

DRAFT	
NATIONAL CHEMICAL	
AND BIOLOGICAL	
EMERGENCY	
PREPAREDNESS AND	
RESPONSE PLAN FOR	
NIGERIA	
	2019

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Glossary of Chemical Terms¹

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Acetylcholinesterase	An enzyme that hydrolyzes the neurotransmitter acetylcholine.	
	The action of this enzyme is inhibited by nerve agents.	
Aerosol	Fine liquid or solid particles suspended in a gas; for example, fog	
	or smoke.	
Atropine	A compound used as an antidote for nerve agents.	
Casualty (Toxic)	Produce incapacitation, serious injury, or death. They can be	
Agents	used to incapacitate or kill victims. These agents are the choking,	
	blister, nerve, and blood agents.	
Choking Agents	Substances that cause physical injury to the lungs. Exposure is	
	through inhalation. In extreme cases, membranes swell and lungs	
	become filled with liquid. Death results from lack of oxygen;	
	hence, the victim is "choked"	
Blister Agents	Substances that cause blistering of the skin. Exposure is through	
	liquid or vapor contact with any exposed tissue (eyes, skin, lungs).	
Nerve Agents	Substances that interfere with the central nervous system.	
	Exposure is primarily through contact with the liquid (skin and	
	eyes) and secondarily through inhalation of the vapor. Three	
	distinct symptoms associated with nerve agents are: pin-point	
	pupils, an extreme headache, and severe tightness in the chest.	
Blood Agents	Substances that injure a person by interfering with cell	
	respiration (the exchange of oxygen and carbon dioxide between	
	blood and tissues).	
Chemical Agent	A chemical substance that is intended for use in military	
	operations to kill, seriously injure, or incapacitate people through	
	its physiological effects. Excluded from consideration are riot	
	control agents, and smoke and flame materials. The agent may	
	appear as a vapor, aerosol, or liquid; it can be either a	
	casualty/toxic agent or an incapacitating agent.	
Cutaneous	Pertaining to the skin.	
Decontamination	The process of making any person, object, or area safe by	
	absorbing, destroying, neutralizing, making harmless, or	
	removing the hazardous material.	
G-Series Nerve	Chemical agents of moderate to high toxicity developed in the	
Agents	1930s. Examples are tabun (GA), sarin (GB), soman (GD), and GF.	
Incapacitating	Produce temporary physiological and/or mental effects via	
Agents	action on the central nervous system. Effects may persist for	
	hours or days, but victims usually do not require medical	
	treatment. However, such treatment speeds recovery.	
Vomiting Agents	Produce nausea and vomiting effects, can also cause coughing,	
	sneezing, pain in the nose and throat, nasal discharge, and tears.	
Tear (Riot Control)	Produce irritating or disabling effects that rapidly disappear	

Agents	within minutes after exposure ceases.
Central Nervous	Compounds that have the predominant effect of depressing or
System Depressants	blocking the activity of the central nervous system. The primary
	mental effects include the disruption of the ability to think,
	sedation, and lack of motivation.
Central Nervous	Compounds that have the predominant effect of flooding the
System Stimulants	brain with too much information. The primary mental effect is
	loss of concentration, causing indecisiveness and the inability to
	act in a sustained, purposeful manner.
Industrial Agents	Chemicals developed or manufactured for use in industrial
	operations or research by industry, government, or academia.
	These chemicals are not primarily manufactured for the specific
	purpose of producing human casualties or rendering equipment,
	facilities, or areas dangerous for use by man. Hydrogen cyanide,
	cyanogen chloride, phosgene, chloropicrin and many herbicides
	and pesticides are industrial chemicals that also can be chemical
	agents.
Liquid Agent	A chemical agent that appears to be an oily film or droplets. The
	color ranges from clear to brownish amber.
Nonpersistent Agent	An agent that upon release loses its ability to cause casualties
	after 10 to 15 minutes. It has a high evaporation rate and is
	lighter than air and will disperse rapidly. It is considered to be a
	short-term hazard. However, in small unventilated areas, the
	agent will be more persistent.
Organophosphorous	A compound, containing the elements phosphorus and carbon,
Compound	whose physiological effects include inhibition of
	acetylcholinesterase. Many pesticides (malathione and
	parathion) and virtually all nerve agents are organophosphorous
	compounds.
Percutaneous Agent	Able to be absorbed by the body through the skin.
Persistent Agent	An agent that upon release retains its casualty-producing effects
	minutes to several days. A persistent agent usually has a low
	evanoration rate and its vanor is heavier than air. Therefore, its
	vapor cloud tends to hug the ground It is considered to be a
	long-term hazard. Although inhalation hazards are still a concern.
	extreme caution should be taken to avoid skin contact as well.
Protection	Any means by which an individual protects his body. Measures
	include masks, self-contained breathing apparatuses. clothing.
	structures such as buildings, and vehicles.
V-Series Nerve	Chemical agents of moderate to high toxicity developed in the
Agents	1950s. They are generally persistent. Examples are VE, VG, VM,

	VS, and VX.
Vapor Agent	A gaseous form of a chemical agent. If heavier than air, the cloud will be close to the ground. If lighter than air, the cloud will rise and disperse more quickly.
Volatility	A measure of how readily a substance will vaporize.

Glossary of Biological Terms

Aerosol	Fine liquid or solid particles suspended in a gas; for example, fog or smoke.		
Antibiotic	A substance that inhibits the growth of or kills microorganisms.		
Antisera	The liquid part of blood containing antibodies, that react against		
	disease causing agents such as those used in BW.		
Bacteria	Single-celled organisms that multiply by cell division and that		
	can cause disease in humans, plants, or animals.		
Biochemicals	The chemicals that make up or are produced by living things.		
Biological Agent	Also called bio-agent, biological threat agent, biological warfare		
	agent, biological weapon, or bioweapon is		
	a bacterium, virus, protozoan, parasite, or fungus that can be		
	used purposefully as a weapon in bioterrorism or biological		
	warfare (BW) against humans, plants, or animals.		
	An attack against people could be used to cause illness, death,		
	fear, societal disruption, and economic damage.		
	Biological agents have the ability to adversely affect human health in a variety of ways, ranging from relatively mild allergic reactions to serious medical conditions, including serious injury, as well as serious or permanent disability or even death.		
Biological Warfar	Living organisms or the materials derived from them that cause		
Agents	disease in or harm to humans, animals, or plants, or cause		
	deterioration of material. Biological agents may be used as		
	liquid droplets, aerosols, or dry powders.		
Biological Warfare	The intentional use of biological agents as weapons to kill or		
	injure humans, animals, or plants, or to damage equipment.		
Bioregulators	Biochemicals that regulate bodily functions. Bioregulators that		
	are produced by the body are termed "endogenous." Some of		
	these same bioregulators can be chemically synthesized.		
Causative Agent	The organism or toxin that is responsible for causing a specific		
	disease or harmful effect.		
Contagious	Capable of being transmitted from one person to another.		

Culture	A population of micro-organisms grown in a medium.		
Decontamination	The process of making people, objects, or areas safe by		
	absorbing, destroying, neutralizing, making harmless, or		
	removing the hazardous material.		
Fungi	Any of a group of plants mainly characterized by the absence of		
	chlorophyll, the green colored compound found in other plants.		
	Fungi range from microscopic single-celled plants (such as		
	molds and mildews) to large plants (such as mushrooms).		
Host	An animal or plant that harbors or nourishes another organism.		
Incapacitating Agent	Agents that produce physical or psychological effects, or both,		
	that may persist for hours or days after exposure, rendering		
	victims incapable of performing normal physical and mental		
	tasks.		
Infectious Agents	Biological agents capable of causing disease in a susceptible		
	host.		
Infectivity	(1) The ability of an organism to spread. (2) The number of		
	organisms required to cause an infection to secondary hosts. (3)		
	The capability of an organism to spread out from the site of		
	infection and cause disease in the host organism. Infectivity also		
	can be viewed as the number of organisms required to cause an		
	infection.		
Line-Source Delivery	A delivery system in which the biological agent is dispersed from		
System	a moving ground or air vehicle in a line perpendicular to the		
	direction of the prevailing wind. (See also "point-source delivery		
	system.")		
Mycotoxin	A toxin produced by fungi.		
Microorganism	Any organism, such as bacteria, viruses, and some fungi, that		
	can be seen only with a microscope.		
Nebulizer	A device for producing a fine spray or aerosol.		
Organism	Any individual living thing, whether animal or plant.		
Parasite	Any organism that lives in or on another organism without		
	providing benefit in return.		
Partner	A person who shares or is associated with another in some		
	action or endeavor.		
Pathogen	Any organism (usually living) capable of producing serious		
	disease or death, such as bacteria, fungi, and viruses.		
Pathogenic Agents	Biological agents capable of causing serious disease.		
Point-Source	A delivery system in which the biological agent is dispersed from		
Delivery System	a stationary position. This delivery method results in coverage		
	over a smaller area than with the line-source system.		
Route Of Exposure	The path by which a person comes into contact with an agent or		
(Entry)	organism; for example, through breathing, digestion, or skin		

	contact.		
Single-Cell Protein	Protein-rich material obtained from cultured algae, fungi, protein and bacteria, and often used as food or animal feed.		
Spore	A reproductive form some micro-organisms can take to become		
	resistant to environmental conditions, such as extreme heat or		
	cold, while in a "resting stage."		
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 experimental animals.		
Toxins	Poisonous substances produced by living organisms.		
Vaccine	A preparation of killed or weakened microorganism products		
	used to artificially induce immunity against a disease.		
Vector	An agent, such as an insect or rat, capable of transferring a		
	pathogen from one organism to another.		
Venom	A poison produced in the glands of some animals; for example,		
	snakes, scorpions, or bees.		
Virus	An infectious micro-organism that exists as a particle rather		
	than as a complete cell. Particle sizes range from 20 to 400		
	manometers (one-billionth of a meter). Viruses are not capable		
	of reproducing outside of a host cell.		

