and ears.

(7) Drop wipe to ground.

(8) Fasten hood.

STEP 6. Put on your protective gloves and cover skin areas that you have decontaminated.

NOTE:

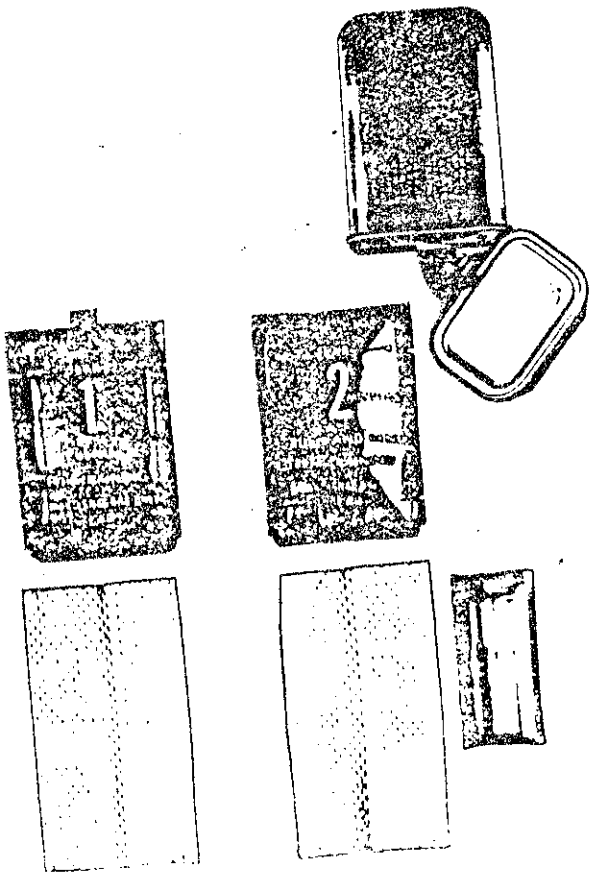
- o When all wipes are used up, t
  away. Order a new kit.
- o The training aid wipes are n
  accordance with organizationa

STEP 7. When you have finished, bury t
trash. You have now completed s

- Face Decontamination. To decontaminate the face use the M258A1.

- Eyes. Flush with water only. (Do this within the first minute.)

M258A1 SKIN DECONTAMINATION KIT



SMOKE OPERATIONS

Employment of Smoke:

(A) Used to conceal your activities.

(B) Many ways to produce smoke are available.

(C) Point to remember: "You can't shoot what you can't see."

1. Sources of Smoke - Smoke Systems

(A) Artillery

- Used to place smoke on distant targets.

(B) Mortars

- Used to create a high volume of smoke on mid-range targets in a specific area.

- Used to spot, mark, and signal.

(C) Smoke Pot

- Produce small area smoke screens for small unit operations.

- Only smoke producing system that floats.

(D) Smoke Grenades (M18)

- Used for vehicle screening.

- Used for signalling.

- White, red, green, yellow, violet.

(E) Vehicle Smoke Grenade Launchers

- Used to generate smoke rapidly in order to conceal or screen individual vehicles.

2. Smoke in the Offense - 5 basic techniques

(1) Blind enemy observers

(2) Obscure vehicles from enemy direct fire gunners.

(3) Conceal a bypass

(4) Screen an assault

(5) Cover a breaching Operation

3. Smoke in the Defense - 5 basic techniques

(1) Slow the advance of attacking forces

(2) Separate and isolate attacking echelons

(3) Force enemy infantry to dismount from vehicles

(4) Cover movement

(5) Expose enemy helicopters

4. Countermeasures to enemy smoke

(1) Use counter smoke to blind enemy defenders

(2) Use enemy smoke to cover a defensive maneuver

(3) Use enemy smoke to cover an offensive maneuver

(4) Use USAF close air support aircraft and attack helicopters to fly above enemy smoke and attack

5. The main consideration in the employment of smoke is wind direction and wind speed.

NUCLEAR WEAPONS EFFECTS

Nuclear weapons produce injury by the release of energies producing the following major effects:

a. Blast:

b. Thermal Radiation:

c. Nuclear Radiation:

d. Electromagnetic Pulse:

Blast injuries come in two forms.

a. Direct:

b. Indirect:

Blast effect accounts for approximately 50% of the bomb's energies.

Temperature at center of blast:

a. Conventional

b. Nuclear

Thermal energy travels in the form of light at 186,000 miles per second.

Thermal energy can produce:

a.

b.

c.

of Burns:

ireball produces a light which is brighter than that of the sun because
same intensity but much closer.

ing the fireball may produce flash blindness or eyburns.

Flash blindnesss

(1) Temporary Condition.
(2) Can be reflected from the sky, ground, and other objects.
(3) Should not last more than a few minutes.

Eyeburns may leave permanent scarring.

th conventional and nuclear weapons have the blast and thermal effects (In
nt degrees); but only nuclear weapons have the effects of nuclear radiation
.

e Army has established 150 Rad/Cgy as the emergency risk dose.

here are basically 3 types of bursts.

. Air Burst

. Surface Burst

. Subsurface Burst

uclear Radiation

. Induced Radiation

b. Residual Radiation

. Electromagnetic Pulse (EMP)

a. Not harmful to human tissue.
b. Has an effect similar to a bolt of lightning on electrical equipment.
c. Accounts for only 1 % of the total bomb energy.

. Nuclear weapons may be employed by

a. Bombs delivered by aircraft

b. Missiles with nuclear warheads

c. Artillery

d. Atomic demolitions

. US. Doctrine on employment of nuclear weapons

a.

b.

Protective measures before a nuclear attack.

(a) Dig foxholes

(b) Stay fully clothed

(c) Seek shelter

(d) Seek defilade position for vehicles

(e) Turn off unnecessary radios and disconnect antennas

Protective measures during a nuclear attack.

(a) Seek cover fast (foxholes)

(b) Fall flat on the ground

(c) Close eyes

(d) Place hands under body

(e) Stay down until the blast has completely cleared your position

Protective measures after a nuclear attack.

(a) Check weapons

(b) Resume communications

(c) Dust yourself off

(d) Assist casualties

(e) Await orders

NUCLEAR BURST INFORMATION

1. OBJECTIVES: Familiarize student with reporting procedures for nuclear detonations, yield estimation techniques, and methods of location ground zero (GZ).

2. REFERENCES:

a. Chapter 2, FM 3-12 w/C1 and 2, dated August 1968.

b. Chapter 6, FM 3-22, dated October 1973.

c. GTA 3-1.

3. NUCLEAR BURST REPORTING

a. Need-The nuclear burst report provides information (or data from which information can be derived) on the size (yield) and location (GZ) of a nuclear detonation and the type of burst.

b. Who reports-Usually, only units designated in higher headquarters' SOPs will submit reports to the higher headquarters. However, all commanders need this information and should designate individuals in their units to observe and collect nuclear burst data.

c. Format-The NBC-1 (Nuclear) report is used to transmit nuclear burst data. See GTA 3-1.

d. Procedures

(1) Initial nuclear burst report. Transmit all data except letter items L and M as soon as possible (FLASH precedence) after bang time.

(2) Subsequent nuclear burst report. Obtain additional data (letter items L or M) and submit a subsequent report (IMMEDIATE precedence), including the type of report (NBC-1 Nuclear), letter items D and H, and either letter items B and C or F.

(3) Special instructions. If letter items L (angular cloud width) is reported, do not report letter item M (stabilized cloud measurements). Report E (illumination time) only when other measured data is not available. However, always report what data is available.

e. Sequence of Events - good visibility

(1) See "blue-white flash" take cover immediately and start counting slowly. Stop count when bang is heard (letter item J). Do not look at fireball and stay under cover until debris has stopped falling.

