



## **National Contingency Plan to Manage Industrial /Technical Disasters**



**National Disaster Management Authority  
Government of Pakistan**

**NATIONAL INDUSTRIAL DISASTER MANAGEMENT CONTINGENCY PLAN****(NIDMCP)**

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**2010****NATIONAL DISASTER MANAGEMENT AUTHORITY  
PRIME MINISTER'S SECRETARIAT  
ISLAMABAD**

**PROMULGATION OF NATIONAL DISASTER MANAGEMENT ORDINANCE (NDMO 2007)**

1. National Disaster Ordinance 2007 was promulgated for information, guidance and compliance by all Ministries, Departments and Industrial facilities for carrying out their tasks in case of a National Disaster. The document is available at NDMA website [www.ndma.gov.pk](http://www.ndma.gov.pk)
2. This document contains detailed instructions and National Contingency Plans for Management of Industrial Disasters to combat following disasters:-
  - a. **National Contingency Plan to Manage Industrial Disasters**
  - b. **To Combat Disasters at Port Terminals.**
  - c. **To Combat Disasters Emanating from Chem Bio Terrorists' Threats.**

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## Prime Minister's Message

It is a matter of satisfaction and assurance for me and our nation that Pakistan has established a National Disaster Management Commission and National Disaster Management Authority which is capable to deal with any emergency situation in the country.

It is a universally recognized fact that preparedness before occurrence of a disaster helps to a large extent to reduce both human and property losses. Efficient organization and detailed plan mitigate the impact of the disaster and also leads to early recovery and rebuilding of the affected segment of the society.

The void in our disaster management system was amply highlighted during and after the earthquake of 2005. Being conscious of that fact, the Government has gone a long way in the redressal of such an inadequacy. In this context, the system of disaster management cobbled together by setting up the National Disaster Management Commission (NDMC) under my chairmanship at policy level and creation of the National Disaster Management Authority (NDMA) at implementation level has been put in place. Similar institutions have been raised at provincial level, in AJK, Gilgit Baltistan and FATA which are now functional. District Disaster Management Authorities (DDMAs) in various parts of the country have also since been notified. Being dynamic in nature and yet in its infancy, the new disaster management system is expected to grow and deliver for the purpose it has been created.

It is with a great sense of satisfaction to note that the NDMA, since its inception and in a period of around two years has been able to conceive, develop and coordinate a number of disaster management plans and related activities. I am pleased to observe that contingency plans to mitigate and deal with various kinds of technical disasters like industrial disasters, disasters at port terminals and chemical-biological threat etc, have been meticulously addressed in this wholesome document. The detailed and coordinated mechanisms for responding to such like disasters were indeed a necessity in order to save precious lives, installations and infrastructure, in and around such national assets, besides catering to biological-chemical related terrorism.

As identified in the plan, all Ministries/Divisions/Departments and Provincial Governments have a key role for assisting the NDMA in the implementation of this Plan because a disaster as a consequence of such an emergency will require national effort. As such all stakeholders will be required to implement the Plan in letter and spirit and build requisite capacity to combat such envisaged disasters. The corporate sector is also expected to join hands with NDMA and PDMA's by effective participatory action on their part as their corporate responsibility.

I hope and wish that through the wholehearted execution of this Plan, we will not only be able to prevent but avoid causing losses to the people of Pakistan and its fragile economy. I also take this opportunity to express my best wishes for the successful future undertakings of the NDMA.

Syed Yusuf Raza Gilani  
Prime Minister  
Islamic Republic of Pakistan

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## **GENERAL**

1. Technical and Industrial disasters are a common and recurring phenomenon world wide. They can have deleterious effects on environment, safety of life and overall economy of the country. Their adverse effects on the population safety can be pronounced. Disasters may also be in the form of terrorist attacks, accidents of road/railway transport carriers or casualties at public places due to chemical attack by terrorists. Disasters can also occur in our strategic installations dealing with nuclear, radiological material. Such incidents demand well considered Relief and Rescue Operations. It is in this context, that National Contingency Plan to combat all such disasters by utilizing appropriate and adequate resources and measures has been outlined.

2. It may be emphasized that NDMO 2007 as National legislation broadly addresses mechanism of Disaster Management and responsibilities of various stake holders. In order to combat industrial disasters, a consolidated plan has been prepared which is a broad based plan providing separate but well coordinated mechanism to deal with all the eventualities erupting out of industrial and chemical disasters. The plan has been formulated to provide a national system, by designating various bodies for coordination at local, national and international level for prompt response and relief operation according to the requirement. For effective implementation, the plan has further been divided into following parts (sub plans):-

**Part-I National Contingency Plan to Manage Industrial Disasters**

**Part-II National Contingency Plan to Combat Disasters at Port Terminals**

**Part-III National Contingency Plan to Combat Disaster Emanating from Chem Bio Terrorists' Threat.**

3. Each sub plan/plans will be activated according to the requirement. However, in case more than one sub plans are to be activated, NDMA as well as concerned PDMA's will be responsible for issuance of necessary directions. An effort will be made to outline coordination amongst all the bodies working under each sub plan.

4. The NDMA, apart from providing general guidelines, apportions various committees and departments, the responsibilities for combating industrial disasters and carrying out Disaster Management operations in an effective manner. It provides a detailed framework for the Federal and Provincial Governments and private sector for enacting their respective role prior, during and after an industrial disaster.

5. This plan has been finalized by the NDMA Islamabad under the guidance of National Disaster Management Commission (NDMC) in the light of NDMO 2007.

6. The-implementation of this plan will be the responsibility of NDMA. The Chairman NDMA will be authorized to issue necessary directive to relevant Government Departments, Ministries and Provincial Governments to follow such instructions under the NDMO 2007.
7. It is living document and will be revised annually or whenever a need for incorporating amendments / revision is felt necessary by NDMA

## PART – I

### NATIONAL INDUSTRIAL DISASTER MANAGEMENT CONTINGENCY PLAN (NIDMCP) TO COMBAT INDUSTRIAL ACCIDENTS

#### GENERAL

1.1 Pakistan imports huge quantities of hazardous chemicals and petro chemicals to meet its industrial and energy needs. Hence there is a risk of oil/chemical disaster on our ports, during transportation of such material and processing in the chemical industry, oil refineries and transfer of oil cargo and chemicals through Pipelines, NLC and Railways. Risk of petro chemical disasters also exits from petroleum exploration and production activities. Such disasters can also threaten our strategic installations and Fertilizer Industries. Hence there is a requirement to have an effective response mechanism to ensure that the impact of such emergencies is kept to a minimum. The plan envisaged in the ensuing paragraphs provides a viable operational organization with representation from all concerned agencies; identifies high-risk areas along with priority for protection in most threatened areas, training and conducting exercises to assess and improve preparedness.

#### SCOPE AND PURPOSE

1.2 The Plan shall have operational ability throughout Pakistan, inter alia, for any damage or threat of damage likely to be sustained through industrial/chemical disaster whatsoever. Whereas monitoring and response to the chemical /industrial disasters within provincial limits shall be the responsibility of the concerned PDMA/DDMA shall have the jurisdiction to monitor and coordinate/combat industrial disasters which are likely to cause damage occurring inside as well as out side the limits of Industrial facilities.

1.3 The purpose of the plan is to ensure a timely, measured and effective response to industrial incidents with a view to prevent, mitigate and where possible, restore damages caused by such incidents. After saving human life, the key purpose of responding to an industrial/chemical accident is to protect population/infrastructure in neighbouring localities. This plan delineates an entire national preparedness and response system, including both public and private resources, for responses to emergencies, which could result in Chemical and Industrial Disaster. The plan also defines policy and responsibilities and identifies the authority or lead agency responsible for the preparation and implementation of the plan, together with the supporting legislation. Coordination Mechanism for Implementation of this part is at **Annex 'A'**. Definitions and Abbreviations used in NIDMCP are at **Annex 'B' and 'C'** respectively. The plan aims to:-

- a. Provide an effective system for reporting, assessing and responding to an industrial disaster as the case may be.

- b. Ensures that existing government's resources are integrated and effectively mobilized in the event of an industrial disaster.
- c. Institute procedures to contain and to minimize the impacts of industrial disaster on the natural and socio-economic environment of the area.
- d. Define division of responsibilities of the stakeholders and Government bodies.

### **OBJECTIVES OF THE PLAN**

1.4 The objectives of the plan are:-

- a. To ensure a timely, efficient and effective response to prevent, control and combat Industrial Disasters.
- b. To develop an efficient mechanism for the detection and reporting of Industrial Disasters.
- c. To ensure correct assessment of the nature of incident.
- d. To encourage co-operation amongst various national stakeholders for adoption, implementation and enforcing of an effective plan.
- e. To ensure that correct response techniques are employed to prevent, control and combat Industrial Disasters.
- f. To strengthen the capacities of the stakeholders and to facilitate cooperation and coordination amongst them to effectively handle Industrial Disasters.
- g. To facilitate information exchange, resource sharing, joint exercises and training of various stakeholders' teams responsible for combating Industrial Disasters.
- h. To prevent and mitigate the damages caused by Industrial Disasters and where possible to restore the situation within available resources.
- j. To evolve procedures for co-operation at national and international level to effectively respond to major Industrial Disasters within Pakistan.
- k. To ensure perception management through proactive media.

### **LEGISLATIVE JUSTIFICATIONS FOR THE PLAN / STAKEHOLDERS OBLIGATIONS**

1.5 The legal basis for this plan are contained in Para 9 (d) of NDMO -2007 which obligates NDMA to “lay down guidelines for preparing disaster management plans by different Ministries or Departments and the Provincial Authorities”. The Para 9 (g) of the same Ordinance obligates NDMA to “lay down guidelines for, or give directions to the concerned Ministries or Provincial Governments and Provincial Authorities regarding measures to be taken by them in response to any threatening disaster situation or

disaster”. The National Disaster Risk Management Framework has been formulated after nation wide consultations to channelize work of the entire system in the realm of disaster risk management and has been issued to relevant Ministries and Departments. Hence, the plan applies to all stakeholders which have been tasked to perform various functions mentioned in this plan. These are :-

- a. Have ready in hand adequate quantity of response, equipment, material and manpower to combat an Industrial Disaster.
- b. Provide a copy of the Off Site and On Site Contingency Plan approved by head of each facility to Coordinator NIDMC during the month of January each year. Whenever an amendment is carried out, such amendment(s) shall be notified to Coordinator NIDMC and PIDMC within 15 days of its incorporation.
- c. Where NDMA/PDMA feel that plan needs some revision / improvement, it will be brought to the notice of the concerned institution/authority. The said institution/authority shall take immediate action to amend the Plan accordingly and submit the amended draft for approval within 30 days or as otherwise directed depending upon the circumstances.
- d. Submit to the respective Chairman PDMA, reports of proceedings of at least one training exercise in execution of the approved plan, at intervals not exceeding 6 months. This exercise shall include the field deployment of Disaster Prevention Equipment, which is to be held by each stakeholder dealing with Industrial Disasters.
- e. Report to the NIDMC and Provincial Industrial Disaster Management Committee (PIDMC), immediately upon initiation, any action taken in implementation of the plan in response an Industrial Disasters.
- f. Submit quarterly report to Coordinator NIDMC about all statistics of chemical and Industrial Disasters within its area of responsibility.
- g. Submit risk assessment survey report to Coordinator NIMDC biennially. Such a survey must be carried out internally if capacity exists within the industry or by a recognized/reputed organization.
- h. Frame an Industrial Disasters contingency plan compatible with the National plan.

1.6 **COMPOSITION OF NIDMC.** The National Industrial Disasters Management Committee structure is given at **Annex 'D'**. The composition of NIDMC is as under:-

Senior Member NDMA	-	Chairman
Advisor/Technical Expert NDMA	-	Secretary
Chemical/Technical Advisor NDMA	-	Coordinator
Director General DESTO	-	Member
Director General Civil Defence	-	“
Director/DD (Operations), JS HQ	-	“
OIC Army Disaster Management Cell (ADMC)	-	“
Director Operations and Planning SPD (in context of Strategic Sites only)	-	“
Provincial Representatives	-	“
Joint Secretary, Ministry of Defence	-	“
Director General (Disarmament), MoFA	-	“
Joint Secretary, Ministry of Industries	-	“
Joint Secretary, Ministry of Interior	-	“
Joint Secretary, Ministry of Ports & Shipping	-	“
Joint Secretary, Ministry of Health,	-	“
Joint Secretary, Ministry of Environment	-	“
Joint Secretary, Ministry of Petroleum	-	“
Representative Army Disaster Management Cell	-	“
President all Pakistan Chamber of Commerce and Industry	-	“
Secretary, Law and Order, FATA Secretariat, Peshawar	-	“
Senior Representative of SDMA, AJ&K)	-	“
Senior Representatives of (GB-DMA)	-	“
Secretary General Oil Companies Advisory Committee (OCAC) (Only for Petro Chemical Disasters)	-	“
PRO, NDMA	-	“

### **POWERS AND FUNCTIONS OF NIDMC**

1.7 The Committee will function under Senior Member NDMA to deal with industrial Disasters. The Committee is required to:-

- a. To be activated as and when any part of the Contingency Plan is operationalized by NDMA.
- b. Manage complete spectrum of Industrial Disasters.
- c. Define and lay down the resources required to be maintained by the stakeholders at Federal and Provincial level.

- d. Carryout periodic review of the Operational Plans.
- e. Designate Monitoring Team for inspection of equipment and evaluation of readiness of the stakeholders/first responders.
- f. On activation of NIDMC, activate and alert respective PIDMC and neighbouring industrial units and other stake-holders in the Zone of incident.
- g. Committee will meet annually and prepare a report for submission to Chairman NDMA on readiness of men/material and their capacity to combat industrial disasters.
- h. Manage media affairs to avoid media hype for objective reporting.
- j. Provide all necessary support/assistance to PIDMC required from concerned Federal Departments / Organizations / Ministries.
- k. Monitor progress and coordinate assistance from stakeholders and advise PIDMC on disaster situation.
- l. Remain available/accessible to PIDMC and other stakeholders to support the operations.
- m. Review the plan at the end of each industrial disaster as well as biennially.
- n. Preparation of detailed latest situation report for NDMC and Political Leadership.

#### 1.8 **ENHANCEMENT OF CAPACITY OF NIDMC/PIDMC**

- a. If any person is required to be co-opted by NIDMC or PIDMC, the proposal will be put up to Chairman NDMA or DG PDMA who if deems necessary will approve the same in the light of NDMO 2007.
- b. Chairman PIDMC may however co-opt any member of District Administration as well as General Managers of relevant industrial facilities on "as and when" required basis for formulation as well as execution of Onsite and Offsite Plans through DG PDMA.
- c. If severity of accident warrants, Chairman NIDMC will intimate concerned Members of the Committee who will be required to assemble at the required point to take stock and remedy the situation.
- d. The capacity of corporate/private sectors will also be utilized and suitably enhanced to extend mutual support to affected industry in same or neighbouring industrial cluster.

#### **PROVINCIAL INDUSTRIAL DISASTER MANAGEMENT COMMITTEES (PIDMC)**

##### 1.9 Composition of PIDMC is as under:-

- a. A senior Officer nominated by the Provincial Govt - Chairman

b.	Provincial Home Secretary	-	Members
c.	Provincial Secretary Environment	-	"
d.	Secretary Industries of concerned Province	-	"
e.	Provincial Secretary Ministry of Health	-	"
f.	DCO/ Nazim of selected districts	-	"
g.	President Provincial Chamber of Commerce	-	"
h.	Director Industries, Minerals and Technical Education, FATA	-	"
j.	OIC Corps Disaster Management Cell (Army)	-	"
k.	General Managers of short listed Industrial Units	-	"

**Notes:-**

- a. Chairman PIDMC may call selected/ any member of the Provincial Government as well as Industrial/Private Sector in order to assist PIDMC in Contingency Planning and for physical Disaster Management operations on as required basis.
- b. State Disaster management Authority (SDMA for AJ&K) and Gilgit Baltistan Disaster Management Authority (GB-DMA) will also notify their Industrial Disaster Management Committees to manage industrial disasters in their area of jurisdiction.

**COORDINATOR INDUSTRIAL DISASTER RESPONSE COMMITTEE**

1.10 Chemical / Technical Advisor NDMA will act as Coordinator for NIDMC. Members of NIDMC are to assist the Coordinator in performance of his duties during the response operation and render any technical information required by him. All assets are to be made available by the resource holders to coordinator NIDMC for immediate mobilization.

**ON SCENE COMMANDER**

1.11 Initially, the senior most executive of the industry where disaster has occurred will act as OSC for execution of On Site plan. On arrival of District Management officials, the senior most official preferably DCO/Divisional Commissioner as applicable may assume this responsibility in consultation with affected industrial facility. While PIDMC is responsible to manage industrial disasters at Provincial level, On Scene Commander (OSC) duly assisted by PIDMC is intended to be the field/On Site focal point of response action according to On Site Plan. He therefore bears a heavy responsibility for the overall effective response to such Industrial Disaster. He is responsible for all activities including the protection of priority areas, the containment and recovery of Industrial Disasters.

**DUTIES OF ON SCENE COMMANDER**

1.12 On Scene Commander is to:-

- a. Exercise the over all command for containment, relief, rescue and recovery operations at the scene of incident.
- b. Execution of the relevant contingency plan.
- c. Issue warnings to contain the disaster.



- d. Ensure health and safety of men and material during operations.
- e. Keep NDMA, PDMA and DDMA abreast about the overall situation of the incident.
- f. Take appropriate measures to Control Environmental degradation.
- g. Handle onsite/local media and apprise, NDMA/PDMA to brief media about current situation and support being provided by various agencies. Based on this information, PRO of NDMA will prepare and issue suitable press release about the incidents.

### **DUTIES OF PROVINCIAL INDUSTRIAL DISASTER MANAGEMENT COMMITTEE (PIDMC)**

1.13 Duties of PIDMC are as under:-

- a. Formulate Industrial Disaster Management Plan based on this Plan to manage complete spectrum of Industrial Disasters at Provincial level.
- b. PIDMC is to assemble on activation of any part of Contingency Plan by PDMA.
- c. Provide all necessary support/assistance to affected District from concerned Provincial Departments / Organizations / Ministries and resource agencies.
- d. Monitor progress of implementation of Provincial Plan and coordinate assistance from stakeholders.
- e. Update and advise NIDMC on disaster situation and remain available / accessible to NIDMC to seek support for ongoing operations.
- f. Keep Chairman PDMA abreast about latest situation to enable him to keep NDMA and Political leadership informed.
- g. Prepare a checklist of actions required to be taken for restoration of sensitive areas in the aftermath of industrial disaster.
- h. Arrange training of Provincial responders and carry out mock exercises to implement Provincial Contingency Plan and review the plan biennially or as and when advised by NDMA.

### **LIST OF FACILITIES AND THEIR LOCATION**

1.14 The list of major facilities is as follows:-

- a. **FERTILIZERS-AMMONIA**
  - (1) Engro Chemical Pakistan Ltd, Daharki, Distt Ghotki.
  - (2) Engro Polymer and Chemical, Park Port Qasim Karachi

- (3) Engro Vopak Terminal Limited (EVTL) - 7<sup>th</sup> & 8<sup>th</sup> Floor, the Harbour Front Building, HC# 3, Marine Vivre, Block 4, Karachi.
- (4) Fauji Fertilizer Coy, Mirpur, Mathelo Distt Ghotki.
- (5) Fauji Fertilizer Bin Qasim Limited, Plot No EZ/I/P-1 Eastern Zone, Port Qasim Karachi
- (6) Fauji Fertilizer Company Goth Machhi, Sadikabad, District Rahim Yar Khan
- (7) Fatima Fertilizer, Sadiq Abad Distt RY Khan.
- (8) Dawood Hercules Chemical Ltd, 28 KM, Lahore Sheikhpura Road, Sheikhpura.
- (9) Pak American Fertilizer Pvt, Ltd, Iskanderabad, Dadukhel, Distt Mianwali.
- (10) Pak Arab, Fertilizer, Khanewal Road, Multan.

b. **CHLORINE-CAUSTIC SODA PLANTS**

- (1) Ittehad Chemicals Ltd, GT Road, Kala Shah Kako, Distt Sheikhpura.
- (2) Sitara Chemicals Industries Limited, 32 Km, Sheikhpura Road, Faisalabad.

c. **OTHER CHEMICAL PLANTS & STORAGE FACILITIES CONTAINING HAZARDOUS / TOXIC OR FLAMMABLE MATERIAL**

- (1) Pakistan Ordinance Factories (POF) Wah Cantonment
- (2) Pakistan PTA - Eastern Industrial Zone Port Qasim Karachi
- (3) Engro Vopak Terminal Limited (EVTL) – 7th & 8th Floor the Harbour Front Building HC # 3, Marine Vivre Block 4 Clifton Karachi
- (4) Engro Polymer and Chemical Limited (EPCL)- EZ/1/P-11-1 Eastern Zone Bin Qasim Karachi 48
- (5) Ibrahim Fiber - Ibrahim Centre 15 Club Road Faisalabad.
- (6) Dewan Salman Fiber - Gadoon Amazi, Industrial State Hazara and Dewan Centre - 46B, Nazim Ud din Road, F-7/4, Islamabad
- (7) ICI Polyester - PO Box No. 38, 30 Km, Lahore Sheikhpura, Road Sheikhpura.

d. **PETRO-CHEMICAL COMPANIES**

- (1) National Refinery Limited, 7-B, Korangi Industrial Area, Korangi Karachi
- (2) Pakistan Refinery Ltd (Korangi), Karachi-74000
- (3) Bosicor Pakistan Ltd, Mouza Kund Plant, Sub Tehsil Gadani, District Lasbella, Balochistan

- (4) Khalifa Point Refinery, District Hub, City, Balochistan
  - (5) Indus Refinery (Port Qasim)
  - (6) PARCO Refinery, Qasba Gujarat, Distt Muzaffargrah
  - (7) Attock Oil Refinery Ltd, Morgah, Distt Rawalpindi
- e. **Railway DRY PORTS AND NLC TERMINALS.** Railway Terminals, Dry Ports Terminals, NLC Terminals all over Pakistan contain sizable storage of Chemicals and hazardous stores. Plan will be developed for each terminal to cater for any untoward incident by the respective stakeholders in coordination with District or local administration.
- f. **OIL INSTALLATION, DEPOTS AND TRANSPORTATION OF POL/CHEMICAL BY RAILWAYS.** Oil installation and depots especially those located in the near vicinity of populated areas need to be identified and plan developed for any incident involving hazardous material. Similarly, large quantity of POL and Chemicals is being transported by Railways, NLC and other Petro Chemical Companies which needs to be monitored and plans developed to cater for any accident.

### **RESPONSE POLICY**

1.15 Initial assessment of the incident shall be the responsibility of the industry in whose premises the incident takes place. They are to employ equip and train suitably personnel for this job. Subsequent decision by DDMA and PDMA is considered necessary to decide on the response options. NDMA will organize rescue keeping in view the extent of disaster and resources as mentioned in Para 15.

### **RESPONSE/RESOURCE AGENCIES**

1.16 Following government/semi government institutions, agencies and industrial units are response/ resource agencies which can provide help in executing this plan:-

- a. Ministry of Defence (Pakistan Armed Forces).
- b. Ministry of Defence Production.
- c. DESTO, Chem Bio Defence Cell (CBDC)
- d. Civil Defence Department of all four provinces.
- e. Ministry of Industries.
- f. Ministry of Environment (Federal / Provincial Environment Protection Agencies).
- g. Ministry of Petroleum and Natural Resources.
- h. Ministry of Interior.
- j. Ministry of Health
- k. Ministry of Railways

- l. All Provincial Governments.
- m. Local Bodies of all four provinces.
- n. Police Department of all four Provinces.
- o. Rescue 1122 Punjab
- p. Fertilizer industries.
- q. Chemical Industries.
- r. Oil Refineries.
- s. National Logistics Cell
- t. Pakistan Steel Mills, Karachi
- u. Pakistan Ordinance Factories, POF Wah
- v. Any other agency, which may be of assistance.

**Note.** Resources and kind of assistance required from various resource holders are given at **Annex 'E'**. The safety equipment held with various industrial units is given at **Annex 'F'**.

### **PREVENTIVE MEASURES TO REDUCE CHEMICAL, PETRO CHEMICAL AND INDUSTRIAL DISASTERS**

1.17 Chemical and Industrial Disasters can be prevented to a great extent by identifying and managing anticipated hazards mentioned at **Annex 'G'**. This can be done by formulation of a Plan at District level in the light of guideline at **Annex 'H'**. *Constant* surveillance of the entire industrial cluster would be needed against the violation of existing national rules. Relevant Ministries are required to ensure that national and international rules pertaining to processing and movement of chemicals are being followed by our Industry. Following preventive measures are to be adhered to as indicated below:-

- a. Monitoring and tracking the movement of hazardous chemicals in Pakistan by Ministry of Industries, Ministry of Railways and Custom Authorities.
- b. Introduction of Automatic Identification System (AIS) for the Scheduled Chemicals from all air, sea and land ports by the National Authority for Chemical Weapons Convention (CWC), Ministry of Foreign Affairs through Wide Area Net Work (WAN) System.
- c. Regular checks by inspectors' of Ministry of Industries in respective industrial units to ensure that safety measures as defined are being followed according to relevant rules for handling of chemicals and petrochemicals in all industrial units processing chemical and fertilizers.
- d. Customs authorities to ensure that scheduled chemicals received at various ports are declared to Ministry of Foreign Affairs on quarterly basis

to validate their end use according to the provisions of CWC and Presidential Ordinance 2000.

- e. Through the respective stakeholders, the port authorities should know the type quantity and movement of all hazardous chemicals in the port area.
- f. NDMA to maintain necessary coordination with concerned Ministries, organizations for receiving early warning round the clock for incidents which could lead to a potential chemical and Industrial Disaster.
- g. Ascertain assistance required from Armed Forces and for management of chemical accidents and apprise ADMC, CDMC and DDMC about such assistance under intimation to NIDMC and PIDMC.

### **OPERATIONS AND PROCEDURES FOR NDMA OPERATIONS ROOM TO CONTROL CHEMICAL / INDUSTRIAL DISASTERS**

1.18 NDMA Operations Room shall be the command and control centre for handling of National Industrial Disasters. During an emergency, Ops Room will remain activated at all times to receive information about industrial disasters and update the Chairman NDMA and Chairman NIDMC about latest developments of an industrial accident. In addition, it will also maintain regular communication/liaison with all concerned. On activation of this plan, members of NIDMC will be required to assemble at the NDMA Operation Room, unless decided otherwise for which, the Chairman NIDMC will issue necessary instructions. The Chairman may also consider convening meeting of selective members of NIDMC for the meeting. Operation and Military Wing of NDMA will be involved in maintaining the operation room.

### **ACTIVATION OF THE PLAN**

1.19 The authority to activate the Industrial Disaster Contingency Plan rests with the Prime Minister of Pakistan. The authority is delegated to Chairman NDMA for execution of this plan. The Plan will be activated in the following circumstances:-

- a. On request of the concerned industry/DDMA/PDMA/ when they are unable to combat the threat of disaster on their own.
- b. On the orders of the Chairman NDMA when it is considered indispensable in the national interest, irrespective of the degree of disaster.

### **INQUIRY AND INVESTIGATIONS**

1.20 After an incident, an inquiry is a pre-requisite. Director General PIDMC to convene appropriate inquiry proceedings about the industrial accident. Provincial Governments to designate suitably qualified Inspector/technical experts for the purpose of obtaining evidence relating to chemicals accident on the site of incident. The inspectors shall have

the powers to visit affected industry, inspect records, take samples of any substance and investigate the suspected discharge and apportion negligence, if any, and responsibility. The inquiry report will be processed by Advisor/TE NDMA. Technical Assistance may be sought from DESTO and PCSIR for analysis of inquiry report.

#### 1.21 **REPORTING PROCEDURE AND INITIAL ASSESSMENT**

- a. NDMA is to be the national contact point for receiving reports in case of National disasters. All such incidents are required to be immediately notified to NDMA, PM Secretariat, Islamabad, (Phone 92-51- 9209989/ 9222373, and Fax 92-51-9213082). To make the system of reporting effective and reasonably quick, disaster reports can also be passed to concerned officials of NDMA/ PDMA. The list of contact key persons from various response agencies and industrial units is given at **Annex 'J'**.
- b. After an Industrial Disaster, the Operations Room NDMA and PDMA are to remain activated at all times to receive updated information about Industrial disasters. Evaluate and advise the Chairman NIDMC/DG PDMA on activation of the relevant contingency plan.
- c. Chairman NDMA is to be informed by Coordinator NIDMC as soon as possible of any report of a potential tier 2 or tier 3 disasters.
- d. Initial Notification of a disaster by the relevant industry should be followed by a report to be sent to Ops Room NDMA through a Fax for evaluation and subsequent requirement on response.

### **INDUSTRIAL DISASTERS – RESPONSE PROCESS TIERED APPROACH**

#### 1.22 **PHASES OF PROCESS**

The main phases of process for responding to an Industrial disaster are:-

- a. Detection of disaster and notification of authorities.
- b. Evaluation, situation analysis and plan activation.
- c. Response and containment of disaster.
- d. Documentation.
- e. Site rehabilitation and compensation.

1.23 **RESPONSE FOR CONTAINMENT OF DISASTER**. Containment and recovery from Industrial Disasters is essential. Guidelines for use of safety equipment must be followed by all concerned. The plan has adopted the concept of a tiered response, which consists of three levels. The concept of a tiered approach will ensure response through joint arrangements, enabling the response agencies to graduate from one tiered

response to another. Three levels of tiered response are based on the following scenarios:-

- a. **TIER-1.** These are small local incidents which may occur more frequently and would normally require a response from the concerned industry/facility only and other local stakeholders involved. However, its effect on surrounding environment will determine the actual level of response. The response would be escalated when it is apparent that resources held within the facility and local District are insufficient or inadequate to effectively manage the response.
- b. **TIER-2.** Tier-2 is concerned with preparedness and response to an industrial accident that requires the co-ordination of more than one source for provision of equipment and personnel. These are generally medium size incidents which could have a serious impact on the population as well as environment of the area. These may occur in and around an industrial facility and would involve a collective response from all stakeholders. The response is to be controlled by PIDMC / DDMA with support and coordination being provided by support agencies and stakeholders. The response will be upgraded when the PIDMC determines that the incident requires resources and coordination beyond those available within the province.
- c. **TIER-3.** Tier-3 is concerned with a major disaster requiring the mobilization of all available national resources and depending upon the circumstances, may involve mobilization of regional and international resources as well. These are incidents involving large quantities of chemicals/large area contamination. Such disasters are rare events and would require considerable resources. The response would be controlled by the NDMA with the help of all stake holders mentioned at para 14 and other industrial units in the same or neighbouring industrial clusters.

### **ARMED FORCES ASSISTANCE**

1.24 In case of major industrial disasters, the response may involve deployment of Armed Forces. Under such threats, Armed forces would be requisitioned by the respective provincial Government as per the existing procedures. NDMA to coordinate provision of necessary assistance including rescue and recovery, medical facilities, shelters, protective equipment and decontamination etc from Federal and international response agencies.

## **OVERSEAS ASSISTANCE**

1.25 In the event of a major Industrial disaster, overseas assistance could be sought by NDMA through Ministry of Foreign Affairs. MoFA may ink bilateral agreements with neighbouring countries to seek/extend support in case of a chemical disaster. Assistance from UN agencies should be coordinated and request for such support initiated according to prescribed international procedures. Efforts may be initiated for attaining International Assistance for capacity building to train and equip local responders in combating industrial disasters.

## **RESPONSE TEAM STRUCTURE**

1.26 To combat industrial disaster, response teams are to be structured by PDMA, DDMA as well as respective industrial facilities. The tasks to be undertaken during a response to a major industrial incident by these response teams are required to be formulated by respective stakeholders. The resources required for combating tier-1 incidents shall be the responsibility of individual stakeholder; whereas the resources in terms of men and material for combating tier-2 incident are to be pooled up by all stakeholders and put at the disposal of PDMA. To combat tier-3 incidents assistance from national/provincial resource holders/ organizations capable of combating tier-3 disaster will be sought for which resources agencies at Federal level including armed forces will be activated by NDMA.

## **LEAD AGENCY**

1.27 In normal Tier-1 disaster, Lead Agency will be the respective stakeholder/ organization unless otherwise determined by the respective DDMA or PIDMC. However, if the stakeholder is not capable enough to handle the consequent damage, the Industrial facility may request concerned PIDMC/DDMA to earmark resources/local responders even for tier 1 disaster or irrespective of the magnitude and situation of the disaster.

## **PROTECTION PRIORITIES**

1.28 Some industrial facilities are more prone to accidents/disasters. Such sensitive areas are to be identified and their maps are required to be prepared by Ministry of Industries in consultation with provincial Governments. Sensitive industrial clusters are required to be mapped by the Ministry of Industries and plans developed for management if industrial accidents in such clusters. Following protection priorities are to be kept in mind while responding to Industrial Disasters:-

- a. Health and safety of population.
- b. Habitat and cultural resources.
- c. Vital industries and industrial complexes.



## **TERMINATION OF DISASTER MANAGEMENT OPERATIONS**

1.29 The decision to terminate disaster management operation must be made by the On-Scene Commander in consultation with respective DDMA, PIDMC and management of affected industrial facility. As a general rule, termination is decided when further operations would be ineffective or the desired level of management / rehabilitation would be achieved. NIDMC may be notified about termination of disaster by PIDMC immediately.

## **CHEMICAL DISASTERS**

### **CHEMICAL INCIDENTS**

1.30 Chemical incidents usually occur at much lower frequency in comparison to oil related incidents. However, associated hazards of chemical disasters related to response personnel, general public and environment are potentially much more severe. The way chemicals interact with environment depends on its chemical properties; therefore information about industrial units which process chemicals threatening industrial workers population and environments is the key for a safe and appropriate response. Following main stages are to be considered in dealing with chemical incidents:-

- a. **RISK IDENTIFICATION**. The first stage in case of a chemical disaster is to identify the industrial units processing hazardous substance and potential risk to humans and environment. This requires identification of the chemicals, which can leak due to an accident or mishap etc. Overlooking of this important aspect could prove fatal at later stages. The risk identification should be based on nature of hazardous chemical, explosive, Inflammability and radio activity etc.
- b. **RISK ASSESSMENT**. After identification of all associated risks, the next step is to establish the relative degree of risk so that response operation can concentrate on how to minimize the impacts of high-risk chemical hazards. This will also help industrial facilities as well as response agencies to ascertain the need for protective equipment required to manage such incidents.
- c. **EMERGENCY RESPONSE**. A limited number of response methods are usually available for the chemical incidents. It is important to rapidly establish which response methods are feasible in order to reduce or eliminate the impact of hazardous substances on facility workers, neighbouring population and environment. The rapid communication of relevant information among chemical first responders is most important.

The detailed response methodology will be worked out by the PIDMC and respective industry while formulating their Off Site/On Site Plans keeping in view the risk assessment.

1.31 Every Industrial Accident involving chemicals has its own unique dangers to which response personnel may be also exposed along with population in surrounding areas. The protection of public and response personnel should always be of prime importance in decision-making. It is important that all risks are evaluated prior to personnel entry into the incident area. Few case studies pertaining to industrial disasters are given at **Annex 'K'**. Guideline to handle disasters pertaining to Ammonia is mentioned at **Annex 'L'**. The prime considerations of chemical disaster response include:-

- a. Identification of chemical, which has been released.
- b. Safety of first responders.
- c. Risk assessment related to environment, health and safety.
- d. On site contamination of victims of chemical disasters.
- e. Containment and recovery of chemical(s).
- f. Availability of chemical specific treatment in nearby health facility.
- g. Additional resources available with first responders which can be offered to affectees of disaster.
- h. Decontamination of the affected zone.
- j. Warnings to other agencies as regard to evacuation of casualties.
- k. General public should be restricted entering in risk zone.

### **CLASSIFICATION INDUSTRIAL DISASTERS**

1.32 Industrial disasters can be classified on the basis of their physical and chemical properties (toxic and hazardous). Once a chemical has been identified and grouped according to its physical or chemical behaviour (toxic or hazard classification), only then a response methodology can be considered.

### **RESPONSE TO CHEMICAL ACCIDENT**

1.33 The appropriate method of response to a chemical accident depends on the quantity of chemical reactivity, concentrations in air and water and the environmental conditions at the location of the accident. The magnitude of the release particularly with gases and vaporous is also important in determining the response option. In order to respond effectively, some kind of database giving preliminary information about various chemicals being processed by various industrial units are considered essential at local level, DDMA, PDMA and NDMA. A data base of 5,000 chemical products is available at the website of National Chemical Emergency Centre (NCEC), UK. Pakistan National Authority for CWC Ministry of Foreign Affairs also monitors import of scheduled chemicals with the help of Custom Authorities. Apart from these, list of toxic Chemicals commonly used by our own industry is given at **Annex 'M'**.

## **RESTORATION OF AFFECTED AREA AND POST ACCIDENT MONITORING**

1.34 As a top priority, disaster management operation, will be directed and channelized to restore the affected areas. Priority is to be given for restoration of the sensitive areas as identified by the relevant industry. The degree of restoration is to be determined by the lead agency in consultation with other agencies such as those representing Ministry of Environment, Ministry of Industry, PDMA and DDMA etc. PDMA in its area of jurisdiction shall be overall responsible for rehabilitation and restoration of affected areas. Detailed SOPs may be prepared by DDMA in consultation with concerned industrial facilities and approved by PDMA to minimize damage and ensure effective rehabilitation of victims.

## **MISCELLANEOUS REPORTING OF INDUSTRIAL ACCIDENTS RECORD KEEPING AND PREPARATION OF CLAIMS**

1.35 Report of industrial accidents will be furnished to NDMA under intimation to relevant federal ministries and respective PDMA as per proforma attached as **Annex 'N'**. The format for Emergency Needs Assessment Report is attached as **Annex O**. For timely preparation of claims, it is essential that records are maintained accurately. Claims should cover all aspects of the incident such as; material cost, labour cost, "consumable materials, workers accommodation, food and resources including response claims for restoring normalcy. Necessary records are to be prepared by the relevant Ministry in consultation with the respective provincial PDMA and Home Ministries. The affected industry will forward Occurrence Report as per format attached at **Annex 'P'**.