List of Stakeholders:

- 1. Office of the Secretary to the Government of the Federation (NAC&BWC)
- 2. Office of the National Security Adviser (ONSA)
- 3. Defence Headquarters (Army, Airforce and Navy)
- 4. Department of State Services (DSS)
- 5. Nigeria Police Force (NPF)
- 6. Federal Ministry of Health (FMoH)
- 7. Federal Ministry of Information (FMoI)
- 8. Federal Ministry of Environment
- 9. Ministry of Petroleum Resources
- 10. National Emergency Management Agency (NEMA)
- 11. National Agency for Food and Drug Administration and Control (NAFDAC)
- 12. Federal Road Safety Corps
- 13. Federal Fire Services (FFS)
- 14. Nigeria Security and Civil Defence Corps (NSCDC)
- 15. Nigerian Nuclear Regulatory Authority (NNRA)

- 16. National Biotechnology Development Agency (NABDA)
- 17. National Environmental Standards and Regulations Enforcement Agency (NESREA)
- 18. National Drug Law Enforcement Agency (NDLEA)
- 19. Nigeria Custom Service
- 20. Nigeria Oil Spillage Detection and Response Agency
- 21. National Research Institute for Chemical Technology
- **22.** Nigerian Red Cross (NRC)
- 23. Relevant NGOs and CSOs (To be contacted)

Chapter One

1.0 Introduction

The National Chemical and Biological Emergency Preparedness and Response Plan for Nigeria provides a framework and direction to the government agencies and other relevant stakeholders for promoting effective coordination and coherence among stakeholders in preparing and responding to Chemical and Biological emergencies.

1.1 Objectives of Plan

The objectives of the Plan are defined within the ambit of the responsibilities and resources of each of the stakeholders involved.

The main objectives of this plan are:

- i. To strengthen country and community emergency preparedness in order to ensure a timely, efficient and effective response to Chemical and Biological incidents in Nigeria;
- ii. To advocate for prioritizing financial and other resources for community and country emergency preparedness, and mobilizing increased domestic and international investment in this area;

1.2 Chemical Disaster

A Chemical Disaster is a severe chemical accident that causes large scale damage to an environment or injuries to or death of animals, plants or humans.² Such events include fires, explosions, leakages or release of toxic or hazardous materials that can cause people illness, injury, or disability.

1.3 Biological Disaster

Biological Disaster is a natural occurrence involving disease, disability or death on a large scale among humans, animals and plants due to micro organisms like bacteria or virus or toxin.³

1.4 **Chemical and Biological Hazards**

These hazards are usually the result of a natural occurrence, but can also result from deliberate or accidental release. Biological hazards pose a risk to animals, including livestock, and to plants. The consequences of a biological hazardous event may include severe economic and environmental losses.

Chemical hazards are systems where chemical accidents could occur under certain circumstances. Such events include fire, explosions, leakages or release of toxic or hazardous materials that can cause people illness, injury, or disability.

Chemical and biological agents can be dispersed in the air we breathe, the water we drink, or on surfaces we physically contact. Dispersion methods may be as simple as placing a container in a heavily used area, opening a container, using conventional (garden)/commercial spray devices, or as elaborate as detonating an Improvised Explosive Device (IED). Chemical and Biological Hazardous material (HazMat) incidents may have the potential to produce cascading off-site effects, which may threaten persons, property or the environment.

Although the frequency of chemical incidents have increased, the severity of the impacts of industrial disasters decreased during the twentieth century.

This reduced severity is due to an improved ability to manage chemical emergencies in many developed nations, which can be ascribed to the development of basic management elements such as:

- The creation of general labeling and safety standards;
- The existence of an emergency plan;
- Better communications with the various stakeholders involved;
- Training sessions and exercises; and
- The creation of mechanisms aimed at learning from the mistakes made during past experiences.

However, there is still a persistent need for better management of chemical and biological incidents. Common weaknesses include the existence of fragmented roles and unclear responsibilities among the various emergency responders. The negative impacts of these incidents on the local economy can also be extremely high and may include disruption of agriculture, loss of jobs, long-term evacuation of the area, rising costs for health care, litigation and rehabilitation.

Chemical incidents can result in extensive damage to the environment, which might take years to remedy; hence, might continue to pose a significant public health hazard. To minimize these negative impacts, it is critical to ensure that the authorities, emergency responders and (plant) operators work together to effectively and efficiently prepare and respond to the incidents.

1.5 Nigeria's vulnerability to chemical and biological threat

Nigeria like other countries is vulnerable to both chemical and biological threat. Some of the incidents are identified below:

- i. The gas explosion on the 25th July, 2015 where eight people died and 101 others injured at the Plateau State Water Board. This was as a result of the inhalation of the contaminated air. There was an excess Chlorine inhalation from an exploded Chlorine Cylinder by residents around the Lamingo Water Board Treatment Plant.
- ii. Another incident is the *Koko incident*: In 1988, Italian businessmen illegally dumped over 2000 drums, sacks, and containers full of hazardous wastes in a small fishing village in the present Delta State, Nigeria. The waste was claimed by the dealer to be fertilizers that would help poor farmers, but instead it turned into a nightmare. Few months later the containers started leaking causing stomach upset, headache, failing sight and death to the local community. The area around the dumpsite was rendered inhabitable and

500 residents were evacuated. People in the Koko village still remember this accident as 'drums of death'.

- iii. A series of lead poisonings in Zamfara State, Nigeria, led to the deaths of at least 163 people between March and June 2010, including 111 children. The Federal Ministry of Health figures state the discovery of 355 lead poisoning related cases with 46 percent proving fatal. This is one of the many lead poisoning epidemics with low and middle income countries. It is thought that the poisonings were caused by the illegal extraction of ore by villagers, who take crushed rock home with them to extract. This results in the soil being contaminated from lead which then poisons people through hand-to-mouth contamination. Others have been contaminated by contact with contaminated tools and water.⁴
- iv. On Friday, 26 August 2011 a Vehicle Borne Improvised Explosive Device (VBIED) attacked the United Nations building in Abuja, Nigeria leaving 21 dead and at least 60 wounded.
- v. A series of attacks occurred during Christmas Day church services in northern Nigeria on 25 December 2011. There were bomb blasts and shootings at churches in Madalla, Jos, Gadaka, and Damaturu. A total of 41 people were reported dead
- vi. A suicide car bombing also occurred in Kaduna on 8 April 2012, targeting Christians. At least 38 people were reported dead.
- vii. On 17 June 2012, three Christian churches in northern Nigeria were attacked by bomb explosions. At least 12 were killed and 80 were wounded.
- viii. On 14 April 2014, multiple IEDs attacks at a crowded bus station in Nyanya, killing at least 88 people and injuring at least 200.
- ix. On 25 November, 2014, two female suicide bombers killed over 45 people in a crowded market in Maiduguri, Borno State also on 27 November, around 50 people were killed in Damasak.⁵
- x. It was reported that a batch of My Pikin Baby Teething Mixture that went on sale in November of 2008 was contaminated with diethylene glycol (DEG), a chemical that can cause damage to the heart, kidneys and nervous system when ingested. According to the National Agency for Food and Drug Administration and Control (NAFDAC), the chemical found its way into the teething mixture when the producer, obtained the contaminated ingredient from an unregistered chemical dealer.
- xi. NAFDAC reported that the first affected child was taken for treatment on November 19, 2008 and pulled more than 5,000 bottles of My Pikin from the market soon thereafter. On November 26, 2008, NAFDAC shut down the factory of the manufacturer.
- xii. An investigation was launched by the Nigeria Field Epidemiology and Laboratory Training Program (N-FELTP), CDC, and the Food and Drug Administration (FDA). This

report summarizes the results of the investigation, which identified 57 cases of DEG poisoning among children aged ≤3 years during August 2008--January 2009, of whom 54 died. Of the 57 children with DEG poisoning, 96% had exposure to the acetaminophenbased teething medication (My Pikin). DEG contamination was identified in six bottles of the medication from patient households and four batches from the facility in which the medication was manufactured.

Some Biological Incidents in Nigeria in the last 10 years

			Disaster	Disaster	Total	
Start date	End date	Location	type	subtype	affected	Disaster name
		Gombe, Jogawa, Kano, Katsina		Viral		Meningococcal
1/1/2009	5/4/2009	states	Epidemic	disease	35255	disease
		Ebonyl, Nasarawa, Plateau, Yobe,		Viral		
11/1/2012	20/01/2012	Lagos, Edo, Taraba states	Epidemic	disease	29	Lassa Fever
		Ondo, Edo, Lagos, Plateau,				
		Bauchi, Ogun, Ebonyi, Taraba,				
		Nasarawa,				
		Rivers, Kaduna, Gombe, Cross-				
		River, Borno, Kano, Kogi, Enugu,		Viral		
4/12/2016	10/11/2017	Anambra, Lagos, Kwara	Epidemic	disease	914	Lassa fever
				Viral		
3/5/2017	2/7/2017	Ngala, Mobbar, Monguno	Epidemic	disease	146	Hepatitis E
		Asa, Ilorin East, Ilorin South, Ilorin		Bacterial		
7/6/2017	3/8/2017	West, Moro (Kwara state)	Epidemic	disease	1558	Cholera
		Anambra, Bauchi, Benue, Delta,				
		Ebonyi, Edo, Ekite, Federal				
		Capital Territory, Gombe,				
		Imo, Kogi, Lagos, Nasarawa,				
		Ondo, Osun, Plateau, Rivers,		Viral		
1/1/2018	8/7/2018	Taraba	Epidemic	disease	1081	Lassa fever

"Source: EM-DAT: The Emergency Events Database - Universite catholique de Louvain (UCL) – D. Guha-Sapir - <u>www.emdat.be</u> Brussels, Belgium"CRED, Created on: August 19, 2019"

1.6 Authority to Plan

This Plan is in response to the directive from the Office of the Secretary to the Government of the Federation - National Authority on Chemical and Biological Weapons Conventions, (NAC&BWC) and under the coordination of National Emergency Management Agency (NEMA) in consultation with other relevant stakeholders. It covers the broad range of conceivable

Chemical and Biological Incidents, which may threaten the safety and security of persons, property or the environment and preparation for their response.