(2) After bang is heard or after five seconds, open eyes and determine ... time (letter item D). Observe developing cloud. Note: If bang is not ... in five minutes (a count of 300) continue with other measurements ...lar cloud width).

(3) Determine type of burst (air, surface) (letter items H). If ...ible, determine location of GZ (letter item F) by visual observation. If GZ ...not be observed, measure azimuth from your location to the center of the ...d (letter item C). Determine own location (letter item B), complete and ...mit initial nuclear burst report (NBC - (Nuclear).

(4) Five minutes after detonation (H+5 min), measure the angular ...th of the nuclear burst cloud (letter item L). If the cloud width can not ...measured, measure the stabilized cloud dimensions (letter items M) 10 minutes ...er burst (H+10 minutes). Submit subsequent NBC-1 report, including letter ...ms D and H, B and C, or F, and L or M.

f. Sequence of Events - poor visibility or nighttime

(1) Take cover at the flash and estimate the duration of illumination ...tter item E). Continue counting until the bang is heard (letter items J). ...y down until the debris has stopped falling.

(2) If possible, measure the azimuth to the center of the cloud (letter ...m C). Determine own location (letter item B), time of detonation (letter ...m D), and type of burst (letter item H).

(3) Complete and submit NBC-1 (Nuclear) Report

GROUND ZERO LOCATION METHODS

a. Direct observation (letter item F)

b. Intersection - Requries two or more observers. Normally used at ...talion or higher level headquarters.

c. Polar plot (letter items B, C, and J) - Normally used at unit level.

d. Combinations of b and c.

NOTE: distance from observer to GZ can be obtained from flash-to-... time (letter item J) by the multiplying the flash-to-bang time in ...ding the distance in kilometers directly from the right scale of figure ..., FM 3-12.

YIELD ESTIMATION METHODS

a. Distance to ground zero (or flash-to-bang time (letter items J) ... nuclear burst angular cloud width, measured at H+5 min (letter item L). ... Figure 2-3, Fm 3-12.

b. Stabilized cloud-top or cloud-bottom height (letter item M). Use Figure 30, FM 3-22.

c. Distance to ground zero (or flash-to-bang time) (letter item J) and stabilized cloud-top or cloud-bottom angle (letter item M). Use Figure 2-4, FM 3-12.

d. Illumination time (letter item E). Least reliable - determined from paragraph 2-11b, FM 3-12.

b. EVALUATED DATA REPORT - NBC 2 NUCLEAR REPORT

a. Usually prepared by NBC Element at division TOC based on two or more NBC-1; Nuclear Reports.

b. Normally contains letter items A, D, F, H and N. See GTA 3-1.

c. Used in conjunction with the effective downwind message to prepare simplified fallout prediction.

Exercises in Nuclear Burst reporting.

re a forward observer posted at CS184937. AT 1121 India, you see a flash of light at 75 degrees magnetic from your position. As you turn away from the light, start counting the flash-to-bang time. When you seconds, you hear the thunderous roar of the explosion. You hold your until the blast wave passes back over your position. While you wait for ations to resume, write the NBC-1 initial nuclear report. Don't forget has a flash precedence.

minutes delay you have sent the initial report over the command net. You o more minutes observing the cloud grow. It has now been five minutes. sure the angle from you position to the left side of the dirty mushroom loud and find that it is 72 degrees magnetic. You then measure the angle ight side and read 78 degrees magnetic. Revise the initial NBC-1 report the new informaton that you now know.

are stationed at CT328047. At 1121 India, you observe a brilliant flash at 1980 mils from your position. After counting for 26 seconds you hear losion. You check your landline and find it it intact. Write the message u will send to the CP.

u spend the next eight minutes calling in close air support. As you look at atch, you find that in one minute you will need your field binoculars to e the vertical angle and find that the top of the cloud is 610 mils up from osition. Prepare the follow up NBC-1 report for transmission.

pproximately 1915 hours local time you observe a nuclear burst from your position, located at TR244304. You measure a magnetic azimuth of 286° to ero and flash-to-bang time of 36 seconds. Write the report which you send battalion S3 to report this nuclear burst.

u are a platoon leader in the 416th Signal Company, located at s NT477296. At 0545 hours local time you observe a nuclear burst south osition. You immediately take cover and make certain measurements of the u estimate the flash-to-bang time to be 51 seconds. Using your compass, te the magnetic azimuth to the burst to be 210°. It looks to you like a rst. Write out the message which you will send to your next higher rs to report the burst.

e minutes after the burst you estimate the width of the mushroom cloud 0 mils. Write the out message you will use to report this new data to

-cise: Estimate Yield

following values of letter line items from NBC 1 Reports, find the
N (yield).

20 Sec
16 Deg
_____

20 Sec
30 Deg (CB)
_____

75 Sec
18 Deg
_____

25 Sec
300 Mils (CT)
_____

30 Sec
220 Mils (CB)
_____

7 Sec
50 Deg (CB)
_____

20 Sec
325 Mils
_____

20 Sec
450 Mils
_____

140 Sec
185 Mils (CB)
_____

70 Sec
25 Deg (CT)
_____

2. J. 50 Sec
L. 130 Mils
N. _____

4. J. 20 Sec
M. 540 Mils (CT)
N. _____

6. J. 30 Sec
L. 70 Mils
N. _____

8. J. 20 Sec
M. 12 Deg (CT)
N. _____

10. J. 50 Sec
M. 9 Deg (CT)
N. _____

12. J. 55 Sec
M. 200 Mils (CB)
N. _____

14. J. 70 Sec
L. 245 Mils
N. _____

16. J. 85 Sec
M. 360 Mils (CB)
N. _____

18. J. 100 Sec
M. 170 Mils (CT)
N. _____

20. J. 15 Sec
M. 35 Deg (CT)
N. _____

Exercise: Estimate Yield

Given the following values of letter line items from NBC 1 Reports, find the line N (yield).

