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United Nations Development Programme
Global Environment Facility
Country: Republic of Armenia
PROJECT DOCUMENT

Project Title: Elimination of Obsolete Pesticide Stockpiles and Addressing POPs Contaminated Sites within a Sound Chemicals Management Framework

UNDAF Outcome(s): Environmental Sustainability

UNDAF Outcome 4: Environment and disaster risk reduction is integrated into national and local development frameworks.

Relevant CP/CPAP Outcome(s) and Indicator (s)

Outcome: 4.1. Armenia is better able to address key environmental challenges including climate change and natural resource management.

Output: 4.1.1. National policies and tools for implementation of and compliance with international environmental agreements are developed and adopted

Implementing Partner: Ministry of Nature Protection in association with the Ministry of Emergency Situations

Responsible Partners: United Nations Development Programme

Brief Description

The objective of the project is to protect human health and the environment globally as well as locally through elimination of POPs and obsolete pesticide stockpiles, and addressing associated contaminated sites within a sound chemicals management framework. The project is directed jointly by the Ministry of Nature Protection and the Ministry of Emergency Situations in partnership with the Ministry of Agriculture. It will meet this objective by eliminating a large POPs pesticide burial site that represents the major POPs stockpile and waste legacy for the country as well as residual obsolete pesticide stores at 24 locations. In total, approximately 7,100 t of POPs waste in the form of heavily contaminated soil, 1,050 t of POPs pesticides and other obsolete pesticides will be recovered, secured and ultimately treated and destroyed in an environmentally sound fashion. A further 12,700 t of less severely POPs contaminated soil will be securely contained. Additionally the project will provide critically needed hazardous waste infrastructure and national technical capability for the ongoing management of POPs and other chemical hazardous wastes as well as supporting the strengthening of institutional and regulatory capacity within an overall chemicals management framework.

Programme Period:	2014-2018
Atlas Award ID:	00081909
Project ID:	00091031
PIMS #:	4905
Start date:	November 2014
End Date:	November 2018
Management Arrangements:	NIM
LPAC date:	t.b.d.

Total resources required:	<u>\$23,924,384</u>
Total allocated resources:	<u>\$23,984,384</u>
• Regular (UNDP)	\$200,000
• GEF	\$4,700,000
• Other:	
◦ Government	\$16,020,000
◦ UNDP (Czech TF)	\$60,000
◦ Private sector	\$ 2,640,000
◦ Other (OSCE)	\$364,384

Agreed by the Government
of the Republic of Armenia:

	Date/Month/Year	Signature
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Agreed by the (Executing Entity/

Implementing Partner:

	Date/Month/Year	Signature
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Agreed by
UNDP Resident Representative in Armenia:

	Date/Month/Year	Signature
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List of Acronyms

ADB – Asian Development Bank
ADR — International Carriage of Dangerous Goods by Road
APC – Air Pollution Control
AUA – American University of Armenia
AWHHE – Armenian Women for Health and a Healthy Environment
BEP/BAT — Best Environmental Practice / Best Available Techniques
CCME – Canadian Council of Ministers of the Environment
CIS – Commonwealth of Independent States
COP – Conference of Parties
DE – Destruction Efficiency
DRE – Destruction Removal Efficiency
DTM – Digital Terrain Modelling
EBRD – European Bank for Reconstruction and Development
ECD – Electron Capture Detector
EHS – Environment Health and Safety
EIA – Environmental Impact Assessment
EMP – Environmental Management Plan
ENGO – Environmental Non-Government Organization
EOI – Expression of Interest
EU – European Union
FAO – Food and Agriculture Organization of the United Nations
FSP – Full-sized Project
GC – Gas Chromatograph
GDP- Gross Domestic Product
GEF – Global Environmental Benefit
GEF — Global Environment Facility
GHG - Greenhouse Gases
HCH - Hexachlorocyclohexane (lindane)
HTI – High Temperature Incineration
HW – Hazardous Waste
IBRD – International Bank for Reconstruction and Development
INC - Intergovernmental Negotiation Committee
IPEN – International POPs Elimination Network
KfW - Kreditanstalt für Wiederaufbau (German Development Bank)
MEAs – Multilateral Environmental Agreements

MES- Ministry of Emergency Situations
MNP – Ministry of Nature Protection
MoA – Ministry of Agriculture
MoH – Ministry of Health
MTE and FTE – Mid-term and final evaluations
NIP — National Implementation Plan for the Stockholm Convention
NGO — Non Governmental Organization
OCP- Organochlorine Pesticide
OPs – Obsolete Pesticides
OSCE- Organization for Security and Cooperation in Europe
PAH – Polyaromatic Hydrocarbon
PCDD/Fs — Dioxins and furans
PIC - Prior Informed Consent
PIF – Project Identification Framework
PIU — Project Implementation Unit
PCB – Polychlorinated byphenils
PCDD/F – dioxins and furans
POPs — Persistent Organic Pollutants
PPE - Personal protective equipment
RA – Republic of Armenia
SAICM – Strategic Approach for International Chemicals Management
SC – Stockholm Convention
SWM – Solid Waste Management
TOR — Terms of Reference
UN – United Nations
UNDP — United Nations Development Programme
UNEP — United Nations Environment Programme
UNIDO- United Nations Industrial Development Organization
UNOPS – United Nations Organization for Project Services
USEPA – The United States Environmental Protection Agency
U-POPs — Unintentionally Produced Persistent Organic Pollutants
WB – The World Bank
WHO — World Health Organization

I. Situation analysis

General country information

Armenia is a small land locked country located in the Caucasus region of South Eastern Europe, bordering Georgia in the North, Azerbaijan in the North-East, East, and South-West, Iran in the South and Turkey in the West. 90% of the territory is at the height of 1,000 m above the sea level and higher with an average of 1,800 m. The total area of the country is 29,740 sq km: 46.8% agricultural lands; 12.7% - forests and 5.6% - surface waters; 34.9% - other. The largest lake in Armenia is Sevan, the fresh waters of which are considered a natural reservoir of drinking water for the entire region. Armenia is characterized by a mountainous continental climate, remarkable for its dryness.

As to January 1, 2003 resident population of the Republic of Armenia was 3,210,300 persons, of which 52% were female. The urban population is 2,062,200 of which 1,102,000 were in the capital Yerevan. The ethnic breakdown is 96% Armenian with the remainder Russian, Yezide, Kurd, Assyrian, Greeks, Ukrainian, Jews and others.

Armenia gained independence in 1991 and has been constituted as a sovereign, democratic republic with state power being administered pursuant to the Constitution and the laws based on the principle of separation of the legislative, executive and judicial power. The Constitution was adopted on July 5, 1995 as a result of nation-wide referendum and is the main Law of the Republic of Armenia, and is the guarantee of independent democratic society, based on the supremacy of social justice and law. The head of state is the President who ensures compliance with the Constitution, normal operation of the legislative, executive and judiciary authorities, and serves as the guarantor of sovereignty, territorial integrity and security of the country. The territorial and administrative division of the country under the national government structure consists of 11 marzes or regions (including the capital city of Yerevan that has a status of a marz with 12 districts/ circuit communities), 47 urban and 871 village communities.

Armenia was always characterized by its developed industry and agriculture. There are substantial mineral resources of such as tufa, marble, pumice, perlite, limestone, basalt, and salt, coal, iron, bauxites, copper, molybdenum, gold, silver, lead, and zinc. There is also a great diversity of precious and semi-precious stones. Likewise, agriculture is well developed particularly in the southern part of the country. In Armenia during 1990 - 1993, an extreme decrease (53%) of Gross Domestic Product (GDP) occurred but with the transition to a market economy since then the country has seen dramatic improvements in growth.

In summary, Armenia is characterized as having a strong national identity reflective of its long and deep cultural history, a stable democratic government, and well developed civil society, particularly as represented by active environmental NGOs. However, like other states of the Former Soviet Union, it still suffers from the cumulative environmental legacies associated with a long period of a centralized command economy. Armenia with its highly developed agricultural sector (19% of GDP) had among the highest application rates of pesticides, particularly organochlorine pesticides (OCPs) in the Soviet Union. As a consequence the potential for human and environmental impacts associated with this use are widespread. Similarly, retained stockpiles of obsolete pesticides and associated contaminated sites are a leading manifestation of historical environmental legacies and source of continuing possible health risk and environmental degradation. More generally, such legacies include those associated with chemicals from closed industrial operations and resource extraction.

Foreign relations

Armenia is a member of the World Trade Organization and United Nations with most of its agencies having active programs in the country. Regionally, it is a member of the Commonwealth of Independent States (CIS), the Council of Europe, and the Organization of Black Sea Economic Cooperation. It is also a member of the CTSO military alliance, participates in NATO's Partnership for Peace Programme and is an observer member of the Eurasian Economic Community and the Non-Aligned Movement. Membership is also held in several International Financial Institutions (IFIs), including the International Monetary Fund (IMF), International Bank for Reconstruction and Development (IBRD), International Finance Corporation (IFC), European Bank for Reconstruction and Development (EBRD), and Asian Development Bank (ADB). A Partnership and Cooperation Agreement between Armenia and the European Union (EU) has been in place since 2000. The country is active in the EU "European Neighbourhood Policy"¹ and signed the EU-Armenia Action Plan² in 2006. Additionally, Armenia hosts delegations and active programs from the Organization for Security and Cooperation in Europe (OSCE) as well as many bilateral assistance organizations through national diplomatic delegations including the United States Agency for International Development (USAID).

General environmental setting

Upon independence in 1992, Armenia had accumulated a similar range of environmental legacies characteristic of many countries in the Former Soviet Union and Eastern Europe operating under command economies that had fallen behind in terms of balancing gross production with environmental quality. In 1998, the country adopted its first formal National Environmental Action Programme (NEAP-1)³. Based on its implementation, it has made significant gains in improving environmental protection and the general quality of its environmental resources over the last decade. Based on a periodic updating process, NEAP 2⁴ is currently being finalized to sustain this process.

The principal environmental issues identified in the country include maintaining biodiversity, combating desertification, addressing climate change impacts and adaptation issues, urban air quality, water quality and distribution, and hazardous and solid waste management. In addition to specific programs to address these specific issues, a number of overarching policy themes are being pursued including i) reduction in the current dependence on high energy intensity technology with adoption of cleaner production approaches, ii) ecosystem approaches to land and service water protection, iv) integration of environmental and sustainable development into national economic and social policy particularly in relation to health and poverty reduction, and v) maintaining and expanding participation in multilateral environmental agreements, both regionally and globally.

Of particular interest at a policy level is enlarging of cooperation with EU in the environmental sector and integration with EU institutions. In this regard the effective implementation of the

¹ http://ec.europa.eu/world/enp/partners/enp_armenia_en.htm

² http://ec.europa.eu/world/enp/pdf/action_plans/armenia_enp_ap_final_en.pdf

³ http://www.mnp.am/eng_htmls/frset_glink7_1.htm

⁴ Draft Second National Environmental Action Programme, MNR, October 2007

provisions of Partnership and Cooperation Agreement between Armenia, the EU European Communities and its member countries is considered a primary vehicle for this, something that is given substance under the EU “European Neighbourhood Policy” and EU-Armenia Action Plan. These specifically attach priorities to things like harmonization of regulation generally, particularly those on environment, trade and customs with the EU.

With regard to Armenia’s participation in multilateral environmental agreements (MEAs) associated with sound handling of dangerous chemicals and wastes, the following table provides information on participation, signing and ratification status by the Government of Armenia.

