TOXIC WASTES AND THE NIGERIAN ENVIRONMENT: AN APPRAISAL

Mrs V E Kalu, LL.M; BL
Lecturer & Ag Head
Department of Private & Property Law
University of Benin, Benin City

Introduction

The 20th century has witnessed a lot of concern over the relationship between man and his environment.[1] The widespread concern has been manifested in the publication of a considerable number of scientific books and the issuance of policy statements by governments. Even the world religious communities have buried their differences and joined forces together in the common battle against man's abuse of the environment through declarations that formally spell out the responsibilities that adherents have towards the earth. In fact, Carson[2] in the early 1960s launched the great modern pulse of environmental awareness when she alarmed societies the world over by warning that DDT[3] and other dangerous pesticides would kill off songbirds and threaten the health of millions of people.

There is no doubt that the world inhabited today is a far cry from primitive times when man was one with nature and his environment. He had no problems of generating and disposing off wastes. But since man's massive conquest of nature, nature's mechanism for wastes disposal went also, leaving man not only to manufacture his food, weapons and conveniences, but also to dispose of the wastes,[4] the most dangerous of which are toxic wastes. As a result of the paradox of world technological advancement and the attendant concerns of its effects on the environment a baffled Eugene Linden[5] has this to say:

> The children of the 21st century will inherit a World in many ways beguiling. For everyone but the poorest, it beckons as a magical empire of Mammon, a madcap consumer's paradise of immediate gratification and express delivery of hot images and cool gadgets, of designer jeans and designer genes.[6] It is a dream world where chemists can turn a sow's ear into a silk purse, where bioengineers can put a little bit of sheep into wolf and the life–styles of the rich and the famous are beamed by satellite to every upwardly mobile village on the planet.

The greatest environmental problem the world faces today is pollution arising from a combination of factors – natural and man made. One of the deadliest of these factors is toxic waste. The focus of this paper is to examine the whole concept of toxic waste particularly in Nigeria; their generation, their hazardous effects on the environment and societal efforts at checking those effects. Where necessary, attention is drawn to efforts made at the world level to combat the problem.

Concept of Toxic Waste

"Toxic" and "hazardous" are used interchangeably when it comes to matters of environmental pollution. This is not surprising considering the fact that one is merely an

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1 Rabie, M.A. and Fuggle, R.F. eds., "The Rise of Environmental Concern" in *Environmental Management in South Africa* Wetton, Juta, 1996, 11.
2 Carson, R, "Silent Spring" cited in *Time Magazine* (special edition) November 1997, 80.
3 Diphenyl Dichloro Trichloroethane
4 Uchegbu, A., "The Legal Regulation of Environmental Protection and Enforcement in Nigeria" (1988/89) *Journal of Private & Property Law,* 58.
5 Eugene Linden, "What Have We Wrought?", *Time Magazine* (special edition) November 1997.
6 The world has just been exposed to the possibilities attainable by toying with genes such as in cloning

extension of the other.[7] The word "toxic" simply means "poisonous" just as a toxin is a poison. By extension, a poison is an agent that chemically destroys life or health upon contact with or absorption by an organism.[8] By implication, poisons are harmful to life and health and anything that is harmful is said to be hazardous.

"Waste" on the other hand means something which originally served a purpose, but is no longer useful, as for example, refuse. They are things left over or are superfluous as excess materials or by-products not required for use in the work at hand. In the context of the topic under discussion, wastes are derived from mechanical and chemical disintegration. In the industrial context, when chemicals are produced, the residue forms wastes and these are more often than not toxic.

Wastes can be classified according to their sources and they come in different forms. They can be organic (e.g. unfinished food) or non-organic (e.g. empty food cans), solid or liquid such as bottles and sewage effluents respectively. They can also be in form of gases such as carbon monoxide from generating sets.[9] It has been noted however that it is not every kind of waste that is dangerous. What constitutes waste to one man may in fact be raw materials to another.[10] It is a common sight nowadays in our cities to see refuse dumps being hunted by stick wielding youths in filthy rags scavenging for materials (originally disposed of as useless items by their owners), which are then recycled by different industries to produce useful objects of various kinds. Nevertheless, in as much as wastes may have their uses, it is a different kettle of fish altogether when such wastes are classified as dangerous, and in this particular context as toxic.[11] Toxic wastes are hazardous because of their physical or chemical quality; it is even more so when they are in large quantities. Such wastes cause grave illnesses and contribute significantly to the destruction of life forms of all kinds.