The National Chemical and Biological Emergency Preparedness and Response Plan is designed as a complementary document and is compatible with the National Disaster Response Plan and other preparedness and response plans already developed by the Country. This means that depending on the nature of the incident, any or all of the Country's plans can be invoked simultaneously or concurrently to suit a particular focus task within the overall operational response.

1.8 Responsible Agency

The National Emergency Management Agency is the responsible agency for coordination, operations, management and maintenance of this plan.

The Plan recognizes the threat specific planning arrangements and jurisdiction of responsible Stakeholders where they apply either singly or in concert with other agencies to provide specialist or general support as regards manpower or material during a Chemical and Biological incident operation, including:

- i. The powers afforded to the National Center for Disease and Control as contained in her establishment Act 2018, Act No. 18 subsection 1b
- ii. The powers afforded to the Nigeria Security and Civil Defence Corps Amendment Act (Act No 6 of the Federal Republic of Nigeria Official Gazette No 54 of 4th June 2007 Vol. 94, page (A55 – 61)
- iii. The powers afforded to the Nigeria Police Force
- iv. The powers afforded to the Office of National Security Adviser Acts of establishment of ONSA - National Security Agencies Decree 1986 (CAP.278 LFN)

Chapter Two

2.0 Chemical and Biological Agents Categorization and Incidents

2.1 Threat Analysis of Chemical and Biological agents

Potential chemical and biological agents are numerous, and the public health infrastructure must be equipped to quickly resolve crises that would arise from a biological or chemical attack. However, to best protect the public, the preparedness efforts must be focused on agents that might have the greatest impact on health and security, especially agents that are highly contagious or that can be engineered for widespread dissemination via small-particle aerosols. Preparing the nation to address these dangers is a major challenge. Early detection requires increased chemical and biological incidents awareness among frontline health-care providers because they are in the best position to report suspicious illnesses and injuries. Also, early detection will require improved communication systems between those providers and public health officials. In addition, Federal, State and local health-care authorities must have enhanced capacity to investigate unusual events and unexplained illnesses, and diagnostic laboratories must be equipped to identify chemical and biological agents that rarely are seen in Nigeria. Fundamental to these efforts is comprehensive integrated training designed to ensure core competency in public health preparedness and the highest levels of scientific expertise among Local, State, and Federal actors.

2.2 Chemical Schedules

2.2.1 Toxic Chemicals

2.2.1.1 Schedule 1 Chemicals:

		(CAS registry
		number)
(1)	O-Alkyl (<=C10, incl. cycloalkyl) alkyl (Me, Et, n-Pr or	
	i-Pr)-phosphonofluoridates	
e.g.	Sarin: O-Isopropyl methylphosphonofluoridate	(107-44-8)
	Soman: O-Pinacolyl methylphosphonofluoridate	(96-64-0)
(2)	O-Alkyl (<=C10, incl. cycloalkyl) N,N-dialkyl (Me, Et,	
	n-Pr or i-Pr) phosphoramidocyanidates	
e.g.	Tabun:O-Ethyl N,N-dimethyl	(77-81-6)
	phosphoramidocyanidate	
(3)	O-Alkyl (H or <=C10, incl. cycloalkyl) S-2-dialkyl (Me,	
	Et, n-Pr or i-Pr)-aminoethyl alkyl (Me, Et, n-Pr or i-Pr)	
	phosphonothiolates and corresponding alkylated or	
	protonated salts	
e.g.	VX: O-Ethyl S-2-diisopropylaminoethyl methyl	(50782-69-9)
	phosphonothiolate	
(4)	Sulfur mustards:	

	2-Chloroethylchloromethylsulfide	(2625-76-5)
	Mustard gas: Bis(2-chloroethyl)sulfide	(505-60-2)
	Bis(2-chloroethylthio)methane	(63869-13-6)
	Sesquimustard: 1,2-Bis(2-chloroethylthio)ethane	(3563-36-8)
	1,3-Bis(2-chloroethylthio)-n-propane	(63905-10-2)
	1,4-Bis(2-chloroethylthio)-n-butane	(142868-93-7)
	1,5-Bis(2-chloroethylthio)-n-pentane	(142868-94-8)
	Bis(2-chloroethylthiomethyl)ether	(63918-90-1)
	O-Mustard: Bis(2-chloroethylthioethyl)ether	(63918-89-8)
(5)	Lewisites:	
	Lewisite 1: 2-Chlorovinyldichloroarsine	(541-25-3)
	Lewisite 2: Bis(2-chlorovinyl)chloroarsine	(40334-69-8)
	Lewisite 3: Tris(2-chlorovinyl)arsine	(40334-70-1)
(6)	Nitrogen mustards:	
	HN1: Bis(2-chloroethyl)ethylamine	(538-07-8)
	HN2: Bis(2-chloroethyl)methylamine	(51-75-2)
	HN3: Tris(2-chloroethyl)amine	(555-77-1)
(7)	Saxitoxin	(35523-89-8)
(8)	Ricin	(9009-86-3)

2.2.1.2 Precursors

		(CAS Registry number)
(9)	Alkyl (Me, Et, n-Pr or i-Pr) phosphonyldifluorides	
e.g.	DF: Methylphosphonyldifluoride	(676-99-3)
(10)	O-Alkyl (H or <=C10, incl. cycloalkyl) O-2-dalkyl (Me, Et, n-Pr or i-Pr)-aminoethyl alkyl (Me, Et, n-Pr or i-Pr) phosphonites and corresponding alkylated or protonated salts	
e.g.	QL: O-Ethyl O-2-diisopropylaminoethyl methylphosphonite	(57856-11-8)
(11)	Chlorosarin: O-Isopropyl methylphosphonochloridate	(1445-76-7)
(12)	Chlorosoman: O-Pinacolyl methylphosphonochloridate	

2.2.2 Schedule 2 Chemicals

2.2.2.1 Toxic Chemicals

		(CAS Registry number)
(1)	Amiton: O,O-Diethyl S-[2-(diethylamino)ethyl] phosphorothiolate	(78-53-5)
	and corresponding alkylated or protonated salts	
(2)	PFIB: 1,1,3,3,3-Pentafluoro-2-(trifluoromethyl)-1- propene	(382-21-8)
(3)	BZ: 3-Quinuclidinyl benzilate (*)	(6581-06-2)

2.2.2.2 Precursors

		(CAS Registry number)
(4)	Chemicals, except for those listed in Schedule 1, containing a phosphorus atom to which is bonded one methyl, ethyl or propyl (normal or iso) group but not further carbon atoms,	
e.g	Methylphosphonyl dichloride	(676-97-1)
	Dimethyl methylphosphonate	(756-79-6)
Exemption: Fonofos:	O-Ethyl S-phenyl ethylphosphonothiolothionate	(944-22-9)
(5)	N,N-Dialkyl (Me, Et, n-Pr or i-Pr) phosphoramidic dihalides	
(6)	Dialkyl (Me, Et, n-Pr or i-Pr) N,N-dialkyl (Me, Et, n- Pr or i-Pr)-phosphoramidates	
(7)	Arsenic trichloride	(7784-34- 1)

(8)	2,2-Diphenyl-2-hydroxyacetic acid	(76-93-7)
(9)	Quinuclidin-3-ol	(1619-34- 7)
(10)	N,N-Dialkyl (Me, Et, n-Pr or i-Pr) aminoethyl-2- chlorides and corresponding protonated salts	
(11)	N,N-Dialkyl (Me, Et, n-Pr or i-Pr) aminoethane-2- ols and corresponding protonated salts	
Exemptions :	N,N-Dimethylaminoethanol	(108-01-0)
	and corresponding protonated salts	
	N,N-Diethylaminoethanol	(100-37-8)
	and corresponding protonated salts	
(12)	N,N-Dialkyl (Me, Et, n-Pr or i-Pr) aminoethane-2- thiols and corresponding protonated salts	
(13)	Thiodiglycol: Bis(2-hydroxyethyl)sulfide	(111-48-8)
(14)	Pinacolyl alcohol: 3,3-Dimethylbutan-2-ol	(464-07-3)

2.2.3 Schedule 3 chemicals

2.2.3.1 Toxic Chemicals

(CAS Registry number)

- (1) Phosgene: Carbonyl (75-44-5) dichloride
- (2) Cyanogen chloride (506-77-4)

(3)	Hydrogen cyanide	(74-90-8)
(4)	Chloropicrin: Trichloronitromethane	(76-06-2)

2.2.3.2 Precursors

		(CAS Registry number)
(5)	Phosphorus oxychloride	(10025-87-3)
(6)	Phosphorus trichloride	(7719-12-2)
(7)	Phosphorus pentachloride	(10026-13-8)
(8)	Trimethyl phosphite	(121-45-9)
(9)	Triethyl phosphite	(122-52-1)
(10)	Dimethyl phosphite	(868-85-9)
(11)	Diethyl phosphite	(762-04-9)
(12)	Sulfur monochloride	(10025-67-9)
(13)	Sulfur dichloride	(10545-99-0)
(14)	Thionyl chloride	(7719-09-7)
(15)	Ethyldiethanolamine	(139-87-7)
(16)	Methyldiethanolamine	(105-59-9)
(17)	Triethanolamine	(102-71-6)



2.3 Biological Agents

2.3.1 Category A Biological Agents

High-priority agents include organisms that pose a risk to national security because they can be easily disseminated or transmitted person-to-person; cause high mortality, with potential for major public health impact; might cause public panic and social disruption; and require special action for public health preparedness.

Category A agents include:

- i. variola major (smallpox);
- ii. Bacillus anthracis (anthrax);
- iii. Yersinia pestis (plague);
- iv. Clostridium botulinum toxin (botulism);
- v. Francisella tularensis (tularaemia);
- vi. filoviruses,
- vii. Ebola hemorrhagic fever,
- viii. Marburg hemorrhagic fever;
- ix. arenaviruses,
- x. Lassa (Lassa fever),
- xi. Junin (Argentine hemorrhagic fever) and related viruses. In capital

2.3.2 Category B Biological Agents

Second highest priority agents include those that are moderately easy to disseminate; cause moderate morbidity and low mortality; and require specific enhancements of CDC's diagnostic capacity and enhanced disease surveillance.