Table 1. International conventions and multilateral agreements signed, ratified and acceded to by Armenia

Multilateral Environmental Agreement	Participation/ Signing Status	Ratification/ Accession (a)	Responsible National Institution
Stockholm Convention on Persistent Organic Pollutants	May 23/2001	Nov. 26/2003	MNP
Basel Convention on the Trans-boundary Movement of Hazardous Waste and their Disposal	n/a	Oct. 1/1999 (a)	MNP
Rotterdam Convention on Prior Informed Consent for Certain Chemicals and Pesticides in International Trade	Sept. 11/ 1998	Nov. 26/2003	MNP
Minamata Convention on Mercury	Oct. 10/2013		MNP
Vienna Convention	n/a	Oct. 1/1999	MNP
Montreal Protocol	n/a	Oct. 1/1999	MNP
– London Amendment to the Montreal Protocol	n/a	Nov. 26/2003	MNP
– Copenhagen Amendment to the Montreal Protocol	n/a	Nov. 26/2003	MNP
– Montreal Amendment to the Montreal Protocol	n/a	Dec. 18/2008	MNP
– Beijing Amendment to the Montreal Protocol	n/a	Dec. 18/2008	MNP
Development of a National Profile on chemicals management, (SAICM implementation)	2003 Updated 2007	n/a	MNP
Convention on Trans-Boundary Effects of Industrial Accidents	n/a	Feb. 21/1997	MNP/MES
UNECE Convention on Long-Range Trans-boundary Air Pollution	n/a	Feb. 21/1997 (a)	MNP
– Gothenburg Protocol to Abate Acidification, Eutrophication, and Ground-Level Ozone	Dec.1/1999		
– Aarhus Protocol on Persistent Organic Pollutants	Dec. 18/1998		
– Aarhus Protocol on Heavy Metals	Dec. 18/1998		
Convention on Access to Information, Public Participation in Decision Making, and Access to Justice in Environmental Matters	June 25/1998	June 27/2001	MNP

– Protocol on Pollutant Release and Transfer Registers	Mar. 21/2003		
ESPOO Convention on Environmental Impact Assessment in a Trans-boundary Context	n/a	Feb. 21/1997 (a)	MNP
– Protocol on Strategic Environmental Assessment	Mar. 21/2003		
UN Framework Convention on Climate Change	June 13/1992	May 14/1993	MNP
– Kyoto Protocol	n/a	April 25/2003	
UN Convention to Combat Desertification	Oct. 14/1994	July 2/1997	MNP
Convention on Biological Diversity	June 5/1992	May 14/1993	MNP
– Cartagena Protocol on Bio-safety	n/a	April 30/2004 (a)	

In addition, Armenia has acceded to the UNECE European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR), and is pursuing participation as an active member.

National legislative framework on waste and chemicals management

The principles of state regulation dealing with issues of environmental protection are established under Article 10 of Constitution of the Republic of Armenia, which states that “The state shall ensure the protection and reproduction of the environment and the rational utilization of natural resources”. The main overarching legal document in the sphere of Environmental Protection is the law adopted by the National Assembly (Parliament) of Armenia in 1991: “Fundamentals of the Republic of Armenia Legislation on Nature Protection”. Two Articles specifically relate to hazardous and chemicals waste management, Article 72 provides for the establishment of standards for allowable release and presence in the environments, in food and in products used, specifically for agriculture. It also specifies the Ministry of Nature Protection and Ministry of Health as the responsible state authorities. Article 27 establishes the polluter pay principle including upon on industrial, agricultural, and municipal entities where they are the generator of pollution.

The following provides a listing of specific legal acts and regulatory measures governing chemicals and hazardous waste management including OPs.

Table 2. Legal Acts and Regulatory Measures Governing Chemicals and Hazardous Waste Management

Legal Act Name	Adoption date/ No.	Responsibility	Application to POPs pesticides and OPs
General Chemicals Management			
Decision of the Government of the Republic of Armenia “On approval of the List of chemicals and pesticides banned in the Republic of Armenia”	March 17, 2005; No. 293-N	No single responsible entity	Regulated obsolete pesticides, including POPs as hazardous waste
Protocol Decision of the Government of the Republic of Armenia “Endorsement of the National Profile on Chemicals and Waste Management”	July 8, 2004; No. 26	Ministry of nature protection as a leading entity	
Draft Law “On Chemicals” has been developed and submitted to the Republic of Armenia Government with enactment pending. The subject matter of the Law make	Pending		Links chemicals handling generally to ensuring

Legal Act Name	Adoption date/ No.	Responsibility	Application to POPs pesticides and OPs
issues			environmental protection and human health
Republic of Armenia Governmental Decision No. 57 of “On approval of the list substances, biogenic elements, heavy metals or compounds thereof and other substances having negative impact on ecosystem of Lake Sevan	January 24, 2002; No. 57	No single responsible entity	Explicit ban on use of Lindane
Waste Management			
Republic of Armenia Law “On Waste”	November 24, 2004 / No. 159- N	Ministry of Nature protection, Ministry of territorial Administration, Ministry of health, Ministry of agriculture, Local- self-government bodies	Regulating all type of waste, including hazardous
Governmental Decision of the Republic of Armenia "On the order of regulating the import, export and transit transportation of hazardous and other wastes over the territory of the Republic of Armenia"	December 8, 1995/ No. 97	The decision defines that the MNP of the RA is providing the permission for importing, exporting and transit	Refer to the Decision 1093, Banned hazardous waste list
“Lists of regulated and non-regulated wastes, hazardous properties thereof, documents on the procedure of applications, notices and disposal/ removal” approved by the Minister of Nature Protection Order	August 10, 1999 / No. 96	The exporting application, information on the movement, the notifications on the start and end of the movement, notifications on the receipt and removal of the wastes are prepared by the respective organizations and presented to the MNP of the RA	The pesticides are included in the list of the Order
Governmental Decision of the Republic of Armenia “On list of measures for ensuring fulfillment of the Republic of Armenia obligations under several environmental conventions (Chapter IX -Basel Convention on Control of Trans-boundary Movements of Hazardous Wastes and Their Disposal)	10 November, , 2011/ No. 1594- N	Ministry of nature protection, Ministry of Emergency Situations, Ministry of health, Ministry of Agriculture, National Academy of Science	Required elaboration of guidelines on sound disposal of hazardous waste, Related to environmentally, implementation of SAICM process, establishment of technology transfer center on waste
Decision of the Government of the Republic of Armenia “On the order of licensing for activity on processing, treatment, storage, transportation, and placement of hazardous wastes in the Republic of Armenia”;	January 30, 2003 / No.121- N	The Government of the RA – in regard of license provision, the MNP of the RA – in regard of the organization of the process of licensing and the Licensing Committee – in regard of provision of the conclusion (POPs – as the hazardous waste
Decision of the Prime Minister of the Republic of Armenia	February 5,	See the comments	The OPs and POPs are

Legal Act Name	Adoption date/ No.	Responsibility	Application to POPs pesticides and OPs
“On approval of the membership and order of activity of inter-departmental commission on licensing of activity on recycling, treatment, storage, transportation and placement of hazardous wastes in the Republic of Armenia”	2004/ No. 46-N	below	subject to licensing as the hazardous waste
Governmental Decision of the Republic of Armenia “On approval of the List of hazardous wastes of the Republic of Armenia”;	May 20, 2004/ No. 874-N dated	The decision approving the list of the hazardous waste may not have enforcement body, the Government of the RA has the policy development authority in the field of wastes, according to Law of the RA “On wastes”, based on which the Government of the RA has developed the list of the hazardous wastes	The pesticides are included in the annex to the Decision
Governmental Decision of the Republic of Armenia on “Amendment to the Governmental Decision of the Republic of Armenia No. 97 of December 8, 1995 and approval of the “List of Banned Hazardous Wastes of the Republic of Armenia”	July 8, 2004 / No. 1093-N	See the comment above	The pesticides are included in the Annex to the Decision
Decision of the Government of the Republic of Armenia “On assignment of the designated body in the waste management area”	May 19, 2005 / No. 599-N	MNP of the RA – as the authorized body	The OPs and POPs - as the hazardous waste
Decision of the Prime Minister of the Republic of Armenia “On measures ensuring realization of the Republic of Armenia “Law on Waste”	May 30, 2005 / No. 380-A	The Decision is not valid anymore and will not affect the issue of the pesticides regulation anyway	
Decision of the Government of the Republic of Armenia “On approval of the order to approve draft standards for waste generation and placement limits”	December 9, 2005/ No. 2291-N	The MNP of the RA approves the thresholds, the physical and legal entities develop the projects (Source: the legal report – chapter. 6.1., page.75)	See the clause 6 of the Annex to the Decision
Decision of the Government of the Republic of Armenia “On approval of the order for waste passportisation”	January 19, 2006/ No. 47-N dated	The wastes passport is developed by the manager of the legal entity or the individual entrepreneur producing the waste and conforms it with MNP of the RA	Refers to the Ops, since the Decision refers to the hazardous wastes - OPs and POPs as hazardous wastes
Decision of the Government of the Republic of Armenia “On approval of the order for maintenance of the Registry on waste generation, processing and utilization entities”	April 20, 2006 / No. 500-N	The Register is run by the MNP of the RA	All type of waste are included
Order of the Republic of Armenia Minister of Nature Protection “On approval of reporting forms for register maintenance and accounts for register recordings on waste generation, processing and utilization entities and the registry book keeping”, (State registration number at the Republic of Armenia Ministry of Justice: 10506391)	November 7, 2006 / No. 359-N	The form of the books is approved, there is no enforcement body	

Legal Act Name	Adoption date/ No.	Responsibility	Application to POPs pesticides and OPs
Decision of the Government of the Republic of Armenia “On approval of the order for maintenance of the Registry on waste disposal sites”	July 13, 2006/ No. 1180-N	The Register of the wastes removal is run by the MNP of the RA. The following legal entities and individual entrepreneurs are subject to the registration: a) the enterprises dealing with deactivation and elimination of the wastes b) the operational entities with 25 m ² placement surface and (or) 50 m ³ placement capacity the wastes burial entities, the operations of which are finalized, but the re-cultivation of the affected area was not undertaken and the plot was not transferred to the third entity.	
Order of the Republic of Armenia Minister of Nature Protection “On approval of book forms for register maintenance and the leaflet for register recordings on wastes disposal sites”, (State registration number at the Republic of Armenia Ministry of Justice: 10506407)	November 24, 2006/ No. 387- N	The form of the books is approved, the enforcement body is not applicable	
Decision of the Government of the Republic of Armenia “On approval of the order for registration of wastes generation, disposal (destruction, treatment, placement) and utilization “	September 14, 2006/ No. 1343- N	The legal and physical entities involved in the wastes application are subject to the wastes record- keeping	The OPs and POPs - as the hazardous waste
Decision of the Republic of Armenia Government “On defining the order for State accounting of wastes”	December 7, 2006/ No. 1739- N	The state registration of the wastes is executed by the MNP of the RA. The state record keeping of the wastes is implemented based on the data generated from the waste annual administrative statistical reporting Form No.1, developed according to the legislation of the RA and presented by the legal entities (including foreign and individual entrepreneurs) generating hazardous wastes and	The OPs and POPs - as the hazardous waste