1. J. 20 Sec
   L. 16 Deg
   N. _____

2. J. 50 Sec
   L. 130 Mils
   N. _____

3. J. 20 Sec
   M. 30 Deg (CB)
   N. _____

4. J. 20 Sec
   M. 540 Mils (CT)
   N. _____

5. J. 75 Sec
   L. 18 Deg
   N. _____

6. J. 30 Sec
   L. 70 Mils
   N. _____

7. J. 25 Sec
   M. 300 Mils (CT)
   N. _____

8. J. 20 Sec
   M. 12 Deg (CT)
   N. _____

9. J. 30 Sec
   M. 220 Mils (CB)
   N. _____

10. J. 50 Sec
    M. 9 Deg (CT)
    N. _____

11. J. 7 Sec
    M. 50 Deg (CB)
    N. _____

12. J. 55 Sec
    M. 200 Mils (CB)
    N. _____

13. J. 20 Sec
    L. 325 Mils
    N. _____

14. J. 70 Sec
    L. 245 Mils
    N. _____

15. J. 20 Sec
    L. 450 Mils
    N. _____

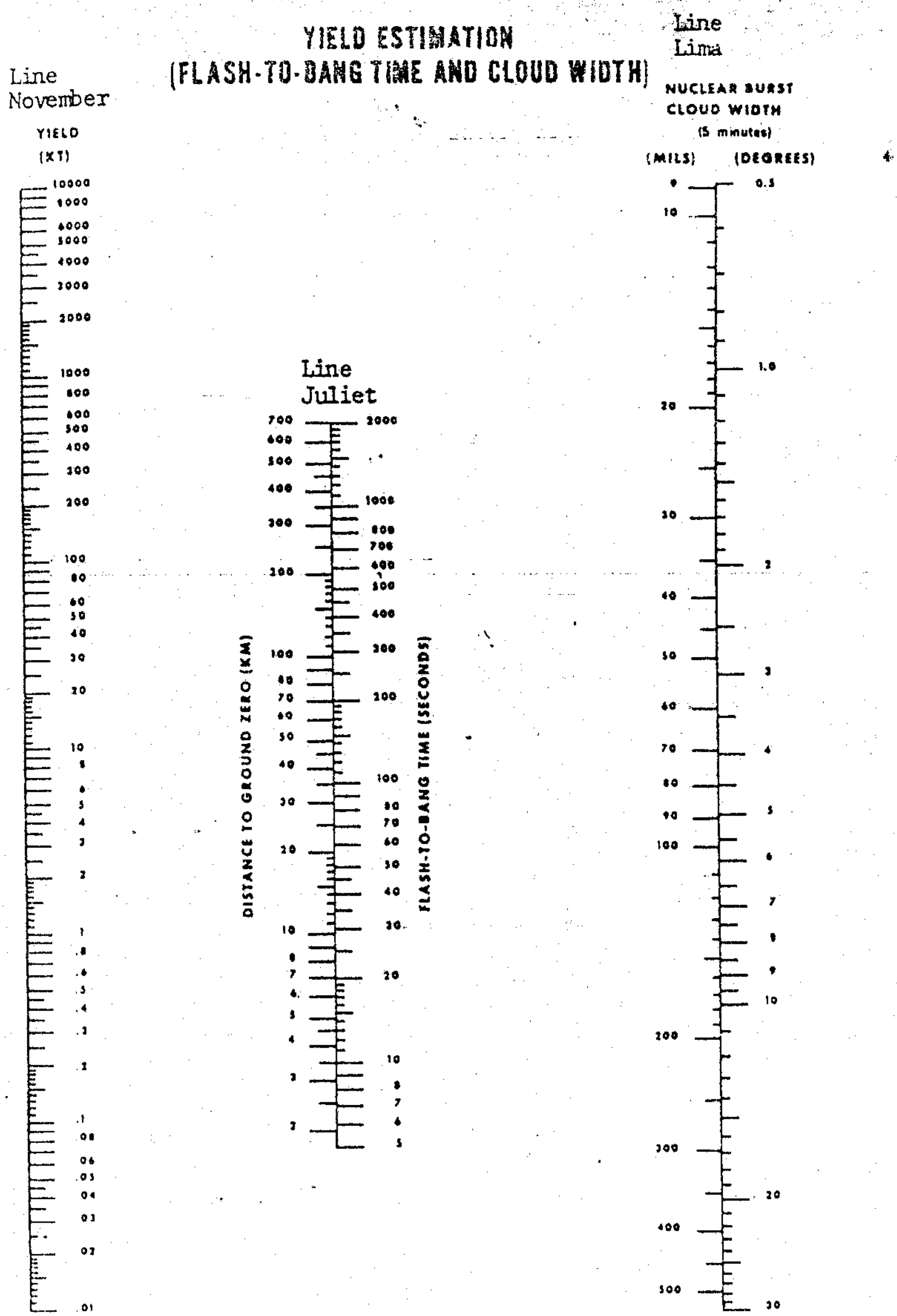
16. J. 85 Sec
    M. 360 Mils (CB)
    N. _____

17. J. 140 Sec
    M. 185 Mils (CB)
    N. _____

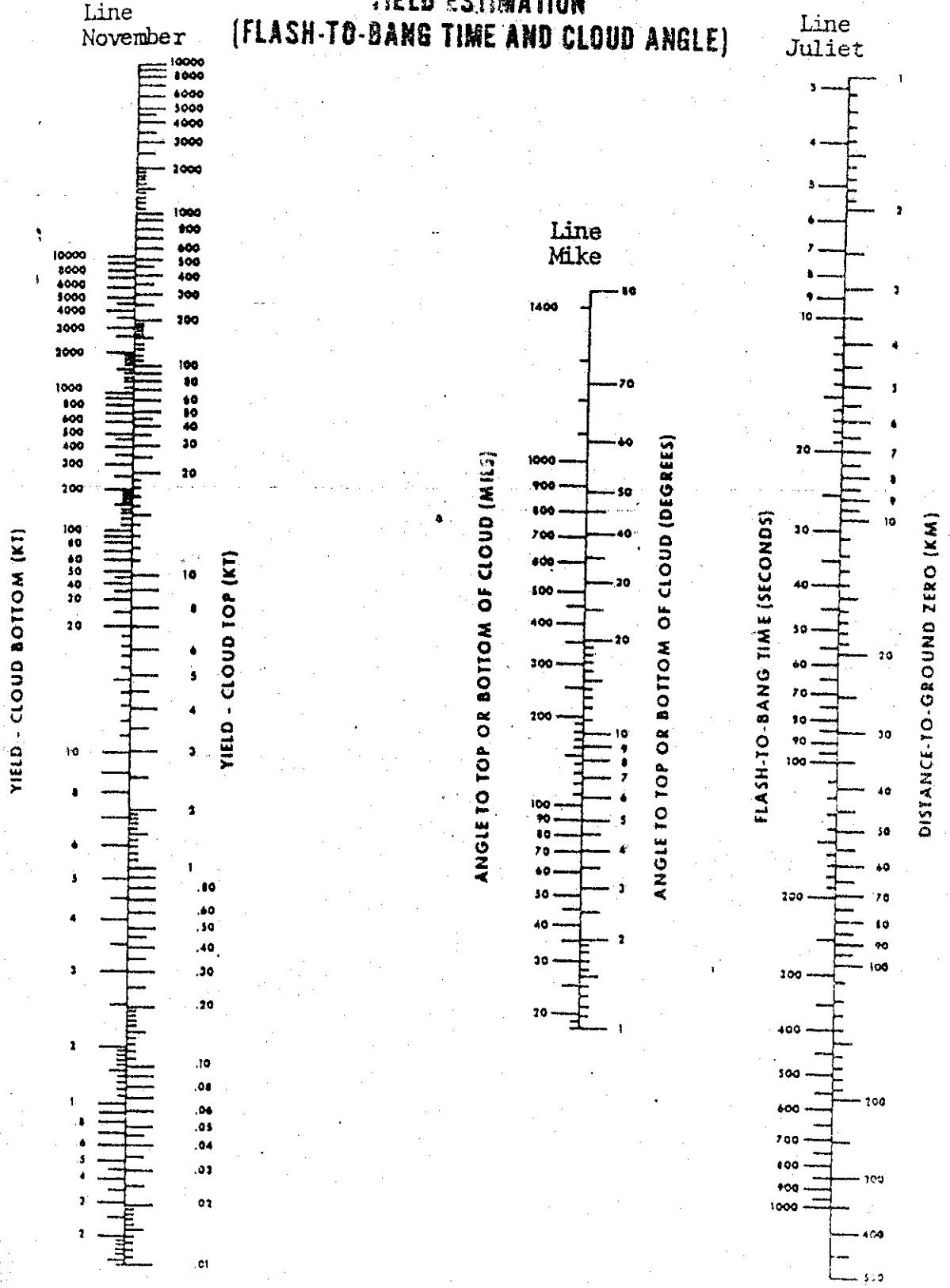
18. J. 100 Sec
    M. 170 Mils (CT)
    N. _____

19. J. 70 Sec
    M. 25 Deg (CT)
    N. _____

20. J. 15 Sec
    M. 35 Deg (CT)
    N. _____



Yield estimation (flash-to-bang time or distance to ground zero versus nuclear burst angular cloud width at 5 minutes after detonation).



Yield estimation (flash-to-bang time versus stabilized cloud-top angle or stabilized cloud-bottom angle).