What constitutes toxic waste is legion. In 1989, an international convention on the control of the transboundary movement of hazardous wastes and disposal was held at Basel, Switzerland[12] and this Convention adopted a similar approach to the principles adopted in the United States of America for the definition of hazardous wastes.[13] There are a total of 18 types of wastes listed in Annex 1 of the Convention as hazardous or "waste streams" and these include clinical wastes from hospitals; wastes from the manufacture of wood preserving chemicals; wastes generated from heavy metal toxicants such as metal dusts; ignitable wastes; and heave metal solution etc. There are also other toxic waste materials classified by the said Annex I of the Convention. These are constituents such as mercury, lead and asbestos. In all these cases, what determines the hazardous nature of any of the classified wastes in the convention is the possession of any of the qualities contained in Annex III, such characteristics being inflammable, explosive, toxic or ecotoxic. Toxic is defined in the Basel Convention as having poisonous effects if breathed in, eaten or absorbed by the skin, including carcinogenicity i.e. cancer – producing.[14] In Nigeria under section 15 of the Harmful Wastes (Special Criminal Provisions etc.) Act,[15] harmful wastes mean:

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7 One is used to bring about the state of the other.
8 *New Webster's Dictionary of the English Language,* Encyclopedic Edition
9 Malcolm, R., *A Guide Book to Environmental Law,* London: Sweet & Maxwell, 1994, 193-194.
10 Obiter in *Berridge Incinerators Ltd. V. Nottinghamshire County Council* cited in Malcolm, id, 198.
11 Different Legal regimes use other terms such as "special wastes" (England) "hazardous wastes" (U.S.) etc.
12 Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, 1989.
13 See the United States Environmental Protection Agency's definition of hazardous waste (toxic waste) at http://www.epa.gov/epaoswer/osw/hazwaste.htm
14 Malcolm, id 195.
15 Cap. H1, Laws of the Federation of Nigeria (LFN) 2004

> Any injurious poisonous, toxic or noxious substance and, in particular, nuclear wastes emitting any radioactive substance … as to subject a person to the risk of death, fatal injury or incurable impairment of physical or mental health.

Uchegbu is of the opinion (and we agree) that these wastes as defined by the Act need not be harmful. It is enough if they create a risk of death or injury either immediately or in the future.[16]

Sources of Toxic Waste[17]

The sources of toxic or hazardous wastes can broadly be categorised into two – human and natural.

(a) *Human Sources:* Most known toxic wastes arise from businesses, refineries and industries. The volume of waste generated by industries is frightening because of its overall effects on the environment, and considering the fact that most of these toxic wastes are untreated before disposal especially in a developing country like Nigeria where there is virtually little or no treatment and disposal regulations.[18] The toxic waste generated by industries may be liquid, solid or gaseous depending on the products of such industries and the raw materials used in their manufacture. Some of the industries, which generate toxic wastes, include the following:

Chemical manufacturing plants that produce wastes types such as strong acids and bases, spent solvents and reactive wastes;

- Cleaning agents/cosmetic-manufacturing industry, which generates heavy metal dust, ignitable waste, flammable solvents, strong acids and bases.
- Printing industry which generates heavy metal solutions, wastes ink, solvents, spent electroplating wastes, ink sludge containing heavy metals;
- Furniture and wood manufacturing and refinishing plants produce ignitable wastes and spent solvents;
- Metal manufacturing industries produce place wastes containing heavy metals, strong acids and bases, cyanide wastes and sludge containing heavy metals;
- Leather products manufacturing plants produce benzene (a clear colourless, aromatic liquid extracted from coal tar and used as a solvent and intermediate in manufacturing organic chemicals) and wastes toluene (a colourless, flammable, mobile liquid hydrocarbon obtained from coal tar and petroleum, used in making explosives, dyes and as a solvent);
    - Paper industry which produces print wastes containing heavy metals, ignitable solvents, strong acid and bases; and
    - Vehicle manufacturing and maintenance shops which produce heavy metal wastes, ignitable wastes, used lead acid batteries and spent solvents.[19]

The above list is by no means exhaustive and the greatest culprit of toxic waste generation is the nuclear industry where the wastes generated are just as dangerous to handle as the nuclear products themselves. There are also some organic substances

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16 Uchegbu, A, "Transboundary Movements of Hazardous Wastes in International Law" in Omotola, J A (ed) *Environmental Laws and Compensation in Nigeria*, Lagos, University Press, 1990, 206.