Legal Act Name	Adoption date/ No.	Responsibility	Application to POPs pesticides and OPs
		implementing wastes (production and consumption) placement	
Decision of the Republic of Armenia Government “On the order of keeping the State Cadastre on Wastes”	January 18, 2007/ No. 144- N dated	The state Cadastre on Wastes is established and run based on the data provided by the legal entities and individual entrepreneurs involved in the application of the wastes, according to the approved order. The data provided to the MNP of the RA is included in the State Cadaster on Wastes.	All waste related
Order of the Republic of Armenia Minister of Nature Protection “On approval of the List of production and consumption wastes generated on the territory of the Republic of Armenia”, (State registration number at the Republic of Armenia Ministry of Justice: 10506373)	October 26, 2006/ No. 342- N	The list of the industrial and consumption wastes generated in the RA is approved	Refers only to the obsolete (not banned) pesticides wastes
Order of the Republic of Armenia Minister of Nature Protection “On approval the List of wastes classified by hazard” (state registration No. 10506440 dated December 28, 2006)	December 25, 2006/ No. 430- N	The list of the wastes classified by the level of hazard is approved	The OPs and POPs - as the hazardous waste
Order of the Republic of Armenia Minister of Nature Protection “On approval of the exemplary form for Waste Passport” (state registration No. 10507037 dated February 12, 2007)	February 02, 2007/No. 19-N	A model form of waste passport is approved	Refers only to the obsolete (not banned) pesticides wastes
Order of the Republic of Armenia Minister of Nature Protection “On amendments and changes to the “Order of the Republic of Armenia Minister of Nature Protection No. 430-N dated December 25, 2006” (State registration at the Republic of Armenia Ministry of Justice: No. 105 07 147)	March 7, 2007/ No. 50-N	The list of the wastes classified by the level of hazard is amended	The OPs and POPs - as the hazardous waste
Order of the Republic of Armenia Minister of Nature Protection “On approval of draft exemplary form for calculation of standards on waste generation and placement limits thereof”, (at the Republic of Armenia Ministry of Justice State registration: No. 10507200/)	April 27, 2007/ No. 97-N	A model form on norms of wastes generation and those placement thresholds plan calculations	The OPs and POPs - as the hazardous waste
Protocol Decision of the Republic of Armenia Government «On amendment to Protocol Decision No. 26 of July 8, 2004”	February 19, 2009/ No. 8	Ministry of nature protection	The legal entities and individual entrepreneurs possessing hazardous wastes of I,II,III and IV class develop plans, which are presented to the MNP of the RA
Decree of the Government of the Republic of Armenia laying down “Rules for the handling of obsolete pesticides”	February 17, 2011 / No. 195- N	No single responsible entity	The rules on obsolete pesticides application prescribe the requirements towards the application of the obsolete pesticides
Transportation of Dangerous Goods and Hazardous Waste			

Legal Act Name	Adoption date/ No.	Responsibility	Application to POPs pesticides and OPs
Law on “Transportation of dangerous goods and non-decontaminated containers by motor vehicle”	February 17, 2012/ No 30-N	Government of RA, Ministry of Transport and Communication, RA Police, Ministry of Emergency Situations, Ministry health, Ministry of Nature protection	Hazardous waste, including POPs, are in the list of dangerous goods
Governmental Decision’ ‘On approval of licensing procedure of organizations implementing transportation of dangerous goods by air, organizations carrying out maintenance works of dangerous goods, as well as organizations carrying out maintenance works on air transportation of dangerous goods”	November 26, 2009/ No 1372- N	Ministry of transport and communication	Related to all type of dangerous goods, including hazardous wastes
Governmental Decision of the Republic of Armenia No 570-N/22 April, 2010 “On defining the minimum distance between intersection of railways of general usage and objects, on the territory of which production, loading, transportation and unloading of hazardous goods is performed, as well as building, structures, rail line of general use, communication lines, power transmission lines, oil pipelines, gas pipelines, and other surface and underground structures located on them’	April 22, 2010/ No 570-N,	Ministry of transport and communication	Related to all type of dangerous goods, including hazardous wastes
Decision of the Prime Minister of the Republic of Armenia “On setting list of events insuring implementation of the Law of the Republic of Armenia “On transportation of dangerous goods and non-decontaminated containers by motor vehicle”	May 14, 2012/ No 419-A,	Government of RA, Ministry of Transport and Communication, RA Police, Ministry of Emergency Situations, Ministry health, Ministry of Nature protection	Related to all type of dangerous goods, including hazardous wastes
Hygienic and Sanitary Requirements			
Order of the Minister of Health of the RA #01-N, dated 25.01.2010 : “The hygienic requirements towards soil quality” N 2.1.7.003-10 sanitary rules and normatives	Jan, 25,2010/01- N	Ministry of Health	Defines the threshold limit values of the pesticides concentrations in the soils
Order of the Minister of Health of the RA 20-N, dated 29.10.2009, “Hygienic requirements towards the storage and transportation of the hazardous chemical waste” N 2.1.7.001-09 sanitary rules and normatives	Oct. 29, 2009/20-N	Ministry of Health	Sanitary-hygienic requirements towards origination, prevention, collection, transportation, storage, processing, usage, removal, decontamination and burial of the hazardous chemical waste

Current Situation with respect to general POPs and waste management in Armenia

The Stockholm Convention on Persistent Organic Pollutants (POPs) was opened for signing in May 2001 with the objective of protecting human health and the environment from listed POPs chemicals and wastes. It entered into force in May 2004 and has been subject to a number of amendments since that time including the addition of a number of annexed POPs to the original twelve. According to Article 7 of the Convention, Parties are required to develop National Implementation Plans (NIP) to demonstrate how they intend to implement obligations assumed under the Stockholm Convention. According to existing rules, each Party should develop and

submit the NIP within two (2) years from ratification and update NIPs within every five years thereafter taking into account amendments and additional listed POPs.

Armenia signed and ratified the SC in 2003 and 2005 respectively. The first NIP, prepared with GEF assistance, addressing the inventories and strategic action plan for the initial twelve (12) POPs, was developed by the Ministry of Nature Protection (MNP) in the period 2002-2005, and officially transmitted to the Stockholm Convention's Secretariat on February 24, 2006⁵. This NIP and its action plan has allowed for additional preparation of follow-up capacity building and investment programmes for POPs management in Armenia as well as adoption of basic regulatory measures within the national waste management legislative framework. Currently Armenia is developing an updated NIP to reflect the current status of POPs management and address the new listed POPs included in the amendments to the SC that came into force in 2010. In that regard and noting that such updates are required within two years of the date when amendments entered into force, this represents an urgent priority for the country in terms of compliance with the SC. Armenia does not hold any specific exemptions nor has registered for any declared acceptable purposes under the provisions of the SC. The country is current with SC first round reporting requirements, NIP update is currently on-going.

Implementation activities related to the NIP action plan and its maintenance that have or are being undertaken, in addition to the currently presented programme on POPs Pesticides and OPs⁶, include several other GEF supported projects as follows:

- GEF Project No. 5038: Implementation of BAT and BEP for Reduction of U-POPs Releases from Open Burning Sources in Armenia⁷
- GEF Project No. 4961: Enabling Activities to Review and Update the National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants (POPs)⁸
- GEF Project No. 3571: Technical Assistance on the Environmentally Sound Management of PCBs and other POPs Waste in the Republic of Armenia⁹
- GEF Project 3212: Capacity Building on Obsolete Pesticides in EECCA Countries¹⁰

In addition, there have been a number of bi-lateral international initiatives on or linking to POPs management in the country, mainly in relation to the development of waste management infrastructure and development of expanded technical support capability. In addition to the activities noted above in relation to POPs pesticides and OPs in defining the current situation in this area, these include:

- National 2012-2013 – Development of a national solid waste management SWM strategy, action plan for a series of country wide region SWM collect and disposal (landfills) with ongoing individual regional feasibility studies for IFI financing, developed by ADB and Ministry of Territorial Administration.

⁵ <http://chm.pops.int/Implementation/NIPs/NIPSubmissions/tabid/253/Default.aspx>

⁶ http://www.thegef.org/gef/project_detail?projID=4737

⁷ http://www.thegef.org/gef/project_detail?projID=5038

⁸ http://www.thegef.org/gef/project_detail?projID=4961

⁹ http://www.thegef.org/gef/project_detail?projID=3571

¹⁰ http://www.thegef.org/gef/project_detail?projID=3212

- Kotayk Marz (2011-2013) – Feasibility study and financing proposal for a consolidated regional solid waste collection and landfill development proposed by EBRD
- Lori Marz (2010-2013) – SWM study directed to upgrading SWM and waste diversion through the EU Waste Governance – European Neighborhood and Partnership Instrument (ENPI) East.
- Lori Marz (2012-2013) – Feasibility study and financing proposal for upgraded collection and landfill infrastructure for Vandazor and neighbouring local communities proposed by KfW as part of the above mention national SWM strategy.
- City of Yerevan (2009-2012) – Feasibility study and contractual development of upgrade collection landfill operations based on public private partnerships undertaken through IBRD
- City of Yerevan (2011-2012) – Engineering and feasibility study for proposed upgrading and re-development of the city's municipal landfill proposed by EBRD.
- National/Lori Marz (2010-2013) – EU “Waste Governance – ENPI EAST” Project developing a waste management plan for Lori Marz and providing national SWM technical assistance.
- National (2010-2012) – Local grant funding under the UNDP waste diversion/recycling program using financing from UNDP, USAID and GEF Small Grants program to develop local waste diversion and recycling collection capability (bring banks), along with local landfill upgrades and new collection vehicles.

In general, addressing POPs management issues and waste management generally in Armenia has focused to date on the development of national technical capacity, on developing a better technical definition of the issue, and securing separation of hazardous waste including POPs from SWM. Overall, Armenia has POPs and waste management issues typical of most CIS countries and reflective of the overall legacy issues and impacts associated with industrial and infrastructure development during the Soviet period. These primarily focus on inventories of POPs stockpiles and waste, related to PCBs and POPs pesticides (along with OPs generally), and the unintended release of POPs (U-POPs), mainly dioxins and furans (PCDD/F) now mainly associated with solid waste management (SWM) practices, primarily through the replacement of the current sub-standard local landfills with regional facilities meeting international standards.

Historical Situation respecting POPs pesticides and other obsolete pesticides in Armenia

Armenia with its highly developed agricultural sector had among the highest application rates of pesticides, particularly organochloride pesticides (OCPs) in the Soviet Union. Application levels up to 35 kg/hectare being recorded. Prior to 1991, Armenia had a system of pesticide distribution common to other CIS countries when part of the Soviet Union, namely where pesticide chemicals were allocated for use under the USSR's central planning system through regional and local distribution centres down to the state farm level and administered through specialized organizations under the Republican Ministry of Agriculture. At each level, there were purposely built storehouse facilities of various sizes depending on the intensity of agricultural activity, the largest being at the regional level. In 1990, it was estimated that overall approximately 600 such storehouses existed in Armenia with the primary ones being approximately 13 regional storages. Since that time these have been consolidated and the distribution system has been privatized with those remaining storage facilities being mainly operated by agro-business enterprises while others were simply abandoned.

The NIP documents the presence of pesticides in the environmental media, food and human receptors during this period and more recently, including through a targeted sampling program undertaken as part of the NIP preparation. The principle POPs pesticides used and widely detected in environmental media and receptors were DDT and HCH, although other POPs pesticides (HCB and Heptachlor) have been detected in soil and food stuffs. Such monitoring has been more limited in recent years but the data that has been collected generally indicates that the presence of POPs and other pesticides in the environment is declining as would be expected recognizing that use of all original POPs chemicals has been discontinued for some time and overall use of chemicals in agriculture has declined since 1991. All POPs pesticides except HCH were banned in the 1970s and 1980s. HCH use was restricted in 1985, is now effectively banned under provisions of the Rotterdam Convention adopted by the Government¹¹, and will be explicitly so upon formal Government adoption of the most recent amendments to the SC.

