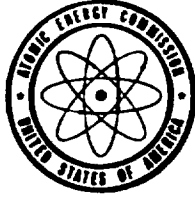


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SECRETARIAT

AEC 907/35

June 24, 1968

AEC RESPONSE TO ACCIDENTS INVOLVING WEAPONS IN DOD CUSTODY

75946

Note by the Secretary

The General Manager has requested that the attached report by the Assistant General Manager for Military Application, be circulated for consideration by the Commission at an early date.

W. B. McCool  
Secretary

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ATOMIC ENERGY COMMISSION

AEC RESPONSE TO ACCIDENTS INVOLVING NUCLEAR WEAPONS  
IN THE CUSTODY OF THE DOD

Report to the General Manager by the  
Assistant General Manager for Military Application

THE PROBLEM

1. To review AEC procedures for response to accidents involving nuclear weapons in the custody of the DoD.

BACKGROUND AND SUMMARY

2. On May 20 the AGMMA conducted a meeting of representatives from concerned AEC Headquarters and Field Offices and the AEC weapons laboratories to discuss lessons learned as a result of AEC participation in the response to the B-52 accident at Thule, Greenland, and to consider recommendations for improving AEC response to future accidents involving nuclear weapons in DoD custody. A member of the staff of the Commander, Strategic Air Command, also attended the meeting in an advisory capacity. An additional purpose of the meeting was to prepare a coordinated AEC position for a forthcoming policy discussion on the subject of AEC support of the DoD in nuclear accidents to be conducted with AEC representatives during a July 9, 1968, meeting of the Military Liaison Committee, at the request of the Chairman, MLC. It is planned that the results of that discussion will be formalized by a subsequent exchange of correspondence between the AEC and MLC.

3. Broad AEC responsibility for radiological health and safety matters is, of course, implicit in the Atomic Energy Act of 1954, as amended. Further, National Security Action Memorandum (NSAM) No. 51 of May 8, 1961, states in part "...the President has directed that the Department of Defense have immediate administrative responsibility for identifying and resolving health and safety problems connected with the custody and storage of nuclear weapons. He has further specified that the Atomic Energy Commission will participate in the consideration of these problems as a matter of continuing responsibility." Further, experience has shown that the public and the Congress, particularly the Joint Committee on Atomic Energy, look to the AEC to provide expert advice and assistance with respect to all radiological safety matters.

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4. The existing agreements with the DoD pursuant to which the Commission responds to DoD nuclear weapons accidents are:

a. The "Joint Department of Defense and Atomic Energy Commission Agreement in Response to Accidents Involving Radioactive Material", dated May 9, 1966. This agreement is commonly referred to as the "JNACC (Joint Nuclear Accident Coordinating Center) Agreement" and updates a February 27, 1958, agreement to the same effect.

b. A 1958 exchange of correspondence among the Deputy General Manager, the ATSD(AE) and the Chief, Armed Forces Special Weapons Project (now Director, Defense Atomic Support Agency), to provide for the immediate dispatch of a limited number of AEC and DoD observers to the scene of radiological accidents. Copies of the pertinent documents are attached as Appendices "A", "B", and "C", respectively. There is no agreement with the DoD which provides for the AEC to immediately and automatically dispatch active participants to a DoD accident scene.

5. By memorandum of March 27, 1958, the General Manager assigned to all AEC Field Office Managers the responsibility to support all applicable portions of the JNACC Agreement, and additionally assigned the Manager, Albuquerque Operations Office, the responsibility for operation of the AEC element of the JNACC and for direct control and coordination of AEC participation. By this direction the full capability of the AEC Radiological Assistance Plan, AEC Manual 0526, remains continuously at the disposal of the JNACC for response to radiological accidents which occur in the continental United States, Alaska, Hawaii, Canal Zone, Puerto Rico, and the Virgin Islands. Including requests through the JNACC system and direct requests to AEC offices in accordance with the Radiological Assistance Plan, the AEC has provided prompt and effective initial emergency response to over three hundred radiological accidents and incidents of a variety of types which have occurred in the CONUS. None of these has involved atomic weapons or presented radiological problems of the magnitude of those experienced from the Palomares and Thule weapons accidents and the attendant scope, depth, and sophistication of AEC response required. It is not anticipated that CONUS incidents would ever involve foreign governments with resulting difficult international political problems such as were encountered at Palomares and Thule.