17 Ademoroti, C M A, *Environmental Chemistry and Toxicology,* Ibadan, Foludex Press, 1996, 186.

18 See however the provisions of National Environmental Protection (Effluent Limitation) Regulation, 1991 which provides that every industry shall install antipollution equipment for the detoxification of effluents and chemical discharges emanating from the industry.

19 Ademoroti, id, 187

such as solvents and vapours, which are made up of such things as kerosene, petrol, tetracloromethane etc. Pesticides, such as DDT are also toxic in nature and extremely dangerous when used improperly.

Happily, Nigeria has no nuclear industry for now but her oil and gas industry is responsible for the generation of a very large volume of toxic wastes generation.

(b) *Natural Sources:* The most obvious natural sources of toxic wastes include volcanoes which upon eruption, produce a lot of toxic gases and undesirable and damaging larvae, and, of course, food containing phytoxins which are highly poisonous when improperly processed or eaten raw.[20]

Effects of Toxic Wastes on the Nigerian Environment

The harmful effect of toxic wastes cannot be overemphasized. Toxic wastes are hazardous because when the chemical contents of the wastes react with the atmosphere, the wastes endanger health and impair the ecological system. Thus, for example, an industrial waste that is toxic could escape from its captivity and seep into the ground and from there to the streams and rivers causing death to marine life and persons. The most obvious culprit in this field is oil spillage, which results in a number of health hazards to man an outright destruction of marine life. A good example is the Lake NYOS incident in Cameroon,[21] and the Finima 5 oil blowout in Nigeria in which 400,000 sq. metres of water bodies and life forms were affected in Rivers State. There are also industrial wastes such as those generated in the refineries, which contain highly flammable solvents with low flashpoint, which could catch fire in high temperatures, and emit toxic smoke.

Across the globe, the nuclear industry today has done more than its fair share of damage to life forms and the environment. World War Π is a gruesome reminder of the devastation caused by atomic bombs in Hiroshima and Nagasaki, Japan.[22] Two decades ago, mankind recorded the Chernobyl nuclear disaster in Russia which left 16 kilometres radius of the environment within the nuclear reactor site desolate. Till date, there is no life form, flora or fauna is in the area and a lot of persons and livestock even in neighbouring countries were exposed to an unprecedented level of radiation and either died or was destroyed.[23]

Toxic emissions from industries, which burn fuels and even worn motor engines, have devastating effects on life forms when inhaled. Acid rains[24] are a nightmare to those who live in the vicinity of industries that generate such toxic emissions. The discharge of untreated industrial wastes effluents into streams have been known to kill marine life and damage crops irrigated with water from such streams.

Wastes from substances such as mercury and its compound affect human, plant and animal life. The Japanese realized the extent of the dangers of mercury in May

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20 The deadliest phyto-toxin is cyanide contained in most plants such as cassava.

21 More than 1,700 people died after deadly gases spewed from Lake Nyos 20 years ago. In August 1986 the lake released a cloud of carbon dioxide, which hugged the ground and flowed down surrounding valleys to suffocate thousands of local villagers and animals. See http://www.fire.org.uk/BBC_News/News2001/February/bbc050201e.htm (accessed 25/05/06) for details.

22 Ralph Raico, "Harry S. Truman: Advancing the Revolution" in Denson, J V (ed) *Reassessing the Presidency: The Rise of the Executive State and the Decline of Freedom,* Alabama: Ludwig von Mises Institute, 2001 reproduced in an excerpt titled, "Hiroshima and Nagasaki" at http://www.lewrockwell.com/raico/raico22.html accessed 25/05/06.