In the late 1970s and early 1980s, an all-Union program was initiated to collect the accumulated banned and expired pesticides that had accumulated within the pesticide distribution system for consolidation and disposal. The disposal option of choice was development of engineered landfills or burial sites within each of the Soviet Republics. One such site referred herein as the Nubarashen burial site is known to have been developed in Armenia in 1982. It is located on the SW edge of Yerevan in the Nubarashen district of the city on a relatively remote elevated slope used as a communal grazing area¹² within a natural drainage course. This is adjacent to what was subsequently established as the Erebuni State Reserve protecting an internationally significant area preserving agro-biodiversity in the form of a number of ancient grain types. This Reserve is administered by the Bioresources Management Agency of MNP and was established in 1981. Its goal is to protect the wild species of wheat and other cereals growing in their natural (original) environment. The flora and fauna of the State Reserve is very rich and varied. It includes about 300 species of higher flowering plants, which is more than 9 % of the Armenian flora. The nearest settlement is a summer residence/country garden community approximate 1 km down slope from the site on the same drainage that originates in and above the valley where the burial site is located. Two other permanent settlements are located approximately 3-4 km distant and the overall location is within sight of the developed outskirts of Yerevan. Figure 1 below provides a general view of the site and surroundings.

¹¹ Decision of the Government of the Republic of Armenia “On approval of the List of chemicals and pesticides regulated by Rotterdam Convention and banned in the Republic of Armenia” (No. 293-N of March 17, 2005)

¹² In this document the obsolete pesticide burial site is referred to as the “Nubarashen site” or “Nubarashen burial site” and should not be confused with the Nubarashen Landfill which is located in the same district of Yerevan and serves as the city’s main municipal and solid waste disposal site.

Figure 1. Location of the Nubarashen burial site relative to its surroundings



(Courtesy of Tauw/OSCE)

Original records indicate that the burial structure consisted of four rectangular, clay lined and capped cells approximately 5 m deep at the base in an overall site approximately 120 m by 20 m. 33 different organic and inorganic pesticides (total of 512 t) were recorded as being disposed of in the site (Table 3) with the largest quantities being DDT (193 t) and HCH (48 t). Until 1989 the site was regularly monitored and maintained, but this was then discontinued. In the period 2003-2004, the site became generally recognized as presenting a major potential environmental risk due to its location on an unstable slope and drainage course which resulted in sliding of the burial structure down slope, water in-flow, and release of buried material due the vandalism and illegal excavation. Awareness of this situation was substantively the result of an initiative by the NGO Armenian Women for Health and a Healthy Environment (AWHHE) who, as part of USAID and IPEN¹³ programs in 2004-2005 implemented initial public awareness surveys, physical site assessment, geophysical, and geological assessment as well as sampling of water and soil which formed the basis of subsequent investigations. This included commissioning a detailed report on sight stability issues and on addressing them.¹⁴ In 2004, a government decision officially designated the situation as a priority issue, and mandated and funded Ministry of Emergency Situations (MES) to take action.

¹³ International POPs Elimination Network "Report on "Environmental security for residents of settlements near to obsolete pesticides burial in Ararat region", AWHHE, 2004

¹⁴ R. Yadoyan, "Recommendations on Priority Measures for Security Insuring of the Burial Ground", AWHHE, 2005

Table 3. Inventory of obsolete pesticides recorded as being deposited in the Nubarashen burial site (data provided by AWHHE)

Chemical	Quantity (t)	Chemical	Quantity (t)
DDT	192.5	Chlorophos	1.7
Endobacterim	33.1	Sevin	1.8
Fenthuran	6.8	Cosan	1.5
Dalapon	17.0	Cyneb	16.4
Hexachlorocyclohexane	43.4	Colloid sulphur	18.0
Simazine	18.1	Metaldehyde	0.1
Cosan	2.7	Calcium Arsenate	42.6
Granosan	8.4	Tobacco packs	5,494 packs
TUR	1.3	BIP	5.2
Thorvit	1.8	Tetramethylthiuramdisulphide	7.2
Cynox	0.1	Paris Green	0.2
Liquid soap	0.3	Vitriol	7.3
Hexachlorobenze	1.3	Dendrobacilim	9.8
Dichol	0.2	Rezetoph	17.1
Phentachlorphenol	8.7	DNOC (Dinitrocresol)	0.9
Lissapol	1.9	Trichlor sodium acetate	5.0
Diamine Phosphate	5.0	Misc. pesticides containing As, S, phosphor, cyanides, Hg)	30.0

(courtesy AWHHE)

As a consequence a number of national and international initiatives have been undertaken in relation to the Nubarashen burial site. In 2004, MES undertook an emergency rehabilitation of the site including repairs to the original surface drainage, restoration of cover and installation of security fencing. However, illegal access continued with destruction of fencing and containment due to illegal excavation including a major incident in early 2010. In addition, slow sliding of land mass including the burial site itself continued with the consequence of possible breaches in the original cell containment occurring. In the summer of 2010, the government through MNP and MES made a more substantial investment in stabilization of site. This involved installation of an expanded surface cap over the original burial area and estimated area where sub-surface sliding had occurred (130 m by 30 m). This consisted of a soil and synthetic cap and attempts to establish stabilizing vegetation. In addition, a concrete surface runoff drainage system upstream and along the sides of the burial berm was installed as was robust fencing, signage and a locked access gate. Permanent manned security by MES officers is also now provided for.

The Nubarashen site has also gained international attention in recent years, having been identified by various EU based NGOs such as the International HCH and Pesticides Association (IHPA) and the International POPs Elimination Network (IPEN) as a significant example of potential risk from historical obsolete pesticide management practices in the Former Soviet Union. This interest extended to formal expressions of concern by the European Parliament and in the Government making a formal approach to the international community for assistance in addressing the issue. In turn this has resulted in a number of initiatives directed primarily toward developing additional data in and around the site including the following:

- Soil sampling around the burial site as well as down slope from it and into surrounding settlements and sampling of agriculture production was undertaken through cooperation

between a local and international NGO using EU funding. DDT was detected in soil and drainage channels immediately adjacent to the site with levels decreasing more remotely¹⁵.

- An initiative by OSCE to support awareness of the issue and a number of locally based studies with MES and the National Academy of Science which undertook a water sampling program that detected DDT water and sediment contamination downstream of the burial site¹⁶. OSCE has also undertaken the solicitation of funding support in the EU and bilateral agencies (USAID) to support a more substantial technical “feasibility” study involving local and international experts results of which are described in more detail below as part of the PPG work undertaken within the framework of the this program.

Attention has also been paid to the residual obsolete pesticides (OPs) storehouse stockpiles, associated contamination and impacts. A MoA inventory from 2005 identified 10 such storehouse sites in 6 Marzer (provinces) containing 53 t of OPs and an updated inventory from 2011-2012 in the same Marz covering 13 stores identified approximately 120 t. All sites were former state agro-chemical distribution centres and now private agro-businesses. Limited identification of the actual materials listed the 2005 inventory indicated none of the OPs were POPs pesticides and were a mixture of organic and inorganic agricultural chemicals. Programs undertaken by AWHHE assessed eight of these larger stores in four regions and has generated survey estimates of 55-57 t of OPs, the largest (Artashat) being a site with 27 t and including one (Jrarat) containing up to 15 t of DDT although the MoA 2011-2012 inventory suggests that this is 3 t of DDT contaminated soil. The AWHHE/ARNIKA work noted above also undertook limited assessments and sampling at three of these sites (Jrarat, Echmiadzin and Masis) which served to confirm that there was POPs pesticide contamination in and around these storehouses.

In 2011, these somewhat fragmented efforts came together through the Government requesting UNDP to develop a full scale project that would specifically address the Nubarashen site along with other obsolete pesticide issues, all within a framework of improved technical capacity for chemicals management in this area. This resulted in the preparation, submission and approval of a PIF and PPG by the GEF. The results of the PPG updating the above situation analysis are described in the following. Independently, in late 2013, the Food and Agricultural Organization of the United Nations (FAO) has indicated that it is undertaking a program related to obsolete storehouses through the Ministry of Agriculture (MoA) using funding from the EU related to a project being developed across a number of CIS countries.

Current situation respecting POPs pesticides and other obsolete pesticides in Armenia

The following provides a summary of work undertaken directly using PPG resources and that made available through two bilateral programs that coordinated their work with the UNDP PPG work. First and foremost among these was the site investigation and feasibility study work on the Nubarashen burial site which was undertaken under the auspices of OSCE by an international consultant and local partners¹⁷ (referred herein as the OSCE program) in consultation with UNDP. The other initiative was a program of supplemental site assessment undertaken by an

¹⁵ “Toxic Hot Spots in Armenia, Monitoring and Sampling Reports “, ARNIKA and AWHHE, Prague and Yerevan, 2011

¹⁶ “Addressing a Discharge of Chemicals from the Nubarashen Toxic Chemicals Repository” National Academy of Science. Center for Ecological and Noosphere Studies/OSCE, Yerevan, 2010.

¹⁷ Tauw in cooperation with AWHHE and MES

international consultant¹⁸ as part of a technical capacity strengthening program related to contaminated sites funded by the Czech Republic and blended with UNDP funds. The PPG itself funded other studies that were undertaken by national consultants including conceptual engineering design work related to the civil works at the Nubarashen site and supporting hazardous waste (HW) storage infrastructure, updating of OP storehouse inventories, and development of project capacity assistance and public awareness consultation programming for the proposed project. Collectively this forms the basis of current knowledge related to POPs pesticides and other obsolete pesticides in Armenia and represents the principle input into the project design subsequently elaborated Section V in this document.

Nubarashen Burial Site: As noted previously the principle investigation work undertaken in relation to the Nubarashen site was done through the OSCE program. This undertook a more in depth physical site assessment than had been previously done, including evaluation of the site's geotechnical stability, characterization of the hydrology associated with the site as well as its direct physical characterization and a program of soil and water sampling. The latter was supplemented by a follow-on analytical program under the Czech/UNDP financed work. Using refined analytical, site assessment and digital terrain modelling techniques (DTM) this allowed a much more detailed quantification of locations of buried obsolete pesticides and definition of the distribution and extent of the associated contamination beyond the actual burial cells themselves. From this, first order quantification of amounts of contaminated soil in various ranges of POPs contamination was developed. A Tier 1 and 2 risk assessment was also undertaken which when applied with a knowledge of the POPs contamination levels provides direction on the strategy and various technical options appropriate in designing actions that would be recommended. The overall results then allowed an assessment of various intervention scenarios and followed by development of a more detailed technical definition and conceptual cost estimate of the two scenarios considered to best match the timing of the current project. The following summarizes the key findings from the OSCE and supplementary Czech/UNDP site assessment reports, interpreted for purposes of application in the project design elaborated in the Strategy section of this document below:

- Site Configuration: The overall landfill site occupies approximately 0.8 ha of fenced area within which the primary landfill body itself is defined by a hillock which is enclosed on three sides by concrete runoff drains and two run off trenches located 10 m on the down slope side. The landfill body as generally defined by the hillock has a surface area of approximately 0.2 hectares with a height of 1 to 1.5 m above the surround grade and is covered with a 40-70 cm top clay cover on top of a 2 mm synthetic liner.
- Landfill Body Configuration: The landfill body consists of five cells (rather than the originally assumed four) as illustrated in Figure 3. Cells 1, 2 and 3 are completely covered by the hillock. Cell 4 is partly covered by the hillock and Cell 5 is found outside the hillock. This suggests that Cell 5 may have been created latter as an ad hoc measure. Cell 1 holds wet pesticides, appears water tight, and is contained by structure of stone/concrete. Cells 2, 3, 4 and 5 cells contain dry solid pesticides and are essentially excavated pits in the native clay/loam soil without purpose built containment. This is generally the type of design used in other places in the Soviet Union for such sites and is almost identical to the site recently excavated and remediated in Belarus under a GEF project. Cells 2 and 3 appear to have been

¹⁸ GEOTest , funded through the UNDP-Czech Trust Fund in 2013

opened likely by illegal waste mining and now contain a mixture of pure pesticides and the surrounding soil. Cell depth below the surface is generally 100-200 cm except for Cell 5 and part of Cell 4 where pure pesticides are encountered at less than 0.05 m below the surface (areas outside the hillock). The bottom of the cells is between 4 and 6 m below the surface.