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6. In the absence of a positive weapon accident response agreement, the Director of Military Application, by memorandum of December 29, 1958, assigned to the Manager, Albuquerque Operations Office, the responsibility to provide from the Albuquerque Operations Office and weapons laboratory complex two AEC observers at the scene of CONUS DoD nuclear weapons accidents. This memorandum further provided that DMA would determine if observers would be sent to weapon accidents overseas. This memorandum is attached as Appendix "D".

7. There are certain deficiencies in the arrangements described above. Among these are the fact that, by definition, the mission of the JNACC is primarily to provide a centralized agency for exchanging and maintaining information concerned with radiological assistance capabilities, with coordination of assistance activities only "when called upon." In the vast majority of past DoD nuclear weapon accident/incident situations the role of JNACC has been limited to initial notification and information exchange as a channel paralleling the National Military Command Center, the Office of the ATSD(AE), or a military Service Headquarters, with the actual provision of AEC assistance coordinated directly among DoD agencies, AEC Headquarters, and the Albuquerque Operations Office. The 1958 exchange of correspondence defines the AEC participants as "observers" and limits them to two. Finally, the role of the AEC weapons complex accident response is largely limited by mission, assignment, and capability to technical advice and assistance in weapons-oriented areas concerning weapon safety, identification, evaluation, recovery, packaging, return, postmortem, and disposition of accident-involved weapons and weapons materiel. The immediate and automatic provision of support from the much wider capabilities of the AEC, in other than purely weapons-oriented disciplines, is not provided for under the scope of existing arrangements.

8. Through liberal interpretation and adaptation of the foregoing arrangements, AEC weapons-oriented response to DoD weapons accidents (normally consisting of three AEC Field Office and weapons laboratory weapon systems safety, weapons design, and high explosive specialists) has been prompt and effective, and until the occurrence of the Palomares, Spain, and Thule, Greenland, accidents has been all that was necessary. This is largely attributable to the fortunate circumstance that none of the

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previous accidents had resulted in the spread of any significant amounts of radioactive contamination, and none beyond the confines of a military installation where it could be promptly and effectively controlled by military decontamination teams.

9. Although AEC weapons-oriented response to the Palomares and Thule accidents was also prompt and effective, arriving almost concurrently with the DoD Disaster Control Teams, these accident experiences have shown that, for accidents which result in significant spread of radiological contamination, the provision of purely weapons-oriented assistance comprises only about 20 percent of the total AEC on-site response and technical support required. Additional AEC advice and assistance in such areas as radiological health hazard evaluation, nuclear criticality, ecological effects of radiation, radiological sampling, surveys and analyses, decontamination, and contaminated waste handling and disposal policies and procedures are also immediately required. The potential for serious human exposure is significant in the case of such materials as plutonium and tritium, and important health and safety decisions must be reached at the earliest possible time particularly where, as at Palomares and Thule, informal international diplomatic negotiations may be required almost immediately. In addition, a weapon accident in an inhabited area can create conventional wounds and thermal burns together with radiological hazards such as to require medical triage and related difficult but necessary medical judgments. Under the existing arrangements, provision of such additional AEC assistance awaits a determination by the DoD that a radiological problem exists and a decision to request further AEC assistance. Such additional assistance has of course been immediately provided upon request, and began six days after the occurrence of the Palomares accident, and four days after the occurrence of the Thule accident.

10. There is an important need to improve communications, both between AEC and DoD and within AEC. Communications difficulties experienced by the DoD Disaster Team Commander at Thule included lack of knowledge of what the AEC on-site role was, of who was authorized to speak for AEC and in what areas, of what additional AEC assistance was available, of who in AEC to contact for additional assistance, and of the arrivals and departures of AEC personnel. The difficulties of the AEC on-site representatives included merger into and subordination to the DoD Weapons Recovery Group, lack of communications with their AEC headquarters, lack of knowledge of the arrivals and status of other AEC and AEC contractor representatives, and obtaining current status and planning information from the DoD.