## **PUBLIC INFORMATION/ROLE OF MEDIA**

1.36 Effective public relations are integral part of the entire operation. Therefore it is pertinent to inform the public and the media as quickly as possible to avoid unnecessary difficulties in dealing with industrial disasters. Public Relations Officer (PRO) NDMA will deal with media and issue necessary information bulletins with regard to chemical/ industrial incidents and response as advised by the experts/specialist. Chairman NIDMC may hold press conferences, on as required basis for the said purpose.

## **COMMUNICATIONS**

1.37 The communication between NDMA, PDMA and other stake holders will be based on Voice over Internet Protocol Phones (VOIPP) and Data Link as and when these links become operational. Normal PTCL Channel and mobile phones will be utilized for the time being by all concerned for management of Industrial Disasters. Standard Operating Procedures will be established by PDMA and issued to all concerned to facilitate effective passing of impact-assessment information between Command Posts established by PDMA, DDMA, and field personnel. DCO of the affected District will be responsible to

establish communication at the location of incident. The radio communication equipment currently held with Police may also be utilized initially till the time, PDMA and DDMA may establish their own communication network. Director IT, NDMA will coordinate this aspect. In case of any accident, the resources of Armed Forces requisitioned for rescue operation will maintain communications with DCO Office on authorized frequencies.

### **CAPACITY BUILDING AT VARIOUS LEVELS**

1.38 All response agencies are required to have suitable equipment and trained workforce to combat an appropriate level of Industrial Disasters/emergencies. (Tier- 1 tier to 3). PIDMCs should enhance their local capacity of first responders for tier II Disasters and ensure that respective industrial facilities also maintain capacity to combat tier I Disaster. It may not be cost effective for some of the Industrial Units to maintain tier-I Disaster response equipment. In such like situation, they may ink a contractual agreement with one of the neighbouring industrial facility or any other agency in the same Industrial Cluster having required equipment. Coordination may also be maintained with other response agencies e.g. Police, Fire Brigade, Ambulance Services etc for combating Tier-1 disasters . In case of tier 3 Emergency, All stakeholders within range should immediately make available their resources to effectively contain the impact of incident. National response for tier 3 Emergencies will be coordinated by NDMA by providing necessary assistance to Provincial Govts/PDMAs. National Fire Protection Agency (NFPA) of USA standards may be taken as guideline to develop such standards. Requisite details can be downloaded from website [www.nfpa.org](http://www.nfpa.org).

### **TRAINING AND MOCK EXERCISES**

1.39 In order to maintain efficient response infrastructure, regular training and exercises are to be conducted by each stakeholder and details are to be forwarded to NDMA and PDMA. Joint exercises involving all the stakeholders are to be organized biannually by NIDMC in collaboration with PIDMCs. Shortcomings in terms of men and material are to be reflected in Annual Report forwarded to NDMC.

### **FINANCIAL REQUIREMENT**

1.40 Federal Government to place sufficient funds at the disposal of Chairman NDMA to mount an initial response to an industrial disaster. Subsequent requirement of funds/resources is to be worked out by Chairman NIDMC and forwarded to NDMA. Director Finance, NDMA will procure funds through Ministry of Finance. He shall maintain a separate head in public account of NDMA as per the rules in vogue.

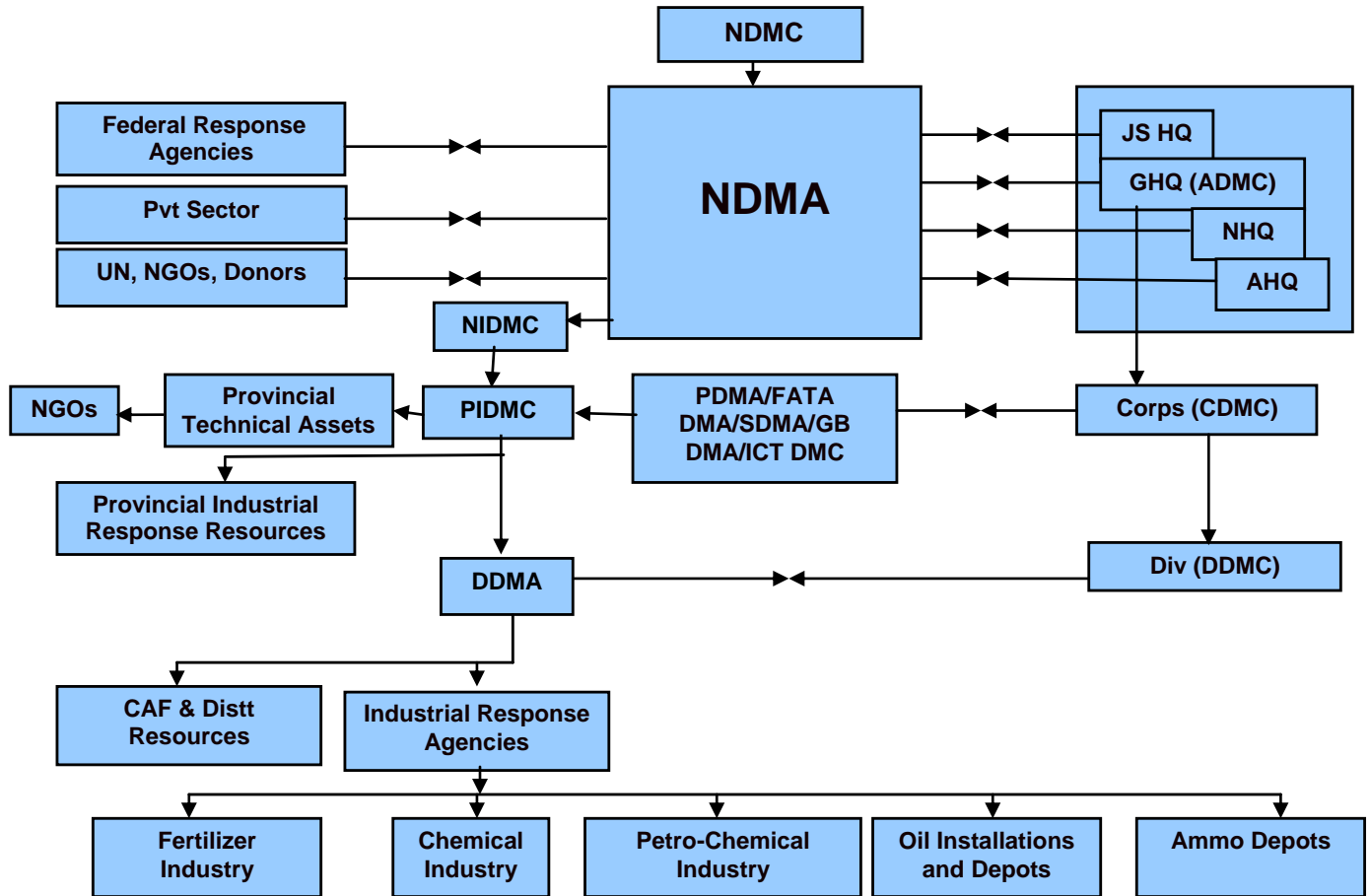
**MONITORING**

1.41 Based on this plan, Ministry of Industries, Ministry of Defence Production and Ministry of Petroleum and Natural Resources will monitor the implementation of this plan and ensure that, all Industrial units under their jurisdiction should compile their respective plans and build capacity for execution of this plan through a dedicated team of experts.

**PLAN REVISION**

1.42 The plan should be reviewed biennially by NDMA and PDMA to incorporate experience gained from regular exercises and actual incidents managed. Regular updates of alerting lists and equipment inventories should also be prepared. Any organizational or legislative changes should be notified to NDMA for timely incorporating of amendments in this plan.

**COORDINATION MECHANISM FOR INDUSTRIAL DISASTER  
MANAGEMENT CONTINGENCY PLAN  
PART-I**



**Acronyms**

- ADMC - Army Disaster Management Cell
- CDMC - Corps Disaster Management Cell
- DDMC - Division Disaster Management Cell
- FATA DMA - Federal Administered Tribal Area Disaster Management Authority
- ICTDMA - Islamabad Capital Territory Disaster Management Authority
- NADMA - Northern Area Disaster Management Authority
- NDMA - National Disaster Management Authority
- NDMC - National Disaster Management Commission
- PDMA - Provincial Disaster Management Authority
- SDMA - State Disaster Management Authority
- GBDMA - Gilgit Baltistan Disaster Management Authority

**DEFINITIONS USED IN PLAN****DISASTER**

1. A disaster is an unforeseen or unexpected event, which may result into injury to personnel or damage to property or both.

**ON-SITE EMERGENCY**

2. If the accident / dangerous occurrence takes place in the factory and its effects are confined to the factory premises involving the workmen working in the factory, it is termed as 'On-Site Emergency'.

**OFF-SITE EMERGENCY**

3. If the effects of the accidents / dangerous occurrence are felt outside the factory premises, the situation thus generated is termed as 'Off-Site Emergency'.

**CONTAMINATION**

4. Chemical dispersal in an area which damages important sources like water, food, soil and environment, depriving its use to human beings and animals unless it is decontaminated.

**DECONTAMINATION**

5. Actions taken to protect areas from damages by hazardous chemicals and mitigate its effects on the environment, wildlife and areas contaminated by it.

**CONTINGENCY PLAN**

6. A plan for action prepared in anticipation of Chemical and Industrial disasters including oil / chemical intended to protect areas of biological, social and economic importance and to reduce the effect of these disasters on the masses.

**COORDINATOR**

7. The authority responsible for coordinating the actions required of the plan within the country.

**GOVERNMENT**

8. Means the Federal Government.

**LEAD AGENCY**

9. The Authority designated by the Government under this plan as having overall responsibility for chemical and industrial emergencies inter alia to incur expenditures and remain in contact with all national entities/organizations/specialists within country as well as abroad.

**LOCAL BODIES**

10. All organizations under the jurisdiction of DDMA.

**LOCAL GOVERNMENT**

11. All authorities and departments/agencies under provincial governments.

**CHEMICAL EMERGENCIES**

12. Any casualty, incident or occurrence resulting in substantial leakage of chemicals or imminent threat to environment and population by oil/chemical disaster. This includes collisions, stranding, and other incidents involving all types of mobile containers, storage tanks, and blowouts arising from petroleum drilling and production, processing/refining activities and chemical or Industrial disaster in some industrial installations.

**Oil**

13. The term oil means petroleum in any form including crude oil, fuel oil, heavy diesel oil, sludge, oil refuse and refined products and also includes hazardous substances.

**Oil DISASTER**

14. Accidental/deliberate catching of fire of the oil during processing, transportation and storage etc.

**CHEMICAL DISASTER**

15. Accidental / deliberate leakage of hazardous chemicals during processing, transportation and storage etc.

**ON SCENE COMMANDER (OSC)**

16. Initially, the senior most executive present at the site of the accident will be on scene commander. On arrival of the officials of District Administration, the senior most official for the execution of respective part of the contingency plan will assume overall command and control of operation.

**REPORTING CENTRES**

17. All centres established for gathering/exchange of information and timely action for combating industrial disasters under the control of respective concerned authority/ agency.

**SAFE SHELTERS**

18. The places containing basic facilities e.g. food, water, medical assistance and bedding etc which are well away from the site of incident, where affected persons can be temporarily accommodated. In case of a an industrial disaster, such locations may be identified well in advance keeping in view the general wind direction to avoid clouds/ fumes of chemicals affecting these areas by hazardous and noxious substances- containers carrying chemicals/ hazardous substances.



**SUPPORT AGENCIES**

19. Any organization identified and assigned with specific tasks under this plan in support of the response. Support Agencies are not limited to those listed at Para 14 which may vary as per the situation.

**TIER-1 Emergencies**

20. A minor chemical /industrial disaster/incident that can be dealt with by the concerned stakeholder(s) themselves by using the resources at a specific location or facility. In such like emergencies, On Site plan will be automatically activated.

**TIER-2 Emergencies**

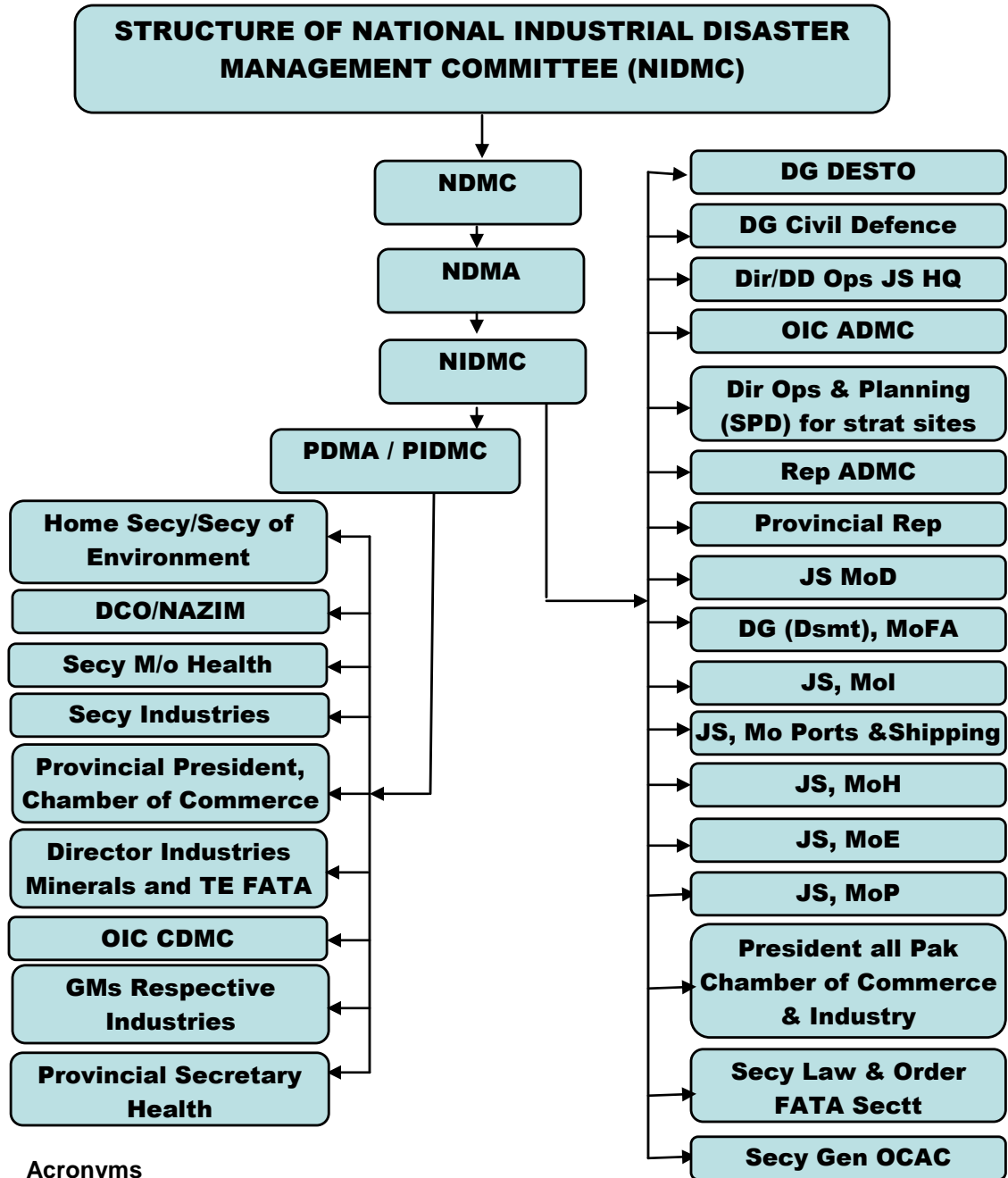
21. A larger chemical/industrial disaster/ incident may require assistance from Local/ District Government and other industrial facilities as well. For such like scenarios, Ministry of Industries in coordination with relevant Chambers Of Commerce and industrial facilities will hire experts to assist DDMA's to prepare Off Site plans for each Industrial Cluster.

**TIER-3 Emergencies**

22. A larger industrial Disaster beyond the capability of Tier 2 or catastrophic disaster that would require provincial/national or may be international assistance.

**ABBREVIATIONS**

<b>Abbreviations</b>	<b>Meanings</b>
NDMO	National Disaster Management Ordinance
NDMA	National Disaster Management Authority
PDMA	Provincial Disaster Management Authority
DDMA	District Disaster Management Authority
NDMC	National Disaster Management Commission
DESTO	Defence Science & Technology Organization
SPD	Strategic Plans Division
DMO	Director Military Operations
NIDMCP	National Industrial Disaster Management Contingency Plan
PIDMC	Provincial Industrial Disaster Management Committee
DG PDMA	Director General Provincial Disaster Management Authority
NCEC	National Chemical Emergency Centre
ERC	Emergency Response Centre
NLC	National Logistic Cell
OSC	On Scene Commander
MoE	Ministry of Environment
KPT	Karachi Port Trust
MoD	Ministry of Defence
MOFA	Ministry of Foreign Affairs
MoH	Ministry of Health
M/o P&S	Ministry of Ports & Shipping
OCAC	Oil Companies Advisory Committee
Pak EPA	Pakistan Environmental Protection Agency
VOIPP	Voice Over Internet Protocol Phones
SOPs	Standing Operating Procedures
C&I	Commerce and Industry
PRO	Public Relation Officer
PTCL	Pakistan Tele Communication Limited
NFPA USA	National Fire Protection Association USA
POF Wah	Pakistan Ordinance Factories Wah Cantonment
SDMA	State Disaster Management Authority
GBDMA	Gilgit Baltistan Disaster Management Authority



**Acronyms**

ADMC	-	Army Disaster Management Cell
CDMC	-	Corps Disaster Management Cell
C & I	-	Commerce and Industries
DCO	-	District Coordination Officer
MoD	-	Ministry of Defence
MoE	-	Ministry of Environment
Mol	-	Ministry of Interior
MoP	-	Ministry of Petroleum
MoFA	-	Ministry of Foreign Affairs
NDMA	-	National Disaster Management Authority
NDMC	-	National Disaster Management Commission
NIDMC	-	National Industrial Disaster Management Committee
PDMA	-	Provincial Disaster Management Authority
PIMDC	-	Provincial Industrial Disaster Management Committee
OCAC	-	Oil Companies Advisory Committee
O&P	-	Operation and Planning
SPD	-	Strategic Plans Division

**SERVICES REQUIRED FROM RESOURCE HOLDERS**

1. At present there is an acute shortage of required equipment in the country to control chemical/industrial disasters. To overcome this inadequacy, it is mandatory to utilize all available assets with different agencies/ resource holders during any national emergency/ disaster. NDMO 2007 also permits NDMA to depute resources held with all organizations/ facilities including men and material support as mentioned below:-

**RESPONSIBILITIES OF NDMA.**

2. The responsibilities of NDMA are as under:-
- a. Coordinate all DRM activities related to Industrial Disasters at National level by obtaining technical assistance from Federal Ministries and Departments to enhance capacity of DM authorities at Provincial, District and Municipal levels.
  - b. Will generate national response to manage industrial disaster.
  - c. Coordinate training and awareness activities for capacity development of stakeholders in collaboration with SPD and other organizations.
  - d. Coordinate formation of regulations by the relevant Ministries/Departments for management of disasters pertaining to their area of responsibility.
  - e. Direct concerned government ministries, departments or agencies to earmark such men and material available for the purpose of emergency response, rescue and relief against Industrial Disasters.
  - f. Facilitate capacity building of first responders/stakeholders through available resources and international donor agencies.
  - g. Evolve strategy for participation of media in DRM activities related to Industrial Disasters
  - h. Hold workshops on industrial disaster management and invite all relevant stakeholders including armed forces personnel to participate in such workshops to enhance their awareness about management of Industrial Disasters

**MINISTRY OF DEFENCE**

3. Assist NDMA by employing Armed Forces to manage affected population in rescue, Medical /First Aid, evacuation and protection by employing available resources. Ministry will develop a Disaster Preparedness and Response Plan for employment of Pakistan Armed Forces in response operation to combat Industrial Disasters in close coordination with NDMA. Armed Forces may be directed to define and maintain necessary equipment for managing ammunition depots/oil depots and other logistic

installations etc. Such equipment can be utilised for management of Industrial Disasters on as required basis. A suggested employment of resources is as follows:-

- a. **PAKISTAN ARMY.** Pakistan Army in coordination with MoD and JS HQ will employ its resources when requested by the NDMA for an industrial disaster and provide technical support with equipment/manpower. It will assist Civilian Authorities in rehabilitation of population and decontamination of area affected by disaster. It will provide essential first aid and transport required for evacuation of patients to hospitals.
  - b. **PAKISTAN NAVY.** In case of an industrial disaster at Karachi, Pakistan Navy will provide all available equipment to support and augment available resources of Army (HQ 5 Corps). It will also provide essential medical support and transport required for transportation of injured to hospitals.
  - c. **PAKISTAN AIRFORCE.** In case of a disaster at cities having air bases, PAF may provide optimum support to NDMA/PDMA in the shape of air transportation facilities medical support and necessary equipment for relief delivery and recovery of affected people.
4. **DESTO.** DG DESTO will act as technical advisor to Chairman NDMA for handling of technical aspects related to industrial disasters as well as capacity building to tackle industrial disasters all over Pakistan. He will also advise Chairman NDMA about mitigation measures related to industrial disasters and scientific monitoring of events in post Industrial Disasters Scenario. In case of accident at a strategic site/installation, DESTO will depute a pool of technical experts to investigate and establish the causes of disaster. It will also provide assistance to all National Stakeholders in terms of technical expertise, training and protective equipment for capacity building of other relevant agencies including Armed Forces.

#### **MINISTRY OF ENVIRONMENT (MoE)**

5. The MoE will develop a Disaster Risk Management Plan with relation to Ministry's mandate in close coordination with NDMA, PDMAs and Ministry of Interior. It is responsible for the following:-
- a. Take all effective measures to mitigate environmental impact of any industrial disaster.
  - b. Ensure safety of environment at large and minimize the environmental damage in close collaboration with Ministry of Industries.
  - c. The Environmental Protection Agency (EPA) should be specifically deputed to protect natural environment from all hazardous risks including Industrial

disasters. It should formulate SOPs for continuous surveillance of environment.

- d. Formulate plan for execution of above tasks plans.
- e. EPA should also be deputed to ensure assessment of environmental damages, deployment of expertise on the scene of disaster to provide advice on decontamination and restoration of normalcy in affected area. It should plan rehabilitation of areas damaged by Industrial Disasters.
- f. Preparation of Damage Assessment Plan and execution of Rehabilitation Plan.
- g. Prevention and control of disaster source and cleaning of the area affected by chemicals through provincial EPAs and other available resources.
- h. Act as focal point for monitoring of management of hazardous wastes etc, Formulate regulations in the light of Basal Convention and other international codes for classification of hazardous substances covering aspects related to health and environment.

### **MINISTRY OF INTERIOR**

6. The Ministry will prepare its plan to deal with Industrial disasters in collaboration with Provincial Home Departments. It is responsible for the following:-
  - a. Police assistance would be basically required to maintain peace and security in the area affected by Industrial Disasters. It will cordon the areas to prevent entry of non essential personnel during various phases of Disaster Management Operation.
  - b. Police personnel should be trained in emergency response skills; e.g. rescue medical first aid, fire fighting evacuation and warning. Assistance should also be personnel of DDMA's to learn these skills.
  - c. Make guidance arrangements for evacuation of affected population to safer areas.
  - d. Concerned police authorities to identify all hazardous industrial units in their area of jurisdiction and have a close liaison with such industrial units to enable them to control the situation in case of a disaster.
  - e. Ministry may suitably equip their personnel with protective equipment required for Industrial disasters for self protection. This capacity may be gradually strengthened over a period of time to facilitate the victims of the industrial accidents as well.

- f. Enhance capacity of National Crisis management Cell (NCCM) and train its personnel on technical equipment to deal with industrial Disasters.
- g. Federal and provincial Civil Defence Departments should be trained/ equipped and incorporated in Industrial Disaster Management Plan.
- h. Establish Provincial Crisis Management Cell (PCMC) in close collaboration with Provincial Home Department as well as DDMA and equip the same with technical equipment to combat Industrial Disasters.
- j. Police Department should provide a liaison officer at PDMA and DDMA for briefing and coordination.
- k. Adequate funds may be allocated for capacity enhancement of Civil Defence Department and Civil Armed Forces. Their officials may be suitably trained and equipped to combat industrial disasters. Response against industrial disaster may form part of operational plan of Civil Defence Department as well as Civil Armed Forces.
- l. National Crisis Management Cell (NCCM) will manage Operational Control Room round the clock and collect information about Industrial Disaster. It will also coordinate with Provincial Crisis Management Cells (PCMCs) and other agencies to gather casualty figures etc and coordinate plans for emergency response.
- m. Acquisition of appropriate intelligence, surveillance and coordination of requisite security measures with other law enforcing agencies to protect industrial facilities.

### **MINISTRY OF PETROLEUM & NATURAL RESOURCES**

7. The Ministry is responsible to develop a Disaster Risk Management Plan with regard to mandate of the Ministry. In addition, it is responsible for the following:-
- a. Develop guidelines for Mitigating oil and gas related emergencies including planning, development and regulation of oil refineries, CNG gas stations, petroleum resources and mining sector etc.
  - b. Steps should be taken to strengthen the security of petro chemical installations and refineries all over the country. SOPs should be developed for emergency response for disaster in above sectors.
  - c. A long term strategy may be evolved by taking safety measures which may include relocating huge oil/chemical reservoirs away from strategic centres and populated areas to avoid any major disaster.

- d. Ministry to liaise with Ministry of environment as well relevant industry for obtaining guidelines on handling of oil and chemicals, hazardous and noxious substances.
- e. Ministry to develop hazard mapping for each industrial cluster. A data base of all industrial units (district wise) may be compiled which can cause hazard to local population during a disaster. The said data may also be shared with NDMA for planning DRM activities at each level.
- f. Ensure through a transparent monitoring mechanism that International safety standards are being followed by all concerned right from oil exploration to the final stage of distribution.

### **MINISTRY OF FOREIGN AFFAIRS**

- 8. The Ministry will develop operating procedures to expedite requests for aid and to facilitate deployment of international response teams to receive technical assistance in case of a large scale industrial disaster. In addition, it is responsible for the following:-
  - a. The operating procedures for requesting and receiving technical assistance from international community for an Industrial disaster may be shared with NDMA.
  - b. The inventory of international organizations/donor agencies to organize requests for assistance in case of an industrial disaster may be develop and maintained.
  - c. Coordinate with foreign countries to receive technical/ humanitarian assistance in case of a major industrial catastrophe.
  - d. Coordinate with Organization for Prohibition of Chemical Weapons (OPCW), other international organizations and relevant UN agencies to receive technical, humanitarian and financial assistance for disaster risk reduction and preparedness.
  - e. Coordinate provision of technical assistance to other countries by Government of Pakistan in case of an Industrial Disaster.
  - f. Maintain liaison with NDMA in order to ensure collaborative efforts for Disaster Risk Management.

### **MINISTRY OF INDUSTRIES, PRODUCTION AND SPECIAL INITIATIVES**

- 9. The Ministry will develop Disaster Risk Management Plan according to the mandate of Ministry. The other functions and responsibilities of Ministry will be as follows:-



- a. Plan for mitigation of health specific hazards for an industrial disaster in consultation with Ministry of Health and other stakeholders.
- b. Develop guideline for Industrial sector to ensure safety of Industry and its production processes in hazard prone areas and ensure systematic monitoring in all Industrial clusters to follow such guidelines.
- c. Develop physical capability all types of Industrial disasters including chemical disasters and formulate SOPs for emergency response to an Industrial Disaster.
- d. Enactment and administration of the legislation related to prevention, control and combating of disasters arising from industrial accidents.
- e. Prosecuting the offenders, violating the National legislation for unlawful storage, transportation and processing of hazardous chemicals.
- f. Monitoring and combating industrial accidents in the limits of each province through provincial Governments and local Govts.
- g. Coordinate/ liaise foreign assistance if required through Ministry of Foreign Affairs as per relevant international conventions to which Pakistan is a party.
- h. The use of Chlorine and Ammonia and other hazardous chemical in large quantities may be subjected to several notification requirements, standards, advice, restrictions, operational codes and maintenance procedures etc. The advice should used to develop emergency plans and routine maintenance checklists, taking into account the special features of the specific installation. Relocation of plants/ units out of populated areas could prevent some major mishap.
- j. Identify industrial hazardous area in near vicinity of Cantonments / Bases and estimate the threat level for preparation of suitable response options by the Armed Forces.
- k. Mechanism of scheduled inspections be introduced to ensure that industrial facilities are well prepared to combat any accident/disaster. Penalties should be imposed upon those industrial facilities violating SOPs.
- l. Identify Districts having concentration of chemical industrial plants as “high risk Districts” and concerned Industrial units to be suitably equipped for responding to any disaster situation accordingly.
- m. Develop a standard list of safety / Disaster Management equipment proportionate to the size of industrial plants and relevant industrial facility should be bound to maintain such equipment.

- n. Formulate health protection plan for each Industrial cluster against health hazards in coordination with Ministry of Health.

### **MINISTRY OF HEALTH**

10. The Ministry will act as focal point for managing all aspect of healthcare preparedness, response and recovery in case of an Industrial Disaster situation in close coordination with the NDMA. In addition, it is responsible for the following:-

- a. Prepare Health Support Plan based upon Disaster Risk Management Plans formulated by Min of Industry to combat Industrial Disaster including management of mass casualties and submit this plan to the NDMA.
- b. Build capacity and strengthen Health Management System in Federal and Provincial hospitals.
- c. Review health specific hazards in coordination with Ministry of Industries and put in place health protection plan for various industrial hazards.
- d. Organise Disaster Management Training for doctors in all Federal and Provincial Hospitals to be deputed further to train Paramedical Staff at District level in mass causality treatment.
- e. Provide technical support in all health related areas to NDMA through Emergency Preparedness and Response Centre of the Ministry.
- f. Keeping in view the location of different Industrial Clusters, vulnerability assessment (infrastructure and organizational setup) may be organized for optimum utilization of available health resources.
- g. Establish emergency health operation to ensure better coordination and mobilization in emergency disaster situation at all levels.
- h. Establish emergency health operation to ensure better coordination and mobilization in emergency/ disaster situation at all levels;
- j. Set-up on Site Health Services including victim decontamination, transportation to concerned health facility and follow-up.
- k. Mobilize emergency health teams including mobile hospitals, to be deployed in the event of an Industrial disaster.
- l. Build effective linkages and coordination at national level especially with Armed Forces through Ministry of Defence to handle industrial disasters in major cities as well as in far flanged areas.
- m. Coordination with regional and international health agencies/ stakeholders to combat an Industrial Disaster.

- n. Establish Burn Centres, Trauma Centre and Protection Shelters in near vicinity of all industrial clusters.

### **MINISTRY OF RAILWAYS**

11. The ministry will develop disaster risk management plan with regards to the mandate of the Ministry. In addition, it will be responsible for the following:-

- a. Monitor transit of inflammable industrial material, chemical and petrochemicals and develop SOPs to reduce vulnerabilities of above material to disaster risk by proper stacking/handling during transportation and storage.
- b. Develop plan for quick rehabilitation of train network in the aftermath of major Industrial Disaster or a disaster of.
- c. Develop guidelines and procedures to receive and transport relief goods to affected areas of an Industrial Disaster disaster-in a quick manner.
- d. Coordinate transportation of relief goods with the NDMA and relevant local authorities.
- e. Develop technical capacities of the Ministerial staff to undertake fire fighting, damage control and evacuation of casualties in case of an incident connected to sabotage or incidental fire or leakage of gas etc.
- f. Ensure elimination of railway accidents at level crossings by constructing overhead/ under head railway bridges in coordination with provincial Governments.

### **PLANNING AND DEVELOPMENT DIVISION**

12. Basing on this plan, Planning and Development Division may prioritise DRM related projects in budget allocations and direct relevant Ministries, Departments and Provincial Govts to allocate specific budget for the said purpose.

### **NATIONAL LOGISTICS CELL (NLC)**

13. NLC to prepare contingency plans and SOPs to counter any emergency in storage or transportation of hazardous material/chemicals. It will also ensure following:-

- a. Develop capacity to handle all kind of disasters at NLC terminals all over Pakistan and assist Railways and other stakeholders in case of an Industrial Disaster.
- b. Develop capacity to handle.
- c. Transportation of emergency relief supplies in case of an Industrial disaster.
- d. Act as coordinator of road, rail, air and sea transport during an Industrial disaster for relief supplies and plan and organize the movement of logistics from base(s) to forward location(s).

## **PROVINCIAL GOVERNMENTS**

14. Provincial Governments to ensure:-
- a. Establish a dedicated response capacity on the pattern of Punjab's Rescue 1122 comprising Fire, safety, rescue and medical support under the operational control of PDMA to tackle industrial emergencies.
  - b. Formulation of their provincial plans for industrial facilities in the province by involving PDMA and DDMA to mitigate and manage Industrial Disasters of tier I to tier III level emergencies.
  - c. Formulation of Off Site plan at District level and ensure development of On Site plans for each hazardous Industrial Facility in the province by incorporating local responders and local Army Units / Headquarters.
  - d. Maintain a database of experts on DRM activities and utilise them as master trainers for imparting training to personnel of various agencies.
  - e. Obtain the services of DESTO through NDMA for Non Destructive Testing (NDT) for periodical testing of Industrial Plants especially pressure vessels, pipelines and furnaces etc.

## **LOCAL BODIES**

15. To perform the functions of the Local Resource Coordinator in obtaining all types of resources from the area, like hospital services, accommodation, manpower, trucks trailers, vehicles, heavy construction machinery, earth moving machinery and workshop services etc. Establish the local Secretariat and operate the same on 24 hour basis for communication with DDMA and PDMA.

## **RESCUE 1122**

16. The mechanism has initially been established in Punjab which is available to DDMA, as well as PDMA of the province for evacuation of casualties and to provide training to the security staff of earmarked industrial units. Such response mechanism may be created in other provinces subsequently.

## **NGOs/INGOs/UN AGENCIES**

17. The role of NGOS/INGOs/UN Agencies including Edhi Welfare Trust for mitigation and DRM activities will be managed and coordinated through NDMA PDMA and DDMA.

## **CIVIL DEFENCE**

18. Civil defence units as first response agency should be prepared to manage industrial disasters. In case of a major disaster where armed forces are employed for

management of Industrial disasters, civil defence units will be suitably grouped with armed forces to augment their resources. Response against industrial disaster should be included in operational plan of Civil Defence outfits especially those deployed in the vicinity of Industrial Clusters. Ministry of Interior to ensure training of response personnel of Civil Defence and procurement of suitable equipment to combat industrial disasters.

### **SERVICES REQUIRED FROM OTHER AGENCIES**

19. The DGs of PDMA and DCOs of respective DDMA in pursuance of their response action may require the services of other unidentified organization and citizens as deemed necessary. All such organizations, persons may be duly notified in writing of the services required from them and will be compensated for services rendered. Such parties are required to comply with the requirements of DDMA and PDMA.