Figure 2. Overview of the Nubarashen burial site

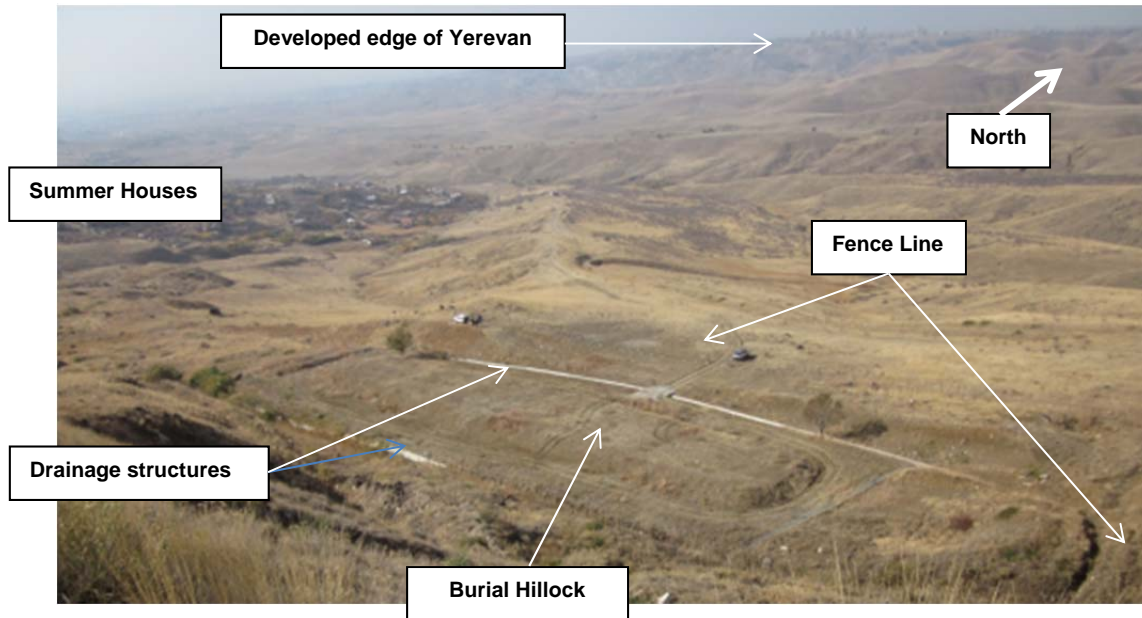
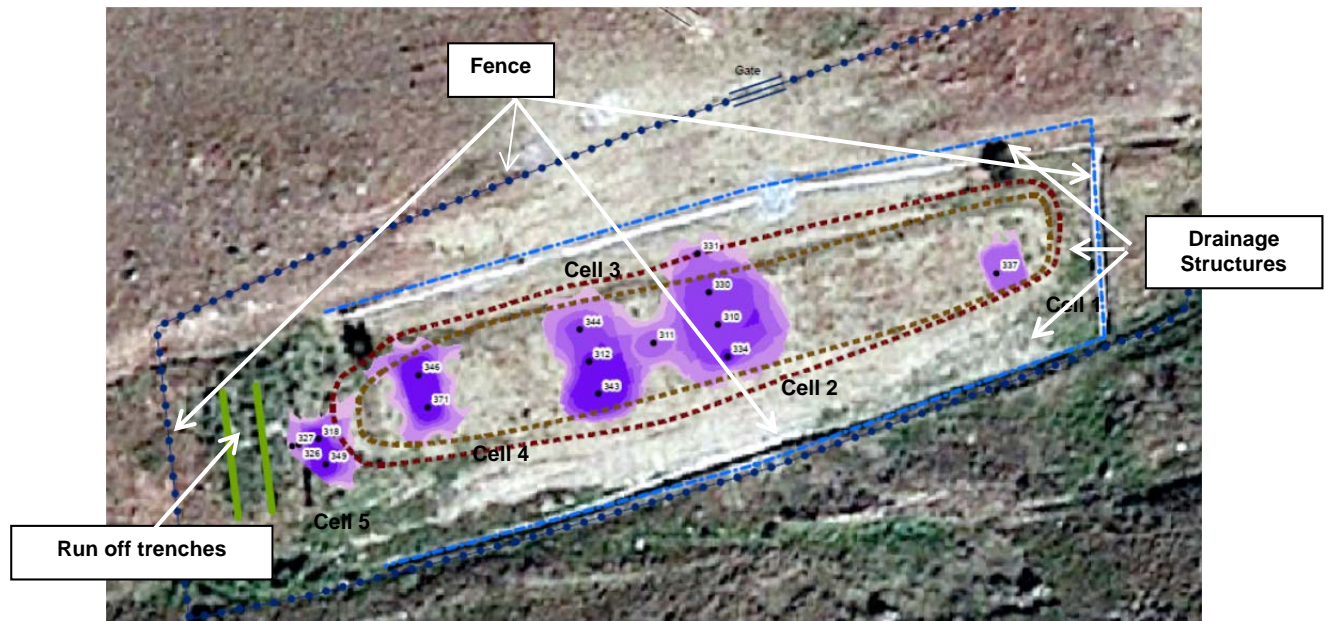


Figure 3. Location of the five cells and the landfill body features



(Courtesy of Tauw/OSCE)

- Potential POPs Waste Volumes: Soil sampling and application of DTM techniques indicate an estimated 634 m³ of pure pesticide (including POPs pesticides) and immediately surrounding clay present in the five cells. There is detectable surface and subsurface POPs

and other OCP contamination to varying degrees distributed across most of the fenced area of overall site with this varying in concentration and continuity generally moving away from the cells and being higher on the surface around and to the north of Cells 2 and 3 where illegal waste mining is thought to have occurred. It was estimated that 1,127 m³ of heavily contaminated soil with traces of pure pesticides, 2,386 m³ of contaminated soil without traces of pure pesticides and 890 m³ of lightly contaminated surface material are present in the hillock area itself. Over the remaining 0.6 ha within the fence significant contaminated locations exist to a depth of 0.5 m, giving an estimated potential contaminated top soil of approximately 3,000 m³. Outside the fenced area, 4,000 m³ of surficial material having locations of relatively low surficial contamination is estimated. These areas are listed and categorized in Table 4 both in volume and estimated weight, along with estimates of excavated volumes with normal ex-situ growth factors applied and in descending order of likely contaminant concentration.

Table 4. In-situ and excavated estimates of POPs waste and contaminated soil by Category (Courtesy Tauw/OSCE)

Component of general landfill site and landfill body	Estimated Quantities m ³ or t		
	In situ	Excavated	Weight
Category 1: Pure pesticides or associated material > 30% pure pesticides			
Pesticides in cell 1, 2, 3, 4, 5 and between cell 3 and 4	605	605	605
Contaminated clay at the bottom of four excavated pits (cell 2, 3, 4 and 5) and between cell 3 and 4	69	83	117
Total	674	688	722
Category 2: Overall volumes with significant potential for heavily contaminated soil above the human health risk threshold for direct exposure (>1,500 ppm DDT) or visual presence of pure pesticides in it			
Contaminated top soil with traces of pure pesticides in landfill body	1,127	1,352	1,916
Contaminated top soil with traces of pure pesticides in fenced area land	3,000	3,600	5,100
Total	4,127	4,852	7,016
Category 3: Overall volumes with potential for levels of soil contamination less than determined as human health risk threshold but above the agricultural (grazing) risk threshold (0.7 ppm-1,500 ppm DDT)			
Contaminated top soil without pure traces of pesticides in landfill body	2,387	2,864	4,058
Slightly contaminated top cover landfill body	890	1,068	1,513
Low contaminated soil outside the landfill site	4,000	4,800	6,800
Nominally clean white/purple coarse sandy liner support / drainage layer	100	120	170
Total	4,377	8,852	12,541
Category 4: Building materials with surface contamination (Suitable for mechanical cleaning techniques)			
Synthetic cover (2mm)	4	20	5
Contaminated bricks/concrete/rubble (cell 1)	16	19	36
Total	20	39	41

*Quantities are calculated by using the Digital Terrain Modelling

** Volume of excavated soil is set as 120 % of in-situ soil

- Interpretive analysis of potential volumes and supplemental analytical results: It should be noted that apart from Category 1, the above volumes represent what should be a conservative estimate, recognizing that within any given location or category the highly heterogeneous nature of the contaminant distribution will result in amounts within these estimates having much lower concentrations than implied by the risk assessment determined thresholds quoted. The more extensive sampling and analysis undertaken as part of the Czech/UNDP program showed that in areas outside the hillock both inside (which largely defines the Category 2 material) and immediately outside the fence above (Category 3 material), much of the area had low levels of total POPs pesticide (< 10 ppm) but several specific areas consistently had levels in the range of 200 to 400 ppm, particularly adjacent to Cell 2 on the south side between the fence and hillock and the length of the north side between the hillock and the fence. This suggests that in reality it is likely that substantially more soil currently classed as Category 2 would fall into Category 3 but it is also probable that where selective segregation of distributed pure pesticides from Category 2 material was feasible, the volume of Category 1 material would increase somewhat, depending on how feasible such discrimination upon excavation was. The one caution created by the supplemental Czech analysis results is that in some places the higher concentrations appear to extend to a greater depth than originally estimated and presented in Table 4.
- Offsite Impacts: Notwithstanding the issues related to overall site stability and site drainage, soil, ground and surface water analytical results indicate that the integrity of the landfill body's containment has generally been maintained. No impacts were noted in the ground water within and downstream of the landfill body and similarly downstream water quality is not impacted. The only downstream impact highlighted was detectable contamination of sediment in pond in the downstream summer house (dacha) community (Figure 1 Pond 8-9) suggesting some cumulative impact over time. Similarly it is apparent that contamination has not generally spread significantly around the original cells at depth suggesting the natural clay has provided an effective hydrogeological barrier for contamination spread at least until now. These results indicate that the main cause of spreading of contamination was the illegal access that has occurred historically, rather than substantial subsurface failure of the original cell containment.
- Overall Site Stability: Assessment of the geotechnical and hydrogeological stability of the general area of the site confirmed that it is generally unstable and progressive land sliding has and continues to naturally occur over time down the valley and water course in which the landfill body is located (Figure 1). This process is being substantially aggravated by the presence of a run off pond (Figure 1 Pond 1), leaking water line, and blockages to drainage upstream at the top of the valley, the presence of a perched shallow water table above the site in the valley and blockages due to poor maintenance in the drainage immediate around the landfill body. The result is general slope instability due to underlying water flow and within the landfill body itself. Additional mass land movement below the landfill site have created further blockages to naturally efficient drainage. While not yet resulting in significant offsite spread of contamination, these mechanisms will ultimately result in this occurring on an accelerated basis over time. As such, addressing these stability issues is required as part of any remediation and containment works to be undertaken.
- Risk Assessment: The environmental assessment and associated Tier 2 risk assessment indicates that sustained direct exposure to concentrations of POPs (DDT) in soil greater than 1,500 ppm represent the threshold conditions for human health risk. On this basis it was

concluded that there is minimal current offsite risk from the landfill body and its surroundings to either human health or the environment in the surrounding area, although the development of such risks over time, particularly with increased instability cannot be ignored. The direct potential risk to human health associated with the site is limited to those spending sustained periods on the site, principally those that might be involved in assessment and civil works undertaken on the site. A lesser risk might be associated with casual access to the site. The risk assessment also indicates that nominal risk may also be associated with grazing on the site area when applying a strict international agricultural soil quality standards¹⁹ noting this is mainly precautionary recognizing the only intermittent grazing use and access limitations to the actual landfill site. Nevertheless, a buffer zone of 100 m beyond the currently fenced area is recommended for exclusion of public and gazing access.