Category B agents include:

- i. Coxiella burnetti (Q fever);
- ii. Brucella species (brucellosis);
- iii. Burkholderia mallei (glanders);
- iv. alphaviruses,
- v. Venezuelan encephalomyelitis,
- vi. eastern and western equine encephalomyelitis;
- vii. ricin toxin from Ricinus communis (castor beans);
- viii. epsilon toxin of Clostridium perfringens; and
- ix. Staphylococcus enterotoxin B.

A subset of List B agents includes pathogens that are food- or waterborne. These pathogens include but are not limited to:

- i. Salmonella species,
- ii. Shigella dysenteriae,
- iii. Escherichia coli O157:H7,
- iv. Vibrio cholerae, and
- v. Cryptosporidium parvum.

2.3.3 Category C Biological Agents

Third highest priority agents include emerging pathogens that could be engineered for mass dissemination in the future because of availability; ease of production and dissemination; and potential for high morbidity and mortality and major health impact.

Category C agents include:

- i. Nipah virus,
- ii. hantaviruses,
- iii. tickborne hemorrhagic fever viruses,
- iv. tickborne encephalitis viruses,
- v. yellow fever, and
- vi. multidrug-resistant tuberculosis.

2.4 Threat description of Chemical and Biological Incidents

2.4.1 Chemical incidents are characterized by the rapid onset of medical symptoms (minutes to hours) and easily observed signatures (colored residue, dead foliage, pungent odor, and dead insect and animal life).

Dead animals/birds/fish	Not just an occasional roadkill, but numerous animals (wild and domestic, small and large), birds and fish in the same area.
Lack of insect life	If normal insect activity (ground, air, and/or water) is missing, then check the ground/water surface/shore line for dead insects. If near water, check for dead fish/aquatic birds.
Physical Symptoms	Numerous individuals experiencing unexplained water-like blisters, wheals (like bee stings), pinpointed pupils, choking, respiratory ailments and/or rashes.
Mass casualties	Numerous individuals exhibiting unexplained serious health problems ranging from nausea to disorientation to difficulty in breathing to convulsions to death.
Definite pattern of casualties	Casualties distributed in a pattern that may be associated with possible agent dissemination methods.
Illness associated with confined geographic area	Lower attack rates for people working indoors versus outdoors, or outdoors versus indoors.
Unusual liquid droplets	Numerous surfaces exhibit oily droplets/film; numerous water surfaces have an oily film. (No recent rain.)
Areas that look different	Not just a patch of dead weeds, but trees, shrubs, bushes, food crops,
in appearance	and/or lawns that are dead, discolored, or withered. (No current drought.)
Unexplained odors	Smells may range from fruity to flowery to sharp/pungent to

2.4.1.1 Indicators of a Possible Chemical Incident

	garlic/horseradish-like to bitter almonds/peach kernels to new mown	
	hay. It is important to note that the particular odor is completely out	
	of character with its surroundings.	
Low-lying clouds	Low-lying cloud/fog-like condition that is not explained by its surroundings.	
Unusual metal debris	Unexplained bomb/munitions-like material, especially if it contains a liquid.(No recent rain.)	

2.4.2 In the case of a **biological incident**, the onset of symptoms requires days to weeks and there typically will be no characteristic signatures. Because of the delayed onset of symptoms in a biological incident, the area affected may be greater due to the migration of infected individuals.

2.4.2.1 Indicators of a Possible Biological Incident

Unusual numbers,	Any number of symptoms may occur. As a first responder, strong	
of sick or dying	consideration should be given to calling local hospitals to see if additional	
people or animals	causalities with similar symptoms have been observed. Casualties may	
	occur hours to days to weeks after an incident has occurred. The time	
	required before symptoms are observed is dependent on the agent used	
	and the dose received. Additional symptoms likely to occur include	
	unexplained gastrointestinal illnesses and upper respiratory problems	
	similar to flu/colds.	
Unscheduled and	Especially if outdoors during periods of darkness.	
unusual spray being		
disseminated		
Abandoned spray	Devices will have no distinct odors.	
devices		



Fig1. Placards Associated with Hazardous materials ⁵

2.5

Chemical Incident 2.5.1

Chemical Incident is a criminal or non-criminal release of one or more hazardous substance(s) which could harm human health and the environment. An example is the gas explosion on the 25th July, 2015 where eight people died and 101 others injured at the Plateau State Water Board. This was as a result of the inhalation of the contaminated air. There was an excess Chlorine inhalation from an exploded Chlorine Cylinder by residents around the Lamingo Water Board Treatment Plant.

Examples of criminal and non-criminal incidents are as follows:

Α. **Criminal incident**

- Incidents involving structural damage i.
- ii. Incidents where no structural damage has occurred
- iii. Incidents leading to adverse environmental impacts

Β. Non-criminal incident

- i. Transport related incidents (road, rail, air and marine incidents).
- ii. Incidents involving Pipelines, facilities with hazardous substances etc.

2.5.2 Biological Incident

The nature of biological incidents continues to evolve; they may result from either natural, accidental or intentional sources, and may include genetically engineered pathogens. An example is the Lassa Fever outbreak (Viral disease) which occurred in 2018 in some States of the Federation affecting 1081 people.

Chapter Three

3.0 General Principles

3.1 Operation and Site Control

An essential component of the management of Chemical and Biological incidents is the establishment of incident operation by the Nigerian Security and Civil Defence Corps (NSCDC) in consultation with other relevant stakeholders such as The Nigeria Police Force (NPF), Fire (FS) Service and National Center for Disease Control (NCDC).

The main objective is to determine whether decontamination is needed by personnel to safely enter or leave a particular incident zone and also to ensure that the movement of materials or equipment between the Hazardous Material (HazMat) zones is well controlled.

The NSCDC will be responsible for isolation of an incident site through the use of a secure outer cordon. This will be established in consultation with the FS. This objective is to contain affected persons for treatment or alternatively to exclude members of the community who may otherwise be exposed to the hazardous material.



Figure 1: A conceptual layout of HazMat Control Zones 6

3.2 Cordon Areas

3.2.1 Inner and Outer Cordon

The Inner Cordon encompasses the Hot Zone and the Warm Zone while the outer cordon is the area surrounding the incident site. Its purpose is to control access and exclude the public from the immediate area around operational and support activities.

3.2.2 The Hot Zone

The Hot Zone is the area immediately surrounding the source of the release of the hazardous material. The concentration of the hazard in this zone poses a critical threat to persons, property and the environment. The Hot Zone is defined and controlled by the NSCDC in collaboration with **NPF** and FS.

Entry to this Zone is restricted and controlled by the NSCDC in compliance with HazMat procedures. These procedures include that:

- i. Only trained personnel wearing the level of Personnel Protective Equipment (PPE) determined by the NSCDC Commander can enter this zone;
- ii. Entry must be through the HazMat Control Point and entry corridor;
- iii. Response personnel must exit through the separate HazMat control decontamination facility for personnel and finally through the HazMat control point.

Considerations in determining the extent of the boundaries of the Hot Zone include:

- i. The type and physical characteristics of the hazard;
- ii. The natural and built environment including the topography at the site and the relevant surrounding area
- iii. Prevailing weather conditions including forecast and unexpected changes.

Activities in this zone may include:

- i. Triage and rescue of victims and forward decontamination initiatives.
- ii. Containment and encapsulation of the hazard release source.
- iii. Monitoring of hazard concentrations and retrieval of samples for on-site identification and off-site laboratory testing.
- iv. Evidence collection and police forensic examination.

3.2.3 The Warm Zone

The Warm Zone is the area immediately surrounding the Hot Zone. The concentration of the hazard in this zone poses a serious threat to persons, property and the environment. The Warm Zone is defined and controlled by the **FS** in collaboration with **NSCDC**, **NPF** and other response Agencies

Entry to this Zone is restricted and controlled by the FS in compliance with HazMat procedures. These include requirements that:

- i. Only trained personnel wearing the level of Personnel Protective Equipment (PPE) determined by the FFS can enter this zone;
- ii. Entry must be through the HazMat control point and entry corridor.

Exit must be through the HazMat control personnel decontamination facility to the cold zone and the HazMat control point.

The extent of the boundaries of the Warm Zone depends on multiple factors including:

- i. The type and physical characteristics of the hazard.
- ii. The natural and built environment including the topography at the site and the relevant surrounding area.
- iii. Prevailing weather conditions including forecast and unexpected changes.

Activities in this zone are confined to decontamination, monitoring and testing of hazard concentrations and securing of contaminated articles including evidence. The assembly of persons for decontamination may occur in this zone.

Medical assessment of contaminated persons may be carried out in this zone. This assessment will be undertaken by ambulance paramedics who are trained and accredited in Chemical and Biological Emergency Response procedures.

3.2.4 The Cold Zone

The Cold Zone is the area immediately surrounding the Warm Zone. The decontamination process exits into the Cold Zone. It is an area set aside for operational support by agencies for their personnel and equipment. The NPF is responsible for coordination of agency operations in this area in collaboration with NCDC and other relevant Agencies, which include:

- i. Operations of the HazMat control and incident control points;
- ii. Operations of casualty collection, triage and the treatment area for casualties.

The Cold Zone is defined as an area where no immediate "hazard" concentration has been detected. The cold zone is **controlled** by the NPF in consultation with NSCDC Commander and Ambulance Commander. The FFS Controller and other officers will monitor behaviour of the hazard release and advise the NPF Commander of changed conditions that may threaten the safety of personnel operating in the cold zone.

Access to the Cold Zone is limited to the personnel and equipment of response and support agencies.

3.3 Securing and Controlling the Hazard Release

During the course of a Chemical and Biological HazMat Incident, the exposure risk is exacerbated by the length of time the release of the hazard continues unchecked. It is this exposure period, which allows the variables such as weather changes and movement of persons to obstruct the process of mitigation, control and recovery. It follows that early location and securing of the hazard release is an imperative in the prevention of on going and increasing effects from the release of the contaminant.⁸

Securing the hazardous material to prevent on-going harm to the community has equal status to the rescue and decontamination of victims.