**LIST OF SAFETY EQUIPMENT AVAILABLE WITH  
VARIOUS INDUSTRIAL FACILITIES**

1. **ENGRO CHEMICALS PAKISTAN LIMITED, DAHARKI, DISTT GHOTKI**
  - a. Fire Extinguishers Plant - 242
  - b. Fire Extinguishers Colony - 406
  - c. Comfo Masks - 119
  - d. Full Masks - 57
  - e. Scott Air Packs - 39
  - f. Smoke Detectors - 91
  - g. Fire Truck (Big) - 1
  - h. Foam Trolley - 11
2. **ATTOCK REFINERY LIMITED, MORGAH, DISTT RAWALPINDI**
  - a. Fire Tenders - 2
  - b. Ambulance - 2
3. **PAK AMERICAN FERTILIZER LIMITED, DAUDKHEL, DISTT MIANWALI**
  - a. Fire Engine - 1
  - b. Fire Tender - 3
  - c. Fire Extinguisher - 16
4. **FAUJI FERTILIZER COMPANY LIMITED, GOTH MACHHI, SADIQABAD,  
DISTT RAHIM YAR KHAN**
  - a. Fire Engine - 2
  - b. Fire Tender - 6
  - c. Fire Extinguisher - 20
5. **PAK ARAB FERTILIZER (Pvt) LIMITED, SADIQABAD, RAHIM YAR KHAN**
  - a. Fire Engine - 1
  - b. Fire Tender - 10
  - c. Fire Extinguisher - 10
6. **CLARIANT PAKISTAN, LAHORE**
  - a. Fire Tender - 1
  - b. Fire Extinguisher - 10
7. **DAWOOD HERCULES CHEMICALS LIMITED, SHEIKHUPURA RD, LAHORE,**
  - a. Fire Extinguisher Plant Site - 361
  - b. Half Gas Masks (for Ammonia Gas) - 150
  - c. Full Face Gas Masks (for Ammonia Gas) - 50
  - d. SCBA (Self Contained Breathing Apparatus) - 4
  - e. Smoke Detector - 50
  - f. Fire Truck - 1

8. **FAUJI FERTILIZER BIN QASIM LIMITED, KARACHI**
- |    |  |   |  |
|----|--|---|--|
| a. | Fire Tenders                                     | - | 2  |
| b. | Fire Water Network                               | - | 72 (Fire hydrants)   |
| c. | Fire Extinguisher                                | - | 271(DCP & CO <sub>2</sub> type)                            |
| d. | Foam Trolley                                     | - | 2  |
| e. | Fire Alarm System                                | - | 279 manual call points<br>415 smoke & 35 heat<br>Detectors |
| f. | Full Face Masks                                  | - | 100 Nos  |
| g. | Half Face Masks                                  | - | 250 Nos  |
| h. | Fire Fighting Suits                              | - | 2 Nos  |
| j. | Automatic CO <sub>2</sub> (Fire knockout system) | - | (Fixed- unmovable)   |
9. **FAUJI FERTILIZER COMPANY LIMITED, MIRPUR MATHELO**
- |    |                   |   |    |
|----|-------------------|---|----|
| a. | Fire Engine       | - | 1  |
| b. | Fire Tender       | - | 3  |
| c. | Fire Extinguisher | - | 10 |
10. **NATIONAL REFINERY LIMITED, KORANGI, KARACHI**
- |    |                                    |   |     |
|----|------------------------------------|---|-----|
| a. | Fire Hose 2.5", 50' Length         | - | 20  |
| b. | Foam Concentrate, Gal, Cans        | - | 120 |
| c. | Fire Extinguisher, DCP, 50 Kgs     | - | 25  |
| d. | Fire Extinguisher, DCP             | - | 166 |
| e. | Fire Extinguisher, CO <sub>2</sub> | - | 22  |
| f. | Fire Proximity Suit                | - | 9   |
11. **PAKISTAN STATE OIL LIMITED, KORANGI KARACHI**
- |    |                                    |   |    |
|----|------------------------------------|---|----|
| a. | Fire Hose 2.5", 50' Length         | - | 11 |
| b. | Fire Extinguisher, DCP, 50 Kgs     | - | 20 |
| c. | Fire Extinguisher, DCP             | - | 13 |
| d. | Fire Extinguisher, CO <sub>2</sub> | - | 30 |
| e. | Fire Proximity Suit                | - | 2  |
12. **PAKISTAN PTA LIMITED, PORT QASIM, KARACHI**
- |    |                                    |   |     |
|----|------------------------------------|---|-----|
| a. | Fire Tenders                       | - | 2   |
| b. | Ambulance                          | - | 1   |
| c. | Breathing Apparatus Sets           | - | 29  |
| d. | DCP Fire Extinguishers             | - | 385 |
| e. | CO <sub>2</sub> Fire Extinguishers | - | 299 |
| f. | Fire Hoses                         | - | 118 |
| g. | Foam Tank (2000 Lit)               | - | 1   |

13. **PAKISTAN ORDINANCE FACTORIES (POF)WAH**

a.	Fire Vehicles	18
b.	Ambulance	13
c.	Breathing Apparatus Sets	16
d.	Respirator	10
e.	Fire Points	700
f.	Fire Static Tanks	55

14. The spread sheet of above resources is given at Appendix 1 to Annex F.



**DETAIL OF SAFETY EQUIPMENT AVAILABLE WITH DEPARTMENTS/INDUSTRIES**

Serial	Department/Industry	Fire Extinguishers	Fire Extinguishers Colony	Comfo Mask	Full Masks	Scott Air Packs	Smoke Detectors	Fire Truck (Big)	Foam Trolley	Ambulance	Fire Engine	Fire Tender	Half Gas Masks	SCBA	Fire Water Network	Fire Alarm System	Heat Dector	Fire Fighting Suit	Automatic CO2 (Fire Knockout System	Fire Hose 2.5", 50'Length	Foam Concentrate, Gal, Cans	Breathing Apparatus Sets	Foam Tank 2000 Lits	Fire Static Tank	Respirator	Fire Point	
1	Engro Chemicals Pakistan Limited, Daharki, Distt Ghotki	242	406	119	57	39	91	1	11																		
2	Attock Refinery Limited, Morgah Distt Rawalpindi	2								2																	
3	Pak American Fertilizer Limited Daud Khel, Distt Mianwali	16									1	3															
4	Fauji Fertilizer Company Limited, Goth Machhi, Sadiqabad, Distt Rahim Yar Khan	20									2	6															
5	Pak Arab Fertilizer (Pvt) Limited, Sadiqabad, Distt Rahim Yar Khan	10									1	10															
6	Clariant Pakistan, Lahore	10									1																
7	Dawood Hercules Chemicals Limited Sheikhupura Road Lahore	361			50		50	1					150	4													
8	Fauji Fertilizer Bin Qasim Limited, Karachi	271			100		415		2			2	250		72	279	35	2	Fixed								
9	Fauji Fertilizer Company Limited, Mir Pur Mathelo	10									1	3															
10	National Refinery Limited, Korangi Karachi	191																9	22	20	120						
11	Pakistan State Oil Limited, Korangi Karachi	33																2	30	11							
12	Pakistan PTA Limited, Port Qasim Karachi	385								1		2							299	118		29	1				
13	Pakistan Ordinance Factory Wah Cantonment							18		13												16		55	10	700	
<b>TOTAL</b>		<b>1551</b>	<b>406</b>	<b>119</b>	<b>207</b>	<b>39</b>	<b>556</b>	<b>20</b>	<b>13</b>	<b>16</b>	<b>6</b>	<b>26</b>	<b>400</b>	<b>4</b>	<b>72</b>	<b>279</b>	<b>35</b>	<b>13</b>	<b>351</b>	<b>149</b>	<b>120</b>	<b>48</b>	<b>1</b>	<b>55</b>	<b>10</b>	<b>700</b>	

**ANTICIPATED HAZARDS AND THEIR MANAGEMENT****a. FIRE DUE TO VARIOUS REASONS**

<b>Type of Disaster</b>	<b>Properties of Material</b>	<b>Effects of Disaster</b>	<b>Preventive Measures</b>	<b>Facilities required</b>
Fire in petroleum products, oil storage tanks, electrical cables, transformer & Wood and wild life	Highly inflammable and greatly expands in volume after getting heated and changing into gaseous form. Electrical cables are highly combustible and gases due to fire are highly toxic and of obnoxious smell. Transformer oil is inflammable having a flash point of 1400C. Highly combustible and fast spreading.	Fire can result into huge explosion of the storage tanks causing wide spread fire and damage to men, material and machines. Transformer can burst causing disastrous fire accident	Stacking in as per standard norms. Storage area declared for Restricted entry. No inflammable Material stored in the proximity. Prohibition of smoking & other sources of fire. Work permit system to be followed.	Fire hydrants, Fire extinguishers, Fire tender, Trained work force, Smoke sensors and automatic water sprinkler, Emergency escape route, Proper house keeping, All inflammable combustible and explosive material to be removed immediately after the completion of work, All inflammable, combustible and explosive materials to be kept away from electrical installations.

**b. EXPLOSION DUE TO VARIOUS REASONS**

Explosion of pressure vessels, pipelines, furnaces, Casting machines	Gaseous substances such as steam, compressed air & nitrogen are explosive due to the higher pressure under which they are retained and transported. If water from any source trickles into the molten metal, the water molecules break immediately into hydrogen and oxygen releasing immense amount of energy causing violent explosion.	The metallic vessels/ containers/ pipelines can burst open & cause high velocity splinters to fly in all directions resulting into fatalities and serious damage to plant. Superheated steam can cause serious burn.	Continuous pressure and temperature monitoring carried out. Pressure gauge regularly calibrated. Boiler inputs constantly monitored. Appropriate isolating valves, thermometers and by pass lines provided. Only highly skilled & experienced manpower is engaged. Standard operating practices and laid down safety procedures are followed.	Restricted entry in critical areas followed. Operation by only trained staff. Fire hydrants. Fire extinguishers. Emergency water tank and power supply. Preventive maintenance and norms of operation as per standard operating practice to be strictly followed.
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c. **CHEMICAL AND GAS HAZARD**

Type of Disaster	Properties of material	Effects of Disaster	Preventive Measures	Facilities Required
<b>Chlorine (Cl<sub>2</sub>)</b>	Greenish yellow in colour and acutely irritating in odour. Reacts slowly with water to form HCl. Moist Cl <sub>2</sub> are corrosive to most metals. Under sunlight it reacts explosively with H <sub>2</sub> to form HCl. It irritates the mucous membranes. In extreme cases the breathing difficulty may reach the point of death due to suffocation. Exposure to Cl <sub>2</sub> causes burning of eyes and nose. Non-combustible in air but most combustible materials will burn in Cl <sub>2</sub> as they do in Oxygen. Flammable gases & vapours from explosive mixture with Cl <sub>2</sub> . Reacts explosively or forms explosive compounds with many common chemicals such as acetylene, turpentine, hydrocarbons, hydrogen and finely divided metals.	If exposed to heat or fire, the cylinder may explode violently releasing the contents. This will result into disaster causing wide spread fire and suffocation. In case of leakage, it will react with body moisture to form acid and at high concentration it will act as asphyxiate and cause wide spread fatalities.	Welding, cutting or any other hot work on the equipment of Cl <sub>2</sub> done only after the system is purged with steam and dried with hot air. Contact with combustible substances, Hydrogen, Acetylene prevented. Indoor storage, handling and use areas properly ventilated with cool and dry atmosphere. Cylinders stored in upright position with enough room between them. The vapour is heavier than air and travels along the ground, therefore the exhaust fans located near the floor of the store.	Proper system developed for storage handling & transportation Trained personnel. Breathing apparatus and gas masks. First aid. Sensors. Sprinklers. Fire and explosion proof fittings. Provision of fibreglass hood to direct the leaking gas into the neutralization tank with lime dosing facility. Periodical Medical check-up
<b>Ammonia</b>	Colourless & pungent in odour. Extremely soluble in water. Solubility decreases with increase in temperature. In presence of moisture corrosive to copper, zinc, copper alloys & galvanized surfaces. Being lighter than air, It will rise up in the air & its pocketing is likely to occur at roof level. The mixture of ammonia & air is flammable with explosion potentiality if the concentration of ammonia in air is less than 25% but greater	If exposed to heat & fire, the cylinder may explode violently releasing the contents. This will result into disaster causing wide spread fire & suffocation. The explosive/flammable limits of the gas are from 16 to 25% by volume of air. In case of leakage, it will react with skin, results chemical burns & at high	As above	As above

	than 16% by volume. It irritates skin, eyes & respiratory tract. Concentration above 2000 ppm may be fatal.	concentration it will produce violent coughing, severe lung irritation & pulmonary oedema and cause fatalities.		
<b>Oxygen (O<sub>2</sub>)</b>	Non-combustible in itself but enhances combustion of other materials. Colourless & odourless. Oil & grease ignites spontaneously in presence of compressed oxygen. Inhalation of 100% oxygen under pressure causes nausea, dizziness, and irritation of lungs, pulmonary inflammation, pneumonia and collapse.	Cylinders if subjected to elevated temp. can explode violently and cause damage to men, materials and machines.	Open flames, sparks, smoking and contact with combustible and reducing substances prevented. The cylinders and piping kept free of oil and grease. Stored in cool and well ventilated. Cylinders of Acetylene and LPG kept away from oxygen storage. Dropping of cylinders is strictly avoided and violent contact with one another is prevented.	As above
<b>LPG</b>	Colourless & odourless. Odorized by addition of Ethyl-mercaptan as warning agent. It is doubly heavier than air and has a tendency to settle down on floor. Degree of fire and explosion hazards is very high due to following properties: Extremely low boiling point. Large liquid to gas expansion ratio at room temp. and subsequently the air/LPG flammable mixture is 10 to 100 times the gaseous volume of LPG. Poor visibility of the ignitable mixture and high burning velocity. Very high calorific value 22,000 Kcal/kg.	High burning velocity (0.38m/sec) it can injure instantly any one coming in contact with it and cause severe burn injury and even death. It has ability to ignite and burn as a deflagration giving rise to fire ball with intensive heat radiation and thus cause wide spread disaster. Fire reports have been received for its ignition from sources as far as 200 Mts. from the source of gas leakage.	Industrial and commercial grade cylinders are only used. Naked lights cigarette ends, sparks from static and live discharges, metal impacts, sparks from welding and cutting, friction in moving parts are avoided. Cylinders are stored in cool locations. Quality of pressure regulators and other devices and rubber hose as per ISI standard.	Periodic inspection of transportation sources including <u>browsers</u> and cylinders as per standards laid down in ASME Sec 8 standards and DOT guidelines. The information can be obtained from website <a href="http://www.webstore.asi.org/">www.webstore.asi.org/</a>

<b>Dissolved acetylene (C<sub>2</sub>H<sub>2</sub>)</b>	Colourless and the commercial grade has a garlic like odor. Non-toxic when pure and mildly anesthetic in mixture with oxygen. Explodes violently when mixed with Cl <sub>2</sub> under sunlight. Inhalation causes dizziness and suffocation. Decomposes violently under pressure when subjected to heat or shock even in the absence of the air.	Because of its wide explosive range even a small leakage, on contact with the spark leads to an explosion. Explosion of C <sub>2</sub> H <sub>2</sub> develops pressures higher than explosions of most other gases and are therefore very violent and damaging.	Conform to standards. Fool-proof shut-off valves and pressure regulator be attached to the cylinder valve. If leaks are identified it is rectified by lightening glands, nuts etc. and removed to a place well away from any possible ignition and gas is allowed to escape. It is ensured that the valve protective caps remain in place before and after the use of cylinders. These valve are kept closed even for the cylinders, which are supposed to be empty. Cylinders are stored and handled in upright position and protected from direct sunlight. Cylinders of Cl <sub>2</sub> and oxygen not stored with C <sub>2</sub> H <sub>2</sub> cylinders.	As Above
<b>Sulphuric acid (H<sub>2</sub>SO<sub>4</sub>)</b>	Colourless, oily dense liquid. Its concentration may vary from 20% to 98%. Reacts vigorously with evolution of heat. Powerful oxidizing agent and can dissolve most metals. It can cause severe damage to eyes leading to blindness. It causes deep and rapid skin burning which may be difficult to heal. Violent splattering occurs if water is added to concentrated acid. The acid does not burn but spillage of concentrated acid into organic material can cause fire.	Large scale Personnel can get affected due to following reasons. Severe damage to eyes/blindness. Severe skin burns. Damage to respiratory digestive tracts. The above situation can cause chaos	Smoking and using naked lights prohibited in the storage area. Hot jobs in the vicinity of acid storage area are done only under permit. Stored in metal drums/glass/ polyethylene carboys and kept in separate well ventilated location away from all sources of ignition. Raised sills/ramps provided at store room door openings. Only trained employees engaged for handling of this acid and suitable PPEs provided.	As above

d. **ELECTRICAL HAZARD**

Type of Disaster	Properties of material	Effects of disaster	Preventive Measures	Facilities Available	Remarks
Electrical hazard	Electrical shock affects the nervous system, muscles and other parts of the body	Severe burns. Damage to nervous, muscular and pulmonary systems and may cause permanent disability and even death. Can cause fire and explosions. Electrocutation can cause falling of persons from height and death	Smoke sensors and alarms. Sprinklers. Suitable fire Extinguishing system	Generation And transmission system has been designed and operated as per electricity Act and Rules. Suitable tripping devices, isolators, no conducting materials being used. Properly insulated tools, tackles and testing devices provided. Suitable lighting arrestors and "earthlings" provided. PPEs such as shock proof gloves, shoes etc. provided and used. Fire retardant sheathing for cables and barriers. Suitable rubber matting. Moistening of Critical electrical Equipment and operating personnel avoided.	As per the Latest findings following are the disastrous effects of strong Electromagnetic field. Children living near power lines are likely to develop lymphatic-cancer. People working regularly in the strong magnetic fields have 60% higher probability of getting affected by leukaemia. Ladies working in the electromagnetic field created by visual display units have the probability of having miscarriage.

e. **COLLAPSE OF STRUCTURES & EQUIPMENT**

Type of Disaster	Properties Of material	Effects of Disaster	Preventive Measures	Facilities Available	Remarks
Collapse of structures and equipment	Higher concentrated loads, height and massive volume make the structures vulnerable to collapse. Being most metallic (mostly carbon steel) is prone to corrosion, leading to weakening and collapse.	Since most of the equipment, personnel and activities are concentrated indoors collapse of structures shall lead to disaster.	All the structures designed and erected as per safety norms/ building codes considering factors such as soil, wind velocity and direction, rainfall, seismic record, salinity of atmosphere etc. Preventive maintenance regularly done. Additional load avoided.	Fire and security people trained for rescue operation. Well laid out fire fighting system. Rescue and recovery teams employment	Seismic Building codes to be strictly adhered to. Special attention to be paid towards structural stability and reinforcement of structure. Roof cleaning and cleaning of drainage system to be ensured.

f. **MAJOR ACCIDENTS OF TRANSPORT FACILITIES**

Type of Disaster	Properties of material	Effects of Disaster	Preventive Measures	Facilities Available	Remarks
Major accident of transport facilities	Hazardous & inflammable material such as chemicals, gas cylinders, oils, etc. that are transported by trucks/road tankers, if met with an accident can cause major disaster	Chemical poisoning Oil & fire explosion Heavy loss of materials & equipment	Road conditions and traffic control maintained in good order. Proper safety and traffic regulations ensured for trucks, road tankers carrying chemicals and oils. Reputed & recognized transporters are only employed.	Trained security and fire fighting staff. First aid ambulance and medical facilities.	People residing inside and outside the plant premises to be made aware about the hazard of chemicals, gas, oils etc. and informed about the preparedness

## GUIDELINES FOR PREPARATION OF DISTRICT OFF-SITE EMERGENCY PLAN

### OBJECTIVE OF THE PLAN

1. PDMA should ensure that **District Off-Site Emergency Plan** is made by each District having hazardous industry and copy of such plan should be available with DDMA as well as PDMA. The objective of this plan is to make maximum use of the combined resources of the units and the outside services to:

- a. Initially contain and ultimately bring the incident under control.
- b. Minimize damage to property and the environment.
- c. Rescue the threat casualties and safeguard other people.
- d. Trace out the fatalities and provide assistance to their relatives.
- e. Provide authoritative information to the media.
- f. Secure the safe rehabilitation of affected areas.
- g. Preserve relevant records and equipment for the subsequent enquiry into the causes and circumstances of the emergency.

### 2. DISASTER AND ITS MANAGEMENT

- a. **ON-SITE EMERGENCY**. If the accident / dangerous occurrence takes place in the factory and its effects are confined to the factory premises involving the workmen working in the factory, it is termed as 'On-Site Emergency'.
- b. **OFF-SITE EMERGENCY**. If the effects of the accidents / dangerous occurrence are felt outside the factory premises, the situation thus generated is termed as 'Off-Site Emergency'.

3. **CAUSES FOR DISASTER**. Any one of the following may lead to a disaster:-

- a. Leakage of toxic gases, steam, hot water etc or leakage and spillage of chemicals and POL products.
- b. Explosion due to entrapping of water in molten metal.
- c. Explosion and fire due to gas, coke, pitch and inflammable oils.
- d. Electrocution.
- e. Collapse of structure.

### FORMULATION OF RULES

4. The Federal Government (Ministry of Environment) has been asked by the NDMA to notify a set of rules entitled "Chemical Accident (Emergency Planning, Preparedness and Response) Rules, complementary to Manufacture, Storage and Import of Hazardous

Chemical under the relevant Environment (Protection) Act. NDMA is pursuing vigorously with various Government Ministries/Departments to define safety parameters in the light of NDMO LIII, of 2007 and structure of National Disaster Management Framework issued by the NDMA duly approved by NDMC to provide a statutory back up for setting up of crisis groups at district level for management of chemical accidents. Under this set up functional control rooms will be established at district level with information networking system. The DDMA is required to be constituted in every District and notified by the Provincial Governments in the official Gazette. DCO of the District shall be Chairperson, ex officio. He will also be Chief Coordinator for District Disaster Management which is required to be constituted to combat industrial disasters. District Government may co-opt technical experts in DDMA for assistance to tackle technical matters.

5. **OBJECTIVE OF DDMA's**. The objectives are:-
- a. Assess the anticipated emergency scenarios.
  - b. Develop an action plan to combat and contain the emergency.
  - c. Develop a scheme to generate public awareness.
  - d. Conduct mock drills to reduce response time.
  - e. Set up a control room for state-wide information networking.

**ACTION PLAN OF THE DDMA's**

6. Emergency Plan will be prepared in the form of a manual and approved by the District Nazim after deliberations with the members of the District Crisis Management Group. Further the manual shall be updated as and when required. The action plan of the District Crisis Management Group can be broadly divided into three major groups i.e:-

- a. Pre-disaster plan.
- b. During disaster plan.
- c. Post-disaster plan.

7. **PRE-DISASTER PLAN**

- a. To generate awareness among the people about the precautions and remedial measures to be taken during a disaster.
- b. To assess the impact of foreseeable disasters in the district by reviewing the emergency plans of installations/ industries involved in hazardous processing.
- c. To formulate one "**District Off-Site Emergency Plan**".
- d. To conduct mock drills to enhance response time.
- e. To identify the areas where local crisis group formation is needed.



8. **PLAN DURING DISASTER**

- a. To combat and contain the disaster.
- b. To inform the public for necessary self-protection measures.
- c. To evacuate & protect the affected areas.
- d. Treatment of victims.
- e. To activate combat/ mutual aid/ technical services.
- f. To restrict the entry points.
- g. To maintain law and order.
- h. To co-ordinate the functions of various agencies.
- j. To bring back normalcy.
- k. To provide authorized information to press and media.

9. **POST DISASTER PLAN**

- a. To rehabilitate displaced victims.
- b. To send information to PDMA/NDMA.
- c. To assess the shortcomings noticed during disaster management.
- d. To update the action plan time to time.

10. **EMERGENCY CONTROL CENTRE**. The office of the DCO shall function as the Emergency Control Centre in case of an emergency. This centre will be well equipped with related data, communication facilities etc.

11. **ASSEMBLY POINTS**. A number of assembly points situated well away from the areas of risk i.e. Industrial Units/facilities, where employees / public are required to assemble in the event of emergency should be earmarked and publicized.

12. **EVACUATION**. In case of an emergency, it is necessary to evacuate personnel from areas already affected or likely to be affected. Distinct alarms (siren) should be used to evacuate and to assemble the personnel in an orderly manner to the pre-determined assembly points.

13. **EXERCISES**. Mock Drills shall be conducted once in a year to train the employees of the industries & the general public, test the plan and to observe & rectify the deficiencies if any. Such exercise will also be attended by the representatives of NDMA as well as respective PDMAs.

14. **REPAIRING AND RESTARTING**. Before taking up repairs and restarting the plant, it is required to ensure that:

- a. All fires are extinguished without risk of re-ignition.
- b. The source of gas release is isolated.
- c. The gas cloud has disappeared, the concentration is within safe limits and the working areas are free from risk.

15. **INFORMATION FOR PUBLIC.** Leaflets containing concise instructions regarding actions to be taken by the general public in case of an emergency should be prepared before hand in local language. These should be distributed to the public.

16. **SOCIAL RESPONSIBILITY OF PLANT SITE.** It is the social responsibility of the plant/facility to establish the likely extent of damage (for a worst case scenario) which may be inflicted to civil population residing in adjoining areas of the plant/facility. The said population may be educated about the chemical / gas hazards by suitable interaction with them. In case of real time emergency, suitable alarm system should be used to forewarn them against envisaged gas/chemical leakage. Medical antidotes against such incidents should also be procured by the concerned industry/facility for the affected population in advance. The relevant industry should be able to establish field camps for civil population after industrial disasters and impart first aid to victims of disasters.

**CONTACT LIST OF PERSONNEL**

<b>S No</b>	<b>Designation</b>	<b>Office/Res</b>	<b>Fax</b>
<b>NDMA/PDMAs</b>			
1.	Duty Officer Operations Room NDMA	051-9213082	051-9213983
2.	Duty Officer Operations Room PDMA Punjab	042-9204408	042-9204405
3.	Duty Officer Operations Room PDMA Sindh	022-9200573	022-9200569
4.	Duty Officer Operations Room PDMA NWFP	091-9212058	091-9212167
5.	Duty Officer Operation Room PDMA Balochistan	081-2880245	081-9201722
6.	Director Environmental Control NHQ ISLAMABAD	20062349 20063490(R)	9261551 9261553
7.	P .S. to Chairman PQA	Ext -4539 4504425(R)	
<b>Ministry of Environment</b>			
8.	Secretary Environment	9224579-80,9222101 (R)	9224580
9.	DG Environment	9205622 9267432(R)	9205835
10.	Director PEPC Ministry of Environment	9223760 9212022(R)	
11.	DG Pak EPA	9267621, 0333-5192556	9261622 9261625
12.	DG EPA Sindh Forest, Wildlife and Environment Department Govt of Sindh	5065950, 5065532 9243074 (R)	5065940
13.	Director General Environmental Protection Agency Balochistan	9201840 2837799 (R)	9201180
<b>Shell &amp; PRL</b>			
14.	Chairman & MD (Crisis Manager) Shell & PRL	5682359, 0300-8237650 5831877 (R)	
15.	General Manager/Chief Executive Pakistan Refinery Ltd	5062005, 0300-8205289 5847175(R)	5091865
16.	Emergency Response Coordinator Shell & PRL	5630047	
17.	Corporate & Supply HSSE Shell & PRL	5689525 5861252(R)	
<b>Caltax Oil (Pakistan) Ltd</b>			
18.	Advisor Health, Environment & Safety	5215644, 0333-2331708 9250259(R)	5685014 5684252
19.	Caltax Oil (Pakistan) Limited	5681371 0333-2379727	
<b>Civil Aviation Authority</b>			
20.	Chief Operations Officer Civil Aviation Authority	45791423 0300-141088 5855047(R)	45791380
21.	Divisional Forest Officer Forest, Wildlife and Environment Department Govt of Sindh	4503022 4518107(R)	4503022
<b>Federation of Pakistan Chamber of Commerce &amp; Industry</b>			
22.	Secretary General Federation Of Pakistan Chamber of Commerce & Industry	5873626, 0303-7270722 6909373(R)	5874332
<b>National Refinery Ltd</b>			
23.	Refinery Head National Refinery Limited	5066369, 0300-8506049	5054663
24.	Advisor P & HR National Refinery Limited	5060300, 0300-8547380	5054663
25.	GM (Admin) National Refinery Limited	5060121, 0320-4334361	5054663
26.	Manager Oil Movement National Refinery Limited	5066701, 0333-2324661 5845330 (R)	5054663
27.	Manager Kemari Terminal National Refinery Limited	2850213, 2853702 0320-4326501, 4632172 (R)	5054663
28.	Manager Fire Protection National Refinery Limited	5060873 0320-4330968 6907031 (R)	5054663
<b>Pak-Arab Refinery Ltd</b>			
29.	Managing Director Pak-Arab Refinery Ltd	5090843, 5090798 5852757(R)	5090929 5090625
30.	Dy Managing Director Ops Pak-Arab Refinery Ltd	5886573, 0300-8258044 5882718 (R)	5090799 5090604

<b>Pakistan Refinery</b>			
31.	Muhammad Noman Shah (GM Technology and Inspection)	021-5122131	
<b>Pakistan Coast Guards</b>			
32.	Director General Pakistan Coast Guards	9215240, 0300-8271430 9203046 (R)	9215250
<b>Pakistan Navy Central Fire Brigade</b>			
33.	Cdr Fire Brigade Pakistan Navy Central Fire Brigade	23198220, 56637112 (R)	
34.	Fire Officer Pakistan Navy Central Fire Brigade	23198221	
35.	Sub Fire Officer Pakistan Navy Central Fire Brigade	23198223	
<b>Pakistan Meteorological Department</b>			
36.	Director Pakistan Meteorological Department	8112880 4976383 (R)	8110740 8112885
37.	Senior Meteorologist Pakistan Meteorological Department	45791300-245791322 9218657 (R)	9218282
<b>PNS SHIFA Hospital</b>			
38.	Commandant PNS Shifa Hospital	9204863, 0300-8238739 48507501 (R)	
39.	Deputy Commandant PNS Shifa Hospital	5606102, 0300-8201839 48507502 (R)	
40.	Manager Ops & Tech Services Fauji Oil Terminal and Distribution Company Ltd	750009, 0320-4302599 715372(R)	
<b>Pakistan State Oil Company Ltd</b>			
41.	GM (Ops)	0345-8291378	99203865
42.	Manager HSE	9203865 0345-8282930	
<b>Preventive Service Custom House Karachi</b>			
43.	Superintendent Preventive Service Custom House Karachi	2850752 123536 (R)	2850752
<b>Abbasi Shaheed Hospital</b>			
44.	H.O.D (Consultant) Burns Deptt. Abbasi Shaheed Hospital	6617942-9, 0320-235315	
45.	H.C.D. (Consultant) E.N.T. Deptt. Abbasi Shaheed Hospital	6617942-9, 0303- 7258692	
<b>Edhi Welfare Centres</b>			
46.	Inch/Duty Officer Head Office Edhi Welfare Centre	2413232 2443158	2418753
47.	Inch/Duty Officer Sub Head Office Edhi Welfare Centre	7512408	7512409
<b>Engro Industries</b>			
48.	Engro Chemical Pakistan Limited, 4th Floor, Dolmen Executive Tower Marine Drive, Block 4, Clifton Karachi	021-5297501-9	
49.	Engro VoPak Terminal Limited, 1st Floor, Bahria Complex 24 M.T. Khan Road, Karachi	021-5610954, 5610368, 5610388, 5610397 & 111-311-311	
50.	Engro Polymers Chemicals Limited, 1st Floor, Bahria Complex I 24 M.T. Khan Road, Karachi	021-5610610, 5610617, 610703, 5610743 & 111-411-411	
<b>Fauji Fertilizers</b>			
51.	Fauji Fertilizer Company Limited, 93-Harley Street, P.O. Box No. 253 Rawalpindi	PABX: 9272307- 15,9272318-9 TELEX: 5785 FFCRP PK, 54310 FFCRP PK	
52.	Fauji Fertilizer Bin Qasim Limited, Plot No. EZ/I/P-1 Eastern Zone, Port Qasim, Karachi 75020	021- 4724500-29	

<b>Pak Arab Fertilizers</b>			
53.	Pak Arab Fertilizers Limited, Khanewal Road, Multan-5960	061-9220022, 90610000	
<b>Dawood Hercules Chemicals</b>			
54.	Dawood Hercules Chemicals Limited, 28-Km Lahore Sheikhupura Road, Lahore 54000, Pakistan	042-7352762-71	
<b>Pak American Fertilizers</b>			
55.	Pak American Fertilizers Pvt. Limited, Iskanderabad (Daudkhel) Distt: Mianwali		
<b>Ittehad Chemicals</b>			
56.	Ittehad Chemicals Limited, G.T. Road, Kala Shah Kaku District Sheikhupura	042-798 00 26, 28, 33, 45	
<b>Sitara Chemicals Industries</b>			
57.	Sitara Chemicals Industries Limited, P.O. Box No 442 32 KM, Sheikhupura Road, Faisalabad – Pakistan	041-4689141-5	
<b>National Refinery</b>			
58.	National Refinery Limited, 7-B, Korangi Industrial Area Korangi, Karachi, Pakistan	021-5064135-7, 5064377-79, 5064981-86, 5064988	
<b>Pakistan Refinery</b>			
59.	Pakistan Refinery Limited, P.O. Box 4612 Karachi – 74000	021-509-1771-79, 509-1811-16	
<b>Bosicor Pakistan</b>			
60.	Bosicor Pakistan Limited, Mouza Kund Plant Sub Tehsil Gadani, District Lasbella, Balochistan	9221-2752299	
<b>Khalifa Point Refinery</b>			
61.	Khalifa Point Refinery, District Hub City		
<b>Indus Refinery</b>			
62.	Indus Refinery Port Qasim		
<b>PARCO Refinery</b>			
63.	PARCO Refinery, Qasba Gujarat, District Muzaffargrah, Pakistan	0697-490990-98	
<b>Attock Refinery</b>			
64.	Attock Refinery Limited, Morgah, Rawalpindi, Pakistan	051-5487041-45	
<b>Ibrahim Fibres</b>			
65.	Ibrahim Fibres Limited, Ibrahim Centre, Faisalabad38000, Pakistan	041-2617836	
<b>Dewan Salman Fibre</b>			
66.	Dewan Salman Fibre Limited, 46 Nazim Uddin Road F7/4, Islamabad, Punjab, Pakistan		
<b>ICI Polyester</b>			
67.	ICI Polyester Works, 30th KM, Lahore-Sheikhupura Road Sheikhupura		
68.		021-5610596-98	
<b>Defence Division</b>			
69.	Secretary	9271114	9271115
70.	PS to Secretary	9271426	
71.	SO to Secretary	9271425	
72.	SO to Secretary	9273358	
<b>National Highway Authority</b>			
73.	Chairman	9260417	9260717
74.	PS	9260417	9260717
75.	Director (Coord)	9260214	9261074
<b>National Highways &amp; Motorways Police</b>			
76.	IG (NH&MP)	9262418	9262420
77.	PSO to (NH&MP)	9262418	9262420

**CASE STUDIES FOR INDUSTRIAL DISASTERS**

1. Toxic industrial chemicals refer to a variety of chemicals used or created by industry that can have a significant impact on human health if released into the air or water. A potential threat exists for individuals located downwind or downstream from an accidental or intentional release of chemicals or for people situated near toxic industrial processes. Toxic industrial chemicals may pose a risk when they are stored in large quantities in one location. An act of sabotage or an accident can result in a large release of toxic material into the air or water. Some material retains its lethality even after travelling a considerable distance. A release of chlorine gas into the surrounding air is one example of the toxic industrial chemical threat.

2. **CASE STUDY.** Emphasis is placed following aspects:-

- a. What went wrong?
- b. How the accident could have been prevented?
- c. What safety controls was in-place?
- d. How effective were the controls and procedures?

3. **BHOPAL, INDIA CASE.** The sequence of events was as under:-

- a. It happened on December 3, 1984 when methyl isocyanate (MIC) vapour leaked from a Union Carbide Corporation plant manufacturing pesticides in Bhopal, India.
- b. The vapour spread over an area of five square miles, killed approximately 2500 people, and injured 200.000.
- c. Water entered an MIC storage tank, probably when "worker whose training did not meet the plant's original standards was ordered by a novice supervisor to wash out a pipe that had not been properly sealed", and triggered a violent chemical reaction.
- d. As the reaction of MIC with water greatly increased the temperature in the tank, the presence of an abnormally high level of chloroform at high temperature in the tank formed chloride ion, which rapidly corroded the stainless steel tank.
- e. The iron from the corrosion (or from earlier cross-contamination) catalyzed a dramatization of MIC and further increased temperature and pressure.
- f. The CO<sub>2</sub> evolved caused mixing of chemicals, which, with the rise in temperature, accelerated both reactions; finally, the build-up of pressure burst the rupture disk in the line to the safety valve. The valve was open for about two hours, during which most of the material in the tank, about

41 metric tons, was released to the environment as vapour.

g. There were five major safety systems at the plant, but they were not operational or did not function as expected. Specifically, these systems were:-

- (1) A refrigeration system to keep the MIC cool, slow down a chemical reaction and decrease vapourization and pressure build-up. This system had been shut-off since Jun 1984 to save electricity.
- (2) A spare tank for temporary storage of off-specification MIC for processing, which in the case of an emergency could be used to confine gas released from the other two tanks. It is not clear if this spare tank was empty or not, however, the operator did not (in the confusion of the accident) open the valves connecting the tanks.
- (3) A chemical scrubber designed to treat with alkali solution the toxic gas and rendering it harmless. In any case, the scrubber was under-designed and could not handle such a massive release. It was designed to neutralize small leaks, about 1.5 kg/min at 35, whereas during the accident, the leakage rate was about 200 times the specified capacity and about 6 to 10 times the temperature.
- (4) A 30m high flare tower, connected after the scrubber, intended to burn un-neutralized toxic gases high in the air. However, the line connecting the flare tower with the scrubber was blanked off for repairs. The flare tower also was designed for relatively small releases.
- (5) A water curtain designed to spray water up to a height 12 to 15 meters in the air, forming a curtain around the vapour cloud and disperse or absorb it. Water reacts with MIC vapour to form, in the liquid-phase, dimethyl urea or trimethylbiuret, both comparatively harmless compounds. The water curtain was not activated until one hour after the release, and was inadequately designed for the height of release (the discharge of MIC reached a height of about 35 to 40m)

4. **SEVESO, ITALY CASE**. In July 1976, in Seveso, Italy, an explosion at a plant producing 2,4,5- trichlorophenol (TCP), sent large quantities of dioxin into the atmosphere (Sambeth,1983). The accident happened on a Saturday morning, a time coinciding with closing the plant for the weekend. Several procedures were not followed:-

a. The operators left too much material in the batch when the distilled only

about a third of the required quantity.

- b. Instead of continuing to stir the mixture until completely cooled, the operators stopped the stirring after 15 minutes.
  - c. They did not add water to cool the mixture down.
  - d. Instead of staying with the system until the temperature decreases to 50-60, the operators left early when the recorded temperature was 158. An exothermic decomposition took place 6.5 hours later, and caused the rupture disk on the vessel to break, and an aerosol cloud containing dioxin to be released into the atmosphere.
5. This accident happened in spite of several safeguards:-
- a. The process (no pressurized) and the solvent (ethylene glycol) used in the process had been chosen as safer than other alternatives. The accident, however, was not connected with the process or the solvent.
  - b. Superheated steam with a saturation temperature of only 188 was used to prevent heating to the critical temperature of 230.
  - c. Additional safety features were a large condenser for rapid cooling, a second condenser at the end of the vent line for trapping leaking vapours, and an inventory of 3,000 liters of water ready to quench the reaction mixture, if needed.
  - d. Nevertheless, all these features required a human activation, and the operators were not there partly due to the lack of knowledge of the hazards presented.
  - e. Thermal studies of the chemical reactions involved, under a wide range of conditions, especially those encountered during startup and shutdown could have revealed the hazard.
  - f. Strict compliance with the prescribed operating procedures should have prevented this accident from happening.
6. **GORE, OKLAHOMA CASE.** The sequence of events was as under:-
- a. On January 4, 1986, also on a weekend, at a Kerr-McGee nuclear plant in Gore, Oklahoma, a release of about 29,000 pounds of uranium hexafluoride resulted in the death of a plant worker and 32 injuries.
  - b. In violation of plant procedures, the worker heated an overfilled cylinder of uranium hexafluoride, the cask ruptured and the chemical escaped, sending 100 people to the hospital and killing the worker.
  - c. Heating the vessels to reduce the mass was not an unusual event at this plant (Diamond, 1986).



**GUIDELINE ON AMMONIA, TOXICITY / SYMPTOMS / CURE**

1. **PHYSICAL PROPERTIES/DESCRIPTION**. At room temperature, ammonia is a colourless, highly irritating gas with a pungent, suffocating odor. It is lighter than air and flammable, with difficulty, at high concentrations and temperatures. It is easily compressed and forms a clear, colourless liquid under pressure. Anhydrous ammonia is hygroscopic. Ammonia dissolves readily in water to form ammonium hydroxide-an alkaline solution. The concentration of aqueous ammonia solutions for household use is typically 5% to 10% (weight: volume), but solutions for commercial use may be 25% (weight: volume) or more and are corrosive. Aqueous ammonia is commonly stored in steel drums. Anhydrous ammonia is stored and shipped in pressurized containers, fitted with pressure-relief safety devices, and bears the label "Non-flammable Compressed Gas". Despite not meeting the Department of Transport definition of flammable it should be treated as such.