(Page 3-10, FM 3-12, Fig 4-1)

YIELD ESTIMATION
USING THE ABC-M4A1 NUCLEAR YIELD CALCULATOR

A. Yield Cloud Width:

Given: J 100 Seconds
L 180 Mils
N ? _____

Solution: Aline 100 seconds on the Flash-to-Bang Time Scale with 180 mils on the Observed Cloud Width at 5 minutes (mils) scale. Read the yield at the point where the indexing pointer alines with the Yield Scale.

Yield 49kt

If line J is given in degrees you must convert to mils by multiplying the number of degrees by 17.8 equals the number of mils.

Example: J 80 seconds
L 15 degrees
N ? _____

15 degrees x 17.8 = 267 mils

Now line up the Flash-to-Bang Time Scale with 267 mils and read yield.

Yield: 77kt

B. Yield Cloud Top or Cloud Bottom:

Given: J 100 seconds
M 300 mils (ct)
N _____

Solution: Aline 100 second on the Flash-to-Bang Time scale with 300 mils on Stabilized Cloud Bottom or Top Elevation Angle Scale. Read the Yield on the Yield-Stabilized Cloud Top scale that falls under the indexing pointer. You should read about 22KT.

Note: No conversions are necessary when using this side of the wheel because it has both mils and degrees.