The objectives include:

- i. Location of the source and identification of the hazard with the support of NCDC.
- ii. Containment of the release on-site to prevent on-going spread of the contaminant.
- iii. Establishing that there are no other sources or potential sources of the hazard.
- iv. Notifying the NSCDC and the FFS of the type of hazard detected.
- v. Confirming with NSCDC and the FFS that the location of the hazard source and encapsulation and control have been achieved.
- vi. Confirming and communicating the extent of spread of the hazardous material that has already been released.
- vii. Conducting search for other sources or devices and recording the areas that have been cleared of suspicion.
- viii. Establishing an off-site disposal location for the contaminant or conducting neutralization of the hazard on-site.
- ix. Arranging with Nigeria Police Force, NSCDC and FRSC for appropriate secured transport, transport routes and police escort for the hazardous material after encapsulation, where necessary.

3.4 Decontamination Process

3.4.1 Decontamination agents

The principal agent used for decontamination is water. Although cold water is suitable for the purpose, warmer water should be used for the comfort of casualties where available. The use of surfactants such as soap and detergent that are suitable for use on humans can increase the effectiveness of decontamination.

3.4.2 Decontamination Objectives

The Objective of decontamination for persons who are known, or suspected to be contaminated, is to:

- i. Increase the survivability of victims.
- ii. Prevent spread of contamination from affected persons to those who are not contaminated and to off-site environments.

Decontamination of emergency services personnel, equipment, environment and **proper handling of evidence** should be carried out as a separate operation from that given to casualties from the general community.

Operational considerations for decontamination include:

- i. Communication of the need for decontamination to the casualties;
- ii. Self-evacuating casualties from the contamination site in multiple directions;
- iii. Self-evacuating casualties who are unaware that they are contaminated;
- iv. Casualties who are non-ambulant and cannot report to the decontamination point;
- v. The physical limitations imposed upon rescuers wearing appropriate Personal Protective Equipment that prevent the removal of large numbers of non-ambulant casualties to the HazMat mass decontamination point;
- vi. Casualties who refuse to be decontaminated;

- vii. Casualties who are not prepared to disrobe;
- viii. Self-evacuating casualties who report directly to health facilities;
- ix. Maintenance of personal dignity and privacy when decontamination occurs in a public place;
- x. Re-clothing of casualties;
- xi. Security of casualties personal belongings.

Referral for off-site Decontamination

FFS, NSCDC, NAFDAC, NCDC and NABDA shall be required to provide assistance in off-site decontamination, where possible.

Chapter Four

4.0 Chemical & Biological agents – Sources and Effects

There are various types and sources of Chemical and Biological agents, these are highlighted below with their effects.

4.1 Chemical Agents

Chemical agents unlike biological agents may be odorless, colorless, gaseous and liquid substances that are toxic to human beings, animals and plants. These Agents can be persistent or non-persistent and attack the body in various ways, both lethal and non-lethal.

4.1.1 Examples of Chemical Agents

The following are examples of chemical agents that are extremely harmful to both humans and other life forms:

- i. Nerve Agents (e.g. tabun, sarin gas, soman, cyclosarin), and Thickened (or
 - a. Persistent). Nerve agents act by 'switching off' the body's central nervous system.
- ii. Blood Agents (e.g. hydrogen cyanide, cyanogen chloride and arsine). Blood agents prevent absorption of oxygen.
- iii. Blister Agents (e.g. sulphur mustard, nitrogen mustard, phosgene oxime and lewisite).Blister agents attack the skin and airways, forming large contaminated blisters.
- iv. Choking Agents (e.g. phosgene and diphosgene). Choking agents attack lung membranes, leading to pulmonary oedema.
- v. Vomiting Agents (e.g. adamsite). Vomiting agents cause a violent emetic reaction.
- vi. Incapacitants (e.g. hallucinogens such as LSD and BZ, as well as sleeping and laughing gas)
- vii. Irritants (e.g. tear gases).

4.1.2 Sources of Chemical Agents

Hazardous chemical agents, materials or substances can be found readily available around us in homes and business places. However the most common sources of these agents come from toxic industrial chemicals (TICs) used in industrial and manufacturing plants. Some soft target Industrial sources include:

- Chemical manufacturing plants (Chlorine, peroxides, industrial gases, plastics and pesticides)
- Food processing and storage facilities with large ammonia tanks and chemical transportation assets (rail tank cars, tank trucks, pipelines, and river barges).

- Gasoline and jet fuel storage tanks at distribution centers, airports, and barge terminals with compressed gases in tanks, pipelines and pumping stations.
- Gold mines where cyanide and mercury compounds are used.
- Pesticide manufacturing and supply distributors.
- Educational, medical, and research laboratories

4.2 Biological Agents

4.2.1 Types of Biological Agents

The three principal types of biological agents are; Fungi, Bacteria and Virus.

i. Fungi

These include molds and yeast. Some fungi are able to cause infection on or inside the human body. Some others produce toxins which pose risks to humans. Fungi reproduce by forming spores that are released, dispersed and find suitable environments to grow in. These tiny spores can be inhaled by human beings and other animals thereby causing lung disease.

ii. Bacteria

These are single-celled organisms which vary widely in shape with some having tails (known as flagella) which allows them to move through water. Some form hard spores that can survive adverse conditions such as heat, cold or absence of water (an example is the bacteria responsible for anthrax). Bacteria grow virtually in every environment on the planet. There are approximately as many bacteria in or on the typical human body as there are cells. Just as many are harmful disease causing to human, many are also beneficial to the human body (example certain bacteria found in the gut).

iii. Viruses

Viruses are micro-organisms but are not strictly alive. They are self replicating molecules that invade host cells to produce more viruses which are then released to repeat the cycle. Their particles are much smaller than both fungal and bacterial cells. Examples of diseases caused by virus present in human fluids are the Acquired Immune Deficiency Syndrome (AIDS) and Hepatitis.

4.2.2 Sources of Biological Agents

Disease-causing biological agents come from three main sources; Humans, animals and environmental sources.

i. **Human Source**: Many fungal, bacterial and viral infections are passed from person to person via body fluids, examples are Ebola, Hepatitis and HIV/AIDS or by inhalation of bacterial spores such as anthrax.

- ii. **Animal Sources**: Some serious fungal, bacterial and viral infections are passed from animals to humans. This happens through the same general mechanism as person-person infections. For example rabies is a viral disease passed onto humans through bite by animals infected with the disease. Another example is Leptospirosis which is a bacterial disease spread by coming in contact with water or surfaces contaminated with animal urine.
- iii. **Environmental Sources**: Many serious occupational diseases originate from the environment. A typical example is Legionnaires disease or Legionellosis caused by *Legionella Bacterium* which occurs naturally in damp soil or water courses.

4.3 Characterization and prioritization of Weapons of Mass Destruction (WMD) threats

Chemical and biological weapons present a specific and immediate danger to the public as well as first responders. Many chemical agents and biological pathogens and their precursors are available and are known to have been used by terrorists across the globe, for example the Tokyo train attack with sarin gas in 1995 and also anthrax attacks in the US in the early 2000s. Lethal effects of Chemical and biological weapons of mass destruction can be seen below:

- **Chemical Weapons:** chemicals weapons kill by attacking the nervous systems and lungs or by interfering with body's ability to absorb oxygen. Some are designed to incapacitate by producing severe burns and blisters. Symptoms appear immediately or are delayed for up to 12 hours. Persistent agents can remain in a target environment for as long as a week.
- **Biological Weapons and Toxic Weapons:** these kill by using pathogens to attack cells and organs in human bodies. They can also be used to target crops and livestock on massive scales. Many are contagious and spread rapidly in a population, while others infect and kill only those who are directly exposed.

Summary of suspected chemical and biological agents of interest used by many terrorist organizations include the following:

BIOLOGICAL AGENTS	CHEMICAL AGENTS
Antrax, Plague, Smallpox, Tularemia, Ebola	Chlorine, Mustard Gas, Phosphogene,
and toxins such as Ricin or Staphylococcal	Various Nerve Agents, Cyanide and
Enterotoxin.	Aerosolized toxic Industrial Chemicals.

Chapter Five

5.0 Preparedness for Chemical and Biological incidents

Early detection of and response to biological or chemical incidents are crucial. Without special preparation at the local and state levels, a large-scale attack with variola virus, aerosolized anthrax spores, a nerve gas, or a food borne biological or chemical agent could overwhelm the local and perhaps national public health infrastructure. Large numbers of patients, including both infected persons and the "worried well," would seek medical attention, with a corresponding need for medical supplies, diagnostic tests, and hospital beds. Emergency responders, health-care personnel, and public health officials could be at special risk, and everyday life would be disrupted as a result of widespread fear of contagion.

5.1 Focus areas of preparedness

Preparedness can be done under the following five focus areas;

- I. Preparedness and Prevention
- II. Detection and Surveillance
- III. Diagnoses and Characterization of Chemical and biological Agents
- IV. Response
- V. Communication Systems

5.1.1 Preparedness and Prevention

- a. Maintaining a public health preparedness and response cooperative agreement which provides support to Federal, State and local health agencies in developing coordinated bio attack plans and protocols.
- b. Establishment of a national public health distance-learning system which provides chemical and biological incidents preparedness training to health-care workers and to Federal, State and Local public health personnel.
- c. Dissemination of public health guidelines and performance standards on chemical and biological threat preparedness planning for use by Federal, State and Local health agencies.
- d. Sensitization and awareness creation are to be carried out
- e. Conducting Threat and Risk Assessments
- f. Capacity building and simulation exercises
- g. Provision of equipment

5.1.2 Detection and Surveillance

a. Provision of detection equipment and training of personnel

- b. Stakeholders are to strengthen the surveillance systems for illness and injury that could result from chemical and biological incidents.
- c. Development of new algorithms and statistical methods for searching medical databases on a real-time basis for evidence of suspicious events.
- d. Strengthening / Establishment of criteria for investigating and evaluating suspicious clusters of human or animal disease or injury and triggers for notifying law enforcement of suspected acts of chemical or biological incidents.