- a. **TOXICITY AND SYMPTOMS**. Ammonia is highly irritating to the eyes and respiratory tract. Swelling and narrowing of the throat and bronchi, coughing, and an accumulation of fluid in the lungs can occur. Ammonia causes rapid onset of a burning sensation in the eyes, nose, and throat, accompanied by lacrimation and coughing. Upper airway swelling and pulmonary edema may lead to airway obstruction.
- b. **RESPIRATORY**. The extent of injury produced by exposure to ammonia depends on the duration of the exposure, the concentration of the gas, and the depth of inhalation. Even fairly low airborne concentrations (50 ppm) of ammonia produce rapid onset of eye, nose, and throat irritation; coughing; and narrowing of the bronchi. More severe clinical signs include immediate narrowing of the throat and swelling, causing upper airway obstruction and accumulation of fluid in the lungs. This may result in low blood oxygen levels and an altered mental status. Mucosal burns to the tracheobronchial tree can also occur. Children may be more vulnerable to corrosive agents than adults because of the smaller diameter of their airways. Children may also be more vulnerable because of failure to evacuate an area promptly when exposed.

- c. **DERMAL.** Dilute aqueous solutions (less than 5%) rarely cause serious burns but can be moderately irritating. Exposure to concentrated vapour or solution can cause pain, inflammation, blisters, necrosis and deep penetrating burns, especially on moist skin areas. Skin contact with compressed, liquid ammonia (which is stored at -28.) causes frostbite injury, and may also result in severe burns with deep ulcerations.
- d. **OCULAR.** Ammonia has a greater tendency to penetrate and damage the eyes than does any other alkali. Even low concentrations of ammonia vapour (100 ppm) produce rapid onset of eye irritation. Contact with high concentrations of the gas or with concentrated ammonium hydroxide may cause swelling and sloughing of the surface cells of the eye, which may result in temporary or permanent blindness.
- e. **GASTROINTESTINAL.** Nausea, vomiting and abdominal pain are common symptoms following ingestion of ammonia. On rare occasions, deliberate ingestion of household ammonia (5-10%) has resulted in severe esophageal burns. Ingestion of more concentrated ammonia can cause severe corrosive injury to the mouth, throat, esophagus and stomach.
- f. **CHRONIC EFFECT.** Survivors of severe inhalation injury may suffer residual chronic lung disease. In case of eye contact, ulceration and perforation of the cornea can occur after weeks or months, and blindness may ensue. Cataracts and glaucoma have been reported in persons acutely exposed. Ingestion of ammonia may cause permanent damage to the mucous membranes of the alimentary canal, with bleeding, perforation, scarring, or stricture formation as chronic effect.
- g. **CURE.** There is no antidote for ammonia poisoning, but ammonia's effects can be treated, and most people recover. Persons who have experienced serious signs and symptoms (such as severe or persistent coughing or burns in the throat) may need to be hospitalized:-
- (1) Victims exposed only to ammonia gas do not pose substantial risks of secondary contamination to personnel outside the HOT ZONE.
  - (2) Victims whose clothing or skin is contaminated with liquid ammonium hydroxide can secondarily contaminate response personnel by direct contact or through off gassing ammonia vapour.
  - (3) Actual absorption of ammonia via dermal exposure is not sufficient

to be of concern, but immediate flushing of exposed skin with water or saline will limit dermal damage and reduce dermal absorption of ammonia.

- (4) It is highly unlikely that enough ammonia could be ingested to be of danger via absorption from the intestines; however, in individuals with liver disease, endogenous production of ammonia may cause toxicity.
- (5) Emesis should not be induced in case of ingestion of ammonia, but administration of activated charcoal, gastric lavage or neutralization with weak acids is recommended. Elimination of urease-producing enteric bacteria with oral antibiotics decrease the amount of ammonia absorbed from the gut.
- (6) Because ammonia is readily soluble in water at low concentrations may be absorbed in the mucosa of the upper respiratory tract and swallowed. Movement to an area of fresh air quickly as possible would limit respiratory damage and absorption via lungs. Following measures may be taken:-
  - (a) First, get to an area free of ammonia gas and remove all clothing contaminated with ammonia as quickly as possible.
  - (b) Skin and eyes should be irrigated with water for at least 15 to 20 minutes at the time of exposure and periodically for 24 hours after exposure.
  - (c) Irrigation of the eye should continue until the pH of the conjunctival sac is less than 8.5.
  - (d) This should be followed with proper medical treatment for respiratory symptoms and dermal and ocular burns.

### **PHYSICAL PROPERTIES / DESCRIPTION OF ARSINE**

2. Arsine is a colourless, flammable, and highly toxic gas. It has a garlic-like or fishy odor that can be detected at concentrations of 0.5 ppm or above. Because arsine is non-irritating and produces no immediate symptoms, persons exposed to hazardous levels may be unaware of its presence. Arsine is water soluble. It is generally shipped in cylinders as a liquefied compressed gas. Exposure frequently occurs when arsine gas is generated while metals or crude ores containing arsenic impurities are treated with acid and this is a common source of exposure.

### **TOXICITY AND SYMPTOMS**

3. Arsine is a highly toxic gas and may be fatal if inhaled in sufficient quantities. Its primary toxic effect is due to haemolytic resulting in renal failure. At lower dose, people may not know they have been exposed to arsine, because it has no odor. At higher doses, a mild garlic odor has been reported. People exposed to a low or moderate dose of arsine by inhalation may experience some or all of the following symptoms within 2 to 24 hours of exposure:-

- a. Weakness.
- b. Fatigue.
- c. Headache.
- d. Drowsiness.
- e. Confusion.
- f. Shortness of breath.
- g. Rapid breathing.
- h. Nausea, vomiting, and abdominal pain
- j. Red or dark urine.
- k. Yellow skin and eyes (jaundice).
- l. Muscle cramps.

4. Exposure to a large dose of arsine by any route may result in these additional health effects:-

- a. Loss of consciousness.
- b. Convulsions.
- c. Paralysis.
- d. Respiratory failure, possibly leading to death.
- e. Showing these signs and symptoms does not necessarily mean that a person has been exposed to arsine.

5. Severely exposed people are not likely to survive. If people survive the initial exposure, long-term effects may include kidney damage, numbness and pain in the extremities, and neuropsychological symptoms such as memory loss, confusion and irritability.

### **CURE**

6. Because no antidote exists for arsine exposure, the best thing to do is avoid it. First, get fresh air by leaving the area where the arsine was released. Moving to an area with fresh air is a good way to reduce the possibility of death from exposure to arsine:-

- a. If the arsine release was outside, move away from the area where the arsine was released.

- b. If the arsine release was indoors, get out of the building.

If you are near a release of arsine, emergency coordinators may tell you either evacuate the area or to "shelter in place" inside a building to avoid being exposed to the chemical. However if you think you may have been exposed to arsine, you should remove your clothing, rapidly wash your entire body with soap and water, and get medical care as quickly as possible.

- (1) Quickly take off clothing that may have arsine on it. Any clothing that has to be pulled over the head should be cut off the body instead of pulled over the head.
- (2) If you are helping other people remove their clothing, try to avoid touching any contaminated areas, and remove the clothing as quickly as possible.
- (3) As quickly as possible, wash any arsine from your skin with large amounts of soap and water. Washing with soap and water will help protect people from any chemicals on their bodies.
- (4) If your eyes are burning or your vision is blurred, rinse your eyes with plain water for 10 to 15 minutes.
- (5) After you have washed yourself, place your clothing inside a plastic bag. Avoid touching contaminated areas of the clothing. If you can't avoid touching contaminated area, or you aren't sure where the contaminated areas are wear rubber gloves, turn the bag inside out and use it to pick up the clothing, or put the clothing in the bag using tongs, tool handles, sticks, or similar objects. Anything that touches the contaminated clothing should also be placed in the bag. If you wear contacts, put them in the plastic bag, too.
- (6) Seal the bag, and then seal that bag inside another plastic bag. Disposing of your clothing in this way will help protect you and other people from any chemicals that might be on your clothes.
- (7) When local or state health department or emergency personnel arrive, tell them what you did with your clothes. The health department or emergency personnel will arrange for further disposal. Do not handle the plastic bags yourself.

7. Treatment consists of providing supportive medical care in a hospital setting. Blood transfusions and intravenous fluids (that is, fluids injected directly into a vein) may be needed. Some people may require Haemodialysis (artificial kidneys) for kidney failure. No antidotes are available for arsine.

### **PHYSICAL PROPERTIES / DESCRIPTION OF CHLORINE**

8. At room temperature, chlorine is a yellow-green gas with a pungent irritating odor. Under increased pressure or at temperatures below -30, it is clear amber-coloured liquid. Odor and irritation are generally adequate. But olfactory fatigue can occur; pungent odor at about 0.31 ppm. It is not flammable, but reacts explosively or forms explosive compounds with many common substances such as acetylene, ether, turpentine, ammonia, fuel gas, hydrogen, and finely divided metals. It is generally shipped in steel cylinders as a compressed liquid. Chlorine is only slightly soluble in water, but on contact with moisture it forms hypochlorous acid (HClO) and hydrochloric acid (HCl); the unstable HClO readily decomposes, forming oxygen free radicals. Because of these reactions, water substantially enhances chlorine's oxidizing and corrosive effects.

9. **TOXICITY AND SYMPTOMS.** During or immediately after exposure to dangerous concentrations of chlorine, the following signs and symptoms may develop:-

- a. Coughing.
- b. Chest tightness.
- c. Burning sensation in the nose, throat, and eyes.
- d. Watery eyes.
- e. Blurred vision.
- f. Nausea and vomiting.
- g. Burning pain, redness, and blisters on the skin if exposed to gas, skin injury similar to frostbite if exposed to liquid chlorine.
- h. Difficulty breathing or shortness of breath (may appear immediately if high concentrations of chlorine gas are inhaled or may be delayed if low concentrations of chlorine gas are inhaled).
- j. Fluid in the lungs (pulmonary oedema) within 2 to 4 hours.

### 10. **EFFECTS OF CHLORINE ON HUMAN BODY**

- a. **RESPIRATORY.** Chlorine is water-soluble and therefore, primarily removed by the upper airways. Exposure to low concentrations of chlorine (1 to 10 ppm) may cause eye and nasal irritation, sore throat, and coughing. Inhalation of higher concentrations of chlorine gas (>15 ppm) can rapidly lead to respiratory distress with airway constriction and accumulation of fluid in the lung (pulmonary oedema). Patients may have immediate onset

of rapid breathing, blue discoloration of the skin, wheezing, or haemoptysis. In symptomatic patients, pulmonary injury may progress over several hours. Lung collapse may occur. The lowest lethal concentration for a 30-minute exposure has been estimated as 430 ppm. Exposure to chlorine can lead to reactive airways dysfunction syndrome (RADS), a chemical irritant-induced type of asthma.

- b. **METABOLIC**. Acidosis may result from insufficient oxygenation of tissues. An unusual complication of massive chlorine inhalation is an excess of chloride ions in the blood, causing an acid-base imbalance. Because of their higher metabolic rates, children may be more vulnerable to toxicants interfering with basic metabolism.
- c. **DERMAL**. Chlorine irritates the skin and can cause burning pain, inflammation, and blisters. Exposure to liquefied chlorine can result in frostbite injury.
- d. **OCULAR**. Low concentrations in air can cause burning discomfort, spasmodic blinking or involuntary closing of the eyelids, redness, conjunctivitis, and tearing. Corneal burns may occur at high concentrations.
- e. **CHRONIC EFFECT**. After acute exposure, pulmonary function usually returns toward baseline within 7 to 14 days. Although complete recovery generally occurs, symptoms and prolonged pulmonary impairment may persist. Exposure to chlorine can lead to reactive airways dysfunction syndrome (RADS), a chemical irritant induced type of asthma.

## 11. **CURE**

- a. No antidote exists for chlorine exposure. Treatment consists of removing the chlorine from the body as soon as possible and providing supportive medical care in a hospital setting.
- b. Leave the area where the chlorine was released and get to fresh air. Quickly moving to an area where fresh air is available is highly effective in reducing exposure to chlorine. If the chlorine release was outdoors, move away from the area where the chlorine was released. Go to the highest ground possible, because chlorine is heavier than air and will sink to low-lying areas. If the chlorine release was indoors, get out of the building.
- c. Quickly take off clothing that has liquid chlorine on it. Any clothing that has to be pulled over the head should be cut off the body instead of pulled over the head. If possible, seal the clothing in a plastic bag. Then seal the first

plastic bag in a second plastic bag. Removing and sealing the clothing in this way will help protect you and other people from any chemicals that might be on your clothes.

- d. If you placed your clothes in plastic bags, inform either the local or state health department or emergency personnel upon their arrival. Do not handle the plastic bags.
- e. If you are helping other people remove their clothing, try to avoid touching any contaminated areas, and remove the clothing as quickly as possible.
- f. As quickly as possible, wash your entire body with large amounts of soap and water.

12. **MISCELLANEOUS PRECAUTIONS**

- a. If your eyes are burning or your vision is blurred, rinse your eyes with plain water for 10 to 15 minutes.
- b. If you wear contacts, remove them before rinsing your eyes, and place them in the bags with the contaminated clothing. Do not put the contacts back in your eyes. You should dispose of them even if you do not wear disposable contacts.
- c. If you wear eyeglasses, wash them with soap and water. You can put the eyeglasses back on after you wash them.
- d. If you have ingested (swallowed) chlorine, do not induce vomiting or drink fluids. See medical attention right away.



LIST OF TOXIC INDUSTRIAL CHEMICALS

TICs listed by hazard index		
High	Medium	Low
Ammonia	Acetone cyanohydrin	Allyl isothiocyanate
Arsine	Acrolein	Arsenic trichloride
Boron tri-chloride	Acrylonitrile	Bromine
Boron tri-fluoride	Allyl alcohol	Bromine chloride
Carbon disulfide	allyamine	Bromine pentafluoride
Chlorine	Allyl chlorocarbonate	Bromine trifluoride
Diborane	Boron tri-bromide	Carbonyl fluoride
Ethylene oxide	Carbon monoxide	Chlorine pentafluoride
Fluorine	Carbonyl sulfide	Chlorine trifluoride
Formaldehyde	Chloroacetone	chloroacetaldehyde
Hydrogen bromide	Chlorosulfonic acid	Chloroacetyl chloride
Hydrogen chloride	Diketene	Croonaldehyde
Hydrogen cyanide	1,2-Dimethylhydrazine	Cyanogen chloride
Hydrogen Fluoride	Ethylene dibromide	Dimethyl sulfate
Hydrogen sulfide	Hydrogen selenide	Diphenylmethane-4-4'-
Nitric acid, fuming	Methane-sulfonyl chloride	diisocyanate
Phosgene	Methyl bromide	Ethyl chloroformate
Phosphorus tri-chloride	Methyl chloroformate	Ethyl chlorothioformate
Sulfur dioxide	Methyl chlorosilane	Ethyl phosphonothioic
Sulfuric acid	Methyl hydrazine	dichloride
Tungsten hexafluoride	Methyl isocyanate	Ethyl phosphonic
	Methyl mercaptan	dichloride
	Nitrogen dioxide	Ethyleneimine
	Phosphine	Hexachlorocyclopentadiene
	Phosphorus oxychloride	Hydrogene iodide
	Phosphorus pentafluoride	Iron pentacarbonyl
	Selenium hexafluoride Silicon	Isobutyl chloroformate Isopropyl
	tetrafluoride	chloroformate, Isopropyl
	Stibine	isocyanate
	Sulfur trioxide	n-butyl chloroformate
	Sulfuryl fluoride	n-butyl isocyanate, Nitric oxide,
	Tellurium hexafluoride	n-propyl chloroformate
	n-Octyl mercaptan	Parathion, Perchloromethyl
	Titanium tetrachloride	mercaptan
	Trichloroacetyl chloride	sec-Butyl chloroformate, tert-Butyl
	Trifluoroacetyl chloride	isocyanate
		Tetraethyl lead
		Tetraethyl pyrophosphate

**FIRST DISASTER NOTIFICATION REPORT**

Complete as much of this report as possible and submit within the first 12 hours after the disaster occurrence. Use second hand information if necessary. Indicate information source.

Prepared By \_\_\_\_\_ Designation \_\_\_\_\_

Organization \_\_\_\_\_

Date of Report \_\_\_\_\_

Province \_\_\_\_\_ District \_\_\_\_\_

Tehsil \_\_\_\_\_ City/Town \_\_\_\_\_

1. **THE DISASTER / EMERGENCY NOTIFICATION**

a. Type of Disaster / Emergency \_\_\_\_\_

b. Date/Time of Occurrence \_\_\_\_\_

c. Area / Location Impacted \_\_\_\_\_

d. Province(s) Affected \_\_\_\_\_

e. District(s) Affected \_\_\_\_\_

f. Tehsil(s) \_\_\_\_\_

g. City/Town Affected \_\_\_\_\_

h. Area Size Affected \_\_\_\_\_

2. **THE DISASTER EFFECTS**

Estimate the number of affected in each category as a result of the disaster.

a.. Number of DEATHS \_\_\_\_\_

b. Number of INJURED \_\_\_\_\_

c. Number of DISPLACED \_\_\_\_\_

d. # of HOUSES completely DESTROYED \_\_\_\_\_

e. # of HOUSES with some damage \_\_\_\_\_

f. OTHER CRITICAL INFRASTRUCTURE (e.g. Hospitals, Roads, BHU's etc)

g. ACCESSIBILITY \_\_\_\_\_

h. SEARCH & RESCUE NEEDS \_\_\_\_\_

**EMERGENCY NEEDS ASSESSMENT REPORT**

This form can be used for reporting, or as a checklist of items to consider **when conducting an emergency assessment during the first week** after disaster occurrence for longer term rehabilitation and reconstruction.

**Prepared**

By \_\_\_\_\_ Designation \_\_\_\_\_

Organization \_\_\_\_\_

Date of Report \_\_\_\_\_

Province \_\_\_\_\_ District \_\_\_\_\_

Tehsil \_\_\_\_\_ City/Town \_\_\_\_\_

1. **THE DISASTER / EMERGENCY.** (Complete the following in narrative form)a. Date, time. Type and magnitude of disaster / emergency \_\_\_\_\_  
\_\_\_\_\_b. Total area and location affected \_\_\_\_\_  
(If possible, attach a map identifying those area affected by disaster)  
\_\_\_\_\_2. **DISASTER EFFECTS.** (State each as fraction of the total in the area (e.g 15 deaths/3,000 total population).

a. What is the total number of people affected by the disaster?

b. What percentage of the overall population in the area is affected?

c. What is the sex/age composition and family size of the affected population?

d. How many people are assumed dead?

e. Give specifics (Where, who, how—example, 243 children were crushed by collapsing school building in village \_\_\_\_\_)

f. How many people are assumed injured? Give specifics (where, who, how).

g. How many people are assumed homeless or displaced? Give specifics (where, who, how).

h. How many houses or dwellings were completely destroyed?

j. How many houses or dwelling suffered some damage but are not completely destroyed?

k. What was the damage to food reserves, crops, and livestock of the affected population? Give specifics (where, what, how many, how much).

3. **INFRASTRUCTURE/ECONOMY /SOCIAL**. Continue on reverse side if necessary for each, be as specific as possible (who, what, where, why)

**INFRASTRUCTURE**

- a. Describe the disaster impact on critical infrastructure (road, public, buildings, electricity, water supply, communication, bridges, hospital, etc.)
- 

**ECONOMY**

- b. How many businesses or markets were affected by the disaster
- 

**SOCIAL**

- c. What has been the impact on local economic and social conditions? What was the social/ economic situation of the population before the disaster after the disaster? \_\_\_\_\_

4. **DISASTER RESPONSE**

- a. If people have left their houses, where are they being sheltered?
- 
- b. What response actions are being taken by the affected population?
- 
- c. Describe actions taken or assistance being provided by local government/ line agencies, non-governmental organizations and other local or national organizational entities in the area (if relevant).
- 
- d. Describe response actions taken or assistance being provided by international organizations (e.g. neighbouring countries, United Nations, etc.), or international non-governmental organizations.
- 
- e. What actions have been taken by the DMA (Disaster Management Authority)? \_\_\_\_\_
- f. What assistance has already been announced or delivered and by whom?
- 
- g. What humanitarian relief coordination mechanism has been established at the national or local level?
-

5. **LOCAL MATERIAL, FINANCIAL & HUMAN CAPACITIES OR RESOURCES**

- a. Describe any local material, financial or human capacities or resources (skilled and unskilled labour, school/houses, trucks, regional markets, etc). That are not being used but that could be used in response, rehabilitation and recovery efforts. Described the capacity or resource and how it might be used. The intent here is to identify potential local capacities and resources that can be utilized in order to avoid having to import assistance and expertise from outside.

<b>Capacity or Resource</b>	<b>Suggestion for use</b>
Example 1 Local Community group	Preparation and serving of food for displaced and homeless
Example 2 Many willing people with basic equipment and tools, such as shovels, rapses, buckets, etc.	Help with clearance of building rubble and temporary restoration of roads

- b. What transport and storage facilities (commercial, government, RC/RC) are available locally? \_\_\_\_\_
- c. What is the availability, location and conditions of roads, airports, railways?  
\_\_\_\_\_
- d. What is the capacity of the Operating National Society?  
\_\_\_\_\_

6. **IMMEDIATE LIFE SAVING PRIORITIES / NEEDS**

Immediate priority needs describe and specify the priority UNMET needs in water, sanitation, shelter, food and other supplies (clothes, blankets, cooking utensils, cooking fuel etc) and health (medical supplies, equipment, facilities). Quantify and qualify the targeted needs (for example, 112 people need food and water for at least the next 20 days). \_\_\_\_\_

7. **POTENTIAL FUTURE PROBLEMS (SECONDARY EFFECTS), AND/OR NEEDS**

Anticipate serious problems and/or needs within the coming three months resulting from the disaster. Estimate of items including financial implications and operational costs. \_\_\_\_\_

8. **ADDITIONAL COMMENTS (USE REVERSE SIDE IF NECESSARY).** (For

example, availability, location and/or condition of transport and storage facilities roads, airports, etc) \_\_\_\_\_

**FIRST 12-24 HOURS REPORT**

1. **DISASTER SITUATION REPORT.** Complete and submit of this report within the FIRST 12-24 HOURS after the disaster occurrence. This report should be based on a visit to the disaster site first hand information or observation.

Prepared By \_\_\_\_\_

Designation \_\_\_\_\_

Organization \_\_\_\_\_

Date of Report \_\_\_\_\_

Province \_\_\_\_\_ District \_\_\_\_\_

Tehsil \_\_\_\_\_ City/Town \_\_\_\_\_

2. **THE DISASTER/EMERGENCY.** (Complete the following in narrative form)

Date of Incident \_\_\_\_\_

Time of Incident \_\_\_\_\_

Type and magnitude of disaster /emergency \_\_\_\_\_

Total area affected \_\_\_\_\_

(If possible, attach a map highlighting or identifying those area affected by disaster)

Location affected \_\_\_\_\_

(If possible, attach a map highlighting or identifying those area affected by disaster)

3. **DISASTER EFFECTS.** (State each as fraction of the total in the area (e.g 15 deaths/ 3,000 total populations)

a. No. of DEATHS \_\_\_\_\_

b. No. of INJURED \_\_\_\_\_

c. No. of DISPLACED \_\_\_\_\_

d. No. of HOUSES DESTROYED \_\_\_\_\_

e. No. of HOUSES with some damage \_\_\_\_\_

f. OTHER CRITICAL INFRASTRUCTURE (e.g. Hospitals, Roads, BHU's etc)

\_\_\_\_\_

g. ACCESSIBILITY \_\_\_\_\_

h. SEARCH & RESCUE NEEDS \_\_\_\_\_

4. **LOCAL RESPONSE AND RESOURCES.** (Complete the following in narrative form):-

- a. Local populations – If people have left their houses, where are they being sheltered? \_\_\_\_\_
- b. What response actions are being taken by the affected populations? \_\_\_\_\_
- c. Describe actions taken by the following agencies:-
  - (1) Local Government/Line Agencies -----
  - (2) Non-governmental organizations: -----
  - (3) Other organizational entities in the area: -----

5. **CURRENT STATE OF DISASTER**

- a. Is the disaster over now? \_\_\_\_\_
- b. How long do you expect it to continue? \_\_\_\_\_
- c. Is the disaster being contained? Is NDMA assistance required?  
How? \_\_\_\_\_

6. **INFRASTRUCTURE / LOGISTICS** (Continue on reverse side if necessary)

**Road**

Conditions. \_\_\_\_\_

**Water Supply**

Conditions. \_\_\_\_\_

**Electric Supply**

Conditions. \_\_\_\_\_

**Telecom**

conditions. \_\_\_\_\_

**Location of food storage**

facilities. \_\_\_\_\_

**Local availability of relief**

supplies. \_\_\_\_\_

Role of Search & Rescue Teams in Disaster \_\_\_\_\_

7. **URGENT LIFE-SAVING PRIORITIES/NEEDS**

- a. Describe what assistance or support is required in the **next 24 -120 hours** (water, food, health concerns, shelter, etc.) Why is this assistance needed? Please quantify these needs.  
Air Sorties required. \_\_\_\_\_  
Water \_\_\_\_\_ Food \_\_\_\_\_
- b. Medical Assistance \_\_\_\_\_
- c. Shelter /Relief Camps \_\_\_\_\_

8. **INDICATE SOURCE(S) OF INFORMATION FOR THIS REPORT**

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**RAPID NEEDS ASSESSMENT CHECKLIST**

- a. **NUMBER OF AFFECTED PEOPLE REQUIRING ASSISTANCE.** This figure will determine all other estimates and calculations, and therefore, needs to be established as precisely as possible.
- b. **WATER NEEDS.** Ideally each person should be provided with 10-15 liters of potable water per day. The target should be 20 liters per person per day, and for hospitals, 100 liters per person per day, for patients and staff. Find water sources assess the need for transporting water where necessary.
- c. **SHELTER NEEDS.** If using tents, calculate one tent for 4-6 people, ideally of the same family. Decide whether you need summer or winter tents. Do they have to be waterproofed or coated? Can locally made emergency shelter be used instead? Is extra roof for protection against heat or rain needed? Should canvas floor be included? Are plastic sheets needed for roofing? If using public buildings, calculate 3.5m<sup>2</sup> of floor space for every person. Is shelter heating planned? If yes, with kerosene or diesel stoves?
- d. **NUTRITIONAL NEEDS.** Set a full ration, mixed diet, giving a minimum of 1,900 kilocalories per person per day. Survival energy level for an adult is a minimum of 1,000 kilocalories per day. For supplementary feedings add what is needed to reach the total of 1,900 kilocalories per day, as well as special food to treat severely malnourished individuals.
- e. **SANITATION NEEDS.** Plan for provision of at least one latrine for 40 people (the minimal acceptable number is one for 100 people). Decide how to deal with solid waste (including from hospitals, laboratories, etc.) and garbage, Identify the need and methods for vector control flies, rats, etc.
- f. **FUEL NEEDS.** Access of people to firewood, coal and /or other fuel is often overlooked in the needs assessment. There is no general rule for calculating the needs, since climate, traditions and quality of fuel varies considerably. Assessment should specify what type of fuel is appropriate, where to get it, and how to transport and distribute it.





**CONTACT OF OFFICIAL - NDMA**

SER	NAME OF OFFICER	DESIGNATION	TEL #	I.COM	MOBILE #	E MAIL ADDRESS
1.	Lt. Gen ® Farooq Ahmed Khan	Chairman	051-9222373 051-9212444 56135391	537	0333-5264426	<a href="mailto:fakhan@ndma.gov.pk">fakhan@ndma.gov.pk</a>
2.	Mr. Shaukat Nawaz Tahir	Senior Member	051-9209338	272	0300-5129060	<a href="mailto:sn@ndma.gov.pk">sn@ndma.gov.pk</a>
3.	Brig ® Abdul Hadi	Co-opted Member	051-9206146	379	0334-8538954	<a href="mailto:ah@ndma.gov.pk">ah@ndma.gov.pk</a>
4.	Brig. ® Waqar Ahmed Durrani	Advisor / TE	051-9203046	367	0300-5586571	<a href="mailto:wa@ndma.gov.pk">wa@ndma.gov.pk</a>
5.	Mr. Muhammad Bilal	Director (Finance)	051-9204429	423	0300-5382912	<a href="mailto:dirfin@ndma.gov.pk">dirfin@ndma.gov.pk</a>
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7.	Lt. Col. Amer Siddique	GSO- I (Ops)	051-9205035	-	0321-9552474	<a href="mailto:g1@ndma.gov.pk">g1@ndma.gov.pk</a>
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## PART-II

### NATIONAL CONTINGENCY PLAN TO COMBAT DISASTERS AT PORT TERMINALS AT KARACHI AND SURROUNDINGS

#### CHAPTER – I

##### INTRODUCTION

2.1 The concentration of chemical stockpiles at the Port Terminals has great potential to cause disastrous situations whose consequences will not only be limited to the workers and management, but also to the neighbouring population and environment at large. The various chemical disasters that have taken place world wide both in developed and developing countries stand as proof to the consequences. The disasters at Port Terminals are generally caused due to fire, explosion, oil spill or toxic release etc. Safety Management at this stage is a complex affair which requires effective functioning of various elements of Process Safety Management. If necessary precautions are not observed/adhered to manage such materials, it may result into wide spread disasters resulting into loss of life and property, as well as National economy.

2.2 Chemical and industrial disasters have occurred internationally as well as in Pakistan at sea terminals and other industrial facilities. There is thus a need for having a proper organization capable of dealing with all emergencies at terminals containing huge stockpiles of hazardous chemicals, petrochemicals, lubricant and Liquid Gases e.g. (LNG) etc. The emergencies at these terminals are required to be addressed through a quick response based on Contingency Planning.

2.3 The purpose of this plan is to provide guidance for coordination amongst different agencies, which would be involved in disaster management operations at Port and other Terminals. This plan discusses various types of response procedures and actions with which the concerned stakeholders and the coordinating/responding agencies must be familiar with. Coordination Mechanism for this part is shown at **Annex 'A'**. Important contact numbers of various stakeholders are given at **Annex 'B'**.

2.4 The success of such a plan, depends to a large degree, on the prompt receipt of information by the Operation Rooms established at Port Terminals with following basic functions:-

- a. Ensure adherence to rules / SOPs.
- b. Locate disaster site promptly.
- c. Ensure activation of On Site plan by the concerned facility.
- d. Decide about activation of offsite plan if situation so demands.
- e. Activate support agencies in minimum possible time.
- f. Help survivors and transport them to safe places.

## **OBJECTIVE OF PLAN**

2.5 The objective of this plan is to afford assistance to alleviate fire/chemical incidents at port terminals and save lives and property, using best practices to assist the victims with utmost speed and manage the disaster while utilizing all available resources.

## **2.6 APPLICABLE RULES AT NATIONAL LEVEL**

- a. NDMO 2007.
- b. Mines Act 1923.
- c. LPG Production Rules 1971.
- c. Regulation Oil and Gas (Safety in Drilling & Production) 1974.
- d. Pakistan Petroleum (Exploration & Production) Rules 1986.

## **ZONE LIMITS FOR TERMINAL DISASTER MANAGEMENT (KARACHI) & GWADAR**

2.7 To manage likely disasters, the terminals have been divided into four zones as follows:-

### **a. ZONE -A. TERMINALS AT PORT QASIM**

- (1) Qasim International Container's Terminal (QICP)
- (2) Engro VO Pak (EVPL).
- (3) Fauji Oil Terminal Company (FOTCO).
- (4) Overseas Oil Trading Company Pvt Ltd (OOTCL).
- (5) PEPCO.
- (6) EVTL LNG Terminal
- (7) Granada LNG Terminal
- (8) GASPORT LNG Terminal
- (9) PROGAS LPG Terminals.
- (10) Liquid Cargo Terminal
- (11) ICI Terminal

### **b. ZONE -B TERMINALS AT KPT**

- (1) M/s Pakistan State Oil Company Ltd.
- (2) M/s Shell Pakistan Ltd.
- (3) M/s Caltax Oil Pakistan Ltd.
- (4) M/s PRL
- (5) M/s NRL
- (6) M/s Parco Ltd.
- (7) M/s Jamia Industries
- (8) M/s Pak Grease Manufacturing Co.
- (9) M/s Lubricants Pvt Ltd.
- (10) M/s Pak Arab Refinery (Pvt) Ltd

- (11) M/s Attock Refinery (Pvt) Ltd
- (12) M/s Al Rahim Trading (Pvt) Ltd
- (13) M/s Panama Impex (Pvt) Ltd
- (14) M/s Azlak Enterprises (Pvt) Ltd
- (15) M/s Gatron Industries (Pvt) Ltd
- (16) M/s Home Product International
- (17) M/s Habib Sugar Mill (Pvt) Ltd
- (18) M/s Karachi Bulk Storage (Pvt) Ltd
- (19) M/s Novatex (Pvt) Ltd
- (20) M/s Pakistan House International
- (21) M/s Rupali Nylon (Pvt) Ltd
- (22) M/s Sindh Tank Storage (Pvt) Ltd
- (23) M/s Pakistan Molasses Company
- (24) M/s Reliance Commodity (Pvt) Ltd
- (25) M/s Bulk Management (Pvt) Ltd
- (26) M/s F & B, Bulk Storage (Pvt) Ltd
- (27) M/s Feroz Sons Maritime (Pvt) Ltd
- (28) M/s Molasses Export Company
- (29) M/s International Tank Terminal (ITT)

c. **ZONE -C TERMINALS ESTABLISHED INSIDE KARACHI CITY**

- (1) National Refinery, Korangi, Karachi.
- (2) Pakistan Refinery Limited, Korangi, Karachi.
- (3) Terminals in other parts of Karachi City.
- (4) Storage Terminals at Korangi including NLC terminals, Railway terminals and dry port terminals.

d. **ZONE -D TERMINALS ESTABLISHED AT GWADAR PORT**

- (1) Oil storage facility of Gwadar Port Authority.
- (2) Gwadar Fish Harbour Cum-Mini Port.
- (3) PNS Akram (Naval Base).
- (4) Gwadar International Airport.
- (5) WAPDA Grid Station Gwadar.
- (6) AKRA Dam Gwadar.
- (7) Sui Southern LPG Air Mix Plant Gwadar.

## **DISASTER MANAGEMENT ORGANIZATIONS AT PORT TERMINALS**

### **SUGGESTED COMPOSITION OF TERMINAL DISASTER MANAGEMENT AUTHORITY (TDMA) PORT QASIM (ZONE A)**

2.8 TDMA Port Qasim will be headed by Chairman Port Qasim Authority (PQA). The other members of the Committee are suggested as under:-

- a. DG PDMA Sindh.
- b. DG Operations PQA (Secretary).
- c. Harbour Master PQA.
- d. Fire Fighting Officer PQA.
- e. Nazim/DCO Bin Qasim Karachi.
- f. DG Ministry of Health, Government of Sindh
- g. Senior Representative of OGRA.
- h. MDs of Terminals located at Zone A.
- j. A senior officer deputed by Pakistan Navy.
- k. A senior officer deputed by Pakistan Army (HQ 5 Corps).
- l. Dy Commandant Mehran Rangers.
- m. Commandant Port Security Force, KPT.
- n. Port Fire Control Officer, KPT.
- o. Any other member selected by Chairman GWA

### **SUGGESTED COMPOSITION OF TERMINAL DISASTER MANAGEMENT AUTHORITY (TDMA) KPT -ZONE B**

2.9 TDMA KPT will be headed by Chairman KPT. KPT response Assets are given at **Annex 'D'**. The other members of Committee will be as under:-

- a. Dy Chairman KPT.
- b. Port Fire Control Officer, KPT.
- c. Commandant Port Security Force, KPT.
- d. DCO Karachi.
- e. Chairmen / MDs of Terminals mentioned located at Zone B.
- f. DG Ministry of Health, Government of Sindh.
- g. A Senior Officer deputed by Pakistan Navy.
- h. A Senior Officer deputed by Pakistan Army (HQ 5 Corps).
- j. Commandant Mehran Rangers.
- k. Harbour Master PQA.
- l. Port Fire Control Officer, PQA.
- m. Senior Representative of OGRA.

**SUGGESTED COMPOSITION OF DISASTERS MANAGEMENT COMMITTEE IN ZONE - C**

2.10 Terminal Disaster Management Committee in Zone C will be headed by DG PDMA Sindh. He will be responsible to handle Disaster at terminals located in any part of Karachi City other than Port Qasim and KPT. DG PDMA may co-opt any government official or MDs of Terminals located at Zone C. He may select concerned members in order to assist TDMA in execution of disaster management operations. The other members of TDMA will be as under:-

- a. Secretary Home, Govt of Sindh.
- b. DCO Karachi
- c. DPO Karachi.
- d. A senior officer deputed by Pakistan Army (HQ 5 Corps).
- e. Deputy Commandant Mehran Rangers.
- f. DG Ministry of Health, Government of Sindh.
- g. Fire Officer Karachi City.
- h. Commandant Port Security Force, KPT
- j. Port Fire Control Officer, PQA.
- k. A senior officer deputed by OGRA.
- l. A senior officer from City Government.

**SUGGESTED COMPOSITION OF TERMINAL DISASTER MANAGEMENT AUTHORITY (GWADAR PORT -ZONE D)**

2.11 TDMA Gwadar Port will be headed by Chairman Gwadar Port Authority. Gwadar Assets are given at **Annex 'G'**. The other members of Committee will be as under:-

- a. Chairman PSA Gwadar International Terminals Ltd
- b. Director General Operations Gwadar Port Authority.
- c. Harbour Master Gwadar Port Authority.
- d. Port Facility Security Officer.
- e. DCO Gwadar.
- f. DPO Gwadar.
- g. EDHO (Executive District Health Officer) Gwadar.
- h. Medical Superintendent Gwadar.
- j. CO PNS Akram.
- k. CO Coast Guard Gwadar.
- l. TMO Gwadar (Tehsil Municipal Officer)
- m. GM Operations PSA Gwadar International Terminals Ltd

### **TERMINAL DISASTER RESPONSE COMMITTEES (TDRC)**

2.12 Chairman of Terminal Disaster Management Authorities of all four zones will ensure constitution of Terminal Disaster Response Committees (TRDC). The composition of this Committee may differ for each Zone keeping in view the response elements located in each Zone as well as out side help. Apart from the stakeholders mentioned at para 6 and 7 above, Chairman of Terminal Disaster Management Authority may depute any agency for disaster Management including responders form Federal, Provincial or Local Government. The TDRC for each Zone will be notified to NDMA, PDMA, DDMA as well as other concerned agencies.