23 See http://www.chernobyl.info/index.php?userhash=14312965&navID=155&lID=2 (accessed 25/05/06) for details, it being a comprehensive site about the 1986 accident

24 It has been reported that more than 11 million hectares of forests are destroyed every year by acid rain. See *Newswatch Magazine*, June 26, 1988, 14.

1956 when one industry processing methyl-mercury discharged its wastes into a lake and this accumulated in the tissues of fishes that later died and also resulted in the death of thousands of villagers who ate fish from the lake. Their women gave birth to deformed children.[25] Wastes from deadly agricultural chemicals cause fatal havoc. In 1986, the River Rhine (a commercially vital river) was the target of Western Europe's worst ecological accident when agricultural chemical wastes were dumped into it. The water became unfit for consumption and the marine life was wiped out. In 1970, PCB[26] was dumped in the Irish river, which resulted in the loss of 10,000 sea birds. The list is endless.

Poisonous gas leakages have their deadly effects. The people of Bhopal in India suffered from the effects of poisonous gas leak from the Union Carbide Corporation. Over 8,000 people were killed and over 50,000 injured when following an explosion of over 40 tons of Methyl Isocynanate (MIC) and other deadly gasses leaked from the Union Carbide pesticide plant. While all the evidence pointed to corporate negligence, the company blamed sabotage. Again deadly methyisucynate gas from the US multi-national plant killed more than 25,000 and injured 200,000 others.[27] Industrial gases have also been identified as a threat to the protective ozone layer, which shields life from the harmful ultraviolet rays of the sun. The layer is already deteriorating from the effects of increased global temperatures and chlorofluorocarbons found in aerosol sprays and the like. The world temperatures are reported to be increasing as a result of the build-up of carbon dioxide and other gases from man-made resources such as power plants and automobiles.

There is no doubt about the harmful and devastating effects of toxic wastes. One can go on and on. Suffice it to say that the harmful effects of toxic wastes are legion and that is probably why the indiscriminate trade in dumping and discharge of toxic wastes have met with stiffer sanctions and penalties in different parts of the world than other sources of environmental pollution.

In Nigeria, there is virtually little or no official data relating to the harmful effects of toxic wastes on the environment. However, events of the last decade on the social-political terrain of the country is a pointer to the fact that environmental pollution – a fairly large proportion of which is toxic – is one factor that is responsible for the civil unrests in the Niger-Delta region of Nigeria. Media reports are replete with accounts of the alarming level of environmental degradation arising from the industries particularly the oil and gas industry.

The advancement of scientific knowledge has led to the industrialization of the society. This has in turn, resulted in the growth of many industrial concerns, which produce harmful wastes and effluents. Toxic emissions from industries that burn fuels have devastating effects on life forms when inhaled. Acid rains are a nightmare to those who live in the vicinity of industries that generate toxic emission. It has been reported that more than 11 million hectares of forest are destroyed every year by acid rain.[28] The discharge of industrial waste effluents into streams have been known to kill marine life and damage crops irrigated with water from such streams.[29] The same result occurs from the indiscriminate and deliberate dumping of toxic chemicals into streams to kill fish and endanger all other life forms including humans in the process. Oil producing areas in Nigeria have been identified as danger zones of pollution arising from toxic wastes.

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[25] In Japan, industrial discharge of mercury into Minamata Bay raised the concentration of the metal in fish, resulting in serious human intoxication and deaths following consumption of the contaminated fish. For more information, see TED Case Studies, "Minamata Disaster" at http://www.american.edu/TED/MINAMATA.HTM accessed 25/05/06.

[26] Polychlorinated biphenyl, which is a class of organic compound whose molecules contain carbon.

[27] For more information, see Bhopal Information Centre at http://www.bhopal.com/ accessed 25/05/06.

[28] See *Newswatch Magazine*, June 26. 1988, 14.

[29] Ibid.