5.1.3 Diagnoses and Characterization of Chemical and Biological Agents

- **a.** Establishment of a multi-level laboratory response network which links public health agencies to advanced capacity facilities for the identification and reporting of critical Chemical and Biological agents.
- b. Establishment of a rapid-response and advanced technology laboratory within Nigeria Center for Disease Control (NCDC) and NAFDAC to provide around-the-clock diagnostic support to bioterrorism response teams and expedite molecular characterization of critical Chemical and Biological agents.

5.1.4 Response

- a. Preparation for deployment of personnel
- b. Ensuring that procedures are in place for rapid mobilization of response teams that will provide on-site assistance to health workers, security agents, and law enforcement officers.
- c. Ensuring the establishment of a national pharmaceutical stockpile to provide medical supplies in the event of a terrorist attack that involves chemical or biological agents.

5.1.5 Communication Systems

- Establishment of an alert and reporting system
- Relevant Stakeholders are to strengthen the electronic infrastructure to improve exchange of emergency health information
- Development and Implementation of an emergency communication plan which ensures rapid dissemination of health information to the public during actual, threatened, or suspected acts of chemical or biological incident.
- Creation of an information platform which disseminates Chemical and Biological preparedness training information, as well as other bioterrorism-related emergency

information, to public health and health-care workers and the public by the OSGF - National Authority.

• Sensitization of the public against the characteristic and dangers of Chemical and Biological agents for quick detection and response

5.2 Protecting Emergency Workers

- National Emergency Management Agency should coordinate with other stakeholders to
 ensure they are prepared to respond to and safely perform rescue operations as needed
 at incident scene that may pose unique or particularly hazardous conditions for
 emergency responders. This should include preparing, training, and exercising capacity
 for response and rescue operations. Such operations may require special engineering
 and administrative controls, work practices, and Personal Protective Equipment (PPE) to
 protect emergency response and recovery workers
- It is crucial that stakeholder organizations plan in advance of an emergency for the PPE and safety needs of their personnel. During and immediately after an emergency, there may be limited supplies of PPE available for purchase, so it is important to have the necessary PPE on hand in advance. In an emergency situation, employers may have little or no time to train or kit personnel (e.g., perform kit testing for respirators) for certain types of equipment, so it is critical to have those tasks completed before an emergency occurs
- Train responders in the proper use of PPE
- Ensure training and simulation exercises for emergency personnel to assess capacity in responding to chemical or biological incident
- Provide medical exams and/or fitness testing,
- Conduct a hazard assessment to determine what safety and health hazards workers may encounter
- Strict adherence to the Incident Command and Control System

Chapter Six

6.0 Community Protection Strategies

6.1 Industry – Community Off-Site Emergency Plans

Potential Hazardous Facilities (industries) are required to have Off-Site Emergency Plans, which are relevant to potential exposure to surrounding communities.

In circumstances where a Chemical or Biological HazMat incident emanates from a Potential Hazardous Facility, the relevant community Off-Site Emergency Plan should be followed.

Arrangements should be made under the direction/coordination of NEMA for the protection of the affected communities. These include transport, evacuation, shelter-in-place or off-site refuge, provisioning including food and refreshments, medical surveillance and social welfare issues.

6.2 Evacuation

Evacuation is the relocation of the public or response personnel from an area of high risk to an area of safety. It is generally the preferred protective action where there is potential for persons to become contaminated during a HazMat Incident. The following issues may complicate evacuation:

- i. An extended geographic area is exposed or potentially exposed to the threat from the hazard.
- ii. Insufficient resources available to implement the evacuation (includes notification/registration of all of the exposed community).
- iii. Evacuation can be difficult to control. Once evacuation has been declared, the potential arises that contaminated persons may self-evacuate without decontamination or medical assessment.

6.2.1 Evacuation Logistics and Control

The NSCDC Commander should advise the FFS and other relevant agencies on strategies to protect surrounding potentially exposed communities.

The strategies should include:

- i. Identification of safe transportation routes.
- ii. The immediate welfare of those directed to surrounding or off-site refuge.

6.2.2 Alternative to Evacuation – Shelter in Place

'Shelter in Place' is the use of a structure in the affected or potentially affected area as a secure place from the threat from a hazard release.

Critical factors for deciding the use of surrounding site for shelter in place are:

- i. The nature and potency of the hazard.
- ii. Evacuation is negated because of the rate of spread of contaminant.
- iii. Evacuation routes are cut by the contaminant.
- iv. Environmental factors which can make estimating the spread/behaviour of the contaminant unpredictable and thus the risk of exposure by moving persons from one place to another cannot be justified.

Critical factors for deciding which structures are suitable for use as a shelter in place during a HazMat incident are:

- i. Structures should have relatively low air exchange rates or it is relatively easy to reduce the air exchange rates to safe levels.
- ii. The use of a structure for the purposes of providing shelter in place has been preplanned.
- iii. The community has received prior information for the use of the refuge and its protective value is known to them.
- iv. A recognized means of communication is available to notify the community to use the **Shelter in Place**.

6.3 Recovery and Monitoring of site

6.3.1 Reconstitution of Contaminated Sites

The effects of a HazMat incident on the immediate and future use of the site and affected area may cause societal disruption.

Clean up, Monitoring and Recovery may involve the following agencies:

- A. Chemical: NESREA, Federal Ministry of Environment, NCDC, NSCDC, Federal Ministry of Health, NOSDRA, NPF, NAFDAC......
- B. Biological: NESREA, National Biotechnology Development Agency, Federal Ministry of Environment, Federal Ministry of Health, NPF......

6.3.2 Declaration of Current and Future Status - Contaminated Sites

Declarations of current and future status of the contaminated site should be issued in writing by the Federal Ministry of Environment in collaboration with Federal Ministry of Health to the owner-occupier of the site. Provision can be made to maintain the communications link with the community during the course of the incident.

6.3.3 Testing for Residual Hazard concentrations

At the termination of the incident, testing for residual concentrations of the hazard should be carried out outside the shelter in place before persons exit the shelter in place.

6.3.4 Off-Site Casualty Management

Casualties may present themselves to hospitals and other medical facilities by self-presentation where persons evacuate themselves using their own means of transport to a hospital or other medical facility. Self-presenters are a threat to the safe operation of the facility and require decontamination. This site should be considered a separate incident site. Transportation of casualties by the Health Services will only occur after decontamination.

Chapter Seven

7.0 Communication

7.1 Dispatch

7.1.1 Initial Notification

National Emergency Call Center should be contacted first of any Chemical or Biological incident. The following agencies should always be notified and alerted:

- a. Office of the National Security Adviser (ONSA)
- b. Nigeria Center for Disease Control (NCDC)
- c. National Authority on Chemical and Biological Weapons Conventions(NAC&BWC)
- d. Nigeria Security and Civil Defence Corps (NSCDC)
- e. Nigeria Police Force (NPF)
- f. Federal Ministry of Health
- g. Fire Service
- h. Federal Ministry of Environment
- i. National Emergency Management Agency (NEMA);

The incident commander will determine on scene, which other agencies may have to be involved.

7.1.2 Dispatch Centre

The Dispatch Center (National Emergency Call Centre with 112) will obtain all information from the person reporting a Hazardous Material (HAZMAT) incident. The information should include observed signs and symptoms, material name and/or type, amount and size of container(s), extent and nature of the incident (leak, spill, fire, etc.) and dangerous properties of the materials or any other Hazardous Material information that may be available as well as the number of persons injured or exposed.

The operator who received the call should remain on the telephone with the caller, if possible, to gain additional information after entering the call for dispatch. Any additional information shall be relayed to responding units after dispatch. This should include the safest approach or best access to the incident, if available.

If the call comes from a person with particular knowledge of the hazardous situation, that person should be instructed to meet and direct the arriving units. Dispatch shall relay that person's location and level of knowledge to responding units. The Dispatch Centre will dispatch the appropriate Hazardous Materials Assignment companies to all reported hazardous materials incidents. The Dispatch Centre will inform the National Authority and other relevant stakeholders.

7.2 Incident Command

6.2.1 Establishment of an Incident Command Post (ICP)

The following will take place at the scene of incidence:

a. The agency arriving on scene first must, as soon as is reasonably possible, establish an Incident Command Post (ICP) and indicate the position of the ICP by an orange and red rotating light or placing a traffic cone (if no rotating light is available) on a vehicle's roof.

The ICP must be situated in such a position that access control and other administrative activities can be easily administered. The ICP can also be housed in a building or other structures depending on the availability thereof and the circumstances.

b. The senior member of the agency arriving first must act as incident commander until the official incident commander has been appointed. This member remains in control of the scene until he/she can hand the scene over to the incident commander. One of the agency commanders will assume the position of the incident commander. Upon the handover of the scene to the incident commander, the first member must brief the incident commander on the activities at the scene and give a final SITREP to the dispatcher, or controlling officer after handing over the scene.

c. The Incident Command (IC) will consist of a command team made up of a representative from each agency represented at the scene. This representative must be able to take decisions on behalf of his/her agency and have them executed. The agency representative must be available at all times at the ICP. Should a member of the ICP have to leave, he must inform the Incident Commander and make alternative arrangements for representation. All arriving responders must report to the ICP and identify their representative at the ICP.

d. Depending on the size of the incident, in addition to the agency representatives, the ICP staff should consist of the following:

- i. Safety officer
- ii. Weather officer
- iii. Support coordinator
- iv. Public liaison officer
- v. Communications officers
- vi. Technical advisors.

e. It is important that cognizance be taken of the fact that the IC is in overall command of the incident. Each response Agency will still have its own functional command structures in order to execute their specific duties and responsibilities on the scene effectively.

f. The main role of the IC is to coordinate all actions on the scene and to control activities that may have mutual effects.