### **ESTABLISHMENT & PROVISION OF OPERATION CENTRE**

2.13 Chairman of TDMA of each Zone will establish Terminal Operation Centre comprising responders from the area under his jurisdiction. Else the Operation Room of PQA, KPT and Office of respective Chairman for each zone can become Operation Centres for their respective zones. In case of an emergency, Chairman TDMA will order establishment of Operation Centre which will be manned round the clock. Necessary assistance shall be provided by all stakeholders having their terminal storages at all port terminals regardless of fact that such storage terminals may belong to some National or Multinational enterprises.

### **FORMULATION OF SOPS AND ONSITE / OFF SITE PLANS**

2.14 Basing on this Contingency Plan, Chairman TDMA will formulate detailed Plans/ SOPs tasking various stakeholders about their duties and tasks. A separate Annex will be prepared for each terminal facility employing all available resources within Zone as well as out side resources expected from other zones. Chairman TDMA will also obtain On Site plan from various terminal facilities and assess their viability against various contingencies. He may advise these terminal facilities to earmark resources which will have to be spared while disaster occurs at some other terminal facility located in any zone. Such SOPs should be rehearsed annually for each terminal facility. All terminal facilities should spare their integral resources at the disposal of TDMA to meet any one of following eventualities:-

- a. Fires.
- b. Explosions.
- c. Spill prevention and Containment.
- d. Major Hydrocarbon Release.
- e. Bomb threat and security Risks.



## **CHAPTER -2**

### **DUTIES AND RESPONSIBILITIES OF VARIOUS AGENCIES**

#### **RESPONSIBILITIES FOR TERMINAL DISASTER MANAGEMENT OPERATIONS**

2.15 National Contingency Plan for Disaster Management at Port terminal is being issued in the light of NDMO 2007. NDMA is primarily responsible for coordinating and initiating Disaster Management response at National level with other civil and military entities such as Pakistan Army, PN, Karachi Port Trust (KPT), Port Qasim Authority, Provincial/Local government authorities, and different NGOs i.e. Edhi welfare etc for appropriate support.

2.16 Keeping in view the zones already mentioned, it is considered that in case of Disaster in Zone A, it can be effectively managed by Port Qasim Authority. It is further envisaged that location of the scene of incident in this zone can easily be detected through existing surveillance network under the use of PQA. It would be wise for each TDRC to employ its integral resources immediately while necessary help is obtained from other responders. Similarly in Zone B, KPT can effectively employ its integral resources while pooling up resources of other responders in minimum possible timeframe. Nearest terminal administration will also provide spontaneous, help to other zone when called for the required emergency. However any disaster in zone 'C' being located deep in the City is expected to have more material and human losses. In Zone C, PDMA with the help of Local Government and other responders will be required to tackle the disaster.

#### **COORDINATION WITHIN THREE ZONES**

2.17 DG PDMA Sindh would be focal point for initiating necessary Disaster Management coordination between the three Zones. This includes obtaining timely information about any incident which takes place in either Zone or liaison with concerned organizations / agencies for smooth conduct of Disaster Management operation. Upon receipt of emergency call from any Zone, PDMA Sindh will assess the situation and will employ responding agencies with in Zone C as well as outside this particular Zone. In case of an emergency, all responders located in Zone C will be notified by PDMA and tasked to provide requisite support including fire tenders ambulances, transport and medical facilities etc. PDMA will continuously update NDMA on the development of the situation till the time it becomes under control. Upon receipt of tasking request from PDMA or Disaster Management Authority of relevant Zone, the assets tasked for the operation will come under the operational control of the said Zone. However, the provision of the logistics, manpower and safety of concerned equipment etc will lie with

the parent assisting organization/ agency. During the operation, the participating units will be required to pass situation reports (SITREP) to PDMA as well as Operation Centre of relevant Zone. Based upon these SITREPS, PDMA will continuously re-evaluate the situation so as to respond to the developing situation in an effective manner.

### **RESPONSIBILITIES OF PDMA**

2.18 PDMA Sindh is responsible for following:-

- a. Collect information from all available sources about the incident, confirm the zone of the incident and keep NDMA posted about latest development.
- b. Ascertain disaster management resources with respect to the nature of the incident vis-a-vis incident location and disaster management zone to deal with the incident.
- c. Arrangements for medical evacuation/ rescue of survivors.
- d. Coordinate availability of fire tenders and other rescue equipment from various zones to augment their existing resources.
- e. Evaluate the prevailing weather condition from Meteorological Department in the area of incident e.g. wind direction, wind speed and their likely effect on Disaster Management Operation.
- f. Employment of Decontamination Resources.
- g. Coordinate the Disaster Management spectrum.

### **FUNCTIONS OF TERMINAL OPERATION CENTRE (TOC)**

2.19 TOC of each zone is responsible for following: -

- a. Timely reporting of incident if any accident takes place in their area of responsibility.
- b. Gathering maximum possible information about the incident.
- c. Update the TDMA, PDMA and NDMA, whenever any significant information is received.
- d. Render assistance using own and assigned assets as directed by TDMA.
- e. Keep liaison with TDMA of other Zones and relevant disaster management agencies.
- f. Maintain good control over the situation in their respective area.
- g. Inform PDMA / concerned local civil/ military authorities to deploy their disaster management assets.

### **RESPONSIBILITIES OF PAKISTAN NAVY**

2.20 Pakistan Navy is responsible for following:-

- a. Assist concerned Terminal Disaster Management Authority in execution of Disaster Management operation.
- b. Alert its units/elements located nearest to the scene of incident for immediate help.
- c. Provision of support equipment including fire tenders, cranes, ambulances and transport vehicles as requested by Terminal Disaster Management Authority.
- d. Provide medical treatment of casualties in Naval Hospitals.
- e. Provide aerial reconnaissance of the disaster site on request from concerned TDMA.

### **RESPONSIBILITIES OF PAKISTAN AIR FORCE (PAF)**

2.21 PAF assets for this plan are reflected at **Annex 'E'**. Pakistan Air Force is responsible for following:

- a. Assist Terminal Disaster Management Authority in execution of disaster management operations.
- b. Alert the appropriate units especially fire department to provide immediate assistance.
- c. Provide assistance in medical evacuation.
- d. Provision of required equipment as requested by PDMA as well as TDMA of each Zone.
- e. Provide medical treatment of casualties in PAF Hospitals

### **RESPONSIBILITIES OF EDHI WELFARE CENTRE**

2.22 Edhi Welfare Trust assets for this plan are reflected at **Annex 'F'**. Edhi Welfare Centre may assist in following ways:-

- a. Alert all those assets for immediate assistance which are requested by TDMA.
- b. Provision of first aid and ambulances for evacuation of casualties.
- c. Provision of other medical facilities.

### **RESPONSIBILITIES OF KARACHI PORT TRUST (KPT)**

2.23 Karachi Port trust will be required to provide following assistance:-

- a. Initiate contingency planning and mitigation measures for Terminals at zone B.
- b. Coordinate with other agencies for provision of the required disaster management assets and medical facilities for Zone B.

- c. Establishment of Operation Centre for Terminal Disaster Management Authority for Zone B.
- d. Coordinate provision of integral medical facilities as well as out side help from other zones.
- e. Fire Tender in case of fire at terminals.
- f. Liaison with responders of Port Terminal Disaster Response Committee.

### **DUTIES OF NDMA**

2.24 NDMA is responsible to formulate a contingency plan at National level and coordinate timely provision of resources held with different Federal stakeholders and NGOs. NDMA can also assist PDMA, TDMAs and other stakeholders in capacity building.

### **DUTIES OF CONCERNED PDMA AND DDMA**

2.25 PDMA is responsible to implement National Contingency Plan issued by NDMA in the Province. It will provide requisite support to PQA and KPT to prepare specific plan to combat Disaster situation at terminals located in Zone A and B. The plans should be prepared in collaboration with City Government of Karachi as well as District Govts. In case of Zone C, PDMA will act as lead agency to combat any disaster situation and prepare Contingency Plan accordingly. It may obtain necessary support from stake holders located in Zone A and B as well as Provincial/local Government.

### **COORDINATION WITH NATIONAL RESCUE AGENCIES**

2.26 In view of lack of our requisite national capacity for disaster management, efforts will be made by all stake holders at Federal and provincial level to build their capacity to manage disasters. Coordination within rescue agencies is crucial. NDMA is responsible to ensure coordination between Federal responding agencies including armed forces and initiate contingency planning to ensure prompt response in case any emergency. However, at provincial level, PDMA will ensure necessary coordination with responders within province and formulate contingency plan to combat envisaged disasters at provincial level. Medical facilities / transport pool for implementation of this part of this plan is reflected at **Annex 'C'**.

### **RESPONSIBILITIES OF MINISTRY OF INTERIOR**

2.27 Ministry of interior may ensure following:-

- a. Maintain law & order situation at the site of incident.
- b. Control traffic and clear route for vehicles and fire tenders in supporting role.
- c. Cordoning the area and disallow entry of unnecessary persons.
- d. Evacuation of masses from high risk areas.
- e. Inform the public about the mishap & rescue.
- f. Employ rescue agencies under ministry for DRM activities.

**RESPONSIBILITIES OF CITY/DISTRICT GOVERNMENT**

2.28 The City Government will take care of following aspects:-

- a. Transportation of victims from the scene of disaster.
- b. Maintain communication link with three zones and activate all available resources for management of disaster.
- c. Activate relief camp and arrange all possible facilities including boarding and lodging and medical facilities for victims/displaced people due to disaster.
- d. Educate the public located in close proximity of disaster site to arrange self protection and remain away from the scene of disaster.

**RESPONSIBILITIES OF MINISTRY OF INDUSTRY AND PRODUCTION**

2.29 Ministry of Industry is responsible to ensure Process Safety Management (PSM). Analytical methods may be adopted to identify and evaluate process hazards for the purpose of determining the adequacy of, or need for control measures which otherwise may lead to disasters. The PSM consists of the following elements which should be efficiently addressed for prevention of disasters in chemical stockpiles and industries/terminal.

- a. Management commitment.
- b. Employer and employee participation.
- c. Processes safety information.
- d. Process hazard analysis.
- e. Operating procedures.
- f. Training.
- g. Pre-start up safety review.
- h. Mechanical integrity.
- j. Non-routine work authorization.
- k. Incident investigation.
- l. Emergency preparedness planning and response and compliance audits.

**RESPONSIBILITIES OF MINISTRY OF HEALTH WITH REGARD TO TREATMENT AND EVACUATION OF CASUALTIES**

2.30 The Ministry will be responsible for following:-

- a. Prepare health support plan based on Disaster Risk Management Plans formulated by Min of Industry for Industrial Disaster including management of mass casualties and submit this plan to the NDMA.
- b. Review health specific hazards in coordination with Ministry of Industries and put in place health protection plan for various industrial hazards.
- c. Organise Disaster Management Training for doctors in all Federal and Provincial Hospitals who will be deputed to train paramedical staff at District level in mass causality treatment.
- d. Provide technical support in all health related areas to NDMA through Emergency Preparedness and Response Centre of the Ministry;
- e. Keeping in view the location of different Industrial Clusters, vulnerability assessment (infrastructure and organizational setup) may be organized for optimum utilization of available health resources.
- f. Establish emergency health operation to ensure better coordination and mobilization in emergency disaster situation at all levels.
- g. Establish emergency health operation to ensure better coordination and mobilization in emergency/ disaster situation at all levels;
- h. Set-up onsite health services including victim decontamination and transportation to concerned health facility, follow-up and mobilize emergency health teams including mobile hospitals, to be deployed in the event of an disaster at port terminals.
- j. Build effective linkages and coordination at national level especially with Armed Forces through Ministry of Defence to handle industrial disasters in major cities as well as in far flanged areas.
- k. Coordination with regional and international health agencies/ stakeholders to combat an Industrial Disaster.

**RESPONSIBILITIES OF PAKISTAN METEOROLOGICAL DEPARTMENT (PMD)**

2.31 PMD is responsible to provide early weather warning to response agencies involved in rescue operations during the entire duration of the operation to plan their response accordingly.

## **CHAPTER - 3**

### **PROCEDURES**

#### **INFORMATION ABOUT DISASTER**

2.32 Receiving Notification of disaster is obligatory for all concerned and can be sent to concerned stakeholder by FAX, TELEX and Telephone etc. Whenever such information is received, it must be disseminated by all possible means through media and sirens etc.

#### **ALERTING & INITIATING OF OPERATION**

2.33 The essence of a successful operation is the speed with which it is planned and carried out. It must be assumed that in each incident, there will be survivors who need assistance and whose chance of survival will diminish with each passing second. The success of a disaster management operation depends on the receipt of all available information by the concerned stakeholders including responding agencies. Thorough evaluation of the situation and an immediate decision and prompt execution, on the best course of action, is very important.

#### **EVALUATION OF REPORTS**

2.34 In the aftermath of disaster, all reports received prior to and during a disaster management operation must be carefully evaluated by PDMA to determine the effectiveness of the SOPs and response aspects by various responders. Basing on these analyses, necessary amendment in existing SOPs must be made. The capacity of all responders must be improved in the light of these analyses. A post disaster report will be forwarded to NDMA within one month of the incident taking place.

#### **FACTORS DETERMINING THE URGENCY OF PROVIDING ASSISTANCE**

2.35 The Disaster Management information must be obtained as early as possible and evaluated as the rescue progresses. The Terminal DMA of each Zone may consider following factors to determine the nature of urgency:-

- a. Nature of emergency.
- b. Position of Terminal.
- c. Type and size of Chemical stockpile.
- d. Reported condition of terminal, whether it is a dangerous chemicals.
- e. Equipment available at the terminal.
- f. Visibility, including daylight or darkness conditions.
- g. Present and forecasted weather including wind and temperature.
- h. Special considerations such as number of personnel killed, injured and medical problems, requiring specialized attention.
- j. Cellular telephones for emergency purposes are considered a reliable form of communication.

### **TIERS OF EMERGENCY**

2.36 When operation room in each zone receives a call for assistance, it shall evaluate the circumstances to determine the severity of the case using information obtained from other sources. It is the initial determination that will govern how a response is to be initially treated. Later developments may cause the operation room of Terminal DMA to classify the incident and modify the response. Following are the different tiers of emergencies which will need reaction from various stakeholders accordingly.

- a. **Tier 1.** When the emergency is within the capacity of the Terminal Facility and does not require activation of resources held with Terminal DMA.
- b. **Tier 2.** When Terminal facility is experiencing difficulty in handling the situation and may need assistance from Terminal DMA. Chairman of concerned Terminal DMA may request PDMA or Terminal DMA of the other zone to allocate resources available with them.
- c. **Tier 3.** When grave or imminent danger to the terminal and personnel involved including neighbouring population exists, requiring immediate and massive response to the distress scene. The response would also involve NDMA and other federal entities to respond to the call of Terminal DMA.

### **ASSISTANCE FROM AIR FORCE AND NAVAL UNITS**

2.37 Following actions are to be initiated by the Chairman of concerned TDMA:-

- a. Have a close liaison with Duty Officer Southern Air Command/OOD MEHRAN.
- b. Inform KPT control and PN Dockyard for all possible assistance.
- c. Inform the Medical facilities at Annex 'B' and of other organizations/ agencies about the possible evacuation of victims, and details of type of casualties and injuries expected.
- d. Arrange ambulances and transport from relevant transport yard to assisting organizations/ agencies at the reception point of effected terminal unit.
- e. Contact the relevant agency for the information required about the progress on causality evacuation and disaster management.
- f. Continuously update the picture.



## **NOTIFICATION TO CIVIL POPULATION TO VACATE THE PREMISES OF TERMINAL**

2.38 The information should be provided regarding the risk of hazard to people through media, alarms and loudspeakers; population under grave risk should be told to leave the site of incident immediately. Following steps are important:-

- a. Ensure prior tasking for alarm and announcement.
- b. Ascertain limits to which disaster can spread.
- c. Inform people through all possible means including media not to come near risk zone.

## **RECORDING OF EVENTS**

2.39 Whenever information of distress is received by any credible source, the Operation Room Officer must obtain all available information for onward passage and record. These may include following:-

- a. Name of terminal.
- b. Specific details about incident ie chemical/petrochemical or leakage of gas etc.
- c. Nature of the emergency ie oil/chemical spill.
- d. Type of assistance required.
- e. Approximate number of workers working in the terminal.
- f. Civil population affected or required to be evacuated around the site of incident
- g. The concerned agent or company to which the terminal belongs.
- h. Fill in the information log round the clock.
- j. Pass the relevant information to all agencies and stakeholders involved in Disaster Management.

## **EVACUATION**

2.40 Emergency evacuation of all affected personnel has to be done immediately from the affected area to a safer place, which is termed as “Assembly Point”. The routes to be followed to reach the assembly point shall be known as “Evacuation Routes”. Both the “Assembly Point” and “Evacuation Routes” are pre-determined, free from danger and should be marked on the rescue layout sketch of the contingency plan.

## **ASSEMBLY POINTS**

2.41 The “Assembly Points” should be provided with the following facilities since the affectees may have to stay out of their houses for a prolonged period. The assembly points should have following facilities:-

- a. Sufficiently ventilated accommodation.
- b. Free flowing potable water and toilets.
- c. First-aid facilities.
- d. Stretcher bearers.
- e. Telephones with directory.
- f. Sufficient stock of food stuff and water.
- g. Emergency light arrangements.

### **RESCUE ROUTES**

2.42 At the break out of any disaster at any port terminal, it becomes essential to evacuate the affected personnel from the locations and assist them to collect in the identified assembly point. In order to carry out the evacuation, two to three "Rescue Routes" may be identified and designated. These routes should be marked in the terminal rescue layout drawing.

### **PRECAUTIONS TO BE ENSURED**

2.43 Following must be observed:-

- a. Provide identification boards near entry, exit & turnings of the rescue routes.
- b. Keep the rescue route free from any obstructions.
- c. Provide proper illumination with the emergency services.
- d. Provide police control.

## CHAPTER - 4

### MISCELLANEOUS EMERGENCIES

#### FIRE FIGHTING

2.44 Terminal fire service staff may initially engage themselves in fire fighting operations to avert a significant threat. Responsibility for maintaining fire fighting capabilities in all ports and harbours lies with local Port Authorities. Apart from the fire service resources available with City/local Government, PQA and KPT may employ their fire fighting resources immediately. For this, a high level of personnel training and the adequacy of equipment may be ensured. Terminals administration will employ its fire fighting capabilities to counter the fire and should concentrate on life saving of the survivors, besides controlling the fire.

#### FIRE IN TERMINALS LOCATED IN VARIOUS PARTS OF CITY OTHER THAN PORT TERMINAL

2.45 Following actions are to be taken by PDMA:-

- a. Inform Provincial Government as well as City Nazim and DCO to dispatch their fire fighting resources to the site of incident.
- b. Inform other resource holders to keep their fire fighting resources standby for employment.
- c. Alert the medical units of other relevant organizations/agencies.
- d. Inform the control room of the Zone A & B to dispatch fire fighting arrangements.
- e. Continuously update the information to NDMA, DG Rangers, Port Qasim, KPT Authorities and concerned Medical units.

**Note:-** In case of fire from oil spill, WAPDA should cut of electrify of the area to avoid fire triggering from electric spark.

#### RESCUE OF SURVIVORS

2.46 TDMA of each Zone will take following actions:-

- a. Locate survivors.
- b. Inform NDMA, PDMA and DDMA
- c. Inform medical units at **Annex 'C'** and all other relevant organizations/agencies.
- d. Inform all stake holders for timely assistance.
- e. Keep monitoring the situation and react as and when required.

## **FIRE IN TERMINAL AT ZONE A & B**

2.47 Operation Centre will take following actions:-

- a. Inform location of fire to the fire brigade departments.
- b. Inform medical units and all other relevant organizations/ agencies.
- c. Keep monitoring the situation and react as and when required.

## **RESPONSE ACTIONS / PROCEDURE TO BE FOLLOWED BY THE TERMINAL ADMINISTRATION**

2.48 The sequence of actions as under:-

- a. The first action shall be rescuing and safeguarding life.
- b. Hot work to be stopped immediately.
- c. Evacuation of non-essential workers to be carried out.
- d. Use of safety and life supporting equipment.
- e. The shift operating team will attempt to control the emergency in the initial stage.
- f. Take actions to remove or minimize undesirable effects.
- g. Fire protection facilities e.g. firewater monitors and foam system, must be activated at once to extinguish fire in the immediate vicinity.
- h. Simultaneously, isolation and blockage of the fuel being released has to be done, if possible. Also attempts to control fire with portable fire extinguishers. Emergency alarm must be sounded simultaneously.
- j. Subsequent actions of fuel released:-
  - (1) Emergency shutdowns.
  - (2) Depressurizing equipment involved.
  - (3) Removing flammable / toxic materials, where appropriate.
- k. **REPORTING A FIRE.** It is the duty of anyone who discovers a fire to report it to the Control Room by the use of the telephone or by himself. While informing by telephone, the person should speak clearly and distinctly and give his name, personnel be made aware about such reporting.

## **RELEASE OF FLAMMABLE/TOXIC GASES**

2.49 **GENERAL**. Prevention of gas leaks is extremely important, to ensure that the probability of leakage, toxicity injuries, fires and explosions is minimized. The next step is to minimize the effects of the incident once it has occurred. The important feature is early detection and rapid safe initial response with the objective of isolating the source of the release.

## **HANDLING GAS/VAPOUR EMERGENCIES**

2.50 **IMMEDIATE ACTION**. The most important actions to be taken, which should automatically be prompted by the sounding of the alarm:-

- a. Stop all hot work.
- b. All non-essential staff to evacuate the areas against the wind direction.
- c. People working in confined spaces to be assisted to bring them in the open air.
- d. Close off roads to traffic around the affected area.
- e. Suspension of all work in terminal and its premises.

## **RESPONSE ACTION**

2.51 Response teams, having been informed of the location (inside/outside terminal area), the wind strength and direction and the nature of the vapour/gas. Personnel involved in dispersing the cloud by means of water sprays must take appropriate position to keep the vapours away from critical areas such as ignition sources and air intakes, control centres and Heaters/ boilers. The initial response actions, following detection of any serious gas/vapour leak, will be to:-

- a. Put on Fire suits / breathing apparatus.
- b. Evacuate the casualties;
- c. Activate firewater spray monitors.
- d. Where appropriate, shutdown Heaters/Boilers that might cause ignition.
- e. Stop air intake;
- f. Shutdown Power Generators to avoid ignition of the gas cloud.
- g. Depressurized equipment involved in a safe manner;
- h. Initiate dispersal of the cloud with mobile water spray equipment.
- j. Close terminal roads.

**MEDICAL ACTIONS**

2.52 There must be adequate first aid and medical response in this situation and in particular medical expertise to attend to injury caused by toxic gases or vapours. For general use, written instructions are covered in First Aid and Hazardous chemical data sheets.

**SPILLAGE/LEAKS****CONDENSATE SPILLAGE**

2.53 Spillage may occur from storage terminals or tanks. When such a spill occurs immediate actions should be taken to prevent further spillage to prevent fire. The basic actions to combat Condensate spill:-

- a. Stop all hot work in the vicinity.
- b. Contain the spilled Condensate by deploying sand bags.
- c. Close off roads to traffic around the spilled area if spill is in open area.
- d. Initiate immediate collection and transfer operation with the help of Pneumatic submersible pumps and clean up the area.
- e. Spread foam on spill if it is flammable.

**EARTHQUAKES****GENERAL**

2.54 Pakistan lies in the earthquake belt therefore the possibility of this calamity may affect Port terminals as well. Besides the Terminal equipment particularly all tall /heavy structure should be designed and constructed with a certain earthquake tolerance factor consequently, the equipment should withstand earthquake tremors of normal intensity. It must be appreciated that due to lack of any prior warning and the very brief duration of an earthquake tremors normally last a few seconds. It is impossible to suggest any preventive measures by the operating staff by which, in the short time available, the terminal could be effectively brought to a relatively safer condition. In all probability the tremor will be already over by the time any action can be taken by the operating staff. Immediate action should therefore be to **"Move to a safe location Preferably in the open and away from structures"** In the following few minutes, should the earthquake tremor result in collapse/ breakdown of any equipment and the situation assumes disastrous proportions, proceed as follows:-

- a. Extinguish all furnaces and lights.
- b. In case of any local fire, try to extinguish it with any chemical powder or foam if available.
- c. If fire water supply system is intact, it should be utilised to extinguish the fire, if not the damaged section should be isolated so that remaining system is available for fire-fighting if required.

**SAFETY INSTRUCTIONS FOR LPG TERMINALS**

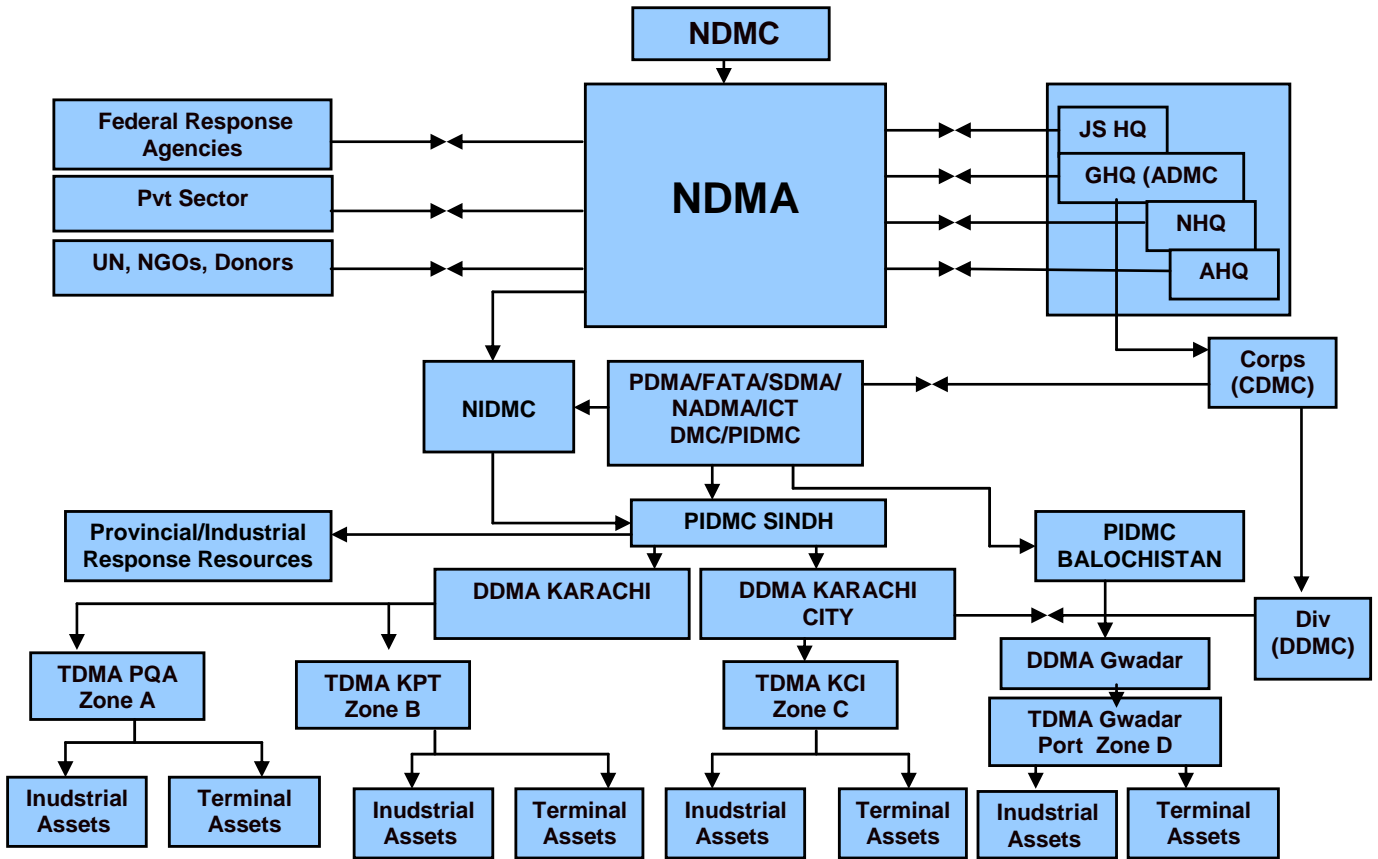
2.55 LPG terminals are also vulnerable to all kind of hazards mainly fire. Following precautions must be adhered to safeguard against LPG related disasters:-

- a. All areas within a radius of 100 Meters from the LPG Storage, Filling Platform and Trucks loading unloading should be classified as hazardous areas.
- b. Smoking be prohibited inside the classified areas.
- c. Matches and cigarette lighters shall not be carried inside these areas.
- d. Visitors and outsiders may not be allowed to enter the operating areas without permission of the area Incharge.
- e. No flame type equipment shall be installed or operated within a distance of 100 Meters from the classified area. No vehicle and spark producing equipment is allowed inside the area without entry permit from the area Incharge.
- f. Vehicles shall be parked in the designated safe areas. It is forbidden to block road and access to operating areas, as it may hinder the movement of fire vehicles and ambulance in case of emergency.
- g. All employees before assigning a job in the classified area must go through the Safety Orientation Program, learning the use of compressed air breathing apparatus, use of fire extinguishers and safety procedures.
- h. No maintenance work can be carried out by maintenance or any other service department without the prior permission of the Plant Incharge and a work permit. Personnel on duty are required to wear necessary specified personal protective gear.
- j. All electrical drive and fittings must comply with the electrical explosion hazard classification.
- k. The operating areas must be provided with wind socks or other devices indicating wind direction.
- l. First air box, Fire suits, Air breathing apparatus must be available at the terminal.
- m. No person should be allowed to enter a vessel, pit or confined space unless it is properly purged and checked for toxic gases and sufficient oxygen according to vessel entry permit / safety check list.
- n. Oily waste or oil soaked clothing and rags must not be left lying around. The area must be cleaned and clear from combustible and tripping hazards. The trash shall be stacked in metal containers and disposed off safely.

- o. All accidents near misses, injuries on the job must be reported to the Incharge and safety department on prescribed accident report.
- p. All unsafe conditions, hazards, leaks shall be reported to area Incharge for immediate rectification. If immediate repairs are not possible, extra precaution against fires should be instituted.
- q. A safety report book shall be kept in operating areas to be used for reporting hazardous condition that can not be corrected immediately.
- r. All door keys shall be available at conspicuous locations in the control room. Main gates of all the locations shall not be locked at any time.
- s. LPG gas concentration in the area must be monitored periodically and its record shall be available in the operating areas or control room.
- t. All equipment and piping must be tagged and clearly marked to avoid any malfunction.
- u. Flow diagram indicating safe operating condition, hydraulic test, pressure of vessels, shall be placed in the operating area.
- v. Necessary fire fighting equipment must be provided in sufficient quantity according to rules and these shall be inspected periodically to keep it in working condition.
- w. Compressed air breathing apparatus of at least 20 minutes duration shall be provided in the control room or operating post, according to the number of operating staff.
- x. Proper non-spark tools shall be used for operating the valves, mechanical and electrical jobs.
- y. All pressure vessels and storage terminals shall be electrically earthed.
- z. No electric light bulbs shall be changed or electric fitting altered in a hazardous area while current is on. No electric cable should pass overhead through operating and storage area.
- aa. No electric make shift arrangement that may cause the spark should be allowed, no electrical cable should travel on ground without protection.
- bb. Tank Lorries reporting for loading and unloading shall be returned if they do not possess the fitness certificate, approved diagram, necessary safety equipment and calibration from the Chief Inspector Explosives, Government of Pakistan.
- cc. Safety audit of the area should be carried out at regular intervals to identify the hazards, unsafe condition and practice. The audit recommendation shall be attended on priority basis.



**COORDINATION MECHANISM FOR DISASTERS AT PORT TERMINALS**  
**PART-II**



**IMPORTANT TELEPHONE NUMBERS**

Some important telephone numbers in regard to DISASTER MANAGEMENT are appended below:

<b><u>S. No</u></b>	<b><u>PLACE</u></b>	<b><u>TELEPHONE NO</u></b>	<b><u>FAX NO</u></b>	<b><u>DEFCON</u></b>
1.	KARACHI WIRELESS	48506215-56216	330111	-
2.	PTCL GMDSS (DSC)	2629590		-
3.	KARACHI RADIO	4591161-4592009	4591285	-
4.	EDHI	2424125-2424148 2201261-2201262	2418753 2313434	- -
5.	KARACHI RADAR	45791953	-	-
6.	HQ 5 CORPs	5602127	250035	250011
7.	GSO-1 (OPS) CITY DIST GOVT KHI	4560227	-	-
8.	KPT	9214310	9214329-30	-
9.	EDHI	2315401-51	-	-
10.	MARINA CLUB	5841891/5842231/ 5842253	5842258	-
11.	SECY DEFENCE(MOD)	580536		-
12.	DEPUTY SECY(MOD)	84678		-
13.	CSO to COMCOAST	021-48506695		-
14.	HQ MSA	9214964-748508850	341605	-
15.	DCO KARACHI	9232400-9215151		-
16.	Pak Arab Refinery (Pvt) Ltd	2852791 & 2854100		
17.	National Refinery (Pvt) Ltd	2850213 & 2854935		
18.	Pakistan Refinery (Pvt) Ltd	2850212 & 2851078		
19.	Attock Refinery (Pvt) Ltd	2856697 & 7728727		
20.	Pakistan State Oil Company	2853629 & 2850359		
21.	Shell Pakistan (Pvt) Ltd	2852303		
22.	Al Rahim Trading (Pvt) Ltd	2851045 & 2851046		
23.	Panama Impex (Pvt) Ltd	2852640		
24.	Azlak Enterprises (Pvt) Ltd	2850689 & 2850081		
25.	Gatron Industries (Pvt) Ltd	2851685 & 2850317		
26.	Home Product International	2850080		
27.	Habib Sugar Mill (Pvt) Ltd	2852003 & 2852004		
28.	Karachi Bulk Storage (Pvt) Ltd	2850533 & 2850293		

<b><u>S. No</u></b>	<b><u>PLACE</u></b>	<b><u>TELEPHONE NO</u></b>	<b><u>FAX NO</u></b>	<b><u>DEFCON</u></b>
29.	Novatex (Pvt) Ltd	2854655 & 2854656		
30.	Pakistan House International	2850969 & 2850970		
31.	Rupali Nylon (Pvt) Ltd	2850484		
32.	Sindh Tank Storage (Pvt) Ltd	2850968 & 2850540		
33.	Pakistan Molasses Company	2850363 & 2858651		
34.	Reliance Commodity (Pvt) Ltd	2855444 & 2855445		
35.	Bulk Management (Pvt) Ltd	2852795 & 8240056		
36.	F & B, Bulk Storage (Pvt) Ltd	2851744 & 2851741		
37.	Feroz Sons maritime (Pvt) Ltd	2850891 & 2850892		
38.	Molasses Export Company	2852627 & 2852628		
39.	International Tank Terminal (ITT)	2315058 & 2315083		
40.	Caltex Oil (Pakistan) Limited	2311590 & 2311203		

**MEDICAL FACILITIES/TRANSPORT POOL**

1. In case of Evacuation of patients, Operation Room established by Terminal Disaster Management Authority will contact the Duty officers of following medical facility and alert them about possible evacuation of patients.
  - a. PNS SHIFA.
  - b. PNS RAHAT.
  - c. CMH Malir.
  - d. PAF Hospital Masroor.
  - e. Civil Hospital Karachi.
  - f. Jinnah Post Graduate Medical Center.
2. Following transport pools are to be alerted in case of requirement.
  - a. Transport Pool MSA.
  - b. Transport Pool COMLOG.
  - c. Transport Pool FHQ.
  - d. Transport Pool HQ COMKAR.
  - e. Transport Pool PAF Base Masroor.
  - f. Transport Pool Malir Cant.
  - g. Transport Pool PAF Base Masroor.
  - h. Transport Pool KPT.
  - j. Transport Pool Edhi Center (for Ambulances only).
  - k. Transport Pool of the medical facilities mentioned at Para 1 for ambulances only.
  - l. Transport Pool of City District Government Karachi through CDGK Ops room at Civic Centre.

**KARACHI PORT TRUST- ASSETS**

<b><u>ASSETS</u></b>	<b><u>SIZE/TYPE</u></b>	<b><u>QTY</u></b>	<b><u>ENDURANCE REMARKS</u></b>
		(In Number) (In Hours)	

**AMBULANCES**

1.	Ambulances	06	
----	------------	----	--

**FIRE TENDERS**

			<b><u>AGE OF VEHICLES</u></b>	
1.	Fire Tenders Water	09	05 Yes	04 vehicles
2.	Fire Tenders Foam	09	07-12 yrs	09 vehicles
			19-25 yrs	04 vehicles
3.	Snorkel	01	23-28 yrs	02 vehicles

**MEDICAL FACILITIES AVAILABLE**

1.	Operation Theatre
2.	Plastic Surgery
3.	X-Ray Laboratory
4.	ECG
5.	Ultra Sound
6.	Dental Department
7.	Laboratory

**SOUTHERN AIR COMMAND (PAF) -ASSETS**

<b><u>ASSETS</u></b>	<b><u>SIZE/TYPE</u></b>	<b><u>QTY</u></b> <b><u>(In Number)</u></b>
1. Helicopters	Alt-111	1
	MI-17	2
2. Ambulances	MITSUBISHI-L-300	1
	1-4MB	3
3. Fire Tenders	-	12
4. Medical Facilities	PAF Hospital	1

ABDUL SATTAR EDHI -ASSETS

<u>ASSETS</u>	<u>SIZE/TYPE</u>	<u>QTY</u> (In Number)
1. Ambulances	Suzuki, Hyundai Toyota	900
2. Miscellaneous	Edhi Emergency Medical Service (Pre Hospital Handler)	20

**GWADAR PORT ASSETS**

1. 1x Fire Bowser ex Baldia Gwadar.
2. 2x Fire Browsers PNS Akram Naval Base
3. 2x Fire Browsers ex Civil Aviation
4. 2x Fire Browsers Gwadar Port both Browsers can function as foam spreaders for oil fires.
5. 1x Gwadar Port Oil dispersing equipment used for containing oil over flow from ships into the sea.
6. 1x Sui Southern LPG plant is installed with self contained Water Hydrant for containing fire within the LPG terminal.