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11. Experience at Palomares, and even more markedly at Thule, has demonstrated that radiological detection instrumentation problems exist. A considerable period of time elapsed at Palomares before a sufficient inventory of operable radiac instruments and the capability to maintain them was assembled by the DoD. At Thule, the DoD standard model radiac instruments never functioned reliably because of the severe environment, and reliable quantitative measurements of contamination were not possible until the arrival of the sophisticated LRL FIDLER (Field Instrument for Detection of Low Energy Radiation) instruments and the required LRL personnel to operate, maintain, and calibrate the instruments and to interpret the readings. LRL advises that the cost of sophisticated laboratory radiac instruments such as the FIDLER instruments, and others currently under development for special applications, and the degree of personnel skill required to operate and maintain them, prohibit stocking of sizeable amounts of such equipment by the DoD and maintaining an adequate force of DoD personnel to operate and maintain it.

12. Thule and Palomares accident experience has shown that a significant time lapse, which might have radiological health and safety implications, is encountered when samples and specimens must be returned from a remote accident site to an established AEC or DoD laboratory for analysis. If a large number of samples is involved a logistics problem may also ensue.

13. Accurate calculations of the extent of atmospheric transport and diffusion, deposition, resuspension, and the resultant inhalation hazards from the post-accident cloud of plutonium and other radioactive aerosols are dependent upon the completeness and accuracy of meteorological and other data. The calculations are of importance in estimating the total distribution of active materials, and, in the event of a future accident in a densely populated area, may be of significant assistance in initial identification of persons who have been exposed to an inhalation hazard and therefore require further detailed health evaluation. Experience in Palomares and Thule has indicated that attention to the collection of the necessary data has been neglected until long after the accident.

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14. Communications problems can be greatly alleviated if the AEC were to immediately and automatically provide, as a result of a formal agreement with the DoD, a senior AEC staff representative at the scene of future accidents with the

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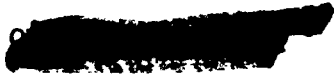
predefined mission to coordinate all AEC and AEC contractor on-site personnel and activities, to provide a single AEC point of contact with DoD representatives to provide information on the existence and most efficient employment of additional AEC support capabilities, and to provide to the DoD on-site commander authoritative AEC response in all matters of concern to the AEC.

15. Delays in provision of AEC advice and assistance in vital health and safety matters can be significantly reduced by the immediate and automatic provision, as a result of formal agreement with the DoD, of a more broad spectrum of AEC response. A typical AEC immediate accident response group would include, in addition to weapons specialists, a nuclear physicist, a medical doctor, a senior health physicist, and three radiological physicist assistants, an ecologist, a meteorologist, debris packing specialists and a waste handling and disposal specialist.

16. Radiological detection instrumentation problems can be alleviated most economically and reliably if the AEC maintains the capability to immediately and automatically provide at an accident scene a limited, but sufficient, quantity of specialized radiac instruments and a cadre of personnel to operate and maintain them. In addition, LRL has developed a mobile, air transportable, radiological sample analysis laboratory which can be transported to, and set up at, an accident scene to expedite the conduct of analyses and greatly reduce numbers of samples requiring transport to permanently established AEC or DoD laboratories. A formal agreement should be reached with the DoD for AEC to provide these instrumentation and portable laboratory services for use at an accident scene to supplement DoD standard radiac instruments.

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17. The problem of collecting adequate and accurate data for calculation of the likely extent and degree of spread of radiological contamination can perhaps be alleviated to some extent by widespread predistribution of a data collection checklist similar to that attached as Appendix "E" to this paper. Such a checklist might be reproduced and provided to AEC and DoD facilities for guidance in the event of a future radiological accident.



STAFF JUDGMENTS

18. The Office of the General Counsel and the Divisions of Biology and Medicine and Operational Safety concur in the recommendation of this staff paper.

RECOMMENDATION

19. The General Manager recommends that the Atomic Energy Commission:

a. Approve the approach whereby the DMA/AEC representative to the forthcoming AEC/MLC discussion of AEC support of the DoD in nuclear weapons accidents would begin negotiations leading to a mutually acceptable formal AEC/MLC agreement which would provide for expanded and automatic AEC support.

b. Note that the kind of measures on which agreement would be sought for improving response to accidents involving nuclear weapons in the custody of the DoD are described in paragraphs 14., 15., 16., and 17. of this staff paper.