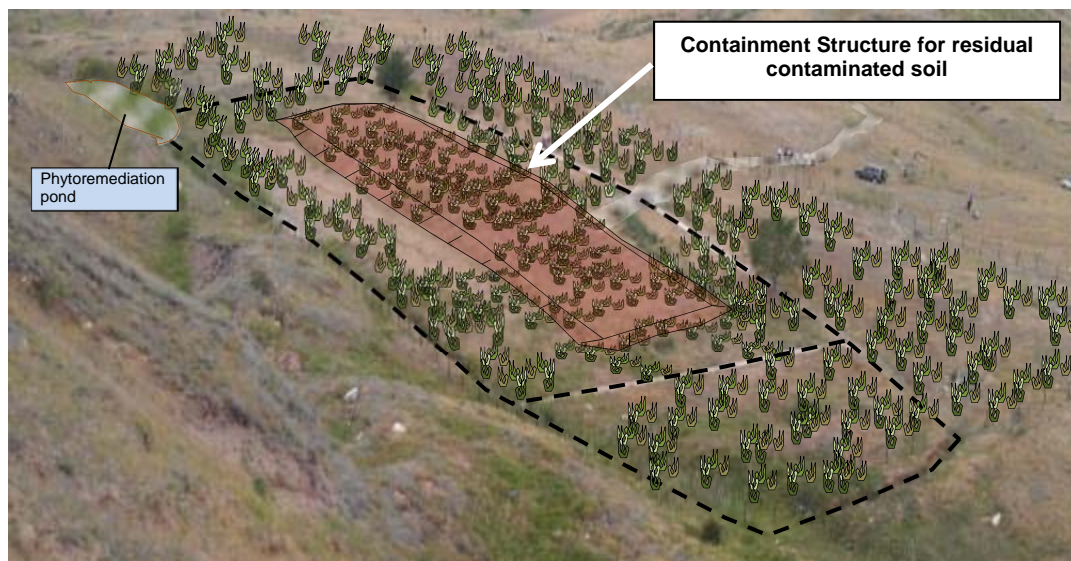
- Strategy for Elimination, Remediation and Containment: The overall strategy proposed for addressing the Nubarashen site proposed in the OSCE work is based on the premise that the highest concentration materials should be prioritized for excavation and elimination. Based on the simplifying assumption that Category 1 material contains essentially 100% of the targeted contaminants, the Category 2 material has an average concentration of 5,000 ppm and the Category 3 material has an average concentration of 30 ppm, 94% of the contamination is eliminated by removing and destroying the Category 1 material, 5 % is eliminated with the Category 2 material and less than 1% is eliminated with the Category 3 material. This in turn has guided the selection of approaches that, depending on assumption made in respect to funding availability and timing, cover various combinations and applications of i) containment on site; ii) removal and secure storage of priority material (Category 1); and iii) removal and destruction or remediation of Category 1 and as much Category 2 POPs waste as practical. In addition to removing and isolating the sources of the current risk the other element of the strategy recommended is stabilization of the overall site to minimize the risk of continued land movement and ensure adequate drainage on a sustainable basis, this minimizing the risk of long term distribution of the remaining contaminants.
- Developed scenarios for addressing the Nubarashen site: The OSCE work developed two scenarios in some detail. Both essentially have the same scope based on excavation and removal of Category 1 and 2 materials to storage, either on-site or off-site with export of this material for destruction or soil treatment. Category 3 material would be contained on the site in a hydro-geologically secure engineered structure, and the site would be re-vegetated, monitored, and subject to restricted access and future land use. Stabilization measures respecting the elimination of upstream ponding and resulting perched water table to enhance overall slope stability and ensuring surface and sub-surface drainage around rather than through the retained containment structure would be taken. Additionally the site would be equipped for passive remediation techniques (phytoremediation with surface vegetation and reed beds in downstream ponds). Both scenarios have a total estimated present value cost of approximately US\$9 million, approximately 80% of which are for off-site management, treatment and/or destruction of Category 1 and 2 materials. The differences in the two scenarios are essentially related to the timing of the key activities as dictated by the availability of funding. One where funding might be available in two lots, one immediately as might be the case through the GEF Project assuming committed co-financing levels and

¹⁹ CCME Soil Quality Guidelines for DDT and HCH applied to agricultural land use of 0.7 ppm and 0.01 respectively (http://www.ccme.ca/publications/ceqg_rcqe.html)

the other in 3-4 years. This undertakes the extraction and disposal of the Category 1 materials immediately along with the site stabilization measures with all remaining material being contained, and then latter removing and exporting the Category 2 material for destruction/treatment with the final stabilization and restoration of the site being undertaken.

- Long Term Land Use and Monitoring: Notwithstanding the approach of substantially removing the primary source of the contamination and containing what remains, the site inclusive of an appropriate buffer should remain restricted with respect to future land use and public access, and should be subject to a program involving monitoring as well as maintenance of the drainage and other stabilization measures. To this end institutional arrangements involving extending the Erebuni State Reserve to cover the site and associated buffer are also recommended. The final configuration envisioned for the site is illustrated in Figure 4.

Figure 4. Final configuration of the completed restored site and Category 3 containment structure



Courtesy Tauw/OSCE

Obsolete pesticide storehouses and stockpiles: While the Nubarashen burial site represents the main POPs pesticide and waste issue requiring action, the project has also undertaken preparatory work related to the secondary issue identified at the project's PIF stage, namely the existence of a number of relatively small obsolete stockpiles principally at historical pesticide distribution centres. These were originally controlled by MoA but are now largely in private hands, although several are effectively “orphan” sites. A survey of all identified sites was undertaken for UNDP by a national expert in cooperation with the MoA in 8 Marz. In total 78 sites were assessed including 32 sites that were regional and sub-regional distribution centres dating from Soviet times and a further 46 community level stores identified with the assistance of AWHHE. Of these sites, 24 were found to contain OP residuals in the form of actual OPs or evidence of historical contamination based on visual inspection and interviews. These are in addition to the seven sites previously assessed in Ararat and Armavir Marz by ARNIKA/AWHHE in 2011²⁰. Table 5 provides a summary of data collected in the 2013 PPG

²⁰ AWHHE have indicated that additional small village level sites likely exist in Ararat, Armavir and Kotayk Marz

inventory and previous inventories along with site condition notes and recommended action. The total quantities based on the current composite inventory suggest that around 150 t of OP stockpiles might be recovered. While many of the sites have small quantities and no POPs pesticides are identified except for some potentially DDT contaminated soil, most of the listed sites should have additional screening level analytical assessment work undertaken, recognizing that there is potential for residual contamination from historical POPs pesticides storage and handling. Similarly all sites with recoverable stores and associated contaminated material should have this packaged and removed. 6 sites are identified as requiring or likely requiring more detailed site assessment and potentially more invasive remediation.

The major additional development that has occurred during the PPG phase was the appearance of EU funding for Armenia related to OPs and pesticide management generally which is anticipated to come through the FAO administered project entitled “Improving Capacities to Eliminate and Prevent Recurrence of Obsolete Pesticides as a model for tackling Unused Hazardous Chemicals in the Former Soviet Union”²¹. UNDP had been initially informed that FAO and MoA were in the process of finalizing an agreement involving the allocation of EUR 500,000 from this initiative to Armenia for a range of activities including detailed inventories and site assessment along with site safeguarding in the form of analysis, packaging, general clean-up and disposal of OP storehouses. However, the current status of this is less certain with FAO now actually only offering Armenia 138,000 EUR, apparently because of preferential allocation of funds to other countries. Based on discussions with FAO, it has been agreed that the current GEF project will limit its activities in relation to relative low priority OP storehouses to the centralized intermediate storage and environmentally sound disposal arrangements for the relatively small volumes of OPs involved as part of the management of the more major and higher risk POPs pesticides waste from the Nubarashen burial site. Based on the work available currently, the GEF project will make allowance for up to six more invasive detail site investigations and remediation operations as may be identified from the FAO/MoA work under the assumption that MoA and MNP retain responsibility for regulatory control and eventual clean up as required.

Technical capacity analysis respecting hazardous waste and chemicals management

An assessment of a number of key areas related to national technical capacity specifically in the area of OPs but more broadly related to HW and chemicals management was undertaken, recognizing such capacity is required both to undertake the current project and more importantly sustain progress in managing POPs, HW, contaminated sites generally under a sound chemicals management framework. The aspects assessed and results are as follows:

- General Assessment: Even though there are legislative requirements to have licensed waste management infrastructure and services from handling, transportation, storage, treatment and disposal of hazardous wastes including OPs, Armenia generally has very limited actual functional or officially approved capability in any of these areas. The main practical capability available comes from outside the regulatory framework through the Rescue Service of MES who provides emergency response capability for the containment and removal of dangerous good spill response capability as was the case for the Nubarashen site in securing it and undertaking temporary measures respecting its repair and security as ordered. Outside of this capability, there are four licenced service providers for activities involving processing, treatment, storage, transportation, and placement of hazardous wastes,

²¹ <http://www.fao.org/news/story/jp/item/134629/icode/>

mainly for biomedical waste. This includes two state medical institutions and two private commercial service providers. One of the commercial service providers is licensed by MNP to operate a small bio-medical and special waste incineration facility that has recently been put into operation in Yerevan. Although a preliminary assessment of its performance specifications suggests its current ability to handle any chlorinated wastes would be marginal, there is strong interest in investigating its current performance and the possibility of additional owner investment in upgrading to offer services to the project.