Exercise: Estimate Yield

_ sec
_ degrees
_____

2. J 45 sec
L 150 mils
N _____

3. J 20 sec
L 30 degrees
N _____

4. J 15 sec
L 450 mils
N _____

_ sec
_ degrees
_____

6. J 30 sec
L 70 mils
N _____

7. J 25 sec
L 300 mils
N _____

8. J 20 sec
L 20 degrees
N _____

_ sec
_0 mils
_____

10. J 50 sec
L 10 degrees
N _____

_ sec
_ degrees (CT)
_____

2. J 20 sec
M 540 mils(CB)
N _____

3. J 25 sec
M 300 mils (CB)
N _____

4. J 20 sec
M 15 degrees (CT)
N _____

_ sec
_0 mils (CB)
_____

6. J 50 sec
M 10 degrees (CT)
N _____

7. J 12 sec
M 200 mils (CB)
N _____

_0 sec
_5 degrees (CT)
_____

9. J 15 sec
M 35 degrees (CT)
N _____

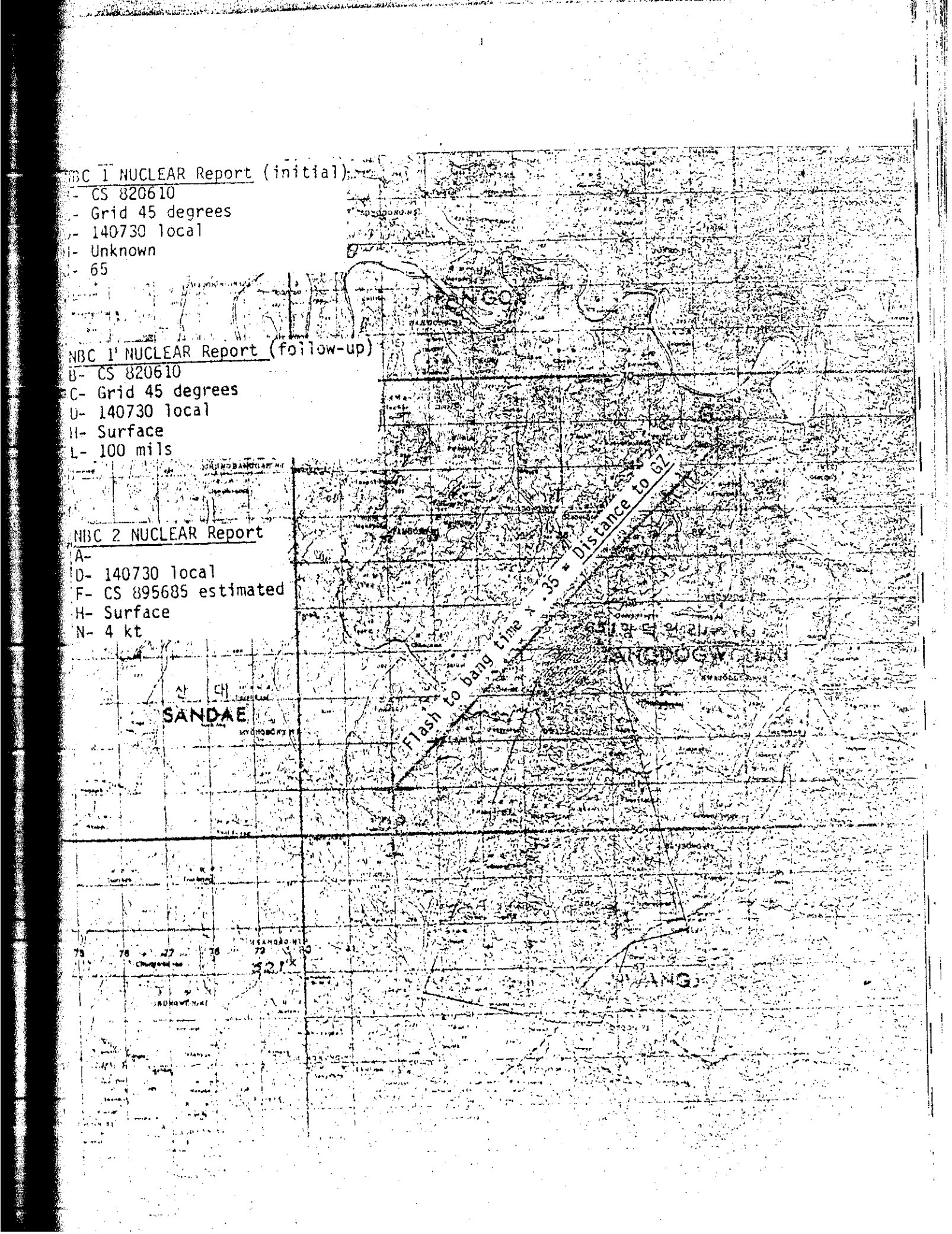
10. J 20 sec
M 45 degrees (CB)
N _____

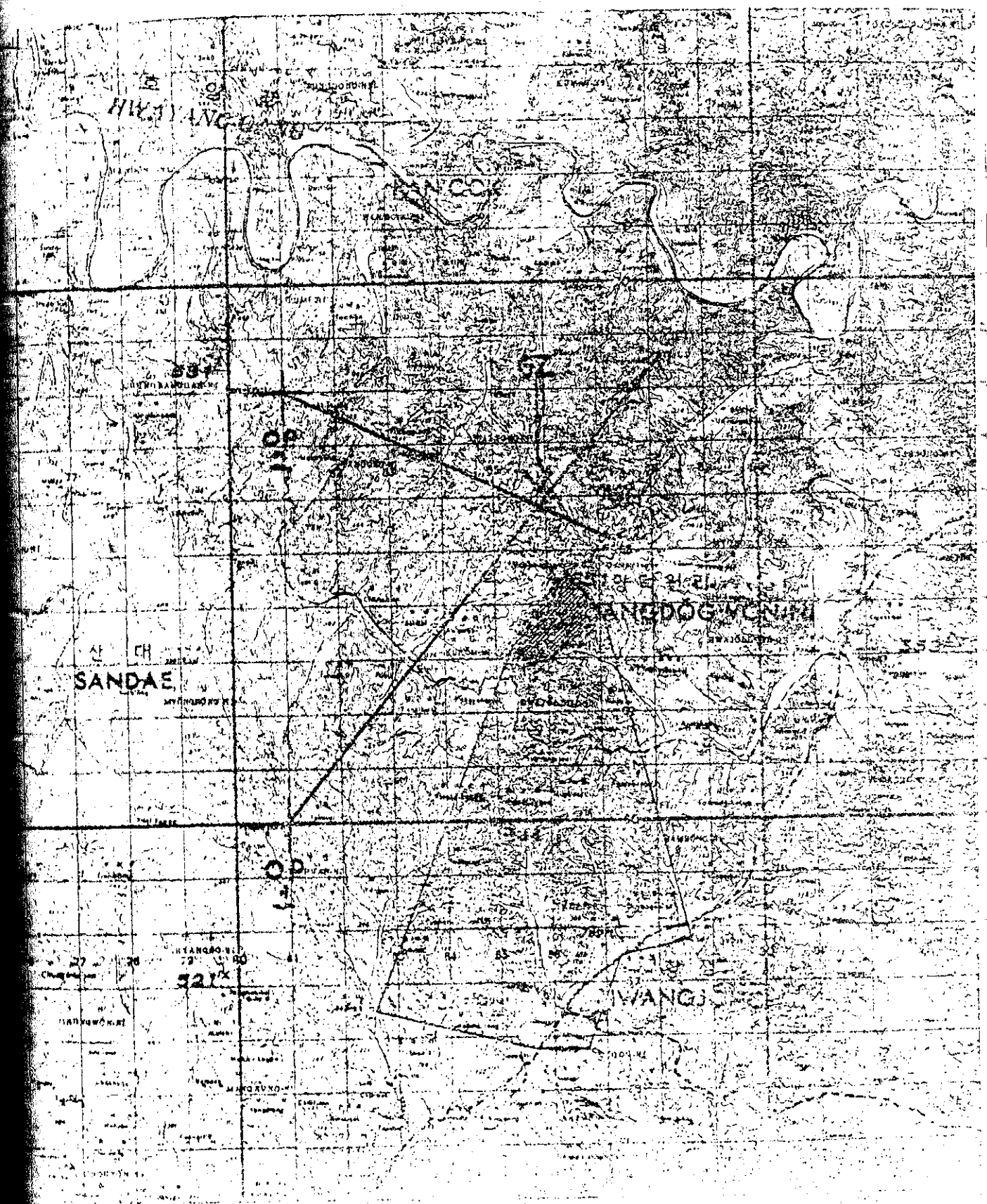
NOTES

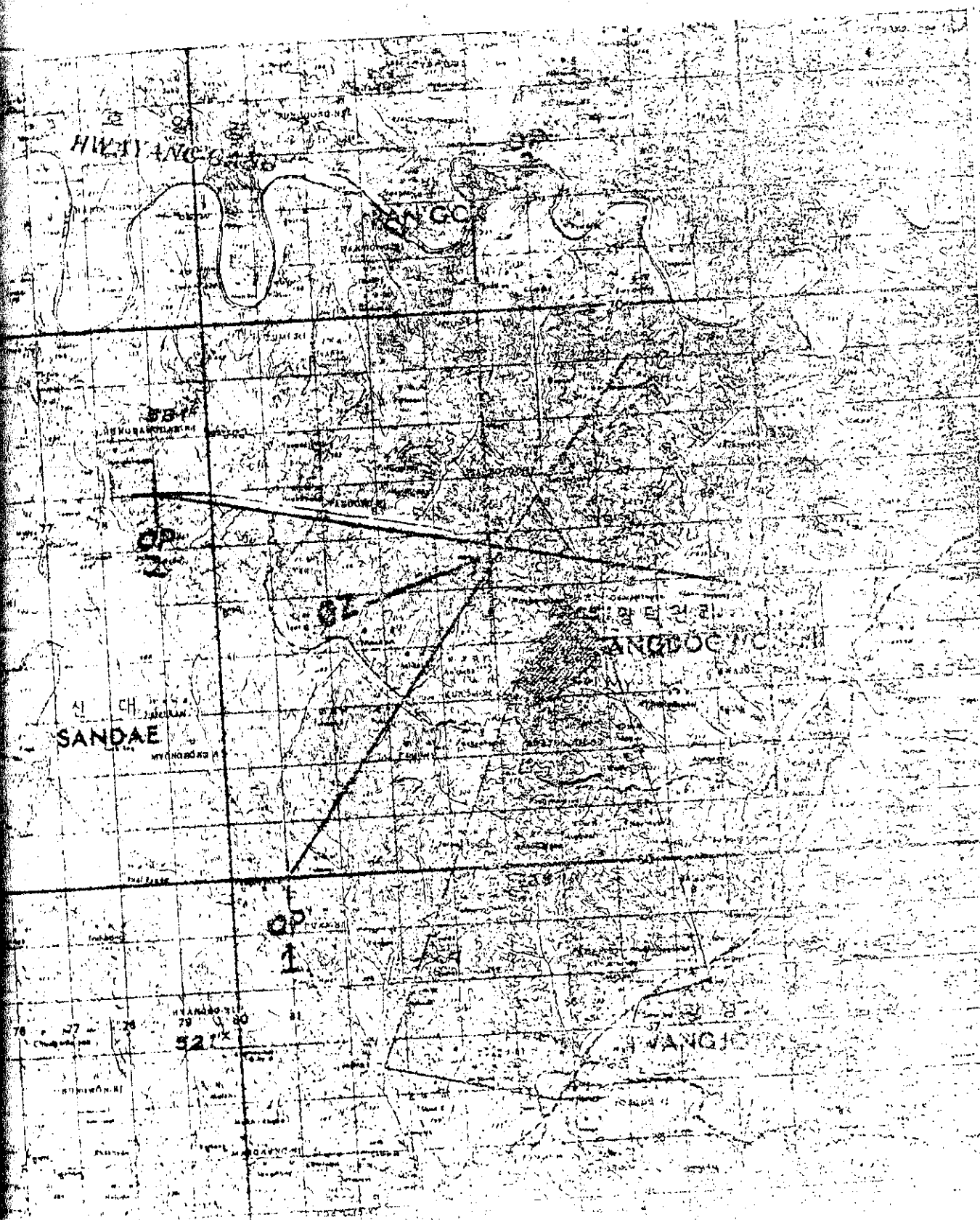
NBC 1 NUCLEAR Report (initial)
A- CS 820610
B- Grid 45 degrees
C- 140730 local
H- Unknown
L- 65

NBC 1' NUCLEAR Report (follow-up)
B- CS 820610
C- Grid 45 degrees
D- 140730 local
H- Surface
L- 100 mils

NBC 2 NUCLEAR Report
A-
D- 140730 local
F- CS 895685 estimated
H- Surface
N- 4 kt




SANDAE
IVANGJ


SANDAE
CP 2
CP 1

NBC Wind/Weather Message

Effective Downwind Message (EDM)

FORMAT	MEANING
ZULU: DDTTTT	Date/Time winds were measured given in zulu or local time. Valid for 12 hours from stated time.
ALFA: dddsss	Over 0 thru 2 KT [3,4,5,6]
BRAVO: dddsss	Over 2 thru 5 KT
CHARLIE: dddsss	Over 5 thru 30 KT
DELTA: dddsss	Over 30 thru 100 KT
ECHO: dddsss	Over 100 thru 300 KT
FOXTROT: dddsss	Over 300 thru 1 MT
GOLF: dddsss	Over 1 thru 3 MT

Notes:

1. Effective Downwind Message is used with Area Predictor, Radiological Fallout, ABC-M5A2 and NBC 2 (Nuclear) Report to prepare simplified fallout predictions.

2. The first two digits (DD) are the day of month; the last four digits (TTTT) are the time.

3. The first three digits (ddd) give the direction the wind is blowing <u>toward</u> in degrees from grid north.

4. The last three digits (sss) give the wind speed in kilometers per hour.

5. The symbol (nn) added to a line indicates a special case. Left and right radial lines on M5A2 must be expanded to angle indicated.