LIST OF ENCLOSURES

<u>APPENDIX</u>		<u>PAGE NO.</u>
"A"	Joint DoD and AEC Agreement in Response to Accidents Involving Radioactive Material, dated May 9, 1966 .....	9
"B"	Letter fm ATSD(AE) to Deputy General Manager, AEC, dated April 22, 1958 .....	12
"C"	Letter fm Chief, AFSWP, to Deputy General Manager, AEC, dated May 26, 1958 .....	13
"D"	Memorandum fm Director of Military Application to Manager, Albuquerque Operations, dated December 29, 1958 .....	15
"E"	Data Collection Checklist .....	17

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APPENDIX "A"

JOINT DEPARTMENT OF DEFENSE AND ATOMIC ENERGY COMMISSION  
AGREEMENT IN RESPONSE TO ACCIDENTS INVOLVING RADIOACTIVE MATERIAL  
DATED MAY 9, 1966.

1. Purpose: To set forth the general areas of responsibility and general procedures required for prompt, effective, and coordinated response to accidents involving radioactive material.

2. Cancellation: This Agreement updates the "Joint Department of the Army, Navy, Air Force, and Atomic Energy Commission Agreement of General Areas of Responsibility and Procedures Applicable to the Prompt, Effective and Coordinated Response to Accidents Involving Nuclear Weapons" dated 27 February 1958, and existing memoranda of understanding on the same subject authorized thereunder, are superseded and cancelled.

3. Implementation: The Military Services, Defense Atomic Support Agency, and Atomic Energy Commission will issue instructions to implement this agreement.

4. Responsibilities:

a. The DoD or AEC official first to arrive at an accident scene will assume initial control of emergency operations and take such immediate action, within the limits of his capability, as may be necessary. The official will remain in control until relieved by the commander of the military installation or AEC facility nearest the accident or by a representative of the service or agency having the primary responsibility as set forth in paragraph c. or d. below.

b. The commander of the military installation or AEC facility nearest the accident will assume control of emergency operations and take such action, within the limits of his capability, as may be necessary. The commander will remain in control until relieved by a representative of the service or agency having the primary responsibility as set forth in paragraph c. or d. below.

c. Primary command responsibility for control at the scene of an accident, except under circumstances set forth in d. below, rests with the service or agency having physical possession of the material at the time of the accident. Control at the scene will be assumed as soon as possible by the representative of the responsible service or agency.

d. Primary command responsibility for control in the area where action is required in connection with accidents of a domestic emergency nature will rest with the Department of the Army. The term "domestic emergency" applies to emergencies occurring in and affecting the public welfare of the United States, its territories and possessions, as a result of enemy attack, insurrection, civil disturbances, earthquakes, fire, flood, and other public disasters or equivalent emergencies which disrupt the usual processes of government.

e. DASA and the AEC will operate a Joint Nuclear Accident Coordinating Center (JNACC) to provide and perform the function and mission set forth in paragraph 5.c. below. Assistance and information may be requested from the JNACC at any time.

f. The Military Services, DASA and the AEC will respond to requests from the JNACC for mutual assistance subject to command and operational limitations.

5. Procedures:

a. The Military Services, DASA, and the AEC will provide JNACC with information necessary for the maintenance of current records reflecting the location and capability of specialized units and teams which can be used for emergency radiological accident operations.

b. When the services of the JNACC are being employed, commanders concerned shall keep JNACC informed of the status of the effort at the accident scene and the identity and location of the on-the-scene commander.

c. The "mission" and the principal "task and functions" of the JNACC are as set forth below.

(1) Mission: To provide a centralized agency for exchanging and maintaining information concerned with radiological assistance capabilities and coordinating assistance activities, when called upon, in connection with accidents involving radioactive materials. **DOE ARCHIVES**

(2) Principal Task and Functions:

(a) Maintain current information as to the location and availability of specialized DoD and AEC teams or organizations capable of responding to accidents involving radioactive materials.

(b) Receive notification of accidents and requests for assistance.

(c) Request necessary assistance from appropriate DoD or AEC teams or organizations.

(d) Provide available accident information to appropriate commands and agencies.

(e) Obtain all available information regarding the radioactive material involved in the accident for relay to the accident scene.

(f) Refer public queries to the service or agency having primary command responsibility as described in paragraph 4.c. above.

(g) Furnish essentials of the JNACC operational procedures to all participants.

6. Reimbursement for Emergency Assistance Expense:

The Military Service or Agency providing the necessary assistance will fund such costs initially within existing fund availability. The Military Service or Agency having physical possession of the weapon or radiological material at the time of the accident will be responsible for reimbursing, upon request, the Military Service or Agency providing the necessary assistance for those costs which are in addition to normal operating expenses and which are directly chargeable to, and caused by, the radiological accident.