Higher incidents of birth defects and cancer are becoming more rampant in such areas as a result of gas pollution from the gas-flaring activities of oil companies. Oil spillages are a part of the Nigerian society. It is so common that the reverse situation is odd. The incident of oil pollution in the oil-producing areas of Nigeria has its effects on agricultural land and streams thereby making them unsuitable for biotic life. On January 17, 1980, there was the Texaco Finima 5 oil blowout in the Niger-Delta. It was curtailed after 30 days, at which time it had caught fire and emitted poisonous gases into the air. About 200,000 barrels of oil was lost. Four villages including marine life in the town of Finima and Sangama River were polluted, leaving 350 hectares of mangroves dead. November 2, 1982 witnessed another major spillage at Abudu oil pipeline. The oil flowed into the nearby villages leaving untold destruction behind. The crops withered, the soil dried up and marine life died. These are just a few of several such incidents. However three incidents that are highly relevant to the subject under discussion are the Koko incident of 1988,[30] the Jesse fire disaster of October 17, 1998[31] and the recent pipeline explosion in Ilado Village in Lagos State.[32] The flaring of natural gas had led to an increase in the climatic temperature of gas producing communities and a destruction of the biotic life in such areas. Dwelling houses around such sites are bathed in acid rains, which also leave farmlands wasted and unproductive.

In summary, toxic wastes in Nigeria do not only cause loss of lives, they also have the effect of crippling the economic and social lives of the people directly affected. Marine and biotic life forms are also not spared, while the degrading effect on the environment generally is incalculable.

The Way Forward

The general and collective need to safeguard the environment from pollution has led to a number of measures taken by the world society to check the rape, abuse and degradation of the environment as a result of unprecedented scientific, industrial and technological developments taking place in the world. These measures range from public enlightenment, demonstration by NGOs and other world bodies to outright legislation following the formulation of environmental policies and strategies by various countries and international organizations both at the regional and world levels. However, we shall confine ourselves to measures taken to control toxic wastes pollution of the environment.

In Nigeria, the "Koko incident" of 1988 rudely jolted the Nigerian government to the reality of toxic wastes when same were dumped at Koko port in the then Bendel State of Nigeria by some Italian business frauds with the active connivance of a poverty-stricken, ignorant and hungry villager, Sunday Nana[33] for a miserable sum of N500.00 monthly. Prior to 1988, the government of Nigeria had no meaningful environmental policy. Thanks to the resourcefulness of the Italian businessmen and Sunday Nana, the Nigerian government in its usual fire-brigade approach to problems, came out with its

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30 For a detailed press account and analysis of the incident, see *Newswatch Magazine*, June 26, 1988; Ikhariale, M, "The Koko Incident: The Environment and the Law" in Shyllon, F (ed) *The Law and the Environment in Nigeria*, Ibadan, Vantage Publishers, 1989.

31 The severe scarcity of fuel in Nigeria in 1998 is the culprit of the Jesse fire incident. The locals of Jesse town in Delta State found an avenue of making quick money from the Nigerian National Petroleum Corporation (NNPC) petroleum pipeline that was left open by vandals. They went in droves to "fetch" petrol for sale defying all warnings of the dangers involved in such activity. The result was a massive explosion that claimed over 1,000 lives including women, children and babies. The resultant fire burned for days emitting harmful smoke and petroleum gases into the environment and the destruction of all life forms in the immediate vicinity of the incident.

32 The local and foreign media widely reported the NNPC pipeline explosion in Ilado Village that occurred on Friday, May 12 2006 leaving over 200 persons dead with some corpses floating in the nearby river. The cause of the explosion was attributed to the activities of pipeline vandals.

33 Now reported dead allegedly from the effects of the toxic wastes dump in his compound.

first policy statement on matters of environmental protection and went a step further to enact the Harmful Wastes (Special Criminal Provision etc.) Act, 1988, which makes it an offence for any person to "carry, deposit, dump, or be in possession, for the purpose of carrying, depositing or dumping, any harmful waste anywhere on Nigerian soil, inland waters or seas".[34] This is a strict liability offence, which even excludes the defence of diplomatic immunity. Again, at the State level in Nigeria, Imo State enacted the Pollution (Prevention and Control, Miscellaneous Provision) Edict, 1985 to deal among others, with the compulsory arrangements by industries that generate toxic industrial wastes to adequately treat and dispose of such wastes.