6. When only three digits are given on a line, the value given is the downwind distance of zone one.

TYPES OF FALLOUT PREDICTIONS

following types of radiological fallout predictions are used to aid nning after a nuclear burst.

Simplified fallout predictions

Detailed fallout predictions

Special case fallout predictions

Strikwarn (friendly) predictions

posed unprotected personnel can expect to receive the following doses diation for each zone.

Zone I: Expected to receive 150 rad (cgy) in less than 4 hours after fallout arrives.

Zone II: Not expected to receive 150 rad (cgy) within 4 hours but may receive 50 rad (cgy) or greater within 24 hours after fallout arrives.

Outside the predicted zone: May receive total dose that does not reach rad (cgy) in first 24 hours after fallout arrival. The total dose for infinite time of stay outside the area should not reach 150 rad (cgy)

ommanders should not move units solely based on a fallout prediction.

allout predictions can be used for the following purposes.

. When a commander plans the use of a nuclear weapon that lacks a 99% robability of being safe.

. When information indicates that fallout is occuring or that fallout ill occur, a prediction is required to warn higher, adjacent, and ubordinate unites.

c. When information is needed to plan surveys or other aspects of the collection effort. The prediction establishes an outline of the expected hazard that can be used for this purpose.

FALLOUT PREDICTION

fied fallout predictions

quirements

) NBC 2 Nuclear report, or NBC 1 Nuclear report

) Current effective downwind message

) M5A2 area predictor

cedures

Determine the weapon yield

Find appropriate line on EDWM

Draw azimuth of wind direction through azimuth wheel from ground zero and label GN (grid north)

Darken cloud radius for appropriate weapon yield

Use windspeed and yield (nomogram) to calculate downwind distance of Zone I. Zone I x 2 = Zone II

Draw tangent lines from edge of cloud radius to end of Zone I

Darken radial lines between Zone I and Zone II. Label prediction Zone I and Zone II.

Draw in dashed time of arrival archs useing windspeed from EDWM and label H+1 and H+2. H+1 x 2 = H+2

Label prediction (lines A, D, and F) from NBC 2 or NBC 1 Nuclear report

Place prediction on map and orient to grid north.

FALLOUT PREDICTION PRACTICAL EXERCISE

. Given the following information, construct a simplified fallout prediction.

BC - 2 Nuclear Report
lfa 21DN002
elta 191100 India
oxtrot CT 187059
otel Surface
ovember 15KT

ale 1:50,000

Effective Downwind Message	
Zulu	190600 India
Alfa	070010
Bravo	090020
Charlie	142012
Delta	141020
Echo	140025
Foxtrot	139030
Golf	136035

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actical Exercises

WM

XX0800Z
007
140010
142014
152014
134016
101019

M same as problem 1

M

XX0800Z
166010
165011
165009
160012
154009
008

M

XX 08001
245012
232017
238015
240016
246010
250014
same as problem 4

1. NBC 2 Nuclear

A. NO1
D. XX1645I
F. CS 740720
H. Surface
N. 3kt

2. NBC 2

A. NO2
D. XX1645I
F. CS 885635
H. Surface
N. 13kt

3. NBC 2
A. NO3
D. XX1530I
F. CS 885635
H. Surface
N. 20kt

4. NBC 2
A. NO4
D. XX1415
F. CS 722625
H. Surface
N. 1.5kt

5. NBC 2
A. NO5
D. XX1014I
F. CS 7[illegible]
H. Air
N. 15[illegible]

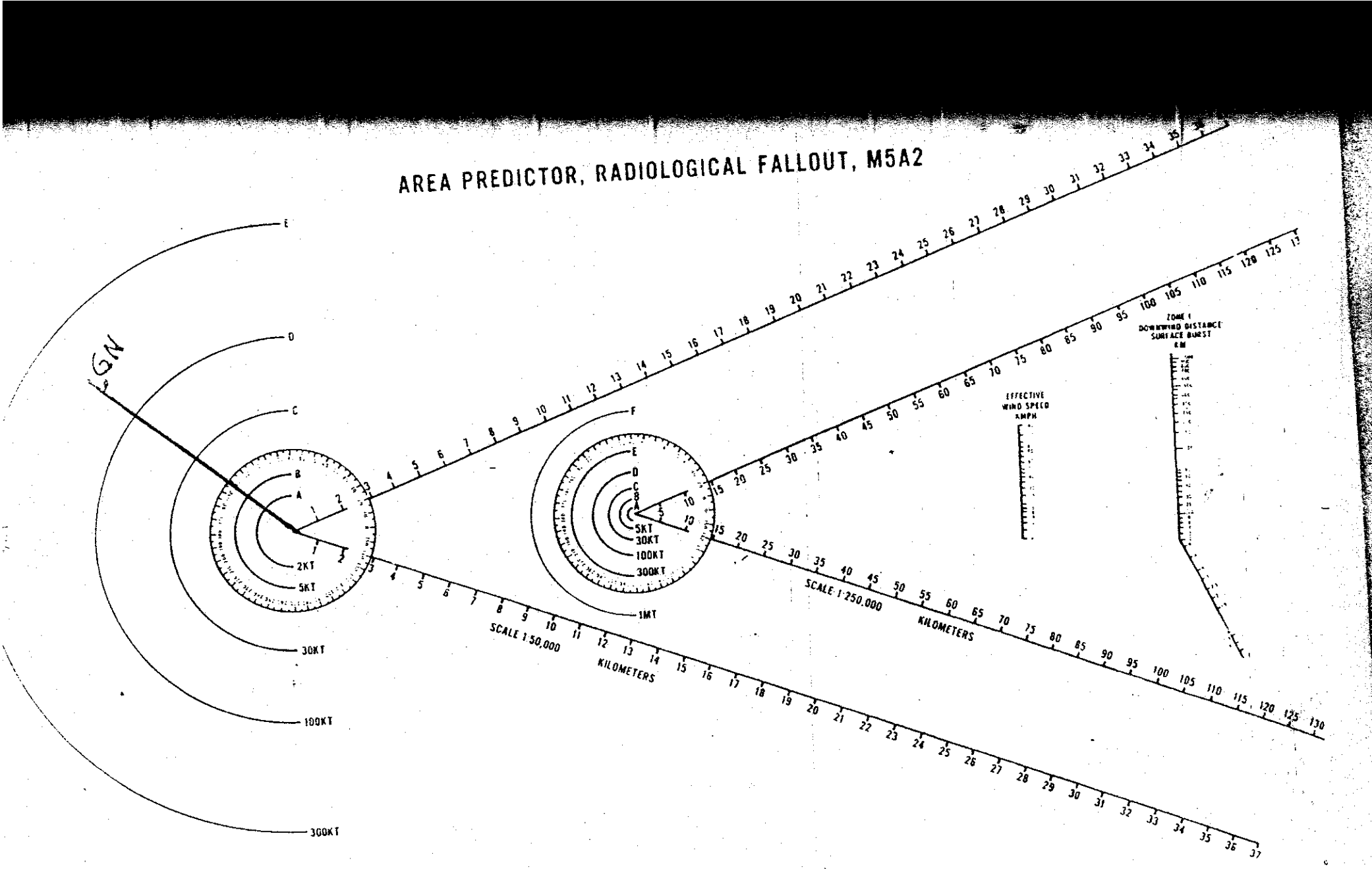
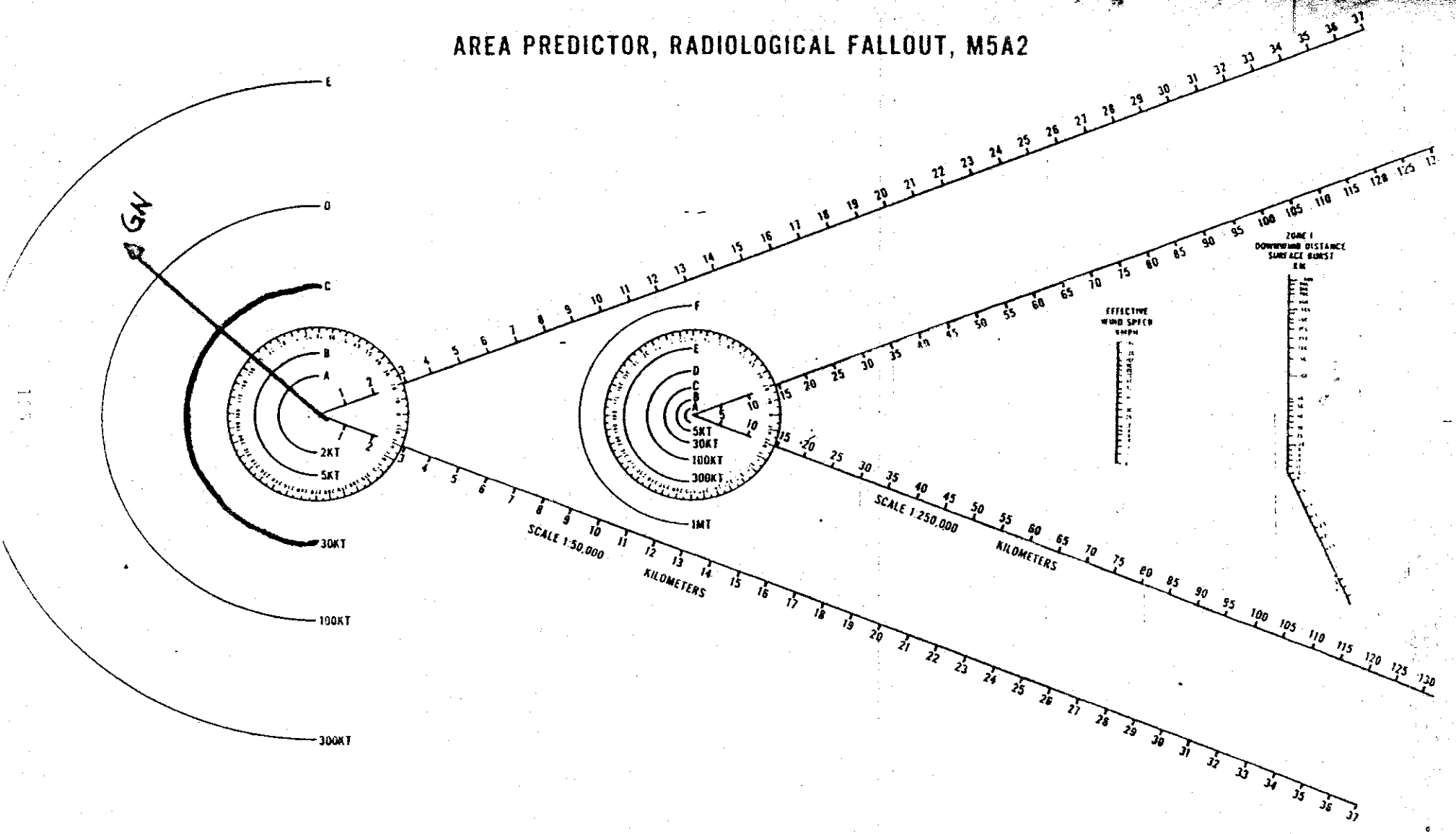