By authority of the Secretary of Defense and the Atomic Energy Commission:

FOR THE DEPARTMENT OF DEFENSE:

FOR THE ATOMIC ENERGY COMMISSION:

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/s/ Cyrus Vance  
Deputy Secretary of Defense

Glenn T. Seaborg

APPENDIX "B"

April 22, 1958

Dear Mr. Cook:

I concur with your proposal that a limited number of AEC observers should attend future operations resulting from incidents which are under the operational control of the Military Services.

I have asked the Chief, Armed Forces Special Weapons Project to make the appropriate arrangements, effective as soon as possible, to permit your observers to arrive on the scene at the earliest possible time.

Sincerely yours,

Herbert B. Loper  
Assistant to the Secretary  
of Defense (Atomic Energy)

Mr. R. W. Cook  
Deputy General Manager  
Atomic Energy Commission

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APPENDIX "C"

May 26, 1958

Mr. R. W. Cook  
Deputy General Manager  
Atomic Energy Commission  
Washington 25, D. C.

Dear Mr. Cook:

Reference is made to letter, Assistant to the Secretary of Defense (Atomic Energy), 22 April 1958, in which he concurred with your proposal that a limited number of AEC observers should attend future operations resulting from incidents which are under the operational control of the Military Services.

As requested by General Loper, I have made the following arrangements with the Services in order to permit your observers to arrive on the scene at the earliest possible moment. These arrangements have been coordinated also with members of your staff.

a. AEC will send a message containing the names of the AEC observers, their clearances, and estimated time of arrival at the scene to the Service having operational control of the incident. The message is to be sent to the cognizant Service, with information copies to this headquarters and the Joint Nuclear Accident Coordinating Center, Field Command, Armed Forces Special Weapons Project, as follows:

(1) Army - Chief of Staff, U. S. Army, with information copies to the Commanding General, U. S. Continental Army Command, and the Army commander of the geographical area concerned.

(2) Navy - Chief of Naval Operations, with information copy to the Commandant of the Naval District concerned.

(3) Air Force - Chief of Staff, U. S. Air Force, with information copy to the commander of the major air command concerned.

b. Your observers may proceed as soon as this message has been sent except in the case of those incidents which occur on board ship. In such cases, observers should not be dispatched until further instructions are received from the Chief of Naval Operations.

c. Further:

(1) Normally the number of observers is to be limited to two. Authorization for an increase in number must be obtained by a special request from the Atomic Energy Commission to the Service having operational control.

(2) Each civilian observer is to be "Q" cleared and have AEC certification for access to Top Secret information, and each military observer is to be cleared for Top Secret Restricted Data.

(3) Orders to AEC observers are to direct them to report to the officer in charge of the incident upon arrival at the scene. The observers will be subject to the control and safety measures established by the responsible commander. In the case of the Army, the observers should report to the senior Army Area representative located at the Incident Control Point. Also, in the case of incidents which occur within the geographical boundaries of a Naval installation ashore, the observers will be ordered the first report to the Commanding Officer of the installation for further instructions.

**DOE ARCHIVES**

(4) Transportation and subsistence for observers will be provided by the AEC.

(5) The AEC will be notified of incidents involving radiological materials in accordance with the reporting procedures currently in effect.

In your proposal, you expressed willingness to extend observer privileges to the Services. As the Services have indicated an interest to send observers to the scene of an incident under your operational control, it is requested that you notify me of the arrangements necessary for implementation.

Sincerely,

Edward N. Parker  
Rear Admiral, USN  
Chief, AFSWP

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APPENDIX "D"

December 29, 1958

K. F. Hertford, Manager  
Albuquerque Operations

Brig. General Alfred D. Starbird, USA  
Director of Military Application

OBSERVERS FOR ACCIDENTS INVOLVING WEAPONS ON MILITARY CARRIERS OR UNDER THE  
OPERATIONAL CONTROL OF THE MILITARY SERVICES

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Reference is made to the General Manager's memorandum dated July 2, 1958 concerning observers at sites of DOD incidents involving radiological contamination. In order to assure prompt AEC participation in the event of a weapons accident in the continental U.S. under the operational control of the Military Services, the following procedures will apply:

- a. The ALO will be responsible for sending two observers to the scene of the accident as soon as possible upon notification. One observer should be technically qualified; the other should be qualified in radiological accident procedure.
- b. An initial TWX report should be dispatched by the observers within 12 hours after arrival at the scene with an information copy to DMA. All TWX reports will be classified no lower than confidential regardless of content in order to protect AEC association with the location.
- c. Follow-up TWX reports should be sent as necessary to reflect pertinent changes in the situation.
- d. A final report to be forwarded to DMA within 30 days of the initial report.