**FIRST DISASTER NOTIFICATION REPORT**

Complete as much of this report as possible and submit within the first 12 hours after the disaster occurrence. Use second hand information if necessary. Indicate information source.

Prepared By \_\_\_\_\_ Designation \_\_\_\_\_

Organization \_\_\_\_\_

Date of Report \_\_\_\_\_

Province \_\_\_\_\_ District \_\_\_\_\_

Tehsil \_\_\_\_\_ City/Town \_\_\_\_\_

1. **THE DISASTER / EMERGENCY NOTIFICATION**

a. Type of Disaster / Emergency \_\_\_\_\_

b. Date/Time of Occurrence \_\_\_\_\_

c. Area / Location Impacted \_\_\_\_\_

d. Province(s) Affected \_\_\_\_\_

e. District(s) Affected \_\_\_\_\_

f. Tehsil(s) \_\_\_\_\_

g. City/Town Affected \_\_\_\_\_

h. Area Size Affected \_\_\_\_\_

2. **THE DISASTER EFFECTS**

Estimate the number of affected in each category as a result of the disaster.

a.. Number of DEATHS \_\_\_\_\_

b. Number of INJURED \_\_\_\_\_

c. Number of DISPLACED \_\_\_\_\_

d. # of HOUSES completely DESTROYED \_\_\_\_\_

e. # of HOUSES with some damage \_\_\_\_\_

f. OTHER CRITICAL INFRASTRUCTURE (e.g. Hospitals, Roads, BHU's etc)

g. ACCESSIBILITY \_\_\_\_\_

h. SEARCH & RESCUE NEEDS \_\_\_\_\_

**EMERGENCY NEEDS ASSESSMENT REPORT**

This form can be used for reporting, or as a checklist of items to consider **when conducting an emergency assessment during the first week** after disaster occurrence for longer term rehabilitation and reconstruction.

Prepared by \_\_\_\_\_ Designation \_\_\_\_\_

Organization \_\_\_\_\_

Date of Report \_\_\_\_\_

Province \_\_\_\_\_ District \_\_\_\_\_

Tehsil \_\_\_\_\_ City/Town \_\_\_\_\_

1. **THE DISASTER / EMERGENCY.** (Complete the following in narrative form)

a. Date, time. Type and magnitude of disaster / emergency \_\_\_\_\_

b. Total area and location affected \_\_\_\_\_  
(If possible, attach a map identifying those area affected by disaster)

2. **DISASTER EFFECTS.** (State each as fraction of the total in the area (e.g 15 deaths/3,000 total population).

- a. What is the total number of people affected by the disaster?
- b. What percentage of the overall population in the area is affected?
- c. What is the sex/age composition and family size of the affected population?
- d. How many people are assumed dead?  
Give specifics (Where, who, how—example, 243 children were crushed by
- e. collapsing school building in village \_\_\_\_\_)
- f. How many people are assumed injured? Give specifics (where, who, how).
- g. How many people are assumed homeless or displaced? Give specifics (where, who, how).
- h. How many houses or dwellings were completely destroyed?
- j. How many houses or dwelling suffered some damage but are not completely destroyed?
- k. What was the damage to food reserves, crops, and livestock of the affected population? Give specifics (where, what, how many, how much).

3. **INFRASTRUCTURE / ECONOMY /SOCIAL.** Continue on reverse side if necessary for each, be as specific as possible (who, what, where, why)

**INFRASTRUCTURE**

- a. Describe the disaster impact on critical infrastructure (road, public, buildings, electricity, water supply, communication, bridges, hospital, etc.)
- 

**ECONOMY:**

- b. How many businesses or markets were affected by the disaster?
- 

**SOCIAL**

- c. What has been the impact on local economic and social conditions? What was the social/ economic situation of the population before the disaster after the disaster? \_\_\_\_\_

4. **DISASTER RESPONSE**

- a. If people have left their houses, where are they being sheltered?
- 
- b. What response actions are being taken by the affected population?
- 
- c. Describe actions taken or assistance being provided by local government/ line agencies, non-governmental organizations and other local or national organizational entities in the area (if relevant). \_\_\_\_\_
- 
- d. Describe response actions taken or assistance being provided by international organizations (e.g. neighbouring countries, United Nations, etc), or international non-governmental organizations.
- 
- e. What actions have been taken by the DMA (Disaster Management Authority)? \_\_\_\_\_
- f. What assistance has already been announced or delivered and by whom?
- 
- g. What humanitarian relief coordination mechanism has been established at the national or local level? \_\_\_\_\_

5. **LOCAL MATERIAL, FINANCIAL & HUMAN CAPACITIES OR RESOURCES**

- a. Describe any local material, financial or human capacities or resources (skilled and unskilled labour, school/houses, trucks, regional markets, etc). That are not being used but that could be used in response, rehabilitation and recovery efforts. Described the capacity or resource and how it might be used. The intent here is to identify potential local capacities and resources that can be utilized in order to avoid having to import assistance and expertise from outside.

<b>Capacity or Resource</b>	<b>Suggestion for use</b>
Example 1 Local Community group	Preparation and serving of food for displaced and homeless
Example 2 Many willing people with basic equipment and tools, such as shovels, rapses, buckets, etc.	Help with clearance of building rubble and temporary restoration of roads

- b. What transport and storage facilities (commercial, government, RC/RC) are available locally? \_\_\_\_\_
- c. What is the availability, location and conditions of roads, airports, railways?  
\_\_\_\_\_
- d. What is the capacity of the Operating National Society?  
\_\_\_\_\_

6. **IMMEDIATE LIFE SAVING PRIORITIES / NEEDS**

Immediate priority needs describe and specify the priority UNMET needs in water, sanitation, shelter, food and other supplies (clothes, blankets, cooking utensils, cooking fuel etc) and health (medical supplies, equipment, facilities). Quantify and qualify the targeted needs (for example, 112 people need food and water for at least the next 20 days). \_\_\_\_\_

7. **POTENTIAL FUTURE PROBLEMS (SECONDARY EFFECTS), AND/OR NEEDS**

Anticipate serious problems and/or needs within the coming three months resulting from the disaster. Estimate of items including financial implications and operational costs. \_\_\_\_\_

8. **ADDITIONAL COMMENTS (USE REVERSE SIDE IF NECESSARY).** (For example, availability, location and/or condition of transport and storage facilities roads, airports, etc) \_\_\_\_\_

**FIRST 12-24 HOURS REPORT**

1. **DISASTER SITUATION REPORT.** Complete and submit of this report within the FIRST 12-24 HOURS after the disaster occurrence. This report should be based on a visit to the disaster site—first hand information or observation.

Prepared By \_\_\_\_\_ Designation \_\_\_\_\_

Organization \_\_\_\_\_

Date of Report \_\_\_\_\_

Province \_\_\_\_\_ District \_\_\_\_\_

Tehsil \_\_\_\_\_ City/Town \_\_\_\_\_

2. **THE DISASTER/EMERGENCY.** (Complete the following in narrative form)

Date of Incident \_\_\_\_\_

Time of Incident \_\_\_\_\_

Type and magnitude of disaster /emergency \_\_\_\_\_

Total area affected \_\_\_\_\_

(If possible, attach a map highlighting or identifying those area affected by disaster)

Location affected \_\_\_\_\_

(If possible, attach a map highlighting or identifying those area affected by disaster)

3. **DISASTER EFFECTS** (State each as fraction of the total in the area (e.g 15 deaths/ 3,000 total populations)

a. No. of DEATHS \_\_\_\_\_

b. No. of INJURED \_\_\_\_\_

c. No. of DISPLACED \_\_\_\_\_

d. No. of HOUSES DESTROYED \_\_\_\_\_

e. No. of HOUSES with some damage \_\_\_\_\_

f. OTHER CRITICAL INFRASTRUCTURE (e.g. Hospitals, Roads, BHU's etc)

\_\_\_\_\_

g. Accessibility \_\_\_\_\_

h. Search & Rescue Needs \_\_\_\_\_

4. **LOCAL RESPONSE AND RESOURCES**. (Complete the following in narrative form):-

- a. Local populations, if people have left their houses, where are they being sheltered? \_\_\_\_\_
- b. What response actions are being taken by the affected populations?  
\_\_\_\_\_
- c. Describe actions taken by the following agencies:-
  - (1) Local Government/Line Agencies: -----
  - (2) Non-governmental organizations: -----
  - (3) Other organizational entities in the area: -----

5. **CURRENT STATE OF DISASTER**

- a. Is the disaster over now? \_\_\_\_\_
- b. How long do you expect it to continue? \_\_\_\_\_
- c. Is the disaster being contained? Is NDMA assistance required?  
How? \_\_\_\_\_

6. **INFRASTRUCTURE / LOGISTICS** (Continue on reverse side if necessary)

**Road**

Conditions. \_\_\_\_\_

**Water Supply**

Conditions. \_\_\_\_\_

**Electric Supply**

Conditions. \_\_\_\_\_

**Telecom**

conditions. \_\_\_\_\_

**Location of food storage**

facilities. \_\_\_\_\_

**Local availability of relief**

supplies. \_\_\_\_\_

Role of Search & Rescue Teams in Disaster \_\_\_\_\_

7. **URGENT LIFE-SAVING PRIORITIES/NEEDS**

- a. Describe what assistance or support is required in the **next 24 -120 hours** (water, food, health concerns, shelter, etc.) Why is this assistance needed? Please quantify these needs.  
Air Sorties required. \_\_\_\_\_  
Water \_\_\_\_\_ Food \_\_\_\_\_
- b. Medical Assistance \_\_\_\_\_
- c. Shelter /Relief Camps \_\_\_\_\_

8. **INDICATE SOURCE(S) OF INFORMATION FOR THIS REPORT**

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**RAPID NEEDS ASSESSMENT CHECKLIST**

- a. **NUMBER OF AFFECTED PEOPLE REQUIRING ASSISTANCE.** This figure will determine all other estimates and calculations, and therefore, needs to be established as precisely as possible.
- b. **WATER NEEDS.** Ideally each person should be provided with 10-15 liters of potable water per day. The target should be 20 liters per person per day, and for hospitals, 100 liters per person per day, for patients and staff. Find water sources, assess the need for transporting water where necessary.
- c. **SHELTER NEEDS.** If using tents, calculate one tent for 4-6 people, ideally of the same family. Decide whether you need summer or winter tents. Do they have to be waterproofed or coated? Can locally made emergency shelter be used instead? Is extra roof for protection against heat or rain needed? Should canvas floor be included? Are plastic sheets needed for roofing? If using public buildings, calculate 3.5m<sup>2</sup> of floor space for every person. Is shelter heating planned? If yes, with kerosene or diesel stoves?
- d. **NUTRITIONAL NEEDS.** Set a full ration, mixed diet, giving a minimum of 1,900 kilocalories per person per day. Survival energy level for an adult is a minimum of 1,000 kilocalories per day. For supplementary feedings add what is needed to reach the total of 1,900 kilocalories per day, as well as special food to treat severely malnourished individuals.
- e. **SANITATION NEEDS.** Plan for provision of at least one latrine for 40 people (the minimal acceptable number is one for 100 people). Decide how to deal with solid waste (including from hospitals, laboratories, etc.) and garbage, Identify the need and methods for vector control flies, rats, etc.
- f. **FUEL NEEDS.** Access of people to firewood, coal and /or other fuel is often overlooked in the needs assessment. There is no general rule for calculating the needs, since climate, traditions and quality of fuel varies considerably. Assessment should specify what type of fuel is appropriate, where to get it, and how to transport and distribute it.





**PART – III****NATIONAL CONTINGENCY PLAN TO COMBAT DISASTER EMANATING  
FROM CHEMICAL/BIOLOGICAL TERRORISTS' THREATS****INTRODUCTION**

3.1 The threat of Chem-bio terrorism is real. It is becoming increasingly possible for terrorists to be able to produce and deploy Chem-bio weapons, as the volume and sophistication of the necessary information becomes ever more accessible through publications, the internet, and other sources. It is relatively easy to acquire such materials as these are effective means of causing widespread destruction and fear amongst the public. Given the magnitude of the harm that could be caused by a bioterrorist attack, an untold number of deaths are possible. It is therefore clear that we must take this threat seriously. In view of current global and regional complex security environment. With conventional threat diminishing considerably, the destruction of a portion of Chemical Weapons stockpiles by the possessor states, emergence of the new face of a threat in the form of Chem-Bio terrorism cannot be ruled out.

3.2 As our response capacity to such threats still remains rudimentary, in order to develop core capabilities to prevent, protect, identify and mitigate Chem-Bio threat, a concerted, dedicated and well coordinated National effort is needed to acquire/establish the bare minimum Chem-Bio defence capability. The best protection against any catastrophe is "preparedness", which must continuously be reviewed, evaluated and upgraded. While we have little control over the occurrence of natural disasters, we must strive to prevent the man-made disasters and be well prepared to contain/minimize their effects.

3.3 Chem-Bio threat necessitates a call to action for general public, government, law enforcement agencies, intelligence agencies and public health officials. It may be noted that Chemical and Biological agents are significantly easier to handle and transport than nuclear or conventional weapons. They are difficult to detect, and in cases of certain biological agents, the symptoms from exposure may not appear for hours or days. It is generally believed that recent trends in terrorism favouring mass-casualty incidents may incite terrorists to make use of Chemical and Biological Weapons as Weapons of Mass Destruction.

3.4 In April 2004, the United Nations Security Council adopted Resolution 1540, which highlighted the serious threat posed by Chemical and Biological weapons to international peace and security, and urged greater national and international co-ordination to strengthen the global response. Recognizing the imminent dangers from

these forms of crimes was the first step in countering the threat. It was vital to provide the necessary tools which would enable law enforcement and responding agencies to take appropriate measures.

### **OBJECTIVE THE PLAN**

3.5 NDMA has therefore developed a National Contingency Plan to build capacity to counter the threat, focusing on chemical and bioterrorism-prevention with following objectives:-

- a. Raise awareness about the threat among the decision makers and masses.
- b. Task relevant authorities to train and equip their responders against chem bio threat.
- c. Enforce existing legislation and promote the development of new legislation.
- d. Enhance the capacity of various National institutions/stake holders to combat Chem-bio threat.
- e. Encourage co-operation between various agencies at National level and international organizations and countries.

### **OPERATIONALIZATION PARAMETERS**

3.6 In order to initiate awareness about the chem bio terrorism threats and put in place a response mechanism reflected at **Annex 'A'** to effectively to combat the threat, following steps are required to be initiated:-

- a. Dissemination of early warning to all concerned from the affected area.
- b. Intimation of terrorist act through available means by local authorities and security agencies who will manage disaster according to local Off Site plan if the same exists.
- c. Dissemination of terror alert by DDMA and execution of District Contingency Plan which should also cater to requisite support from local military units/formations including provision of medical care/treatment.
- d. DDMA issues warning, alert and updates. If DDMA's / local authorities determine that the disaster is beyond their capacity, they request for a higher level of response.
- e. PDMA may also determine if the disaster requires Federal intervention or otherwise.
- f. NDMA to identify operationalization of a plan based on inputs from PDMA.

- g. In case of a major disaster, necessary support from Armed Forces, Ministry of Defence and humanitarian assistance from OPCW/UN is obtained by the Ministry of Foreign Affairs.
- h. Special NBC units will have to be formed and deployed by Ministry of Defence and Ministry of Interior for rescue, protection, decontamination and rehabilitation.

### **POSSIBLE SCENARIOS**

3.7 Apart from Chem-bio threat in conventional war, following possible threat scenarios may emerge from the Chem-Bio threat:-

- a. Terrorists attack either at a Railway station, Airport terminal, Seaport, City Centre, road/railway tunnel or any other strategic targets, using Chemical/ Biological agents.
- b. Attack by non state actors on Strategic Installations inside Pakistan using chem bio weapons with resultant collateral damage to civil population.
- c. Outbreak of an epidemic or accidental leakage of Toxic Chemical / Industrial materials in the aftermath of a natural disaster like flood, earthquake etc.
- d. Industrial/Lab accidents involving Chem-Bio toxic agents.
- e. Unintentional transmission of deadly Bio-agents through humans, livestock and agricultural/food products.

### 3.8 **THREAT AWARENESS**

- a. **PUBLIC AWARENESS.** Following steps need to be taken to enhance public awareness:-
  - (1) Education of Policy makers, health researchers, law enforcement agencies and the general public.
  - (2) A National level campaign for general public through media, seminars, symposiums, conferences and workshops.
  - (3) Focused education at colleges, universities and specialized professional level.
  - (4) Modification and up-gradation of the health infrastructure including training of para-medics.
  - (5) Training of first responders through mock exercises in realistic environment to prepare them both physically and mentally for WMD incident.
  - (6) Training of trainers in Armed Forces institutions, Police and Civil Defence, Medical Colleges and laboratory staff.

- (7) Plan for education of masses by the Ministry of Interior in coordination with Ministry of Information and Ministry of Education.
- b. **INTELLIGENCE**. Acquisition of timely, accurate and relevant intelligence is crucial for national Chem-Bio defence programme. The Intelligence agencies will have to improve their ability to collect, analyzes, and disseminate Chem-Bio intelligence by acquiring and utilization of modern equipment/ techniques using innovative/proactive approach. Dedicated resources for intelligence gathering will help to remain ahead of the problem. New scientific trends will have to be exploited to develop protection against Chem-Bio weapons.
- c. **ASSESSMENTS**. Periodic assessments of Chem-Bio weapons threat may help in evolving and prioritization of our threat perception. NDMA in coordination with Strategic Plans Division, DESTO, Ministry of Defence and Ministry of Interior will conduct periodical assessments of Chem-Bio threat. Basing on this threat, deployment and acquisition of protective and detection equipment can be decided at the National level when such need arises. An annual senior-level policy evaluation will also be carried out under the Chairman NDMA to monitor progress in implementing this policy, identify gaps or vulnerabilities in our Chem-Bio defence and make recommendations to various stakeholders to evolve a balanced and responsive Chem-Bio Defence strategy.
- d. **ANTICIPATION OF FUTURE THREATS**. In view of awareness of non state actors about new techniques/expertise about Chem-Bio technology, there is a need to address this challenge by anticipating it timely to ensure effective counter measures. For this, the capacity of our responders including medical, public health, agricultural, defence, law enforcement, diplomatic, environmental, and transportation sectors will have to be enhanced. The Ministry of Health and Human Development Commission, in coordination with other appropriate Federal Ministries, will ensure an integrated and focused national effort to anticipate and respond to emerging chemical and biological weapons threat.

### 3.9 **POLICY FRAMEWORK**

- a. **CHEM-BIO THREAT**. The intricacies of Chem Bio threat must be understood within the framework of a comprehensive approach involving all the relevant constituents, including police, customs, immigration, health

professionals, bio-safety, bio-security, legal, emergency management offices, military/security organizations, intelligence services, environmental management, agriculture, and other relevant private and public organizations (local, regional, national, and international). These diverse professional communities must forge effective coordination and partnerships in order to ensure an integrated and coordinated approach, and to maximize the synergies of our complimentary skills, methodologies, perspectives, and resources. Our Policy Makers, Academic Circles, Industry, Medical and First Responders, includes Chem-Bio related intelligentsia should be well aware of anticipated Chem-Bio threat. The general public should also be made conversant about this threat through media. Vulnerability assessment is also vital to improve our ability, to collect, analyzes, and disseminate information about Chem-Bio threat.

- b. **PREVENTION AND PROTECTION**. This includes identification and protection of critical material which can be made use of by non state actors to develop Chem-Bio weapons through strengthened law enforcement mechanism and Custom Procedures.
- c. **SURVEILLANCE AND DETECTION**. It includes incorporating all available means to detect the threat and give timely warning of Chem-Bio attack. Surveillance resources should be further developed to give early warning through various means to minimize the loss.
- d. **RESPONSE AND RECOVERY**. It includes planning of response, provision of protective equipment, and development of safe shelters, mass casualty care, medical countermeasures/antidotes and decontamination of affected areas.

### **POLICY RESPONSE**

3.10 The present capability to defend the Chem-Bio threat in Pakistan is undeveloped. Therefore, the Contingency Planning on Chem-Bio Defence focuses on developing “Core Capabilities”, including all means necessary for threat awareness, Prevention, Surveillance, detection, identification, protection and mitigation through response and recovery in case of a Chem-Bio emergency.

#### 3.11 **PREVENTION, DETECTION AND PROTECTION**

- a. **PROACTIVE PREVENTION**. This being most economical approach to carry out Chem-Bio defence requires continuation and expansion of current multilateral initiatives to limit the access of agents, technology, and know-how to countries, groups, or individuals seeking to develop, produce and

use these agents. To address this challenge, diplomacy should be further enhanced in the context of Arms Control, Law Enforcement and Multilateral Export Controls. We will also seek threat reduction assistance from State Parties of CWC and BWC including coalition partners in the War against Terrorism. Cooperation and information sharing amongst the Armed Forces, Federal Ministries and various agencies will continue to expand threat reduction progress aimed at preventing proliferation and possible use of Chem-Bio weapons expertise by non state actors.

- b. **SURVEILLANCE & DETECTION**. To combat unconventional threats and to strengthen our National defence capabilities, the Chem-Bio defence programme should have a focal body comprising of life scientists, physicists, biologists, chemists, explosive ordnance disposal experts and engineers working at the National Chem-Bio Disaster Management Centre (NCBDMC) under DESTO. In case of an untoward national disaster like Bhopal, the centrally located National Response Teams (NRT) under Strategic Plans Division (SPD), comprising Chem-Bio experts/scientists, shall remain on call, along with suitably equipped mobile labs. To perform the crucial tasks of identification of threat, protective work on incident site, marking of contaminated area, decontamination facility and Medical Evacuation will be set up. This would require establishment of a centralized Network of Static and Mobile Chem-Bio Analytical Labs for Surveillance and early detection/Identification of Chem-Bio agents, as matter of priority and urgency.
- c. **INFRASTRUCTURE PROTECTION**. Protecting our critical infrastructure from the effects of Chem-Bio weapons attacks is crucial. A Chem-Bio weapons attack might deny us access to essential facilities and response capabilities. Therefore, we must improve survivability and ensure continuity and restoration of operations of critical infrastructure sectors, following a Chem-Bio weapons attack. Assessing the vulnerability of infrastructure, particularly the medical, public health, food, water, energy, agricultural, and transportation sectors must be emphasized. The Ministry of Interior, in coordination with DESTO, Ministry of Agriculture, Food as well as other concerned departments and agencies, leads these efforts, which include developing and deploying Chem-Bio detection & identification technologies and decontamination methodologies.

## **RESPONSE AND RECOVERY**

3.12 On detection of a Chem-Bio weapons threat / physical attack, prompt public and private sector response will be critical to mitigate the lethal effects of such threats. Response to such threats depends on pre-planning, preparedness of first responders, capacity of hospitals to treat casualties, availability of means of communication, protection and decontamination capabilities. Following are the essential steps in this regards:-

- a. **RESPONSE PLANNING.** Basing on National Response Contingency Plan by the NDMA, PDMA and DDMA needs to develop their respective plans. Capabilities required for response and mitigation against Chem-Bio attacks will be based on threat assessments at respective level. These plans will be regularly tested through Federal, Provincial and District level exercises. NDMA will ensure that all relevant Ministries and Federal departments will develop comprehensive plans that provide for well coordinated Federal, Provincial and local level responses to a Chem-Bio attack.
- b. **MASS CASUALTY CARE.** Following a Chem-Bio weapons attack by non state actors, all available means will be rapidly employed to prevent loss of life, illness, psychological trauma and to contain contagious disease. Provision of timely preventive treatments such as medical antidotes, antibiotics, vaccines would save lives. The Ministry of Health will be the lead Ministry to work closely with provincial public health officials to strengthen plans to swiftly distribute medical assistance. Moreover, it will work to expand and, where needed, create new Federal, Provincial and Local medical and public health facilities for all hazard mass casualty care. The Ministry of Health in coordination with Human Development Commission will depute other appropriate Federal Departments and agencies, including medical assets of armed forces. Ministry of Interior will ensure parallel deployment of Federal assets to maintain law and order and coordinate the overall Federal response. The Ministry of Defence will play an important supporting role by deploying Armed Forces for mass casualty care.
- c. **RISK COMMUNICATION.** Effective risk communication is critical for mass casualty care. Timely communications, with the general public and medical/public health responders can significantly influence the success of response efforts, including health and life-sustaining interventions. The

Ministry of Interior, in coordination with other appropriate Federal departments and agencies, including media, will develop comprehensive coordinated risk communication strategies to facilitate emergency preparedness for Chem-Bio weapons attacks, to educate general public and relevant professional sectors before, during and after an attack or other public health emergencies.

- d. **DECONTAMINATION**. Recovering from a Chem-Bio weapons attack may require significant decontamination and related measures for restoration to normalcy. Our current capability in this field is limited. We will have to build Federal, Provinces and Districts capability through generous fund allocation for effective decontamination. Basing on our potential, Standards Operating Procedures (SOPs) may be developed to execute decontamination of effected area. The Environment Protection Agency (EPA) Ministry of Environment will be focal point to address the risks of contamination. It will develop strategy and formulate a plan containing guidelines for decontamination of persons, equipment and facilities. It will also coordinate with the Ministries of Defence, Interior, Agriculture, Labour, and Health & Human Development for capacity building and response activities in case of Chem-Bio disaster.

### **RESEARCH AND DEVELOPMENT OF CHEM-BIO DEFENCE EQUIPMENT**

3.13 Pakistan has already ratified the Chemical Weapons Convention (CWC) and Biological Weapons Convention (BWC). In the light of these conventions, development of Chem-Bio Defence under prevalent threat scenarios is a pre-requisite. Procurement of Chem-Bio protection and decontamination equipment being very costly cannot be procured through import in existing budget resources. In order to ensure continuous availability of Chem-bio equipment for Armed Forces and other responders at economical cost, indigenous production of chem-bio equipment is of paramount importance. DESTO being an R&D establishment should play a lead role to develop necessary Chem Bio Defence Technology by employing its own research infrastructure and also by integrating infrastructure of other National R&D institutions/facilities. This will help the country in attaining viable, economical and reliable Chem-Bio defence capability.

### **DEVELOPMENT OF MEDICAL COUNTERMEASURES**

3.14 Ministry of Health will be lead agency to undertake development of safe & effective medical countermeasures, against Chem-Bio agents. The National Institutes of Health (NIH), may be deputed to work with the relevant ministries/departments to



develop better medical countermeasures to mitigate illness and death in the event of Chem-Bio weapons attack. The Ministry will expedite procurement/development of necessary medical antidotes and ensure their rapid licensure. The Department of Health and Human Services, in coordination with other appropriate Federal departments and agencies, will ensure availability of sufficient quantities of safe and efficacious medical countermeasures to cater for any Chem-Bio emergency. Armed Forces Institute of Pathology in collaboration with DESTO may be tasked to develop medical counter measures for chem bio emergencies.

### **CAPACITY BUILDING**

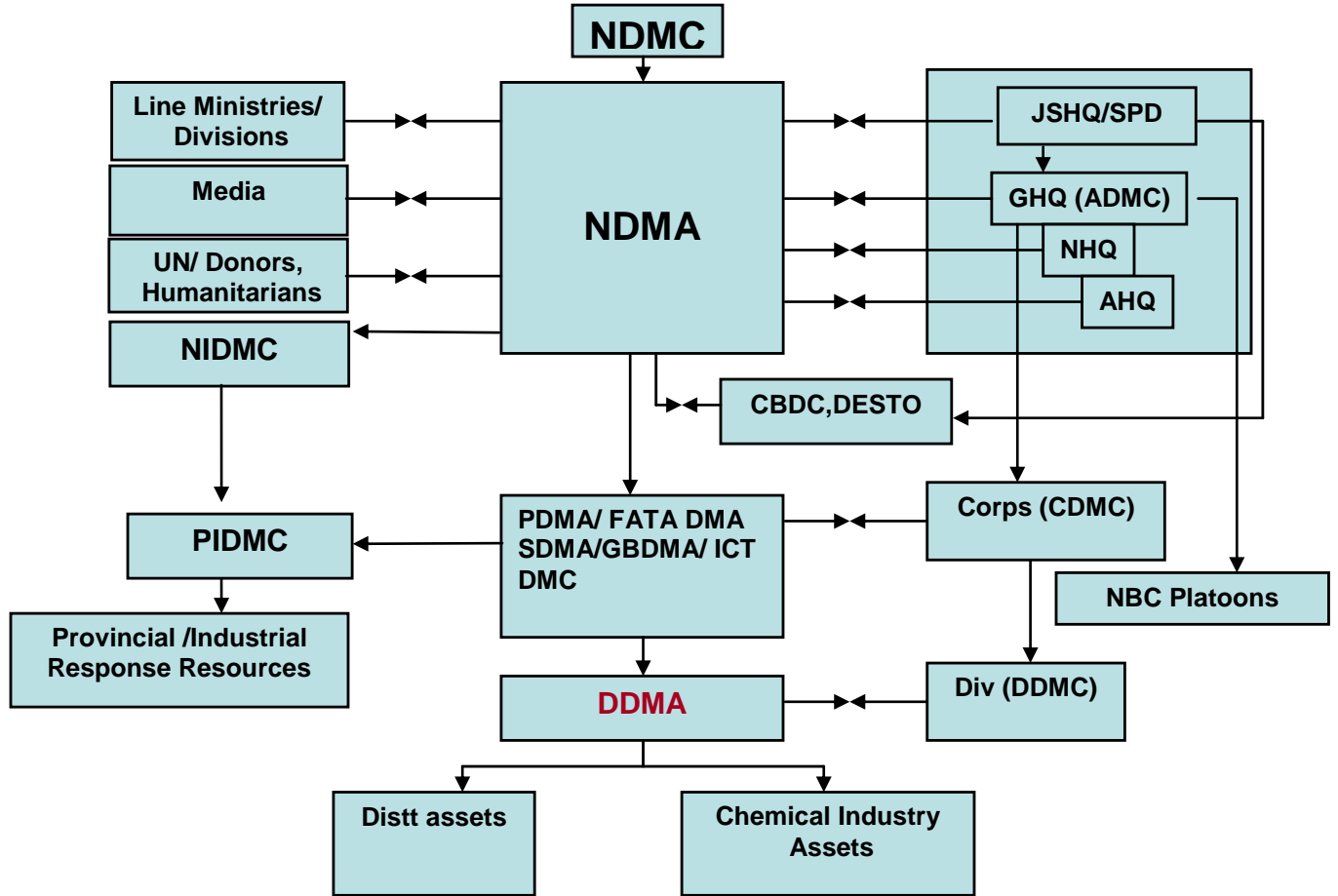
3.15 NDMA may seek approval from the NDMC to issue a directive to Provincial Governments to dedicate at least 10 % of their budget for all types of Disaster Risk Reduction. Moreover, the capabilities that reside at the Federal, Provincial, Local and Private sectors levels should be developed on following lines:-

- a. The public health policy, which is still far from being ideal for addressing natural disease, will have to be reviewed. Our current capacity may be enhanced considerably for a possible Chem-Bio attack. Health care providers in general and Public Health Departments in particular will have to attain a high degree of preparedness to address the current and future threats, with a view to respond against such threats with greater speed and flexibility.
- b. Private, local and provincial capabilities need to be augmented and coordinated with the Federal assets, to provide layered defence against Chem-Bio attacks. These will also complement and enhance our defense against new or recurring natural/infectious diseases.
- c. The traditional approach towards protecting agriculture, food, water from natural diseases is also required to be substantially altered by focusing on the anticipated deliberate Chem-Bio threats.
- d. Armed forces to be fully prepared to meet the Chem-Bio threat by raising their relevant outfits to combat the threat effectively.
- e. Close international cooperation through Ministry of Foreign affairs in the shape of bilateral agreements with states parties of CWC in the region should be ensured for mutual defence against Chem-Bio weapon threats.

## **ROLE OF MINISTRIES, DEPARTMENTS AND INSTITUTIONS TO COMBAT CHEM BIO THREAT**

3.16 Learning a lesson from the past experiences, Pakistan has become cognizant of the Chem-Bio threat which requires strong institutional arrangements and foundational framework. The Government of Pakistan has promulgated the National Disaster Management Ordinance, 2007 and constituted the National Disaster Management Commission (NDMC), and National Disaster Management Authority (NDMA). The NDMA, besides other tasks, is expected to develop and implement appropriate strategies and programmes for risk management. Such risk management will also include Chemical, Biological, Radiological and Nuclear (CBRN) risks, disaster effects and to ensure that the country is ready to tackle any future disasters including Chem-Bio hazards in an organized and effective way. In this regard, NDMA in collaboration with Federal Ministries, SPD, DESTO, Armed Forces, Provincial Disaster Management Authorities (PDMAs), Departments, Technical Agencies, provincial governments, UN agencies, donors, NGOs, and civil society will have to cover a lot of mileage to strengthen our institutional capacity. Keeping in view, the quantum of threat and availability of existing rudimentary infrastructure, guidelines for various Ministries are being issued as **Annex 'A'** for preparing them deal with Chem-Bio threats and emergencies. This is an initiative towards attainment of the policy objectives. These guide lines have been prepared to be read in conjunction with the existing guidelines contained in National Disaster Risk Framework issued by the NDMA.

**COORDINATION MECHANISM FOR CHEM BIO THREAT  
PART-III**



**RESPONSIBILITIES FOR NDMA, MINISTRIES AND ORGANIZATIONS**

1. The terrorists have the potential to hit any sensitive strategic target with Chem-Bio Weapons and cause terror as well as losses in term of human lives and property. Various Ministries will have to play an effective role to counter Chem-Bio threat as mentioned in the preceding paragraphs.
2. **NDMA.** As secretariat of the NDMC, to coordinate disaster risk management related to Chem Bio threat at National level. Its main functions would be as follow:-
  - a. Obtain/ Coordinate technical assistance from Federal Ministries and other departments to enhance capacity of DM authorities at federal, provincial, district, and municipal levels.
  - b. Coordinate training and awareness raising activities for capacity development of stakeholders in collaboration with SPD and other relevant Ministries/Departments.
  - c. Coordinate formulation of appropriate regulations by the relevant Ministries/ Department for management of disasters pertaining to their area of responsibility.
  - d. Coordinate evolution of strategy by the Ministry of Information and Broadcasting for participation of media in Disaster Risk Management (DRM) related to Chem Bio protection activities.
  - e. Coordinate regional and international cooperation pertaining to Chem Bio disaster risk management in the light of common standards and protocols through MOFA.
  - f. Coordinate with the concerned ministries, departments or agencies to earmark such men and material equipped and trained for the purpose of emergency response, rescue and relief against Chem Bio threat.
  - g. Arrange to provide monitory support for enhancement of capacity of first responders out of National Disaster Management Fund.
  - h. Constitute Safety and Crisis Management Cells at national / provincial levels in consultation with SPD/DESTO staffed by experts, charged with inspecting/ensuring safety standards at plants / facilities and provide experts advice for chemical disaster management.
  - j. Ensure availability of stocks of medicines / antidotes by the Ministry of health at national / provincial level with arrangements for their quick transportation to affected area.

- k. Serve as the lead agency for relevant NGOs/INGOs to ensure their performance matches accepted international standards.
- l. Develop guidelines and standards for national and provincial stakeholders regarding their role in Disaster Risk Management pertaining to Chem bio threat.

### **MINISTRY OF DEFENCE**

3. Ministry of Defence will be focal agency to combat Chem-bio threat and provide assistance and protection in terms of rescue, evacuation, provision of protective equipment and decontamination etc. In this regard, Ministry of Defence will be required to take following measures:-

- a. Assess vulnerability of general public, Armed Forces, National strategic assets and infrastructure to Chem-Bio threat (including threat from non state actors) and incorporate the same in Internal Security Schemes (IS) schemes of General Headquarters as well respective formations down to unit level.
- b. In the first phase, armed forces may enhance their capacity for self defence against Chem-Bio threat. This capacity may be subsequently, upgrade to enable Armed Forces to extend assistance and protection to populace in close coordination with NDMA, DESTO, Ministry of Interior and Civil Defence.
- c. Ministry of Defence may view the possibility of establishing Chem Bio-Terrorism Prevention Unit (CBTPU) in all three branches of Armed Forces to protect civilian and military targets.
- d. Integrate management of Chem-Bio Defence education in Armed Forces training curriculum and enhance training capacity of Armed Forces Institutions to impart Chem Bio defence training to responders from other Ministries and Departments.
- e. Bulk production of NBC equipment through Defence Production Division as well as DESTO and maintain reserve stock of Chem Bio equipment centrally as well as provincial capitals (in CODs) to enable rapid deployment of responding echelons through air lifting for rescue, relief and recovery of affected people.
- f. Formulate plan to reduce the risks of chemical and biological accidents in the facilities managed by the Ministry in close collaboration with PAEC, PNRA, DESTO and other relevant agencies.