Table 5.Obsolete Pesticide Storehouse Inventory and Site Screening Information

Marz	Location	MoA/PPG Inventory: Estimated Quantity (kg)			Notes	Action Assessment
		2005	2011/ 2012	PPG 2013		
Ararat (3 sites)	OJSC “Masis berriutyun” OJSC, Masis	1,070	1,500-2,000	1,500-2,000	Identified stocks: Phenazin, Semeron. Arnika analysis (2011) shows areas of total POPs pesticide contamination up to 500 ppm inside store room and high levels of HCH around a broken barrel	Packaging and removal of remaining stockpiles and surficial clean up residues. Priority for detailed site assessment. Likely contaminated site clean up
	OJSC “Artashat berriutyun”, Artashat	27,000	6,500-7,000	6,500-7,000	Identified stocks – sulphur powder Trypholine.	Packaging and removal of remaining stockpiles and surficial clean up residues. Further analytical screening assessment
	“Ararat intraregional warehouse” Yeraskh village	-	20,000-21,000	20,000-21,000	MoA identified 1,000 kg of DDT contaminated soil	Packaging and removal of remaining stockpiles and surficial clean up residues. Further site analytical assessment. Possible contaminated site clean up
Armavir (4 sites)	“Arm berriutyun association central warehouse” Jrarat village	-	60,000-65,000	60,000-65,000	MoA identified 3,000 kg of DDT contaminated soil. Arnika analysis (2011) shows areas of total POPs pesticide contamination (up to 500 ppm) in store and immediate surroundings locations. PCBs reported by MNP as stored at this site at one time	Packaging and removal of remaining stockpiles. Priority for detailed site assessment. Likely contaminated site clean up
	OJSC “Armavir berriutyun”, Armavi	3000	3,500-4000	3,500-4,000	Identified stocks – Semeron, Ridione, Phomeline, Simazine.	Packaging and removal of remaining stockpiles and surficial clean up residues. Further analytical screening assessment
	OJSC “Ejmiatdsin berriutyun”, Ejmiadzin	12000	4,500-5000	4,500-5,000	Identified stocks- Phenazin, Semeron, Dendrobacillin, Ridione, Resertophine, Carbphos, Keltan, Applaud, Lepidocyde, Entobakterin, Simazine, Benzophosphate, Sulphur powder. Arnika analysis (2011) shows areas of total POPs pesticide contamination over 50 ppm inside store room	Packaging and removal of remaining stockpiles and surficial clean up residues. Further site analytical assessment. Possible contaminated site clean up
	SNCO “Veterinary-sanitary, foodstuffs safety and phyto-sanitary service center”	-	3600	3600		Packaging and removal of remaining stockpiles and surficial clean up residues. Further site screening analytical assessment
Aragatsotn (3 sites)	OJSC “Ashtarak Productivity”,	n/a	n/a	4000	Characteristic OCP odors. Internal POPs pesticide contamination >50 ppm	Packaging and removal of remaining stockpiles and surficial clean up residues

Marz	Location	MoA/PPG Inventory: Estimated Quantity (kg)			Notes	Action Assessment
		2005	2011/ 2012	PPG 2013		
	Ashtarak				analytical confirmed in AWHHE/UNEP study 2013. Close proximity to residences	Further site analytical assessment
	Private distributor, Oshakan village	n/a	n/a	1000	Characteristic OCP odors	Packaging and removal of remaining stockpiles and surficial clean up residues Further site screening analytical assessment
	OJSC “Aparan Productivity”, Kuchak village	370	1,200-1,500	1,500-2,000	Identified stocks: Phenazone.	Packaging and removal of remaining stockpiles and surficial clean up residues Further site screening analytical assessment
Gegharkunik (5 sites)	OJSC “Vardenis AgroService”	2,365	2.365	2000-2500	Identified stocks: Ridione, Simazine, Benzophosphate, sulphur powder, Entobakterin, G-12 fumigant, Carbophos, Lindane. Characteristic OCP odors. Internal POPs pesticide contamination >50 ppm analytical confirmed in AWHHE/UNEP study 2013. Separated from residences.	Packaging and removal of remaining stockpiles and surficial clean up residues Further site screening analytical assessment
	OJSC “Vardenis Productivity”, M.Masrik village	n/a	n/a	400-500	Store completely destroyed, the pesticides are mixed with construction materials	Packaging and removal of remaining stockpiles and surficial clean up residues Further site screening analytical assessment
	Local Private Owner, Vardenik village	n/a	n/a	200-300	Internal POPs pesticide contamination >50 ppm analytical confirmed in AWHHE/UNEP study 2013. Close proximity to residences Structure in ruins. It has been covered and fenced. Close to a residence	Packaging and removal of remaining stockpiles and surficial clean up residues
	“Gagarin intra-regional warehouse”, Gagarin Industrial community, Sevan	n/a	n/a	200-250	Broken packaging and pesticides residuals	Packaging and removal of remaining stockpiles and surficial clean up residues Further site screening analytical assessment
	OJSC “Martuni Productivity”, Litchk village	n/a	n/a	150-180	Mixed pesticides	Packaging and removal of remaining stockpiles and surficial clean up residues

Marz	Location	MoA/PPG Inventory: Estimated Quantity (kg)			Notes	Action Assessment
		2005	2011/ 2012	PPG 2013		
Lori (3 sites)	OJSC “Spitak Productivity”, Spitak	n/a	n/a	80-100	Store destroyed, OPs mixed with demolition materials	Possible packaging and removal of remaining stockpiles and surficial clean up residues
	Abandoned by Private Owner, Shnogh village	n/a	n/a	400-500	Store destroyed. Characteristic OCP odors.	Possible packaging and removal of remaining stockpiles and surficial clean up residues Further site screening analytical assessment
	OJSC “Tumanyan Productivity”, Odzun village (Owned by State Property Management Department)	n/a	n/a	20,000-21,000	Store destroyed Characteristic OCP odors.	Packaging and removal of remaining stockpiles and surficial clean up residues Further site screening analytical assessment Potential priority for detailed site assessment Possible contaminated site cleanup.
Shirak (4 sites)	OJSC “Akhuryan Productivity”, Akhuryan village	n/a	n/a	1450-1500		Packaging and removal of remaining stockpiles and surficial clean up residues Further site screening analytical assessment
	OJSC “Artik Productivity”, Artik	410	410	280-300		Packaging and removal of remaining stockpiles and surficial clean up residues Further site screening analytical assessment
	Private Owner Anushavan village	n/a	n/a	600-700	Store destroyed, the pesticides are mixed with other materials	Packaging and removal of remaining stockpiles and surficial clean up residues Further site screening analytical assessment
	OJSC “Ani Productivity”	n/a	n/a	500-700		Packaging and removal of remaining stockpiles and surficial clean up residues Further site screening analytical assessment
Syunik (4 sites)	OJSC “Meghri Productivity”	n/a	n/a	1450-1500	Store destroyed, the pesticides are mixed with other materials	Packaging and removal of remaining stockpiles and surficial clean up residues Further site screening analytical assessment
	OJSC “Kapan Productivity”,	n/a	n/a	700-800	Store partly destroyed	Packaging and removal of remaining stockpiles and surficial clean up residues

Marz	Location	MoA/PPG Inventory: Estimated Quantity (kg)			Notes	Action Assessment
		2005	2011/ 2012	PPG 2013		
	Kapan					Further site screening analytical assessment
	Community property Artsvanik village	n/a	n/a	20-30	Store destroyed	Packaging and removal of remaining stockpiles and surficial clean up residues
	OJSC “Sisian Productivity”, Sisian	1,500	1,500	1500-2000	Store partly destroyed Identified stock: Binish, Semeron, Keltan, Ridione, Sulphur powder, 2-4 diamine salt	Possible packaging and removal of remaining stockpiles and surficial clean up residues. Further site screening analytical assessment.
Vayots Dzor (1 site)	Storage of former Yeghegnadzor state farm now privatized	n/a	n/a	600-700	Small store of unidentified packaged material	Packaging and removal of remaining stockpiles and surficial clean up residues. Further site screening analytical assessment.
Tavush (4 sites)	“Ijevan intra-regional warehouse”, Ditavan village	5,000	5,000	4000-5000	Identified store: Ridione. Storage is in good state with, OPs segregated	Packaging and removal of remaining stockpiles and surficial clean up residues. Further site screening analytical assessment.
	OJSC “Noyemberyan Productivity”, Ayrum station	n/a	n/a	700-1000		Packaging and removal of remaining stockpiles and surficial clean up residues. Further site screening analytical assessment.
	Winery, Berdavan village	n/a	n/a	24	Identified stores: Deltamethrin	Packaging and removal of remaining stockpiles and surficial clean up residues.
	Gyughkimia of Shamshadin	n/a	n/a	Not known	Bomb site, material transferred elsewhere, potential site contamination	Further site analytical assessment Possible contaminated site clean up
Total		52,719	108,875-118,375	141,354-154,184		

Hazardous waste management infrastructure development: Recognizing that off-site storage of POPs wastes and OPs would likely be required for the current project and does not otherwise exist, UNDP working with MES undertook an evaluation of the options for this based on using present MES locations during the PPG. Out of three sites that had potential storage structures, a site located in Kotayk Marz adjacent to the main M4 north-south highway, north east of Hrazdan has been selected as a prospective site for development as part of the project. The site that housed an former MES logistics and staging base involves 15 ha of flat land, with direct highway access on a high strength hard surface road, basic but degraded utility supply, and a number of structures including several suitable for upgrading as storage as well as others suitable for support services. The site is located over 2 km from the nearest habitation or other development and proximate water bodies, well outside any national sanitary exclusion zones and consistent with accepted international siting criteria. A conceptual engineering feasibility study was undertaken on the upgrading the current asset both national standards and international guidance materials applicable to both hazardous waste storage and potentially treatment. Based on this a secure site could be developed that would be fully equipped with necessary water and power utilities, access, security in the form of gating and fencing, high quality storage structures, hard surface laydown and/or working pad, and surface water management system. For the current project this would offer inside secure priority storage up to 1,200 t of HW and additional temporary secure covered storage up to 10,000 t of material such as contaminated soil, as well as the potential option of undertaking soil treatment using an imported remediation technology. In the longer term it would provide the infrastructure base for incremental development of a national HW management capability. MES along with MNP and AWHHE are currently undertaking institutional and public consultations on this development, including discussion with local authorities and the general public, particularly in the general area of the burial site.

Number of meetings with surrounding Mushavan community administration and residents, and Mushavan summer residential area' population aimed at raising of the community awareness on the developments concerning the OP burial site in relation to its location in the landslide zone, as well as on the activities undertaken in Armenia for increasing of the population security has been held. The meetings in various formats were organized during the three days. The first meeting with the participation of the Mushavan village head was held with 36 active representatives of the communities. Current situation in the burial site, contamination scope and the expected project activities have been presented. Meanwhile, the presentation has covered the potential hazards and risks associated with foreseen field level activities. Next round of consultations has taken form of visits to different parts of the Mushavan village for keeping the population aware on the current situation and upcoming plans. In addition, a meeting with 14 households in summer residential area was organized. In total around 100 community residents were informed on upcoming activities. The participants have reacted positively on envisaged interventions towards possible solution of Nubarashen burial site and asked to keep them updated on the further developments in the field.

- Technical service provider capability assessment: Another technical capacity aspect investigated during the PPG involved an assessment of engineering and environmental services capability specifically as might be used for site assessment, design, environmental impact assessment (EIA), recognizing the substantial intellectual and technical education

capacity the country offers. Armenia has good general civil engineering and infrastructure design capability as well as a small but capable and growing general environmental services sector both with national and branches of international firms. However it lacks integration between the two that is characteristic of international capacity. The environmental services capacity is largely oriented toward general EIA and environmental expertise support. There is limited capability specific to HW, chemicals and contaminated sites management, specifically in relation to site and risk assessment, as well as managing the related institutional and stakeholder consultation and awareness process. However, except for the public consultation and risk assessment activities undertaken by AWHHE acting in the capacity of an environmental services provider in support of various international initiatives, capability appears limited to individual consultant experts and various public sector institutions affiliated with specific Ministries and the National Academy of Science. As identified in the PIF, the only such capability identified as undertaking work on the current OP issues and the impacts associated with the Nubarasehen site is the Centre for Ecological and Noosphere Studies in the National Academy of Science. Another recently created public institution, SNCO "Wastes Research Centre" operates within MNP and provides technical support services to MNP related to POPs and waste management generally including a providing analytical support to a recent AWHHE assessment of OP stockpile sites.