Figure 1. The M5A2 radiological fallout area predictor.



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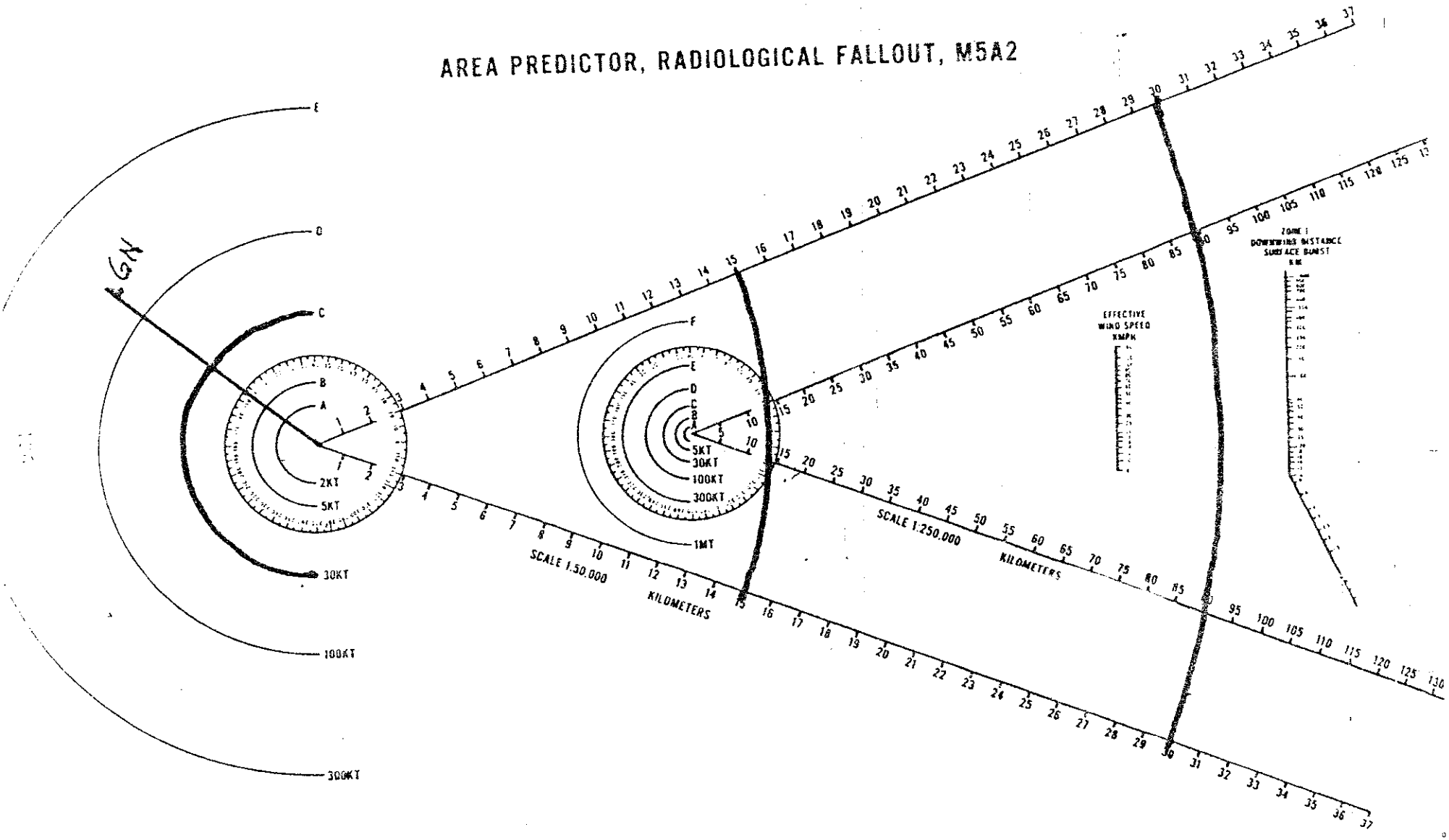