The mission of these observers will be to:

- a. Obtain all available technical information on the accident itself and the involvement of the weapon.
- b. Obtain information regarding the administrative handling of the accident including emergency procedures, public information activities, legal or other problems encountered, etc.
- c. Render technical assistance on the scene if requested to do so by the responsible DOD representative.

In order to permit observers to arrive on the scene at the earliest possible moment, the following procedures will apply:

- a. Send a message containing the names of the observers, their clearances, and estimated time of arrival at the scene to the Service having operational control of the incident.

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- (1) Army - Chief of Staff, U.S.A., with information to the Commanding General, U.S. Continental Army Command, and the Army Commander of the geographical area concerned.
- (2) Navy - Chief of Naval Operations, with information to the Commandant of the Naval District concerned.
- (3) Air Force - Chief of Staff, USAF, with information to the Commander of the major air command concerned.
- (4) AFSWP - Information to Chief, Armed Forces Special Weapons Project.

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- b. The observers may proceed as soon as this message has been sent except in the case of those incidents which occur on board ship. In such cases, observers should not be dispatched until further instructions are received from CNO.
  
- c. Orders to observers are to direct them to report to the officer in charge of the incident upon arrival at the scene. The observers will be subject to the control and safety measures established by the responsible commander. In the case of the Army, the observers should report to the senior Army area representative located at the Incident Control Point. Also, in the case of incidents which occur within the geographical boundaries of a Naval installation ashore, the observers will be ordered to first report to the Commanding Officer of the installation for further instructions.

In the event that there is a need for additional observers, arrangements will be made by the Division of Military Application.

In event of a similar accident overseas, the Division of Military Application will determine what action will be taken at the time of the accident.

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APPENDIX "E"

DATA COLLECTION CHECKLIST

1. Accident Description.

a. General

- (1) Number and type of nuclear weapons involved.
  - (a) number without loss of radioactive material.
  - (b) number burned.
  - (c) number detonated.
- (2) Other high explosive involved.
  - (a) amount burned.
  - (b) amount detonated.
- (3) Other flammables (fuel, oils, etc.).
  - (a) amount involved in initial deflagration.
  - (b) amount in residual fire.
- (4) Duration of initial high order explosions and deflagration.
- (5) Duration of residual fire.

b. Specific (if available).

- (1) Estimated radioactive material in air (mass, or percent).
- (2) Estimated mass accounted for on ground, on debris, etc.
- (3) Size spectrum of airborne and deposited plutonium.

c. Other specifics

- (1) Time of accident.
- (2) Site of accident with map (topographic, if available).
- (3) Description of accident.
- (4) Other observations deemed pertinent by observers.

2. Cloud (if observed).

a. At time of accident (within 2 minutes).

- (1) Height
- (2) Width
- (3) Description of shape (picture, sketch, radar observation, etc.)

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b. After 2 minutes.

- (1) Height, width, shape, etc.
- (2) Direction and speed of travel of upper, middle and lower portions of cloud; particularly note differences.

3. Wind-Transport and Diffusion.

a. At or near accident site as soon as possible after accident.

- (1) Wind speed and direction and temperature at surface (measurement or estimate - specify which). Time-trace record of any or all of these if available.
- (2) Wind speed and direction and temperature with height.
- (3) Time of day.
- (4) Cloud cover.
- (5) Ground cover (snow, sand, vegetation, etc.).

b. Within 100 Km of accident site, before and after accident.

- (1) Wind speed direction and temperature with height at regular weather observation stations; hourly observations are recommended for first 10 hours and 6 to 10 daily thereafter 'til end of cleanup.
- (2) Cloud cover, as in 1.
- (3) Precipitation areas, immediately and as in 1.
- (4) Large scale topographic map. Scale of 1 = 250,000 or less.
- (5) Special wind and temperature observation with height at and downwind of the accident site.

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