Both at the national and state levels, there are regulations (though mainly unenforced) requiring industries to have treatment plants for their waste products that are harmful to the environment before disposal. Oil companies are now more conscious of the environmental hazards and damage caused by their activities and is taking steps to minimize or correct same. The Federal Government is currently embarking on a number of projects (e.g. the liquefied natural gas) aimed at converting the gas that in currently being flared to natural gas for export.

On the international scene, a lot has been achieved in the checking of the effects of toxic wastes. Apart from a society that is environmentally conscious, the western world has been able to put a lot of legislation in place with the volume of industrial development and resultantly the level of toxic wastes generated in such industries. The legislative regimes are rigorous and are accompanied by very stiff penalties. Waste generators are made to adopt safety measures or pay heavily for their crimes. In fact, the situation is such that in the worlds of Murphy:

> Selecting an offside TSD[35] for hazardous wastes is similar to selecting a spouse. Both decisions are important and can lead to years of satisfaction or grief, and can result in unanticipated expenses and legal implications. In today's legal climate, however, it is often easier and less costly to extricate a client from a bad marriage than from an unfortunate disposal facility selection.

In the United States, there are several federal and state laws and regulations specifically devoted to the protection of the environment from toxic waste. The various government agencies involved in environmental matters are generously invested with authority to deal with any erring generator of toxic waste. It is so serious that prudent industrialists avoid being caught violating laws on toxic wastes management. The laws of developed countries on toxic wastes management are such that no wastes generator can easily escape liability for defective disposal and no one can tell when such risk will terminate because a careless disposal today may attract liability in fifty years time. Legislation such as Resource Conservation and Recovery Act, (RCRA) the Comprehensive Environmental Response, Compensation and Liability Act, 1982 (CERCLA) or the Superfund (all in the US)[36] as well as other Federal and state environmental statutes make sure of that. The position is the same in Europe.[37]

In summary, the "Polluter Pays Principle" (PPP) has become a common international approach to environmental problems of compensation and damages. The European Community (EC), Organisation for Economic Co-operation and Development (OECD) and the Council of Europe as well as the United State's CERCLA has even adopted this principle.

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34 Section 1(2)(a) of the Harmful Wastes (Special Criminal Provisions etc.) Act, 1988.

35 TSD means Treatment, Storage and Disposal services

36 The United States Congress established the Superfund Programme in 1980 to locate, investigate, and clean up the worst toxic waste sites nationwide in America. The U.S. Environmental Protection Agency administers the Superfund Programme in cooperation with individual states and tribal governments.

37 Control of pollution (special wastes) Regulations, 1980, U.K

International conventions in the area of toxic waste management include the Vienna Convention on Early Notification of a Nuclear Accident and the Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and their Disposal. In Nigeria there are three principal legislative attempts to deal with waste management. These are the Federal Environmental Protection Agency Act, 1988,[38] Harmful Wastes (Special Criminal Provisions etc.) Act, 1988, and the Environmental Impact Assessment Act, 1992.[39] It is our submission that these pieces of legislation and the regulations made under some of them are not enough to check the harmful effects of toxic waste dump. Perhaps, the Federal Government would do well to institute a programme similar to that of the US Superfund Programme as backup to sanctions imposed under the current laws in order to make any meaningful impact.

Conclusion

The era of environmental dormancy is over. All over the globe, governments and various bodies have generated a greater awareness as to the need to protect the environment. There is no doubt that toxic wastes have done a fair share of damage to the environment as discussed above even though only very few instances are apparent on the face of this paper. However, this generation has done more for the environment in terms of measures for its protection and preservation than past generations. Different national governments have put strict legislation in place to deal with indiscriminate handling and disposal of toxic wastes, with Europe and America in the forefront.

The developing countries that used to benefit from trade in toxic waste have now repented and are making efforts to tow the path blazed by Europe and America, having realized that they are heading for extinction due to the hazardous nature of the cargoes of toxic wastes dumped in their territories. It is recommended that Nigeria should make efforts to tow the lines of the West, especially the USA in environmental concerns, and it is hoped that all these efforts will lead to a better place for mankind and other life forms in the environment.

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[38] Cap E10 LFN, 2004

[39] Cap E12 LFN, 2004