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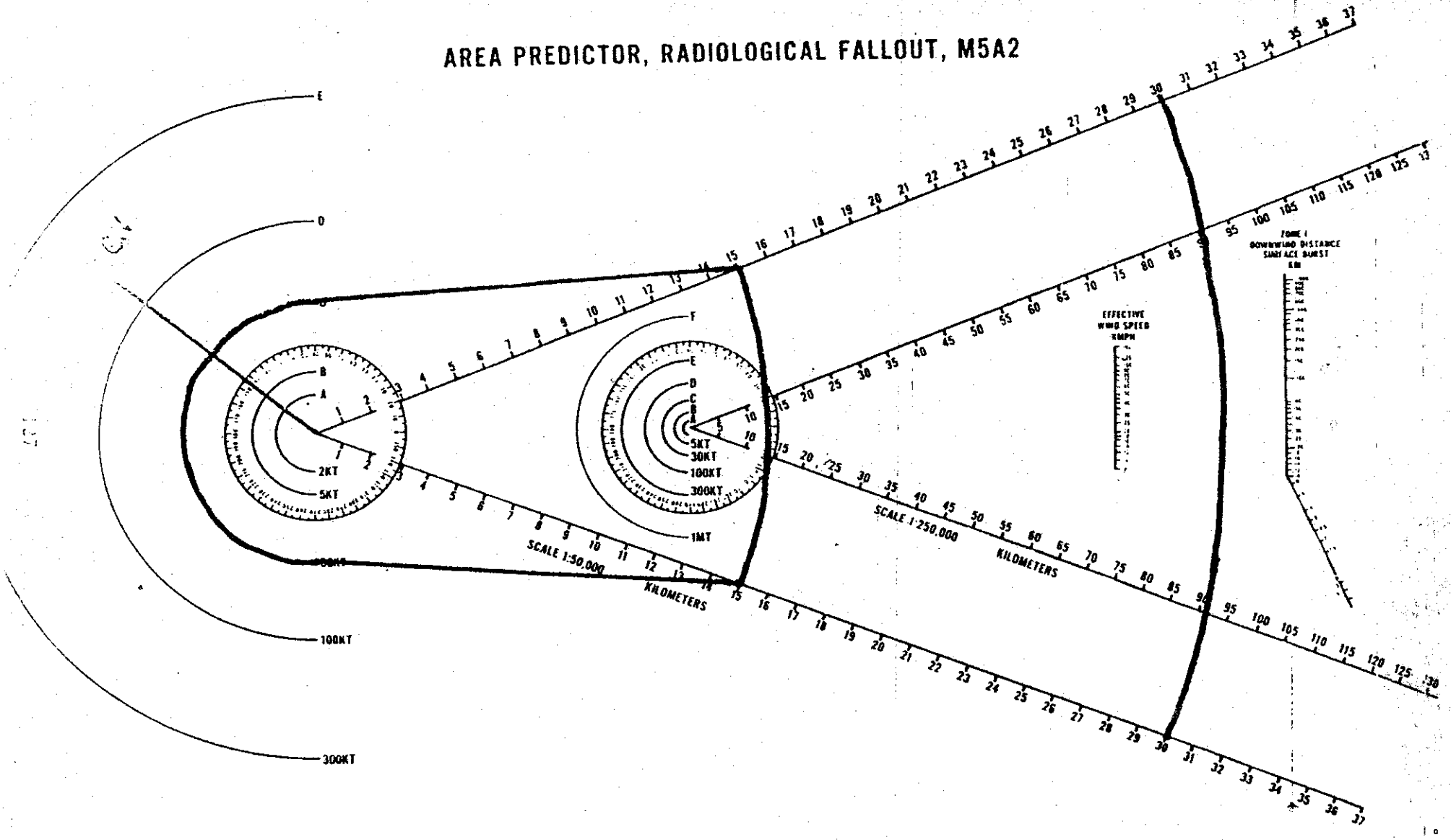

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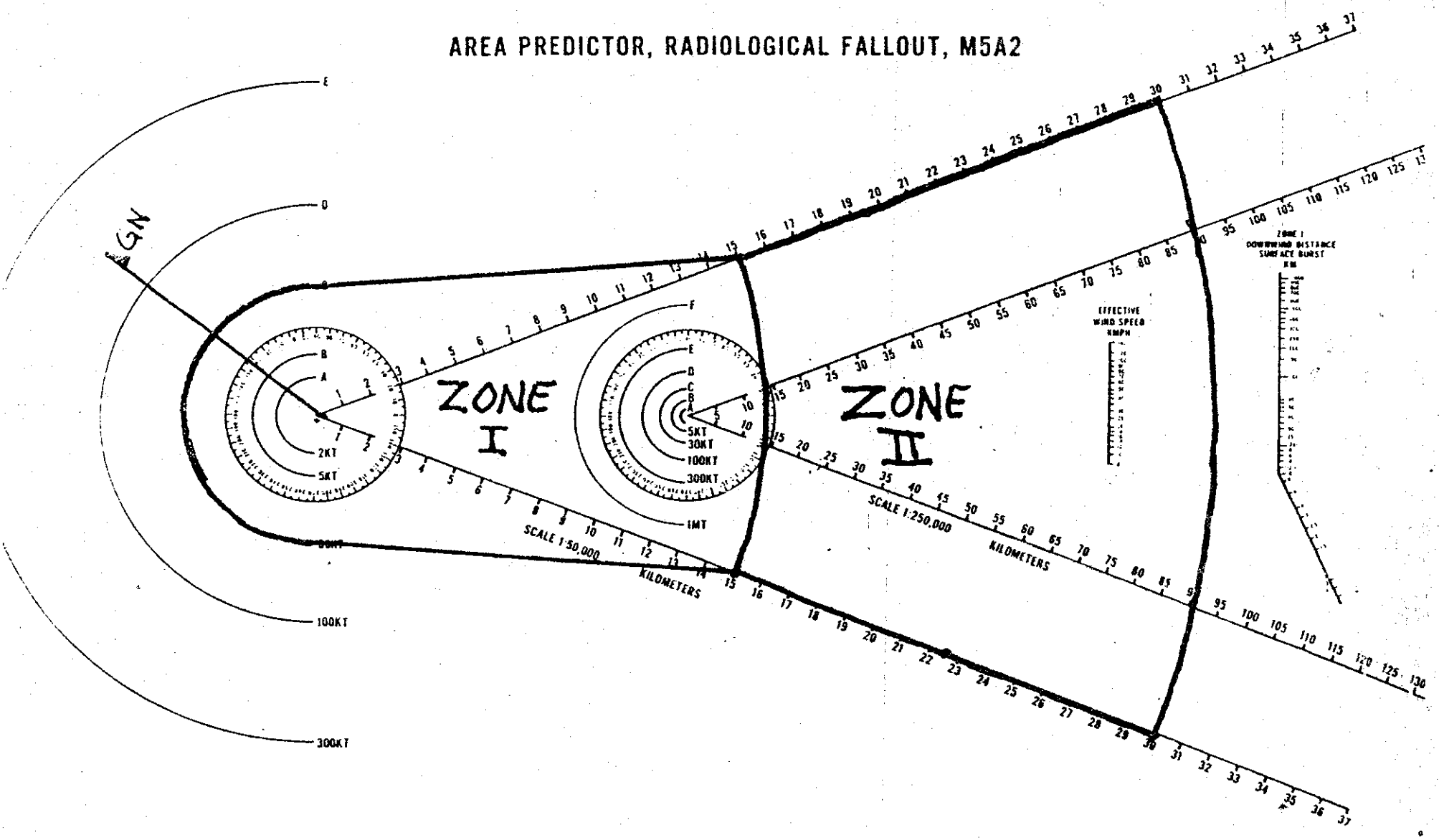

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