- g. Develop comprehensive plans about Chem- Bio response operations and conduct Mock Exercises involving armed forces and other stakeholders. The schedule of such exercises may be reflected in GHQ Training Instructions.
  - h. Assist civil communities in rescue, first aid and evacuation of civil population during Chem-Bio emergencies.
  - j. Assist civilian authorities in decontamination and rehabilitation of infrastructure in post disaster phase.
  - k. Timely collection and analysis of intelligence, with regard to Chem-Bio Threat.
  - l. Provision of 'First Responders', Casualty management and Medical Countermeasures.
4. **STRATEGIC PLANS DIVISION (SPD)**. SPD as Secretariat of National Command Authority (NCA) in collaboration with NDMA has formulated detailed action plan by drafting National Chem-Bio Protection Policy. Ministry of Interior, Information, Health, Education, Foreign Affairs, SPD (CBDC DESTO) and other stakeholders have been tasked to perform their relevant functions to combat Chem-Bio Threat. On finalization, this policy will act as guideline for all relevant stakeholders to perform various functions pertinent to their role assigned in the policy. SPD may capitalize the R&D capacity of DESTO by obtaining funds from Federal Government through NCA.
5. **DESTO**. Being the sole organization to possess requisite infrastructure and expertise against chem bio threat, DESTO will play an advisory role to NDMA in building the National capacity against chem bio threat. The role of DESTO will be as under:-
- a. Train and equip the stakeholders to organize physical response against Chem bio threat anywhere in Pakistan.
  - b. Develop best possible efficient Chem Bio Protective Equipment through Research and Develop Programmes (R&D) programmes and provide the same to all responders including Armed Force on payment.
  - c. Enhance capacity of first responders through training of trainers for chem bio defence/ response mechanism.
  - d. Assist relevant stakeholders to maintain a reserve of protective/ decontamination equipment at Federal and Provincial level to ensure its availability for local responders on as required basis.
  - f. Develop an operational plan for mitigating Chem Bio threat in strategic installations and carry out mock exercises for various contingencies to ensure an effective response in case of a chem bio terrorist attack or chem

bio accident.

- g. Provide technical assistance to Provincial Governments to maintain one mobile lab for detection of chem-bio agents at Provincial capitals.

6. **EDUCATION.** Ministry of Education (MoE) in close coordination with MoH and Ministry of Environment will address the natural/accidental/intentional disaster management issues (including chemical and biological defence) in the National Education Policy and ensure its effective implementation. In addition, the Ministry will do the following:-

- a. Develop awareness among students by including Chem-Bio threat in curriculum of educational institutions, universities, schools and colleges.
- b. Develop the appropriate curriculum for medical disciplines by including management of casualties from a Chem Bio disaster.
- c. Implement the action plan to reduce vulnerability of infrastructure in education sector in hazard-prone areas, e.g. retrofitting, renovation, rebuilding etc;
- d. Develop capacities of schools and colleges to cater for additional water, sanitation and other administrative amenities to house affected populations in the event of a Chem -Bio disaster.
- e. Develop a disaster risk management plan for the educational institutions covering aspects of risk reduction, preparedness and initial response to mitigate effects of Chem-Bio attack.
- f. The Higher Education Commission (HEC) may sponsor students in disciplines related to Chem Bio Disaster Managements at the graduate/post-graduate level
- g. Regular civil defence drills should be organized for all public and private sector educational institutions.

7. **ENVIRONMENT**

- a. Develop Chem-Bio Defence Management Plan for risk reduction and response with relation to Ministry's mandate.
- b. Develop technical capacities to undertake assessment of Chem-Bio risk to enable and carry out Chem-Bio risk reduction activities in the environment sector.
- c. Undertake assessment of vulnerability of natural resources (forest, lakes, streams, mangroves, coral reefs, protected areas, coastal areas) to natural and human induced hazards.

- d. Implement Chem-Bio defence plan and procure necessary technology to monitor air over major cities with respect to pollution and release of Toxic Industrial Chemicals (TICs).
- e. Take all effective measures to deal with the environmental impacts of all incidents having environmental repercussions.
- f. Ensure chemical and biological safety including industrial/occupational safety as well as safety of the environment through Environmental Protection Agency (EPA) which is specifically responsible for protection of natural environment from all hazardous risks.
- g. Surveillance of atmosphere/environment in the close vicinity of existing industrial installations and monitoring of effluents/waste discharges of toxic nature.
- h. Develop plans to protect the environment and population from its harmful effects of chem bio disaster and recovery of the natural environment in the aftermath of as early as possible.
- j. Arranges mock exercises/drills in close coordination with the Civil Defence organizations.

8. **FOOD, AGRICULTURE AND LIVESTOCK**

- a. Carry out assessment of the vulnerability of the infrastructure to Chem-Bio threats, particularly for food, water, agricultural, and livestock.
- b. Develop Chem-Bio risk management plan to deal with Chem-Bio hazards in relation to Ministry's mandate and assets.
- c. Undertake vulnerability, risk analysis and response capability for food, agriculture and livestock sectors in hazard-prone areas in relation to natural disasters in general and man made disasters in particular.
- d. Coordinate with PAEC, DESTO and other research organizations / institutions to establish warning 'Systems for identification of risks to food, agriculture and livestock sectors.
- e. Develop plan to raise awareness of staff of ministries at federal and provincial levels, local extension workers and farmers on Chem-Bio vulnerabilities with respect to food, agriculture and livestock sectors.
- f. Impart training to experts to check the food, agriculture and livestock for import and exports.

9. **FOREIGN AFFAIRS.** Ministry of Foreign Affairs, being focal point to implement Chemical Weapons Convention (CWC) and Biological Weapons Convention (BWC) in Pakistan may ensure enactment of rules and regulation to implement provisions of these



regimes effectively.

- a. Develop procedures to expedite requests for assistance including facilitation / reception and deployment of international response teams.
- b. Negotiate agreements with other countries of the region to jointly combat chem-bio terrorism by providing prompt assistance, intelligence sharing and restrict proliferation of material.
- c. Maintain liaison with SPD and NDMA in order to ensure collaborative efforts for Chem-Bio risk management.

10. **HEALTH.** The Ministry in close coordination with the NDMA, NIH and other Ministries/Departments will act as a lead agency for managing all aspects of healthcare preparedness, response and recovery in a Chem-Bio Emergency. It will establish emergency health operation to ensure better coordination and mobilization at all levels.

In addition, the Ministry will perform following role:-

- a. Ensure an integrated and focused National effort to anticipate and respond to emerging Chem-Bio threats.
- b. Carry out assessment for the vulnerability of infrastructure, particularly in the medical and public health sector.
- c. Prepare Chem-Bio preparedness and response plan in coordination with NDMA for each level of health care facilities, including management of mass casualties and epidemics.
- d. Create new Federal, Provincial, local medical and public health capabilities for NBC casualty handling and improve the existing medical countermeasures to mitigate the losses in the event of Chem-Bio emergencies, at Federal, Provincial and District level through designation of specialized NBC medical response facilities.
- e. Equip designated private and public hospitals and health infrastructure for meeting exclusively Chem-Bio emergencies in all major cities and districts.
- f. Maintain sufficient stock of antimicrobial agents, antidotes, selective vaccines NBC protective equipment, life saving equipment and other medical/surgical items.
- g. Set-up emergency medical camps and mobilize health teams including mobile hospitals and mobile labs in the event of a Chem-Bio incident.
- h. Establish surveillance & detection system, in collaboration with MoE, for potential emergency or epidemic outbreak.
- j. Devise strategies for effective implementation of laboratory bio-safety and bio-security measures at all levels.

- k. Prepare and implement NBC mass causality handling and bio-safety syllabi through PMDC and Ministry of Education.
- l. Coordinate effective linkages with all national, regional and international health agencies/stakeholders.
- m. Educate community for its involvement in all aspects of emergency preparedness, response, recovery plans and mitigation of NBC illnesses.

11. **NATIONAL INSTITUTE OF HEALTH**

- a. Provide general guidance to the masses, regarding Chem-Bio emergencies and epidemics.
- b. Establish national database regarding the levels of various laboratories functioning in the country; both public and private.
- c. National Laboratory Certification system should also be established as early as possible.
- d. Develop and execute research programme to achieve better medical counter measures through in collaboration with Ministries of Interior and Defence.

12. **INTERIOR.** The Ministry of Interior with support from Law Division and Ministry of Health may review the existing legislative frameworks for the prevention and prohibition of chem-bio threat. It may identify legislative and regulatory gaps in these frameworks and enact primary and subsidiary legislation. In addition following will be ensured:-

- a. Include Chem-Bio threat in curriculum of first responders in police academies, Civil Defence institutions and other training institutions etc.
- b. Establish Chem Bio-terrorism Prevention Units at Islamabad and Provincial capitals with the help of NDMA, Ministry of Defence and DESTO to respond to chemical disaster/terrorism.
- c. Equip first responders from Civil Defence Fire Brigade, Anti Terrorist Squad, and Rescue 1122 with NBC protective equipment and impart them training to combat chem bio emergencies with the help of NDMA, Ministry of Defence, DESTO.
- d. Ensure maintenance of law and order in affected areas, through Provincial Governments and provide security to volunteers, government officials, and staff of international NGOs and UN agencies working in areas affected by chem bio disaster.
- e. Provide assistance to NDMA, PDMA's and DDMA's in Chem-Bio warning, rescue, relief and evacuation operations.

- f. Enhance capacity of the National Crisis Management Cell and make a plan to deal with crisis situations created by terrorists and criminal activities and share the plans with NDMA for better coordination and effective response.
- g. Federal and Provincial Civil Defence Departments should be strengthened by improving their response capacity against chem bio threat.
- h. FIA Forensic Lab Islamabad, PCSIR labs and similar other labs all over Pakistan, should be equipped to test samples for investigation of Chem-Bio crimes.

13. **SCIENCE AND TECHNOLOGY**

- a. Develop Disaster Risk Management Plan and evolve scientific techniques to reduce vulnerability of general public, flora and fauna, infrastructure and facilities to Chem-Bio threats.
- b. Identify and finance suitable National Industries/Institutions for indigenous development and production of Detection, Sampling, Identification, decontamination devices/equipment to effectively manage and mitigate Chem-Bio incidents/hazards.
- c. Undertake research projects through scholarship programme in promoting Chem-Bio Risk Management culture in Pakistan in close collaboration with relevant Ministries.
- d. Chem-Bio related research projects may be conceived and offered to relevant academic/research institutions to deal with the Chem-Bio incidents/hazards.
- e. Ministry may task its subordinate departments/organizations and laboratories to develop and execute relevant projects related to Chem-Bio defence. All public and private laboratories may be suitably equipped to efficiently detect and identify Chem-Bio agents/hazards.

DEFINITIONS

1. **TERRORISM.** Terrorism is the use of violence, or the threat of violence, to create a climate of fear, in a given population. Terrorists target ethnic or religious groups, governments, political parties, corporations, and media enterprises. Organizations that engage in acts of terror are almost always small in size and limited in resources compared to the populations and institutions they oppose. Through publicity and fear generated by their violence, terrorist groups seek to magnify their influence and power to effect political change on either a local or an international scale.
2. **TECHNOLOGICAL TERRORISM.** The taking advantage of technology to disrupt, destroy, or hamper the use of last technology. Computer viruses are a perfect example of technological terrorism. A simple, well written virus can bring the world to it's knees by disrupting computer usage around the world.
3. **CHEMICAL/BIOLOGICAL.** Chemicals, bacteria and nuclear waste could be used as weapons of mass destruction. Production of infectious agents, toxins, or chemicals and then disseminating it in the atmosphere, water or food.
4. **PHYSICAL TERRORISM.** The physical destruction of property and/or the taking of human life. September 11, 2001, is an example of physical terrorism that not only destroyed property and took human life, but also had a psychological effect on the population as a whole.
5. **PSYCHOLOGICAL TERRORISM.** Relies on instilling fear in others and taking away the basic freedoms/rights that we take for granted on a daily basis. It can be as simple as being afraid to open our mail, to go out in public, or to travel. Psychological terrorism affects everyone differently and can have long lasting effects.
6. **ANTHRAX.** Anthrax is a serious disease caused by Bacillus anthracis, a bacterium that forms spores. There are three types of anthrax: skin, lungs and digestive. The bacteria are found in the soil and infect grazing animals.
7. **ANTISERUM.** The liquid part of blood containing antibodies, which react against disease causing agents such as those used in bio-weapons (BW).
8. **ASEPTIC TECHNIQUE.** Precautionary measures taken in the field and the lab to prevent the contamination of equipment, people, animals or plants by extraneous materials or other micro organisms.
9. **BOTULINUM TOXIN.** Toxin made by the bacteria Clostridia Botulinum. This toxin causes botulism, a muscle-paralyzing disease. Exposure can be by inhalation, ingestion or injection by the toxin. It is not transmitted person-to-person.

10. **BACTERIA**. Single-celled organism that multiply by cell division and that can cause disease in humans, plants or animals.
11. **CAUSATIVE AGENT**. The organism or toxin that is responsible for causing a specific disease or harmful effect.
12. **CONTAGIOUS**. Capable of being transmitted from one person to another, one animal to another and between people and animals.
13. **DECONTAMINATION**. The process of making people, objects or areas safe by absorbing, destroying, neutralizing, making harmless or removing the hazardous material.
14. **DUAL-USE TECHNOLOGY**. Technology that can be used for both peaceful and military purposes.
15. **INFECTIOUS AGENTS**. Biological agents capable of causing disease in a susceptible host.
16. **TOXICITY**. A measure of the harmful effect produced by a given amount of a toxin on a living organism. The relative toxicity of an agent can be expressed in milligrams of toxin needed per kilogram of body weight to kill animals.
17. **POINT –SOURCE DELIVERY SYSTEM**. A delivery system in which the biological agent is dispersed from a stationary position. This delivery method results in coverage over a smaller area than with the line-source system.
18. **VACCINE**. A preparation of killed or weakened micro organism products used to artificially induce immunity against a disease.
19. **VECTOR**. An agent, such as an insect or rat, capable of transferring a pathogen from one organism to another.
20. **VENOM**. A poison produced in the glands of some animals, for example, snakes, Scorpions or bees.
21. **VIRUS**. An infectious micro organism that exists as a particle rather than as a complete cell. Particle sizes range from 20 to 400 nanometres.
22. **CHEMICAL WARFARE AGENTS**. Chemical substances which might be employed because of their direct toxic effects on man, animals and plants (United Nation 1969).
23. **CHEMICAL WEAPONS**. Chemical weapons including toxic chemicals, ammunition and equipment for their dispersal (Chemical Weapons Convention).

## **TECHNICAL GUIDELINE TO COUNTER BIO- TERRORISM INCIDENTS**

### **PART 1**

#### **INTRODUCTION**

1. Bioterrorism refers to the intentional release of biological agents or toxins for the purpose of harming and killing humans, animals or plants with the intent to intimidate or coerce a government or civilian population to further political or social objectives.
2. Covert incidents will primarily be detected by medical and public health authorities. Police services cannot deal with instances of bioterrorism on their own. It is critical that agreements be in place and regularly exercised between law enforcement and partner agencies outlining their respective/ co-operative roles in dealing with a biological attack. Most important aspects include agreements with the medical and public health communities that include:-
  - a. An early warning system wherein law enforcement is informed of any emerging suspicious health issues.
  - b. Collection and handling of evidence.
  - c. Selection of compatible personal protective equipment.
  - d. Co-operation with other national/international health and law enforcement organizations.

#### **PREVENTION**

3. It is universally agreed that the terrorist acquisition of biological agents must be prevented by strictly regulating the legitimate use of potential biological agents to prevent those materials from being misused. Ministry of Foreign Affairs being the focal point to implement Biological and Toxin Weapons Convention (BWC) in Pakistan should put in place, laws and regulations restricting the export and import of such agents and the apparatus used for their preparation/weaponization. The BWC signed in 1972 bans the use of biological weapons and their production, acquisition and stockpiling. However, the convention does not include verification mechanisms for compliance. Proactive role should be adopted by Ministry of Foreign Affairs in battling bioterrorism by negotiating agreements with other countries to jointly combat bioterrorism by sharing intelligence and best practices and eliminating the proliferation of biological agents.
4. In addition to the development of response procedures, Ministry of Health should take a lead role in promoting a programme of prevention. It may be realized that dangerous biological pathogens are stored in many legitimate laboratory facilities within the country. Improve security is required at these facilities. Similar to other critical

infrastructure requirements, legislation requiring mandatory reporting of accidents, theft, loss, or release of biological agents should be enacted. In addition, legislation restricting the purchase of dual-use laboratory equipment, and regulations on the transportation of biological agents may serve as a deterrent to the misappropriation of biological agents. The creation of outreach programmes that increase the level of bioterrorism awareness and information exchange between law enforcement, industry and scientific communities will facilitate the reporting of suspicious activities and will have deterrent value as well.

### **BIOLOGICAL AGENTS**

5. Biological agents are defined as disease-causing organisms or toxins produced from a biological source and may also be referred to as pathogens. Toxins are poisons produced by or derived from living organisms. These agents may be selected by terrorists to injure or kill persons or animals and some may be used to destroy crops.

The examples of Biological agents are as under:-

a. **BACTERIAL AGENTS**

- (1). Bacillus anthracis (Anthrax)
- (2) Yersinia pestis (Plague)

b. **VIRAL AGENTS**

- (1) Variola (Smallpox)
- (2) Marburg (Hemorrhagic Fever)

c. **TOXINS**

- (1) Botulinum Toxin (from Clostridium Botulinum)
- (2) Ricin (from Castor Beans)

### **BIOLOGICAL AGENT ACQUISITION**

6. While there are legitimate reasons for the acquisition of particular biological agents and associated production equipment, it is also possible for people to acquire these agents for criminal purposes. A significant challenge for the terrorists is the acquisition of the pathogen or a source of toxin for production and dissemination. Bacteria and viruses are living entities. When placed in the right atmosphere and supplied with proper nutrients, bacteria can grow and multiply in a relatively short time where as viruses cannot grow on their own. Viruses must reproduce within living cells, and are therefore more difficult to grow in a laboratory. Toxins may be derived from bacteria, plants or animals. There is publicly available information that may enable persons with various levels of education to carry out successful production processes. Depending on the intentions of the terrorists, they may consider a number of factors/ characteristics in selecting a biological agent ie:-

- a. Ease of acquisition/production.
  - b. Ease of weaponization.
  - c. Ease of delivery.
  - d. Intention to kill or temporarily disable.
  - e. Whether the agent is contagious.
  - f. Potential risk to the terrorists themselves.
7. Possible means of acquisition in obtaining biological agents are:-
- a. By the diversion of transported materials.
  - b. From natural sources.
  - c. By theft from universities, microbiological laboratories, veterinary laboratories and industry.

### **BIOLOGICAL AGENT PRODUCTION**

8. There are a number of methods for the isolation, culturing, purification and weaponization of biological materials. The education required varies since the methods may be very simple or extremely advanced. While executing a plan for the isolation, growth, purification and dissemination of a pathogen may require advanced scientific training or laboratory experience. Plans involving toxins could be effectively carried out by individuals or groups with far less formal education or laboratory experience. Information on bio-agent preparation is available in libraries and on the Internet. Apparatus/equipment need not be specific, recognizable laboratory equipment; there are a number of household items that can be used in clandestine biological agent preparation. Biological agents may be prepared in liquid, water-based slurry or powder forms. A well-prepared, fine powder presents the biggest danger to the public and responders. Other additives may be included to protect the agent or assist with dispersal, e.g., silica, clay particles and cellulose. These additives may have unique features which provide vital evidentiary value within the forensic investigation.

### **INTELLIGENCE GATHERING ABOUT BIOTERRORISM**

9. Surveillance of a terrorist group may yield specific indicators of their attempts to acquire, manufacture and weaponize a biological agent. Following are few examples of intelligence findings potentially indicating interest in bioterrorism:-
- a. Efforts to recruit members with education or experience in microbiology, medicine or engineering.
  - b. Buildings with altered ventilation systems.
  - c. Possession of protective clothing or respirators or masks.
  - d. Test animals, cages and animal care-related materials.
  - e. Bacterial or viral cultures.



- f. Purchase of plants, seeds and/or beans known to be sources of toxins.
- g. Vaccines and antibiotics.
- h. Laboratory equipment.
- j. Periodicals, instruction manuals or web resources providing biological agent preparation recipes.
- k. Antiseptics, bleach or other anti-microbial cleaning supplies.
- l. Dissemination equipment such as sprayers, pressure tanks or nebulizers

### **MEANS OF AGENT DISSEMINATION**

10. Biological agents can be disseminated by the terrorists in one of the following ways:-

a. **DISPERSAL SYSTEMS FOR INHALATION EXPOSURE**

- (1) Mail/packages.
- (2) Commercially available spray devices.
- (3) Crop dusters.
- (4) Fire extinguishers.
- (5) Air conditioning systems.
- (6) Smoke generators.
- (7) Street air fresheners.

b. **FOOD AND WATER**

**CONTAMINATION**

- (1) Individual consumption items.
- (2) Food chain contamination.

c. **INJECTION**

- (1) Contaminated needles.
- (2) Projectiles.
- (3) Contaminated shrapnel.

d. **DIRECT CONTACT.** Direct contact by infected persons/animals, military munitions.

### **DETECTION OF BIOLOGICAL AGENTS**

11. Law enforcement agencies may detect biological agent dissemination through reports of unusual behaviour or the discovery of unexpected devices or odours. Few examples of biological agent dissemination indicators are as under:-

- a. Presence of suspicious liquids or powders.
- b. Unscheduled/unusual spraying activity.

c. **Unusual Odours**

- (1) Purified biological agents are odourless, but un-purified products may have distinct odours characteristic of rotting meat or fermentation.
  - (2) The smells of growth media may be interpreted as musty, yeasty or like rotten meat.
- d. Presence of dissemination devices.
  - e. Reports of tampering with food or water supply or distribution systems.
  - f. Receipt of a written, electronic or verbal threat or claim of responsibility.

**DISSEMINATION OF BIOLOGICAL AGENTS**

12. Weather conditions and building ventilation systems can affect dispersal efficiency. Outdoors, a light wind may help disseminate an agent; however, high winds may spread an agent over such a large area that the dose inhaled by individuals may be too small to cause disease. Indoors, there are many variables which impact the effectiveness of aerosol dissemination. Ventilation systems which move air within buildings may spread an agent throughout a building rapidly. On the other hand, many modern heating and air conditioning systems utilize very efficient filtration to remove indoor and outdoor air pollutants. These filters may also remove a biological agent from the air, significantly reducing the impact of an indoor release. Following conditions promote airborne dissemination of biological agents:-

- a. Cloudy weather or night time.
- b. Light winds (5-10 kph).
- c. Uniform terrain.
- d. Vehicular or pedestrian movement.
- e. Active heating ventilation equipment (buildings).
- f. Crowded places.

**CHARACTERISTICS OF BIOLOGICAL AGENTS**

13. Biological agents have characteristics which are dissimilar to chemical agents. Biological agents are generally more difficult to detect by physical observation and cause symptoms some time after exposure. These characteristics make recognition of a biological event more difficult.

- a. Do not have a unique colour, taste or smell.
- b. Preparation method may impart some odor.
- c. May have small infective doses.

- d. Can cause delayed symptom onset from 2-7 days but may extend to 30-40 days.
- e. Can be transmitted by ingestion, injection or inhalation of aerosolized particles.
- f. Some may be transmitted person-to-person.
- g. Rarely cause disease on exposure to unbroken skin.
- h. May have a high morbidity and mortality rate.
- j. Could potentially be produced with either laboratory or improvised household equipment.
- k. Variable survival in the environment when exposed to sunlight, air pollution, humidity or other meteorological conditions.

### **OVERT ATTACK**

14. An overt attack is an event clearly recognizable by the police or other responders provided they possess requisite knowledge and training in this field. Awareness of the attack will be evidenced by receiving a specific threat, warning or intelligence, discovery of a means of dispersal or other signature activities/ apparatus, or discovery of questionable/suspect materials. To mitigate the health consequences of the attack, public health and medical authorities must be informed by law enforcement of the event. The means for this contact should be pre-established and exercised in order to avoid delay and inefficient information exchange. The consequence of failing to have an established information exchange procedure between law enforcement and public health for overt attacks is the potential for delays in public health and medical responses. There is also the potential that attacks have occurred prior to the detection of the overt event, and these prior attacks would be only found on review of medical and public health information.

### **COVERT ATTACKS**

15. Terrorists are likely to use biological agents in a covert attack. A covert attack will have no announce threat or warning, a carefully disguised dispersal device or method, and no physical indication of the agent being spread. In these situations, victims are unaware that they have been exposed, and police are not aware that a crime has taken place. There will not be a defined crime scene until after medical diagnosis or environmental detection has occurred. The terrorist is likely to desire this scenario as victims will not seek the necessary medical treatment until they experience symptoms, thus creating a delayed recognition by law enforcement. For some agents this delay will increase mortality as treatment becomes less effective the longer the disease is unrecognized. A police investigation will not be initiated until notification by public health

subsequent to their detection of an unusual disease pattern by a surveillance system or the health-care community has diagnosed an unusual disease. Few examples of disease patterns that may indicate bioterrorism are as under:-

- a. A sudden increase in patients with similar symptoms.
- b. A high mortality rate among victims having common home/ work locations and activities.
- c. Disease concurrent with illness in the susceptible animal population.
- d. A disease that is not normally seen in that geographical location or at that time of year.
- e. The diagnosis of a known bioterrorism disease such as inhalational anthrax or smallpox.

### **LAW ENFORCEMENT INTERACTION WITH PUBLIC HEALTH**

16. It is essential to establish communication mechanisms between law enforcement and public health ie Ministry of Interior and Ministry of Health. These mechanisms and the criteria used to prompt information exchange should be developed with consideration of pertinent laws and regulations protecting both the sensitive data of law enforcement and confidential medical information. Effective information exchange requires that law enforcement and public health personnel be familiar with one another and know which people in each agency should receive the information. A strong working relationship between law enforcement and public health is essential to responding effectively to both covert and overt acts of bioterrorism. Public health and medical assets should be jointly incorporated into training. Exercises should also be planned to build these relationships and identify and correct potential problems before an actual event occurs. Common goals of law enforcement and public health:-

- a. Protect the public.
- b. Prevention of disease.
- c. Prevention of bioterrorism.
- d. Identify those responsible and prevent a secondary attack.
- e. Protect responders/investigators and members of the public from harm.

### **JOINT INVESTIGATIONS/ OPERATIONS**

17. Law Enforcement Agencies should focus their efforts on establishing partnerships with public health as Public health practitioners are responsible for disease control measures within the community, while physicians focus on curing the sick and promoting health in individuals. Public health agencies are responsible for protecting the health of the public. They do this by investigating the causes of disease outbreaks or epidemics, and then making recommendations to prevent the spread of disease, as well as prevent

future outbreaks. Therefore, public health practitioners have specialized expertise in investigating disease outbreaks, which can prove highly valuable to law enforcement during a bioterrorism investigation. Once information regarding a potential threat, outbreak or incident has been shared, law enforcement and public health agencies may be responsible for independent roles and responsibilities in the resulting investigation. Coordination of law enforcement and public health activities is essential. It is recommended that joint operations and investigations be pre-planned and exercised.

### **JOINT INTERVIEWS**

18. In a bioterrorism investigation, it may be beneficial to conduct joint interviews utilizing both public health and law enforcement investigators. A joint interview draws on the strengths of having a multidisciplinary interview team. In a joint interview, a law enforcement officer and a public health official both take part in a single interview of a victim. This allows both parties to obtain the same information and minimizes potential duplication of efforts and possible collection of contradictory information. The advantages and disadvantages of joint interviews are as under:-

a. **ADVANTAGES**

- (1) Minimize the collection and documentation of conflicting information.
- (2) Simultaneous information access.
- (3) Opportunity to address misunderstandings.
- (4) Multi-disciplinary interview perspective.

b. **DISADVANTAGES**

- (1) Logistical challenge of coordinating two or more interviewers.
- (2) Law enforcement presence may inhibit forthright answers.
- (3) Confidential health information concerns.
- (4) Immigration status.
- (5) Law enforcement participation may draw attention from both the media and the public.

### **RESPONSE PRIORITIES**

19. Police officers who respond to a potential bioterrorism event must do so within the limitations of their training, support network and equipment. Personal safety is a primary concern. Police agencies should also consider providing officers with alternative housing during this period. Officers on duty face a higher risk of being exposed to the bio-agent and consequent higher probability of being infected. As such, officers may wish to stay away from their families during this period and alternative housing should be provided for this purpose.

## **HUMAN RESOURCES**

20. The existing response capacity of police to respond to bioterrorism should consist of a layered, integrated model.

- a. **FRONTLINE POLICE PERSONNEL**. The first officers to respond will be general duty personnel, who should be able to adopt self-protection measures, report the situation to multi-agency responders, observe symptoms if present, cordon and preserve the scene, and finally provide other services as directed.
- b. **SPECIALIZED TEAMS**. These teams include those police personnel who will provide critical incident response. They should possess advanced response equipment, training, and operational support. These teams should be able to conduct improvised-dispersal-device, render safe procedures, incident mitigation and forensic scene examination, including sampling and recovery of traditional forensic evidence within contaminated environments.
- c. **BIOLOGICAL ADVISOR**. This person or persons should be able to give real time advice on agent characteristics and production, site safety, medical intervention and decontamination.
- d. **INVESTIGATIVE TEAMS**. These should consist of police officers working with public health and other designated agencies within a pre-established means of cooperative investigation, information sharing and operational support.
- e. **MEDIA RELATIONS TEAM**. Media relations team would include police and public health press information officers and those of related responding agencies.
- f. **SAFETY**. To ensure personal safety for police and support agencies within a contaminated crime scene, training, equipment and support must be provided to the officer.
- g. **TRAINING**. Training in the recognition of potential incidents and hazards, use of personal protective equipment, incident mitigation apparatus and methods, inter-agency concepts of operations and support means is critical for the success of the response.

- h. **PERSONAL PROTECTIVE EQUIPMENT (PPE)**. There are a number of different forms of suitable PPE, with selection being determined by the form of the threat, work environment and type of personal decontamination facilities in operation. Respiratory protection is critical since the primary route of exposure for biological agents is by inhalation.
- j. **OPERATIONAL SUPPORT**. Police operations within a contaminated crime scene must be supported by a competent decontamination facility to transition responders, equipment and evidence in and out of the scene.
- k. **MEDICAL COUNTER-MEASURES**. Medical staff must be on the scene to care for responders. Medical monitoring must be provided for all personnel entering and exiting the scene. Of particular importance is the medical capacity to address heat stress injuries as well as prophylactic treatment for responders against accidental exposure to the agent. Depending on the agent, it may be necessary for medical personnel to administer antibiotics or vaccines to responders and to continue medical monitoring for a prescribed time period after the event.

### **LEVELS OF PERSONAL PROTECTIVE EQUIPMENT (PPE)**

- 21. The level of protection for various responders are as under:-
  - a. **LEVEL A**. Offers a high level of protection for both respiratory and skin exposure to toxic liquid and gaseous products as well as biological agents, and includes a self contained breathing apparatus (SCBA) worn within a gas-tight suit and chemical-resistant gloves and boots.
  - b. **LEVEL B**. Offers a high level of respiratory protection and includes a splash protective suit (non gas-tight), SCBA and chemical-resistant gloves and boots.
  - c. **LEVEL C**. Offers respiratory protection and some splash protection and includes hooded coveralls, gloves and foot coverings, and a full-face respirator or Powered Air-Purifying Respirator (PAPR) with High Efficiency Particulate Air (HEPA) filters.

## **OPERATIONAL RESPONSE**

### **PART III**

#### **COMMAND INCIDENT RESPONSE CHECKLIST**

22. The response checklist would include following aspects:-
- a. Adopt self protection measures.
  - b. Establish an incident command centre.
  - c. Establish safe holding area -uphill and upwind.
  - d. Establish a cordon.
  - e. Gather information regarding the incident/threat/suspect substance.
  - f. Select appropriate PPE and implement contamination control.
  - g. Ensure no responders enter the contaminated area without the proper PPE.
  - h. Evacuate victims to safe area -collect identifying and contact information.
  - j. Advise public health.
  - k. Identify and interview witnesses.
  - l. Implement media strategy.
  - m. Designate a health liaison.
  - n. Determine the level of response required.
  - o. Request specialized teams to deploy to the scene and reassess location of the holding area.
  - p. Brief personnel about on-site safety.
  - q. Establish decontamination.
  - r. Conduct a hazard assessment- Eliminate explosive, radiological and chemical hazards.
  - s. Hazard containment.
  - t. Determine if additional resources and actions are required.
  - u. Conduct evidence recovery.
  - v. Conduct full handover briefing to the agency responsible for remediation/site cleanup.
  - w. Notify domestic and international partner agencies.

#### **CONTAMINATION CONTROL MEASURES AND SELECTION OF PERSONAL PROTECTIVE EQUIPMENT**

23. Ensuring the safety of responders within any potentially contaminated environment includes the appropriate selection and use of Personal Protective Equipment (PPE), adherence to strict Contamination Control and presence of on site medical personnel is also very critical. Once it has been determined that there are no explosive, chemical or radiological hazards, PPE should be selected after considering the following criteria:-



- a. The type of hazard.
- b. The entry/exit routes of responders.
- c. Environmental conditions.

24. If the hazard involves airborne particles, it is essential that responders rely on either a self contained breathing apparatus (SCBA) or a full-face respirator to ensure protection of the lungs after a comprehensive hazard assessment. The intent of contamination control is to avoid unnecessary exposure. It includes proper entry, in-scene and decontamination procedures for personnel, equipment and evidence.

### **DECONTAMINATION**

25. Decontamination is a critical component of these procedures and must be in place before any responder enters the contaminated area. Decontamination procedures, as a minimum, should proceed as follows:-

- a. Rinse outer garments through the application of a light spray of soap and water.
- b. Disrobe the responder following Standard Operating Procedures (SOP).
- c. Shower the responder thoroughly with soap and water.
- d. Thoroughly decontaminate equipment and the first container/ bag that contains the evidence (double bag procedure) removed from the scene.
- e. Dispose of contaminated waste as hazardous waste.
- f. Rule out potential remnant contamination.

### **FACTORS TO CONSIDER IN SELECTING PPE**

26. The wearing of any level of PPE imposes a number of limitations on responders while developing PPE for first responders. DESTO may incorporate these factors into the manufacturing process. Police officers and other responders should be trained often to understand the impact of wearing PPE on operational duties. Use of PPE limits operational capabilities in the following ways:-

- a. Impaired dexterity
- b. Restricted mobility
- c. Difficulty in hearing instructions
- d. Difficulty in being understood/radio use
- e. Reduced vision
- f. Heat stress
- g. Increased weight
- h. Psychological stress

### **ADVISE PUBLIC HEALTH**

27. Definitive criteria for public health notification to law enforcement are difficult because almost all biological agents mimic other diseases in their early onset. However, there are a number of specific situations in which information should be shared between public health, medical and law enforcement authorities to detect and manage a bioterrorism event.

### **INTELLIGENCE TRIGGERS**

28. The information required to be shared by Law Enforcement Agencies with other stakeholders is as under:-

- a. Any intelligence or indication that any group or individual is unlawfully in possession of biological agents.
- b. Seizure of processing equipment, dissemination devices, literature or related items that could be used in the production or use of biological agents.
- c. Any assessment that indicates a credible biological threat exists in the area.
  - (1) Credible threats to events and venues in the area.
  - (2) Credible threats to segments of the population.

### **TRIGGERS FOR MEDICAL AND PUBLIC HEALTH**

29. Medical and Public Health authorities will share information with relevant stakeholders about following aspects:-

- a. Any indication that a disease outbreak could be caused by an intentional act.
- b. Lab results that indicate the identification of a potential, biological terrorism agent
  - (1) Respiratory anthrax.
  - (2) Pneumonic plague.
  - (3) Ricin.
  - (4) Smallpox.
- c. Large number of individuals reporting common symptoms.
- d. Unexplained deaths.
- e. Unusual disease contraction such as:-
  - (1) Anthrax (inhalation).
  - (2) Plague (pneumonic).

- f. Any disease with an unusual geographic or seasonal distribution such as:-
  - (1) Ebola in non-endemic areas.
  - (2) Flu-like illness in the summer.

### **MEDIA STRATEGY**

30. The terrorist use or threatened use of biological agents is likely to have an extreme psychological impact on the civilian population, potentially resulting in challenges for law enforcement. Response planning must include a media strategy. Early coordinated statements in the media by law enforcement, public health, medical and political authorities are vital to provide accurate information and to defuse the public's confusion and fear. The joint media STRATEGY may be formulated by NDMA in consultation with Ministry of Information and ISPR keeping in view following factors:-

- a. Conduct joint media conferences, including radio and television broadcasts.
- b. Provide frequent regular updates.
- c. Be clear about what is known and what is unknown.
- d. Provide a plan of action that reassures the public that an active investigation is underway.
- e. Ensure that any requests for public actions are clear and concise.
- f. Encourage the media to ensure that all releases are coordinated with the joint media team.
- g. Recognize that media is the primary information source for the public.
- h. High media profile can engage the public to provide law enforcement useful information on suspicious activity. Media teams must be included in training and exercises.

### **HAZARD ASSESSMENT**

31. A prompt and thorough hazard assessment is vital to ensure the safety of responders and the public. Hazard assessment involves determining what the agent is, the form of the agent (e.g., powder, liquid), efficiency of dispersal and predicted dispersal patterns. Hazard assessments distinguish between actual events and hoaxes. In the case of an actual event, hazard assessment allows informed development of the medical response strategy, selection of appropriate PPE, defines evacuation zones/routes and suggests best practice for decontamination/containment. Biological agents in their most dangerous form as powders may move with air movement, which can be modeled to determine the hazard zone. Hazard assessment in a potential bioterrorism incident is complicated by the lack of consistently reliable field detection equipment capable of rapidly identifying biological agents. Components of a biological hazard assessment are

as under:-

- a. Adopt self protection measures while taking shelter in uphill and upwind safe area.
- b. Gather all relevant information:-
  - (1) Explosions.
  - (2) Victims' symptoms.
  - (3) Time from exposure to onset of symptoms.
  - (4) Smells.
  - (5) Observable agents/materials, devices, containers or debris.
- c. Model potential downwind risk and hazard area.
- d. Determine potential victims at risk:-
  - (1) Consider evacuation.
  - (2) Consider medical interventions.
  - (3) Consider shelter in place.
- e. Select the appropriate level of PPE.
- f. Identify/utilize available detection and monitoring equipment as under:-
  - (1) Assess explosive hazards.
  - (2) Assess chemical hazards.
  - (3) Assess radiological hazards.
- g. Determine evidence recovery equipment and teams.
- h. Ensure that the scene is photographed / videoed prior to being disturbed.
- j. Conduct on-site presumptive tests of the hazard, and collect samples for lab analysis and also coordinate sample preparation with receiving laboratory.

### **CONTAINMENT**

32. The purpose of containment is to reduce the risk to the public and responders as well as to preserve evidence. Because a terrorist may attack an open-air event or within a structure, containment strategies must be developed for both. Evacuation of potential victims should take place first before containment. As soon as possible after victims are removed, a containment strategy should be employed. Such attacks may be contained by following methods

- a. **INDOOR**
  - (1) Turning off ventilation systems.
  - (2) Closing doors and windows.
  - (3) Turning off elevators.
  - (4) Restricting air flow by sealing ducts, windows, doors.