7.2.2 Appointment of an Incident Commander

The following general rule should be applied to determine which agency is in overall command:

a. In cases involving hazardous materials where there is no criminal activity suspected, the NSCDC is the lead agency and the Commandant General or his representative will be the incident commander.

b. In all cases where criminal activity is suspected, the Nigeria Police is the lead agency and the Inspector General of Police or his representative will be incident commander.

c. When there is any uncertainty as to whether there is criminal activity involved, the Commandant General of NSCDC will be incident commander.

The IC is a joint decision making body and should take consensus-based decisions; however the final responsibility rests with the incident commander, who should take the final decisions if consensus can't be reached.

All commanders of joint elements, such as safety zone, transport park, access and egress control should be supplied by the lead agency where possible. If the lead agency is not able to supply a commander(s), the IC will appoint a commander from available personnel. Personnel for joint elements should be drafted from participating agencies.

7.2.3 Functions of the Incident Commander (IC)

Incident Commander

The Incident Commander is responsible for the overall management of the incident; chairs the incident command meetings and must make the final decisions.

The incident commander is responsible for the following:

a. Accepting the handover from the acting incident commander and assume control of the scene.

- b. Reviewing command responsibilities.
- c. Confirming the operational mode and level of incident.
- d. Determining incident objectives and strategy.
- e. Establishing the immediate priorities.
- f. Ensuring planning meetings are scheduled.

g. Approving and authorizing the implementation of an action plan for the management of the incident.

h. Ensuring that adequate safety measures are in place and enforced.

- i. Coordinating activity for all command and general staff.
- j. Keeping authorities informed of incident status.
- k. Authorizing release of information to the news media.
- I. Ratifying safety zones.
- m. Establishing incident command post if not yet established.
- n. Confirming deployment of agencies in the cold zone.

o. Establishing communication between the zones, agency command posts and rear command posts/dispatch.

- p. Confirming access and egress routes, ensuring traffic control.
- q. Ensuring that records are kept of activities on scene and decisions made.
- h. Any other responsibilities

7.2.4 Agency Representatives

The agency representatives should all participate in the incident command meetings and decision-making.

7.3 Communication with Stakeholders

The Federal Ministry of Information will work closely with all stakeholders and partners, to ensure timely provision of communications services. The Ministry will implement the following activities:

- i. Continue the provision of coordination and information management activities so as to ensure a coherent response and minimize duplication of efforts,
- ii. The Ministry will also continuously assess communications needs of the preparedness and response activities
- iii. Maintain Internet and security telecommunications services
- iv. Continue delivering capacity-building activities to actors

7.4 Maintaining records and data management

Data on Chemical and Biological incidents will be collected and domiciled in the NAC&BWC, ONSA and NEMA. This will include date of occurrence, type of disaster, Location, affected population, stakeholders involved and any other relevant information.

The information and data should be accessed through a formal request to the offices involved.

Chapter Eight

8.0 Coordination

8.1 Establishing the Operational Context

For the purposes of this Plan, Chemical and Biological HazMat materials are described in terms of chemical and biological substances. It is important to note that such materials may have multiple properties that are within the jurisdiction of, or require expert advice or management from, more than one agency.

Emergency Response may involve an incident of accidental or criminal origins but does not constitute an incident as described under the National Counter Terrorist Strategy (NACTEST). During a Chemical and Biological HazMat emergency response:

- i. NEMA is the coordinating agency and is responsible for overall control of the incident.
- ii. NPF, NSCDC, FFS, NCDC are the response agencies.
- iii. Health Service in consultation with the FFS, FRSC and NSCDC is responsible for the management and transport of casualties.

In cases of incidents involving malicious acts, NEMA will contact the Office of the National Security Adviser (ONSA) decide the appropriate strategy and approach to utilize.

8.2 Overview of Agency Responsibilities

Clarification of legislative responsibilities and agency response roles is critical in the determination of management responsibilities for Chemical and Biological/HazMat Incidents. These roles are determined by responsibilities as lead agency or capability to provide combat or advice and or other support.

Each agency has specific roles during the management of a Chemical and Biological/HazMat incident and is responsible for the safety, protection, training and management of its own personnel and resources. It is important that training should be conducted jointly with all participating agencies.

8.3 Roles and Responsibilities of Stakeholders

Inter-agency collaboration and cooperation is essential for effective preparedness and response to chemical and biological emergencies, as such relevant stakeholders have been identified with their roles and responsibilities specified as follows:

1. National Authority on Chemical and Biological Weapon Convention (NAC&BWC)/OSGF

i. Facilitating assistance to States that are threatened by or have suffered Chemical attacks

- ii. Fostering the peaceful use of Chemistry dual purposes
- iii. Facilitating National assistance in case of Chemical attacks
- iv. Carrying out inspections of relevant Chemical related industries
- v. Escorting International Inspectors to Chemical Industrial sites
- vi. Carry out the National implementation of Chemical and Biological Weapons in Nigeria
- vii. Liaises with OPCW and other relevant stakeholders

2. ONSA

- i. Coordination of all security matters.
- ii. Control the importation of Explosives and Accessories, Chemical and its precursors, Fertilizer, Nuclear and Radioactive materials through the issuance of End Users Certificate (EUC).
- iii. Coordinate and facilitate post blast and forensic investigation
- iv. Implementation of policies and programmes
- v. Monitoring the use of chemical, explosives, urea fertilizer and other sensitive materials from the process of manufacturing, distribution, transportation, storage and usage
- vi. Coordinate national response at strategic level through the national Security Council
- vii. Ensure response MDAs build required capacity
- viii. Validate response readiness of MDAs
- ix. Ensure the NSC understand the risk
- x. Advising the President on matters concerning the Intelligence activities of the National Security Agencies.
- xi. Preparation and ensuring the implementation of policies and programmes aimed at ensuring the effective coverage of national intelligence priorities and requirements for the consideration of the president.
- xii. Other duties as the President, may, from time to time, determine or direct.

3. Defense Headquarters

- i. Maintain territorial integrity in case of trans-boundary movement of Chemical and Biological agents
- ii. The senior CBE defense officer on the scene will be in command of the military sector. The officers in command of decontamination and detection will also be situated in this sector. Each will be responsible for command and control of their respective elements. They will only take orders from the military commander until ordered to be detached to another role player for command and control purposes, but will remain under functional control of the military commander.
- iii. Support logistics arrangement

4. DSS

i. Coordinate and ensure Human Reliability Programme of Chemical and Biological material operators;

- ii. Gather, analyse and disseminate intelligence as it relates to Chemical and Biological material threats.
- iii. Provide intelligence led support in investigations, identification and apprehension of perpetrators.
- iv. Provide intelligence led support in collaboration with other security elements in incident management of Chemical and Biological material events.

5. Federal Ministry of Health

- i. Sensitization and Awareness creation on the preventive measures of Chemical and Biological Weapons.
- ii. Capacity building for Healthcare personnel on the mode of response to Chemical and Biological Weapons intervention.
- iii. Improve, promote and protect the health and wellbeing of Nigeria Citizen.
- iv. Strengthening of programs and initiatives for monitoring/control, elimination/ eradication of specific preventable diseases.
- v. Provide first Aid for affected victims at the sites.
- vi. Collaborate with National Emergency Management Agency (NEMA) and National Authority on CWC & BWC and other relevant agencies to educate and inform the Public on the Health effect of the concerned weapon and the preventive measures.
- vii. Monitor the long term Health impact of the Weapon involved.
- viii. Help Health departments build communication links with other assets in the health-care community (e.g., hospitals, emergency departments, and acute care centers) to assess local capacities and coordinate responses.
- ix. Collaborate with Federal Ministry of Agriculture and Rural Development to ensure responses that involve the animals and plant sectors for safe use of human; and equally ensure decontamination of the affected areas.
- x. Help to ensure Post-Supportive care.

6. Federal Ministry of Information

- i. Engage with the media
- ii. Sensitize the general public
- iii. Determine from the IC if there are any limits on information released.
- iv. Obtain information that may be useful to incident planning.
- v. Gather tactical information and provide tactical expertise where applicable.

7. Federal Ministry of Environment (FMoEnv)

- i. Technical advice with respect to minimising or preventing environmental damage.
- ii. Monitoring of off-site effects of an emergency including run off into watercourses.
- iii. Safe disposal of wastes by providing advice as to suitable short, medium and long term disposal/storage options.
- iv. Undertake characterization, containment, decontamination and remediation of impacted sites and appropriate disposal of/irreversible destruction of stockpiles of debris generated.
- v. Collaborate with relevant agencies in the forensic investigation and intelligence analyses of CB incidents involving contaminated water, wastewater systems, air emissions, and underground injections, human exposures, pursuant to existing global and national regulations.
- vi. Provide laboratory-testing services, as may be required.

8. Federal Ministry of Agriculture

- i. Identify pollutant that destroys or renders livestock or agricultural products unsafe for use as food for humans or livestock.
- ii. Identify pollutant that destroys damages or renders unusable land or waters that are used for farming or fishing related purposes.

9. Nigeria Police Force

- i. Proper investigation and prosecution of C&B related issues
- ii. Support Control and coordination of the incident (includes the on and off-site emergency environment).
- iii. Securing the incident scene from unauthorized entry or departure.
- iv. Support crowd and traffic control.
- v. Security support for casualty collection, treatment and transport loading areas
- vi. Rendering the area safe of explosive devices.
- vii. Support and secure holding areas both off site and on site for supporting agencies and resources.
- viii. Coordination of public protection strategies including evacuation and adjacent refuge.
- ix. Evidence security where criminal or negligence origins evident.
- x. Support the establishment and maintain hot/warm/cold zones with controlled entry/egress points.

10. Fire Service

i. Protection of persons, property and the environment from fire and hazardous materials during the emergency

- ii. To provide an advisory service, and undertake other measures to promote safety and other procedures if a fire or hazardous materials emergency happens.
- iii. To act as a Chemical and Biological HazMat combat agency.
- iv. Assist in off-site decontamination where possible.
- v. Support the establishment and maintain hot/warm/cold zones with controlled entry/egress points.