- (5) Utilize tape, expanding foams and plastic sheet.
- b. **OUTDOOR**
- (1) Physically covering the device or dispersed substance.
  - (2) Lightly spraying the dispersed materials with water and bleach mixtures and employing other available commercial systems for agent containment

### **EVIDENCE RECOVERY**

33. Specially trained and equipped crime scene personnel from forensic lab of FIA, will recover/ interpret evidence within the crime scene and from victims. Evidence removed from the site must be handled and packaged by a means that eliminates any cross-contamination or accidental transfer of the agent from the area. This phase is undertaken only if the environment is safe to work in. It may be noted that Personal safety of responders should not be compromised for evidence recovery. Components of evidence recovery are as under:-

- a. Recording of the scene using digital photography/video.
- b. Collecting suspect substances for confirmatory testing.
- c. Collecting/packaging of contaminated items for forensic examination.
- d. Must be consistent with the level of risk posed by the agent. Procedures should be in place between law enforcement and forensic/epidemiological labs for analysis and retention of contaminated exhibits.

### **SAMPLING FOR SUSPECT BIOTERRORISM INCIDENTS**

34. It is imperative that any unknown substances be cleared for the presence of chemical or radiological materials. If ionizing radiation or chemical hazards are detected, separate procedures must be applied. The sample collection procedures that follow are to be employed during an investigation in which there is suspicion that the substance is of a biological nature. Collection of biological evidence should be performed by a specially trained team following specific procedures that are established and coordinated with the receiving analytical laboratory. The procedure would be as follows:-

- a. **COMPOSITION OF THE SAMPLING TEAM.** Sampling team configuration may be based on specific legislation and incident-specific requirements, required to be introduced by Ministry of Foreign Affairs in consultation with Ministry of Interior and Law Division. As a general rule the sampling team must consist of at least three operators, two individuals for sample collection and a scribe/photographer. Under some jurisdiction, Sampling Teams might be requested to be composed of authorized/qualified personnel with proper

training and equipment. The proper clearance can be given by the entitled national authorities for BWC established at Ministry of Foreign Affairs. If contrary, the samples collected may not be accepted as evidence in the court of law or questioned by the defence attorney.

b. **ENTRY PREPARATION**

- (1) Coordinate all sample collection and packaging with the analytical laboratory that will receive the samples.
- (2) Generate a sample collection plan after determining the areas and number of specimens to be taken.
- (3) Identify necessary equipment.

c. Separate equipment for each sampling task into itemized packages:

- (1) Liquid
- (2) Powder

d. Label the inner containers for each of the collection items.

e. Check the prepared sampling kits against the sampling plan.

f. Organize spare equipment.

g. Prepare control samples (refer to the "Controls" section below).

h. Prepare following necessary equipment before entry:-

- (1) Carry basket, bucket or plastic bag for sampling gear.
- (2) Sample equipment/kits, plastic sheets for the floor.
- (3) Cameras/video equipment (waterproof), radio (waterproof or wrapped in plastic).
- (4) Waterproof note pad and pens.

j. Identify potential safety hazards and conduct a safety briefing

**CONTROL SAMPLES**

35. Control samples may be required as evidence during court proceedings to indicate that collection vessels are sterile and that the samples are free from environmental contamination. Whenever possible, prepare control samples for each type of environmental sample taken at a sampling site. For example, if collecting a soil or water sample from a contaminated site, also collect a sample of soil from an area not involved in the investigation but similar to the site being investigated and label it as a "control sample". Blank samples are used to prove the sterility of the collection equipment. Blank samples of collection media and utensils are prepared and packaged in the same manner as the actual samples, although they are not subjected to a contaminated surface or substance. Preferably the blank and control items should be from the same batch number as those items used during actual sampling. Control

samples and blank samples are prepared away from the contaminated site and stored for future cross-referencing during sample analysis.

### **GENERAL OPERATIONS**

36. Sample collection and safety plans must be prepared prior to commencing operations. Ensuring personal safety, collecting useful samples, avoiding sample contamination and maintaining accurate documentation are the main objectives during sample collection.

### **EVIDENCE PRESERVATION**

37. Biological samples are sensitive to heat and sunlight. Transport to the receiving analytical laboratory as soon as possible. If necessary, make an effort to keep the samples in a cool or shaded area. Regarding storage temperature, consider this rule:

- a. If it's cold, keep it cold (do not freeze!).
- b. If it's warm, make it cold.
- c. If it's frozen, keep it frozen.

### **EVIDENCE INTEGRITY**

38. In order to keep a chain of custody for evidence, collection data must be included with the sample submission. This procedure including following aspects should be developed in advance.

- a. Date and time of the incident.
- b. Name of the officer in charge of the incident.
- c. Brief description of the incident.
- d. Description of the sample (e.g., powder, granules).
- e. Details of all individuals having responsibility for the collection, packaging and transport of the specimen.
- f. Name of the receiving laboratory employee.
- g. Time of receipt of the sample (as there may be a delay in transit), and Contact numbers for future communication.

### **FORENSIC MICROBIOLOGY AND THE INVESTIGATION**

39. Forensic science is, in brief, the application of science in the investigation of legal matters. The scientific knowledge and technology varies among disciplines yet ultimately this science has the potential to provide the information necessary to correctly determine who committed a given crime. As with all major crime investigation, the collection and analysis of traditional forensic evidence such as fingerprints, hairs, fibers and DNA can be valuable in the process of first identifying and later prosecuting the offender. An act of bioterrorism or crime brings with it a new classification of forensic science forensic microbiology which seeks to identify signature traits and markers related to the biological

agent used. Forensic microbiology is defined as a scientific discipline dedicated to analyzing evidence from a bioterrorism act, crime or the inadvertent release of micro organisms/toxins for attribution purposes. Attribution does not refer to the identification of the pathogenic organism alone but more importantly to the persons who committed the crime. In addition to the collection of traditional forensic evidence, investigators may need to consider seeking to analyze the specific make-up of the agent in question (e.g., the strain or species type), because that knowledge might reveal manufacturing traits (e.g., remnants of culture media) and weaponization traits (e.g., flow agents and additives) which might in turn help to narrow the field of suspects. Investigators should seek out those laboratories capable of conducting such testing.

40. It is also important to note that the collection of traditional forensic evidence may be difficult as items of interest may be contaminated and successful decontamination may not be possible without destroying critical evidence. Forensic police may be required to adapt to the challenges presented by a contaminated crime scene. *It is also pertinent* that where possible the collection of traditional forensic evidence, such as latent fingerprints and their development, be conducted on the scene and recorded using digital imaging with water-proof housing.

#### **AREA CLEAN-UP AND RETURN TO PUBLIC ACCESS**

41. This phase is not normally carried out by the police. Typically, Ministry of Environment will conduct the final cleaning of affected areas. In situations involving agents that are very resilient and/or grossly contaminated environments, the affected building may have to be destroyed or areas excavated to remove the entire hazard.



## GUIDELINE FOR CHEMICAL WARFARE AGENTS

### INTRODUCTION

1. Chemical warfare is warfare (and associated military operations) using the toxic properties of chemical substances to kill, injure or incapacitate the target. Chemical warfare is different from the use of conventional weapons or nuclear weapons because the destructive effects of chemical weapons are not primarily due to any explosive force. The offensive use of living organisms (such as anthrax) is considered to be biological warfare rather than chemical warfare the use of non living toxic products produced by living organisms (e.g., toxins such as botulinum toxin, ricin, or saxitoxin) *is* considered chemical warfare under the provisions of the Chemical Weapons Convention. Under this Convention, any toxic chemical, regardless of its origin, is considered as a chemical weapon unless it is used for purposes that are not prohibited legally, known as the General Purpose Criterion (GPS).

2. About 70 different chemicals have been used or stockpiled as Chemical Weapons (CW) agents during the 20th century. Chemical weapons are classified as Weapons of Mass Destruction (WMDs) by the United Nations, and their production and stockpiling was outlawed by the Chemical Weapons Convention of 1993. Under the Convention, chemicals that are toxic enough to be used as chemical weapons, or may be used to manufacture such chemicals, are divided into three groups according to their purpose and treatment:

- a. **SCHEDULE 1.** Have few, if any, legitimate uses. These may only be produced or used for research, medical, pharmaceutical or protective purposes (mustard gas, lewisite).
- b. **SCHEDULE 2.** Have no large-scale industrial uses, but may have legitimate small scale usage.
- c. **SCHEDULE 3.** Have legitimate industrial uses (phosgene, chloropicrin).

### CLASSIFICATION OF CHEMICAL WARFARE AGENTS

3. Chemical warfare agents are organized into several categories according to the manner in which they affect the human body. The names and number of categories varies slightly from source to source, but in general, types of chemical warfare agents are as follows:-

**CLASSES OF CHEMICAL WARFARE AGENTS**

<b>Class of Agents</b>	<b>Mode of Action</b>	<b>Signs and Symptoms</b>	<b>Rate of Action</b>	<b>Persistency</b>
<b>Nerve</b> Cyclosarin (GF) Sarin (GB) Soman (GD) Tabun (GA) VX Some insecticides Novichok agents	Inactivates enzyme acetyl cholinesterase preventing the breakdown of the neurotransmitter acetylcholine in the victim's synapses and causing both muscarinic and nicotinic effects	Miosis (pinpoint pupils) Blurred/dim vision Headache Nausea, vomiting, Diarrhea Copious secretions/ sweating Muscle twitching/ Fasciculations Dyspnea Seizures Loss of consciousness	Vapours: seconds to minutes; Skin: 2 to 18 hours	VX is persistent and a contact hazard; other agents are non-persistent and present mostly inhalation hazards.
<b>Asphyxiant / Blood</b> Most Arsines Cyanogen chloride Hydrogen cyanide	<b>Arsine:</b> Causes intravascular hemolysis that may lead to renal failure. <b>Cyanogen chloride/ hydrogen cyanide:</b> Cyanide directly prevents cells from utilizing oxygen. The cells then uses anaerobic respiration, creating excess lactic acid and metabolic Acidosis	Possible cherryred Skin Possible cyanosis Confusion Nausea Patients may gasp for air Seizures prior to death Metabolic acidosis	Immediate onset	Non persistent and an inhalation hazard
<b>Vesicant/ Blister</b> Sulfur mustard (HD, H) Nitrogen mustard (HN-1, HN-2, HN-3) Lewisite (L) Phosgene oxime (CX)	Agents are acid forming compounds that damages skin and respiratory system, resulting burns and respiratory problems.	Severe skin, eye and mucosal pain and irritation Skin erythema with large fluid blisters on the that heal slowly and may become infected Tearing, conjunctivitis, corneal damage Mild respiratory distress to marked airway damage	<b>Mustards:</b> Vapours: 4 to 6 hours, eyes and lungs affected more rapidly; Skin: 2 to 48 hours <b>Lewisite:</b> Immediate	Persistent and a contact hazard.

<p><b>Choking/ Pulmonary</b> Chlorine Hydrogen chloride Nitrogen oxides Phosgene</p>	<p>Similar mechanism to <i>blister agents</i> in that the compounds are acids or acid forming, but action is more pronounced in respiratory system, flooding it and resulting in suffocation; survivors often suffer chronic breathing problems.</p>	<p>Airway irritation Eye and skin irritation Dyspnea, cough Sore throat Chest tightness Wheezing Broncho spasm</p>	<p>Immediate to 3 hours</p>	<p>Non persistent and an inhalation hazard.</p>
<p><b>Lachrymatory agent</b> Tear gas Pepper spray</p>	<p>Causes severe stinging of the eyes and temporary blindness.</p>	<p>Powerful eye Irritation</p>	<p>Immediate</p>	<p>Non persistent and an inhalation hazard.</p>
<p><b>Incapacitating</b> Agent 15 (BZ)</p>	<p>Causes atropine-like inhibition of acetylcholine in subject. Causes peripheral nervous system effects that are the opposite of those seen in nerve agent poisoning.</p>	<p>May appear as mass drug intoxication with erratic behaviours, shared realistic and distinct hallucinations, disrobing and confusion Hyperthermia Ataxia (lack of coordination) Mydriasis (dilated pupils) Dry mouth and Skin</p>	<p>Inhaled: 30 minutes to 20 hours; Skin: Up to 36 hours after skin exposure to BZ. Duration is Typically 72 to 96 hours.</p>	<p>Extremely persistent in soil and water and on most surfaces; contact hazard.</p>
<p><b>Toxic proteins</b> Non-living biological proteins, such as: Ricin Abrin</p>	<p>Inhibit protein Synthesis</p>	<p>Latent period of 4-8 hours, followed by flu-like signs and symptoms Progress within 18-24 hours to: Inhalation: nausea, cough, dyspnea, pulmonary oedema Ingestion: Gastrointestinal hemorrhage with emesis and bloody diarrhea; eventual liver and kidney failure.</p>	<p>4-24 hours; See <i>symptoms</i>. Exposure By inhalation or injection causes more pronounced signs and symptoms than exposure by ingestion</p>	<p>Slight; agents Degrade quickly in environment</p>

4. There are other chemicals used militarily that are not technically considered to be "chemical warfare agents," such as:-

- a. **DEFOLIANTS.** That destroys vegetation, but are not immediately toxic to human beings. (Agent Orange, for instance, used by the United States in Vietnam, contained dioxins and is known for its long-term cancer effects and for causing genetic damage leading to serious birth deformities).
- b. **INCENDIARY OR EXPLOSIVE CHEMICALS.** (Such as napalm, extensively used by the United States in Vietnam, or dynamite) because their destructive effects are primarily due to fire or explosive force, and not direct chemical action.
- c. **VIRUSES, BACTERIA, OR OTHER ORGANISMS.** Their use is classified as biological warfare.

### **CHEMICAL AGENT DELIVERY**

5. The most important factor in the effectiveness of chemical weapons is the efficiency of its delivery, or dissemination, to a target. Following techniques can be used by non state actors for delivery of Chemical agents:-

- a. **DISPERSION.** The most common techniques include munitions (such as bombs, projectiles, warheads) that allow dissemination at a distance and *spray tanks* which disseminate from low-flying aircraft is the simplest technique of delivering an agent to its target which can be easily used by non state actors. It consists of placing the chemical agent upon or adjacent to a target immediately before dissemination, so that the material is most efficiently used. Gas clouds may give plenty of warning, allowing time to law enforcing agencies to alert effected population to protect themselves.
- b. **THERMAL DISSEMINATION.** Thermal dissemination is the use of explosives or pyrotechnics to deliver chemical agents over a considerable distance. Thermal dissemination remains the principal method of disseminating chemical agents today.
- c. **AERODYNAMIC DISSEMINATION.** Aerodynamic dissemination is the non-explosive delivery of a chemical agent from an aircraft, allowing aerodynamic stress to disseminate the agent. This technique eliminates many of the limitations of thermal dissemination by eliminating the flashing effect and theoretically allowing precise control of particle size. In actuality, the altitude of dissemination, wind direction and velocity, and the direction and velocity of the aircraft greatly influence particle size. Non state actors

may use locally built APVs / Drones to aerodynamic Dissemination of Chemical agents.

### **CHEMICAL WEAPON PROLIFERATION**

6. Despite numerous efforts to reduce or eliminate chemical weapons at National level as well as by the International Community, research and/or manufacture of chemical warfare agents by non state actors cannot be totally denied. They can resort to preparation of chemical weapons through Chemical and petrochemical industry, skilled specialists and stocks of source material, and can produce several nerve, blister and incapacitating agents.

### **NERVE AGENTS**

7. Nerve agents are the most toxic of the known chemical agents. They are hazardous in their liquid and vapour states and can cause death to a living being within minutes after exposure. Nerve agents inhibit acetyl cholinesterase in tissue, and their effects are caused by the resulting excess acetylcholine. In the current geo-strategic environments, non state actors can get hold of this technology which can be used against our strategic targets, city centres and public places.

### **PHYSICAL CHARACTERISTICS**

8. Nerve agents are liquids under temperate conditions. When dispersed, the more volatile ones constitute both a vapour and a liquid hazard. Others are less volatile and represent primarily a liquid hazard. The "G-agents" are more volatile than VX. GB (Sarin) is the most volatile, but it evaporates less readily than water. GF is the least volatile of the G-agents. Nerve agents can be dispersed from missiles, rockets, bombs, howitzer shells, spray tanks, land mines, and other large munitions. Non state actors may resort to spray tank and land mine technologies to neutralize their targets.

### **MECHANISM OF TOXICITY**

9. Nerve agents are organ phosphorous cholinesterase inhibitors. They inhibit the butyrylcholinesterase in the plasma, the acetyl cholinesterase on the red cell, and the acetyl cholinesterase at cholinergic receptor sites in tissue. The three enzymes are not the same; even the two acetyl cholinesterase has slightly different properties, although both have a high affinity for acetylcholine. The blood enzymes provide an estimate of the tissue enzyme activity. After acute exposure to a nerve agent, the erythrocyte enzyme activity most closely reflects the activity of the tissue enzyme, but during recovery the plasma enzyme activity more closely parallels tissue enzyme activity. After a nerve agent inhibits the tissue enzyme, the enzyme cannot hydrolyze acetylcholine, the neurotransmitter at cholinergic receptor sites. Acetylcholine accumulates and continues to stimulate the affected organ. The clinical effects from nerve agent exposure are caused by excess acetylcholine.

## **MEDICAL MANAGEMENT**

10. Management of a casualty with nerve agent intoxication consists of decontamination, ventilation, administration of the antidotes, and supportive therapy. Three drugs are used to treat nerve agent exposure, and another is used as pretreatment for potential nerve agent exposure. The three therapeutic drugs are atropine, pralidoxime chloride, and diazepam. The casualty with skin exposure to liquid is more difficult to evaluate and manage than is a casualty from vapour exposure. Agent on the surface of the skin can be decontaminated, but agent absorbed into the skin cannot be removed. The initial effects from absorbed liquid agent can start two to three hours after thorough decontamination of agent droplets on the skin.

## **BLISTER AGENTS (VESICANTS)**

11. Sulphur mustard constitutes both a vapour and a liquid threat to all exposed skin and mucous membranes. Mustard's effects are delayed, appearing hours after exposure. Organs most commonly affected are the skin (with erythema and vesicles), eyes (with mild conjunctivitis to severe eye damage), and airways (with mild irritation of the upper respiratory tract to severe bronchiolar damage leading to necrosis and hemorrhage of the airway mucosa and musculature). Following exposure to large quantities of mustard, precursor cells of the bone marrow are damaged, leading to pancytopenia and increased susceptibility to infection. The gastrointestinal tract may be damaged, and there are sometimes central nervous system signs. There is no specific antidote, and management is symptomatic therapy. Immediate decontamination is the only way to reduce damage.

- a. **Physical characteristics.** Mustard is an oily liquid with a colour ranging from a light yellow to brown. Its odor is that of garlic, onion, or mustard (hence its name), but because of accommodation of the sense of smell, odor should not be relied on for detection. Under temperate conditions mustard evaporates slowly and is primarily a liquid hazard, but its vapour hazard increases with increasing temperature.
- b. **Mechanism of action.** After absorbed into the body, mustard rapidly cyclizes (seconds to minutes) in extra cellular water. This cyclic compound is extremely reactive and quickly binds to intra and extra-cellular enzymes, proteins, and other substances. Mustard has many biological actions, but the exact mechanism by which it produces tissue injury is not known. According to one prominent hypothesis, biological damage from mustard results from DNA alkylation and crosslinking in rapidly dividing cells, such as basal keratinocytes, mucosal epithelium, and bone marrow precursor cells. This leads to cellular death and inflammatory reaction, and, in the

skin, protease digestion of anchoring filaments at the epidermal-dermal junction and the formation of blisters.

### **MEDICAL MANAGEMENT**

12. The management of a patient exposed to mustard may be simple, as in the provision of symptomatic care for a sunburn-like erythema, or extremely complex as providing total management for a severely ill patient with burns, immunosuppressant, and multi-system involvement. The therapeutic measures for each organ system for general patient care may be taken after sound clinical judgment, especially in the management of complicated cases.

### **LEWISITE**

13. Lewisite is a vesicant that damages the eyes, skin, and airways by direct contact. After absorption, it causes an increase in capillary permeability to produce hypovolemia, shock, and organ damage. Exposure to Lewisite causes immediate pain or irritation, although lesions require hours to become full blown. Management of a Lewisite casualty is similar to management of a mustard casualty, although a specific antidote, British-Anti-Lewisite (BAL; dimercaprol) will alleviate some effects. Lewisite is an oily, colourless liquid with the odor of geraniums. It is more volatile than mustard.

### **MEDICAL MANAGEMENT**

14. Early decontamination is the only way of preventing or lessening Lewisite damage. Since this must be accomplished within minutes after exposure, this is self-aid rather than medical management. The guidelines for the management of a mustard casualty will be useful. Lewisite does not cause damage to hematopoietic organs as mustard does. However, fluid loss from the capillaries necessitates careful attention to fluid balance. British-Anti-Lewisite was developed as an antidote for Lewisite and is used in medicine as a chelating agent for heavy metals. There is evidence that BAL in oil, given intramuscularly, will reduce the systemic effects of Lewisite. However, BAL itself causes some toxicity, and the user should read the package insert carefully. BAL skin ointment and BAL ophthalmic ointment decrease the severity of skin and eye lesions when applied immediately after early decontamination. However, neither is currently manufactured.

### **PHOSGENE OXIME**

15. Phosgene oxime is an urticant or nettle agent that causes a corrosive type of skin and tissue lesion. It is not a true vesicant, since it does not cause blisters. The vapour is extremely irritating, and both the vapour and liquid cause almost immediate tissue damage upon contact. There is very scanty information on phosgene oxime. CX is a solid at temperatures below 95 F, but the vapour pressure of the solid is high enough to produce symptoms. Traces of many metals cause it to decompose. However, it corrodes most metals.

**MEDICAL MANAGEMENT**

16. Management is supportive. The skin lesion should be managed in the same way that a necrotic ulcerated lesion from another cause would be managed.

**BLOOD AGENTS**

17. Cyanide is a rapidly acting lethal agent that is limited in its military usefulness by its high LCt50 and high volatility. Death occurs in 6 to 8 minutes after inhalation of a high Ct. Sodium Nitrite and Sodium thiosulfate are effective antidotes. Cyanide has a high affinity for certain sulphur compounds (sulfanes, which contain two covalently bonded but unequally charged sulphur atoms) and for certain metallic complexes, particularly those containing cobalt and the trivalent form of iron ( $\text{Fe}^{3+}$ ). The cyanide ion can rapidly combine with iron in cytochrome a3 (a component of the cytochrome aa3 or cytochrome oxidase complex in mitochondria) to inhibit this enzyme, thus preventing intracellular oxygen utilization. The cell then utilizes anaerobic metabolism, creating excess lactic acid and a metabolic acidosis. Cyanide also has a high affinity for the ferric iron of methemoglobin and one therapeutic stratagem induces the formation of methemoglobin to which cyanide preferentially binds.

**MEDICAL MANAGEMENT**

18. The primary goal in therapy is to remove the cyanide from the enzyme cytochrome a3 in the cytochrome oxidase complex. A complicating factor is the rapidity with which cyanide, particularly inhaled cyanide, and causes death. A secondary goal is to detoxify or bind the cyanide so that it can not reenter the cell to re-inhibit the enzyme. A closely associated goal is supportive management. Methemoglobin has a high affinity for cyanide, and cyanide will preferentially bind to methemoglobin rather than to the cytochrome. Most methemoglobin formers have clinically significant side effects. The nitrites, which were first used to antagonize the effects of cyanide over a century ago, cause orthostatic hypotension, but this is relatively insignificant in a supine casualty. Amyl nitrite, historically the first nitrite used, is a volatile substance formulated in a perle that is crushed or broken for the victim to inhale. In an apneic patient a means of ventilation is necessary.

**PULMONARY AGENTS**

19. Inhalation of selected organohalide, oxides of nitrogen ( $\text{NO}_x$ ), and other compounds can result in varying degrees of pulmonary oedema, usually after a symptom-free period that varies in duration with the amount inhaled. Chemically induced acute lung injury by these groups of agents involves a permeability defect in the blood-air-barrier (the alveolar-capillary membrane); however, the precise mechanisms of toxicity remain an enigma.



**PHYSICAL CHARACTERISTICS OF PHOSGENE**

20. Because of its relatively low boiling point (7.5 °C), phosgene was often mixed with other substances. It has a characteristic odor of sweet, newly mown hay.

**MEDICAL MANAGEMENT**

21. This may be done by following methods:-

- a. Accomplished by physically removing the casualty from the contaminated environment or by isolating him from surrounding contamination by supplying a properly fitting mask.
- b. Decontamination of liquid agent on clothing or skin terminates exposure from that source.
- c. Establishing a clear airway also aids in interpretation of auscultatory findings. Steps to minimize the work of breathing must be taken.
- d. Even minimal physical exertion may shorten the clinical latent period and increase the severity of respiratory symptoms and signs in an organohalide casualty, and physical activity in a symptomatic patient may precipitate acute clinical deterioration and even death.
- e. Oxygen therapy is definitely indicated and may require supplemental positive airway pressure administered via one of the several available devices for generating intermittent or continuous positive pressure.

**RIOT CONTROL AGENTS**

22. Riot control agents, also called irritants, lachrymators, and tear gas, produce transient discomfort and eye closure to render the recipient temporarily incapable of fighting or resisting. Law enforcement agencies use them for riot control. They have a high safety ratio. Their major activity is to cause pain, burning, or discomfort on exposed mucous membranes and skin; these effects occur within seconds of exposure, but seldom persist more than a few minutes after exposure has ended. Riot Control Agents can be obtained by non state actors and may be used against high value targets to create panic and fear among the population. Unlike most agents, which are liquids under temperate conditions, riot control agents are solids with low vapour pressures and are dispersed as fine particles or in solution. Dispersion devices include small hand held spray cans, large spray tanks and grenades etc. Use of Riot Control Agent in a compartment can cause suffocation to victims which may endanger their Livers.

**MEDICAL MANAGEMENT**

23. The effects of exposure to these agents under the usual field conditions usually are self-limiting and require no specific therapy. Most will disappear in 15-30 minutes, although erythema may persist for an hour or longer. Potential complications may occur only under exceptional circumstances, such as exposure to a very large amount of agent (as in an enclosed space), exposure in adverse weather, or experimental studies in humans or animals. They are not to be expected with normal use of these agents. Less than 1% of exposed people will have effects severe or prolonged enough to cause them to seek medical care. Those who do probably will have eye, airway, or skin complaints. Because there is no antidote for these agents, treatment consists of symptomatic management. The eye should be carefully washed with water or saline and impacted particles should be sought. General care consists of a topical solution (many are available) to relieve the irritation and topical antibiotics. An ophthalmologist should be consulted for further evaluation and care.

**FIRST DISASTER NOTIFICATION REPORT**

Complete as much of this report as possible and submit within the first 12 hours after the disaster occurrence. use second hand information if necessary. Indicate information source.

Prepared By \_\_\_\_\_ Designation \_\_\_\_\_

Organization \_\_\_\_\_

Date of Report \_\_\_\_\_

Province \_\_\_\_\_ District \_\_\_\_\_

Tehsil \_\_\_\_\_ City/Town \_\_\_\_\_

1. **THE DISASTER / EMERGENCY NOTIFICATION**

a. Type of Disaster / Emergency \_\_\_\_\_

b. Date/Time of Occurrence \_\_\_\_\_

c. Area / Location Impacted \_\_\_\_\_

d. Province(s) Affected \_\_\_\_\_

e. District(s) Affected \_\_\_\_\_

f. Tehsil(s) \_\_\_\_\_

g. City/Town Affected \_\_\_\_\_

h. Area Size Affected \_\_\_\_\_

2. **THE DISASTER EFFECTS**

Estimate the number of affected in each category as a result of the disaster.

a.. Number of DEATHS \_\_\_\_\_

b. Number of INJURED \_\_\_\_\_

c. Number of DISPLACED \_\_\_\_\_

d. # of HOUSES completely DESTROYED \_\_\_\_\_

e. # of HOUSES with some damage \_\_\_\_\_

f. OTHER CRITICAL INFRASTRUCTURE (e.g. Hospitals, Roads, BHU's etc)

g. ACCESSIBILITY \_\_\_\_\_

h. SEARCH & RESCUE NEEDS \_\_\_\_\_

**EMERGENCY NEEDS ASSESSMENT REPORT**

This form can be used for reporting, or as a checklist of items to consider **when conducting an emergency assessment during the first week** after disaster occurrence for longer term rehabilitation and reconstruction.

Prepared by \_\_\_\_\_ Designation \_\_\_\_\_

Organization \_\_\_\_\_

Date of Report \_\_\_\_\_

Province \_\_\_\_\_ District \_\_\_\_\_

Tehsil \_\_\_\_\_ City/Town \_\_\_\_\_

1. **THE DISASTER / EMERGENCY.** (Complete the following in narrative form)

a. Date, time. Type and magnitude of disaster / emergency \_\_\_\_\_

b. Total area and location affected \_\_\_\_\_  
(If possible, attach a map identifying those area affected by disaster)

2. **DISASTER EFFECTS.** (State each as fraction of the total in the area (e.g. 15 deaths/3,000 total population).

a. What is the total number of people affected by the disaster?

b. What percentage of the overall population in the area is affected?

c. What is the sex/age composition and family size of the affected population?

d. How many people are assumed dead?

e. Give specifics (Where, who, how—example, 243 children were crushed by collapsing school building in village \_\_\_\_\_)

f. How many people are assumed injured? Give specifics (where, who, how).

g. How many people are assumed homeless or displaced? Give specifics (where, who, how).

h. How many houses or dwellings were completely destroyed?

j. How many houses or dwelling suffered some damage but are not completely destroyed?

k. What was the damage to food reserves, crops, and livestock of the affected population? Give specifics (where, what, how many, how much).

3. **INFRASTRUCTURE / ECONOMY /SOCIAL.** Continue on reverse side if necessary for each, be as specific as possible (who, what, where, why)

**INFRASTRUCTURE**

- a. Describe the disaster impact on critical infrastructure (road, public, buildings, electricity, water supply, communication, bridges, hospital, etc.)
- 

**ECONOMY:**

- b. How many businesses or markets were affected by the disaster.
- 

**SOCIAL**

- c. What has been the impact on local economic and social conditions? What was the social/ economic situation of the population before the disaster after the disaster? \_\_\_\_\_

4. **DISASTER RESPONSE**

- a. If people have left their houses, where are they being sheltered?  
\_\_\_\_\_
- b. What response actions are being taken by the affected population?  
\_\_\_\_\_
- c. Describe actions taken or assistance being provided by local government/ line agencies, non-governmental organizations and other local or national organizational entities in the area (if relevant). \_\_\_\_\_  
\_\_\_\_\_
- d. Describe response actions taken or assistance being provided by international organizations (e.g. neighbouring countries, United Nations, etc), or international non-governmental organizations.  
\_\_\_\_\_
- e. What actions have been taken by the DMA (Disaster Management Authority)? \_\_\_\_\_
- f. What assistance has already been announced or delivered and by whom?  
\_\_\_\_\_
- g. What humanitarian relief coordination mechanism has been established at the national or local level? \_\_\_\_\_

5. **LOCAL MATERIAL, FINANCIAL & HUMAN CAPACITIES OR RESOURCES**

- a. Describe any local material, financial or human capacities or resources (skilled and unskilled labour, school/houses, trucks, regional markets, etc). That are not being used but that could be used in response, rehabilitation and recovery efforts. Described the capacity or resource and how it might be used. The intent here is to identify potential local capacities and resources that can be utilized in order to avoid having to import assistance and expertise from outside.

<b>Capacity or Resource</b>	<b>Suggestion for use</b>
Example 1 Local Community group	Preparation and serving of food for displaced and homeless
Example 2 Many willing people with basic equipment and tools, such as shovels, rapses, buckets, etc.	Help with clearance of building rubble and temporary restoration of roads

- b. What transport and storage facilities (commercial, government, RC/RC) are available locally? \_\_\_\_\_
- c. What is the availability, location and conditions of roads, airports, railways?  
\_\_\_\_\_
- d. What is the capacity of the Operating National Society?  
\_\_\_\_\_

6. **IMMEDIATE LIFE SAVING PRIORITIES / NEEDS**

Immediate priority needs describe and specify the priority UNMET needs in water, sanitation, shelter, food and other supplies (clothes, blankets, cooking utensils, cooking fuel etc) and health (medical supplies, equipment, facilities). Quantify and qualify the targeted needs (for example, 112 people need food and water for at least the next 20 days). \_\_\_\_\_

7. **POTENTIAL FUTURE PROBLEMS (SECONDARY EFFECTS), AND/OR NEEDS**

Anticipate serious problems and/or needs within the coming three months resulting from the disaster. Estimate of items including financial implications and operational costs. \_\_\_\_\_

8. **ADDITIONAL COMMENTS (USE REVERSE SIDE IF NECESSARY)**. (For example, availability, location and/or condition of transport and storage facilities roads, airports, etc) \_\_\_\_\_

**FIRST 12-24 HOURS REPORT**

1. **DISASTER SITUATION REPORT.** Complete and submit of this report within the FIRST 12-24 HOURS after the disaster occurrence. This report should be based on a visit to the disaster site—first hand information or observation.

Prepared By \_\_\_\_\_ Designation \_\_\_\_\_

Organization \_\_\_\_\_

Date of Report \_\_\_\_\_

Province \_\_\_\_\_ District \_\_\_\_\_

Tehsil \_\_\_\_\_ City/Town \_\_\_\_\_

2. **THE DISASTER/EMERGENCY.** (Complete the following in narrative form)

Date of Incident \_\_\_\_\_

Time of Incident \_\_\_\_\_

Type and magnitude of disaster /emergency \_\_\_\_\_

Total area affected \_\_\_\_\_

(If possible, attach a map highlighting or identifying those area affected by disaster)

Location affected \_\_\_\_\_

(If possible, attach a map highlighting or identifying those area affected by disaster)

3. **DISASTER EFFECTS** (State each as fraction of the total in the area (e.g. 15 deaths/ 3,000 total populations)

a. No. of DEATHS \_\_\_\_\_

b. No. of INJURED \_\_\_\_\_

c. No. of DISPLACED \_\_\_\_\_

d. No. of HOUSES DESTROYED \_\_\_\_\_

e. No. of HOUSES with some damage \_\_\_\_\_

f. OTHER CRITICAL INFRASTRUCTURE (e.g. Hospitals, Roads, BHU's etc)

\_\_\_\_\_

g. ACCESSIBILITY \_\_\_\_\_

h. SEARCH & RESCUE NEEDS \_\_\_\_\_

4. **LOCAL RESPONSE AND RESOURCES**. (Complete the following in narrative form):-

a. Local populations, if people have left their houses, where are they being sheltered? \_\_\_\_\_

b. What response actions are being taken by the affected populations?  
\_\_\_\_\_

c. Describe actions taken by the following agencies:-

(1) Local Government/Line Agencies: -----

(2) Non-governmental organizations: -----

(3) Other organizational entities in the area: -----

5. **CURRENT STATE OF DISASTER**

a. Is the disaster over now? \_\_\_\_\_

b. How long do you expect it to continue? \_\_\_\_\_

c. Is the disaster being contained? Is NDMA assistance required?

How? \_\_\_\_\_

6. **INFRASTRUCTURE / LOGISTICS** (Continue on reverse side if necessary)

**Road**

Conditions. \_\_\_\_\_

**Water Supply**

Conditions. \_\_\_\_\_

**Electric Supply**

Conditions. \_\_\_\_\_

**Telecom**

conditions. \_\_\_\_\_

**Location of food storage**

facilities. \_\_\_\_\_

**Local availability of relief**

supplies. \_\_\_\_\_

Role of Search & Rescue Teams in Disaster \_\_\_\_\_

7. **URGENT LIFE-SAVING PRIORITIES/NEEDS**

a. Describe what assistance or support is required in the **next 24 -120 hours** (water, food, health concerns, shelter, etc.) Why is this assistance needed?

Please quantify these needs.

Air Sorties required. \_\_\_\_\_

Water \_\_\_\_\_ Food \_\_\_\_\_

b. Medical Assistance \_\_\_\_\_



c. Shelter /Relief Camps \_\_\_\_\_

8. **INDICATE SOURCE(S) OF INFORMATION FOR THIS REPORT**

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**RAPID NEEDS ASSESSMENT CHECKLIST**

- a. **NUMBER OF AFFECTED PEOPLE REQUIRING ASSISTANCE.** This figure will determine all other estimates and calculations, and therefore, needs to be established as precisely as possible.
- b. **WATER NEEDS.** Ideally each person should be provided with 10-15 liters of potable water per day. The target should be 20 liters per person per day, and for hospitals, 100 liters per person per day, for patients and staff. Find water sources, assess the need for transporting water where necessary.
- c. **SHELTER NEEDS.** If using tents, calculate one tent for 4-6 people, ideally of the same family. Decide whether you need summer or winter tents. Do they have to be waterproofed or coated? Can locally made emergency shelter be used instead? Is extra roof for protection against heat or rain needed? Should canvas floor be included? Are plastic sheets needed for roofing? If using public buildings, calculate 3.5m<sup>2</sup> of floor space for every person. Is shelter heating planned? If yes, with kerosene or diesel stoves?
- d. **NUTRITIONAL NEEDS.** Set a full ration, mixed diet, giving a minimum of 1,900 kilocalories per person per day. Survival energy level for an adult is a minimum of 1,000 kilocalories per day. For supplementary feedings add what is needed to reach the total of 1,900 kilocalories per day, as well as special food to treat severely malnourished individuals.
- e. **SANITATION NEEDS.** Plan for provision of at least one latrine for 40 people (the minimal acceptable number is one for 100 people). Decide how to deal with solid waste (including from hospitals, laboratories, etc.) and garbage, Identify the need and methods for vector control flies, rats, etc.
- f. **FUEL NEEDS.** Access of people to firewood, coal and /or other fuel is often overlooked in the needs assessment. There is no general rule for calculating the needs, since climate, traditions and quality of fuel varies considerably. Assessment should specify what type of fuel is appropriate, where to get it, and how to transport and distribute it.