11. Federal Road Safety Corps

- i. Control traffic and cordoning
- ii. Assist in evacuation of victims and provide First-Aid where possible

12. Nigeria Security and Civil Defense Corps

- i. Contain and mitigate the hazard
- ii. Identify Chemical and Biological HazMat operating zones for the safety of personnel including those of other agencies.
- iii. Rescue and decontamination of casualties, equipment deployed and the environment
- iv. Maintain appropriate Chemical and Biological HazMat Control Procedures.
- v. Identify and tag contaminated articles including clothing, equipment etc.
- vi. Decontaminate incident personnel and the public
- vii. Establish and maintain hot/warm/cold zones with controlled entry/egress points.

viii. Sensitize/educate the general public on CBRNE attack

ix. Rendering safe of IED in coloration with other EOD experts

13. NAFDAC

- i. Regulate the manufacture, distribution, storage, sales and use of chemical and biological substances.
- ii. Safe guard public Health in Nigeria in areas relating to Chemical and Biological substances.
- **iii.** That NAFDAC is empowered by the NAFDAC Act Cap N1 LFN 2004 to regulate the importation, exportation, manufacture, advertisement, sale and use of food, drugs, cosmetics, medical devices, Chemicals, and packaged water referred to as regulated products.
- iv. NAFDAC ACT PART II Subsection 5 gives the agency power to:
- v. Conduct appropriate tests and ensure compliance with standard specifications for the effective control of the quality of chemicals and other regulated products.
- vi. Undertake appropriate investigations into the production premises and raw materials for chemicals and other regulated products and establish relevant quality assurance systems

- vii. Undertake inspection of chemicals and other regulated products including certification of the production sites
- viii. Control exportation and issue quality certification of chemicals and other regulated products.
- ix. Undertake the registration of other regulated products and chemicals.
- x. Compile standard specifications and guidelines for the production, importation, exportation, sale and distribution of other regulated products and chemicals.
- xi. Establish and maintain relevant laboratories or other institutions in strategic areas of Nigeria as may be necessary for the performance of its functions under this act.
- xii. Pronounce on the quality and safety of all regulated products and chemicals after appropriate analysis.

14. NEMA

i.

- i. Provide emergency call numbers
- ii. Coordinate the activities of relevant stakeholders and resources involved in Chemical and Biological emergencies.
- iii. Support in evacuation of affected people
- iv. Create awareness on Chemical and Biological incidents
- v. Development of plans related to Chemical and Biological incidents
- vi. Ensure regular simulation and exercises
- vii. Ensure periodic review of the Plan

15. Nigeria Nuclear Regulatory Authority (NNRA)

i. Responsible for nuclear safety and radiological protection regulation so as to ensure the protection of life, health, property and environment from the harmful effect of ionizing radiation while allowing beneficial practices

16. Nigeria Center for Disease Control (NCDC)

- Off-site laboratory analysis of hazardous materials,
- ii. Declarations of current and future status of the contaminated site should be issued in writing by the NCDC to the owner-occupier of the site.

17. National Biotechnology Development Agency (NABDA)

- i. Support in providing decontamination technology and resources for hazardous materials;
- ii. Support in providing treatment (technology and products) for victims of disaster in events of biological incidents;
- iii. Support in providing analyses of samples and contaminated materials (including DNA finger printing services) in events of biological incidents; and
- iv. Any other duties assigned by the lead and coordinating Agencies.

18. National Drug Law Enforcement Agency (NDLEA)

i. Regulate the use of chemical and biological substances **ii.**

19. Nigeria Custom Services

I. Control the movement of chemical and biological substances across the borders II.

20 Nigerian Red Cross (NRC)

i. Casualty evacuation and first Aid.

8.4 Management Structure

The overall strategy for preparedness for combat management of a major Chemical and Biological HazMat incident is based upon the approval of the National Chemical and Biological Emergency Preparedness and Response Plan through consultation and assent of the stakeholders and approval of the Federal Executive Council.

8.5 Threat, Hazard Identification & Risk Assessment

Risk can be categorized into two:

- a) Threats Risk shown by malicious intent e.g. terrorism, cyber crime etc.)
- b) Hazard- Natural and Human-Induced hazards: natural hazards such as severe weather and flood while Human-Induced hazard include industrial activities.

Selection of Risk:

The following chemicals have been identified to constitute risk in Nigeria. The chemicals can be referred to as hazardous substances because on their own or when combined may become hazardous or unstable. The chemicals /products have been used for illicit and terrorist acts. These include but not limited to the following:

- i. Acetone
- ii. Glycerine
- iii. Sodium hypochorite
- iv. Hexamine
- v. Benzene
- vi. Hydrogen peroxide
- vii. Potassium chlorate
- viii. Sodium Carbonate
- ix. Urea

- x. Ammonium Sulphate
- xi. Potassium nitrate
- xii. Sulphuric acid
- xiii. Nitric Acid
- xiv. Hydrochloric Acid
- xv. Citric acid
- xvi. Sulphur Powder
- xvii. Aluminum Powder
- xviii. Ammonium Nitrate
- xix. Ethylene Glycol
- xx. Methyl Ethyl ketone
- xxi. Potassium permanganate
- xxii. Sodium chlorite.
- xxiii. Acetic Anhydride

In hazard identification we need to consider the following:

- i. Concentration of agents
- ii. Potential of agents to spread
- iii. Toxicity of agents
- iv. Proximity of living organisms

8.6 Risk Assessment

A process of understanding the significance of potential event on the basis of their possibility or likelihood and impact. For the purpose of informing contingency planning and the assessment of the consequences it is essential that risk is clearly defined. The significance is provided on the risk outcome. Reasonable worst case scenario should be considered in developing a contingency plan.

8.7 Resource Mobilization

Resources to be mobilized at Pre, During and Post Emergency phases are:

- Personnel
- Material
- Funds

8.7.1 Pre- Emergency

8.7.1.1 Finances to support activities

- Intervention funds is to be created and domiciled in a competent government body (to be determined by the Main Committee)
- Funds shall accrue from sources such as joint Venture and other sources.
- Funds shall be made readily accessibility in the event of Chemical emergency.

8.7.1.2 Logistics

The following are to be put in place for logistics purpose:

- i. Transportation
- ii. Risk Assessment Information,
- iii. Vulnerability Capability Assessment
- iv. Communication and alert system (Nigeria Communication Commission NCC), telephone companies, National Orientation Agency (NOA), Telephone Companies, Traditional institutions)
- v. Standard operating procedure (SOP)
- vi. Surveillance and intelligence support
- vii. MOU with relevant partners, including on trans-boundary issue.
- viii. Recovery plan.

8.7.1.3 Training and Retraining

- i. Joint training, Simulation exercises, Drills, Table top exercise.
- ii. Each agency is responsible for the training of its own personnel to perform the roles and responsibilities assigned in this Plan.

8.7.1.4 Equipment and Facility Support

- i. Disaster Response Unit (DRU) requirement
- ii. Appropriate PPEs, Decontamination Station and other necessary equipment
- iii. Evacuation Equipment
- iv. Medical and life-support facilities and laboratories (mobile and stationaries)

8.7.1.5 Personnel

- i. Trained Medical, Paramedical Responders
- ii. Toxicologists
- iii. Fire Fighters
- iv. CBRNE / Hazmat team first responders
- v. Security Personnel and others

8.7.2 During Emergency

The following shall be carried out during emergency:

- i. Activation of Incident Command System (to be developed)
- ii. Fund Mobilization
- iii. Mobilization of Responders, Facility and Equipment Support.
- iv. Information sharing

8.7.3 Post Emergency

The following shall be carried out during post emergency phase:

- I. Activation of the Recovery plan which include :Relocation, Transportation, Shelter
- II. Emergency / Trauma Management
- III. Relief and Rehabilitation
- IV. Containment, Clean up and Disposal/ Destruction.

8.8 International Collaboration

The key objective of international collaboration is to guide and support national efforts in preparing and responding to Chemical and Biological incidents. Implementing authorities shall ensure close coordination with relevant international bodies in terms of early notification, capacity building and that standards are adhered to.

The following international organizations will be collaborated with in the course of implementing this plan:

OPCW: Capacity building, standardization etc

UNODC: Capacity building, standardization

BWC: Capacity building

UNDAC: Capacity building, standardization

UNIDO: Capacity building, standardization

USDOE: Capacity building, standardization

EU-CBRN: Capacity building, standardization

UNEP: Advice on environmental impact.

WHO: Mobilization of financial resource and public health support.

UNODA: Investigation assessment and verification of event.

Chapter Nine

9.0 Financing

9.1 Financial Resources

Financial resources are for: emergency preparedness and contingency funding for response; logistics mechanisms and essential supplies for health; training and equipment for human resources involved in Chemical and Biological emergencies.

Existing funding mechanisms for Chemical and Biological emergency in Nigeria are inadequate, therefore, Nigeria needs to mobilize additional and substantive financial resources. To do this effectively, the country needs to:

- a. Undertake Needs assessment (Financial, equipment, training etc) to properly determine the economic costs of early warning and preparedness systems in Nigeria.
- b. Review all multilateral and inter-agency mechanisms to finance Chemical and Biological Emergencies, and determine what capacities must be put in place to access and manage these funds.
- c. Revise the National Fiscal Policy to incorporate the National Chemical and Biological Emergency Response plan.
- d. A funding plan for CBE will be developed by the relevant ministries, departments, and agencies of the government following adoption of the National Chemical and biological Emergency Response plan.

Chapter Ten

10 Monitoring and Assessment

10.1 Quality assurance and program maintenance

Response monitoring intends to determine the progress of the plan implementation and accomplishments and, more importantly, assess the constraints and challenges that require immediate action or adjustments to guarantee appropriateness of response. This will ensure that resources are channeled in a principled manner according to laid down objectives. A Periodic Monitoring and Assessment will be carried out to ascertain the level of implementation, where appropriate recommendations will be proffered.

ONSA, National Authority and NEMA will be responsible for carrying out a bi-annual monitoring of the plan.

10.2 Plan – Review and Maintenance

This Plan should be subjected to review every two years by relevant stakeholders.



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