- Field sampling and laboratory capability assessment: In the case of laboratory capability the survey undertaken during the PPG indicated that there were a total of 10 laboratories offering some potential direct capability for provision of analytical support to OP related site assessment, remediation works and site monitoring (services required by the current project) and which might provide a foundation for expanded POPs, HW and chemicals related analytical services. Table 6 below identifies these laboratories. Overall, four of the laboratories are directly associated with regulatory ministries acting as executing or implementing agencies for this project (MNP, MoA) plus one from the Ministry of Health although nominally structured as “not for profit” legal entities, one is a state owned laboratory affiliated with the Ministry of Economy which would be in the financial decision making chain for the project, two are independent private laboratories, and three have academic linkages through affiliation with the National Academy of Science. The assessment results generally indicate the following: i) some basic capability exists to provide at least low resolution (screening level) analysis of OPs and specifically the POPs pesticides of interest, ii) 5 of the facilities including the private ones have ongoing programs involved with pesticide analysis; iii) only one has any field sampling capability and supporting equipment as well as soil sampling procedures and practices; iv) all have a basic menu of analytical equipment primarily gas chromatographs of various ages and resolutions with the most extensive equipment base being in the regulatory environmental monitoring laboratory in MNP, the National Institute of Metrology; and CJSC “Standard Dialogue” and the Centre for Ecological and Noosphere Studies; v) six laboratories have national certification, and only CJSC “Standard Dialogue” and the NAS Noosphere laboratory has an internationally recognized certification; iv) overall most facilities to a greater or lesser degree have deficits related to space, staffing, training, availability of consumables and QA/QC procedures. All

laboratories identify the need for additional funding or revenue generation to upgrade facilities and implement required training.

Assessment of state, academic and private organizations with relevant laboratory capacities on obsolete

Existing Technical Capacities for Conducting OPs Testing	Analytical Method(s) / Instrumentation, QA/QC Procedure	Sampling Capacity and Type of Samples	Human Resources/ Expert Capacity	Condition of Infrastructure
Sampling and analysis of residual pesticide including DDT, HCH, hexachlorobenzene, 4 D-acid, and other specified in GoA Decree № 904	Gas-Chromatography (GC), Chloroorganic electron-capture detector ECD (ISO); Gas-generator (99.999% nitrogen); Range: ppb for water samples, ppm for all samples ISO QA/QC Manual, SOPs	Full sampling capacity and equipment for water, plants (phytomaterial), crops, agricultural produce, food, animal products (up to 12 samples/day). Soils samples are taken by the Expert Centers of the Ministry of Health	Staff involved – 5: 1 Chief of Department 2 Chemists-analysts 1 Lab Assistant 1 Sampler	Fully adequate lab space, facilities and utilities
Analysis of pesticides, DDT, DDE, DDD (and their metabolites) HCH and isomers, heptachlor, dieldrin, eldin, hexachlorobenzene, etc. Facility in early stages of development	Gas Chromatography (GC)/Mass Spectrometer: Shimadzu GC 2010SE (ECD), ISO Range: ppb and lower (obtained recently under NATO program) No actual QA/QC system: internal calibration and method of internal standards L2000 DX Analyzer (Dexsil) for PCB determination/ screening	Sampling practice training underway through UNDP/Czech PPG program; Samples are delivered by the clients (soil, sludge, water, plants, agricultural products, food/fish, bottom sediments); Preparation of the delivered samples: e.g. extraction, purification, concentrating, and instrumental determination	Staff involved – 3: 1 qualified Chemist-analyst 1 Lab Assistant (full time) 1 Lab Assistant (part time)	Small lab space; Access to additional adjacent space available but requires upgrading.
Analysis of OCPs, dioxins, and others OPs, such as polycyclic aromatic hydrocarbons (PAHs) and other environmental contaminants. In fact, only DDT, DDE, HCH and PAHs are analyzed High work load due to state	Operational equipment - 5 GCs (4 are used): 1. Varian 3800/dual detector ECD 2. Agilent GC-MS 3. Clarus 400 /detector FID/ 4. Upgraded CVET 500 /detector FID, capillary column Varian-30m/ 5. Upgraded CVET 500 /detector FID, capillary column Varian-15m/	Presence of sampling equipment (water) and methods in place; Not fully adequate conditions for samples storage and processing; Sampling practices: Water – fully sufficient Soils – not sufficient Sludge – not sufficient Plants/crops – not sufficient	Staff involved : in analysis of OPs - 3 chemists-analysts, in sampling - 3-5 qualified chemist/assistants, in sample preparation - 3 chemists, 3 data processing specialists	Not adequate conditions for storage of chemicals /reagents; equipment/ infrastructure is developed but not complete; developed equipment maintenance

Institution/Laboratory	Existing Technical Capacities for Conducting OPs Testing	Analytical Method(s) / Instrumentation, QA/QC Procedure	Sampling Capacity and Type of Samples	Human Resources/ Expert Capacity	Condition of Infrastructure
	regulatory enforcement obligations	3800/dual detector ECD and FID/ and Agilent GC-MS For analysis of other OPs (~30 substances) - Clarus 400 /detector FID/ and Agilent GC-MS, upgraded CVET 500 /detector FID, capillary column Varian-30m EPA / ISO methods adopted QA / QC system is formally introduced but not fully implemented			
“National center for control and prevention of the diseases” SNCO, Ministry of Health of the Republic of Armenia, RA Certification	Sampling and testing of number of pesticides, namely: DDT and metabolites, lindane, hexachlorbezol, heptachlorine, 2.4-D acids, salts, ethers, aldrin, dieldrin and etc.	Gas-chromatographs and thin-layered chromatographic methods are applied. The laboratory has relevant chemical reagents, standard materials and equipment. The testing is implemented in accordance with the requirements of standard methods (ISO and GOST). The laboratory is equipped with COLOR-500, COLOR-506, LKHM 8, LKHM 80, AGILENT 7890A gas-chromatographs. The photo and flash ionizing and electron capturing detectors are applied.	The sampling is implemented by laboratory staff and doctors-hygienists. The requirements foreseen by the analytical method are applied during the sampling Process. The environmental sampling: soil, water, air and food raw materials is implemented upon necessity.	Staff: 1. Head of the department, 2. Chemists-analysts 3. Laboratory assistant 4. Sampler	Corresponding laboratory conditions, not fully relevant conditions for chemicals and reagents storage, developed procedures for equipment storage.
Laboratory of the “National Institute of Metrology” Closed Joint-Stock Company, under the coordination of the Ministry of Economy. (located near CJSC “Standard Dialogue” and shares some of their facilities.	Analysis of OCPs, dioxins, and others OPs, PAH. In fact, only DDT, DDE, HCCH, PCP, HCB, PAHs and PCB are analyzed. Analysis of dioxins is performed episodically with the special chromatographic and capillary columns for separation/identification of dioxins and their isomers	Operational equipment - 4 GCs: 1. Shimadzu GC 2010 with Dual detector FID and ECD 2. Shimadzu GC 2010 with Dual detector FID and EC 3. Shimadzu GC 2010 with FID 4. Shimadzu GC-MS 2010 detector MS; For analysis of OCPs: Shimadzu GC 2010 with Dual detector FID and ECD and Shimadzu GC-MS 2010	Adequate conditions for samples storage and processing; Sample preparation practices: Soils/sludge - absent Water – sufficient Plants/crops – sufficient Food products – sufficient	Staff involved : Lab supervisor 4 chemists-analysts, 1 Lab assistants on sample preparation, 1 data processing specialist,	Adequate lab conditions; Not fully adequate conditions for storage of chemicals and reagents; developed equipment maintenance practices in place

Institution/Laboratory	Existing Technical Capacities for Conducting OPs Testing	Analytical Method(s) / Instrumentation, QA/QC Procedure	Sampling Capacity and Type of Samples	Human Resources/ Expert Capacity	Condition of Infrastructure
<u>Not certified</u>		<p>detector MS; For analysis of dioxins: Shimadzu GC-MS 2010 detector MS; For analysis of other OPs (~30 substances) - Shimadzu GC 2010 with Dual detector FID and EC, Shimadzu GC 2010 with FID, Shimadzu GC-MS 2010 detector MS. In compliance with ISO, AOAC, GOST, EPA standards, due to modern/digital instrumentation No formal QA / QC system established but some procedures are applied</p>			
<p>Private Laboratory of “Standard Dialogue” CJSC,</p> <p>RA Certification ISO 9001Quality Certificate (UK) 17025 COC Competency Certificate (UK) International Certification (German Federal Republic authorized body) is in process</p>	<p>Carries out analysis/testing of OCPs and, dioxins, other Ops, PAHs, and PCBs In fact, DDT, DDE, HCCH, PCP, PAHs and PCB are analyzed. Analysis of dioxins is performed episodically with the special chromatographic and capillary columns for separation /identification of dioxins and their isomers Generally high work load associated with state and private contracts</p>	<p>Operational equipment - 5 GCs: 1. Shimadzu GC 2010 with Dual detector FID and ECD 2. Shimadzu GC 2010 with Dual detector FID and EC 3. Shimadzu GC 2010 with FID 4. Shimadzu GC-MS 2010 detector MS 5. Waters HPLC /detector UV (MWD)/</p> <p>In compliance with ISO, AOAC, GOST standards (ISO 6468:1996, AOAC 2007.01, GOST R 53184-2008) QA / QC system is formally established (main elements), with detailed procedures being developed</p>	<p>Not fully adequate conditions for samples storage and processing;</p> <p>Sampling practices: Soils/sludge - absent Water – sufficient Plants/crops –sufficient Food/animal products – sufficient</p>	<p>Staff involved :</p> <p>4 chemists-analysts, 2 Lab assistants on sample preparation, 2 data processing specialists no samplers</p>	<p>Limited lab space Adequate conditions for storage of chemicals and reagents; developed equipment maintenance practices in place</p>
<p>“ADI Lab” of “Tonus-Les” LLC (Kotayk Marz) RA Certification: ISO</p>	<p>Carries out analysis/testing of OCPs and potential capacity for testing of dioxins and others OPs. In fact, 2,4-DDT, 4,4-DDT,</p>	<p>Operational equipment: 1 – GCMS, 1 - GC-MS Bruker GC with detector MS 2 - LCMS 2 - ID chromatographs</p>	<p>Adequate conditions for samples storage and processing;</p> <p>Sampling practices only for Water –sufficient</p>	<p>Staff involved:</p> <p>7 chemists-analysts (2 PhDs), 2 Lab assistants on</p>	<p>Overall adequate lab space and conditions; equipment maintenance</p>

Institution/Laboratory	Existing Technical Capacities for Conducting OPs Testing	Analytical Method(s) / Instrumentation, QA/QC Procedure	Sampling Capacity and Type of Samples	Human Resources/ Expert Capacity	Condition of Infrastructure
17025-2005 (2013)	<p>4,4-DDD and 4,4-DDE are analyzed.</p> <p>Generally high work load associated with state and private contracts</p>	<p>1- HPLC- Knauer D-14163 (HPLC-Journal of Chromatographic science, vol.41, august, 2003, pp.343-349);</p> <p>For analysis of OCPs: GC-MS Bruker GC with detector MS and HPLC-MS Agilent 1100 detector MS;</p> <p>For analysis of dioxins: GC-MS Bruker GC with detector MS and HPLC -MS Agilent 1100 detector MS;</p> <p>For analysis of other OPs (~30 substances: GC-MS Bruker GC 2010 with detector MS h HPLC-MS Agilent 1100 detector MS, GC Bruker GC with detector FID, HPLC Knauer LC with DAD detector, HPLC Knauer LC with dual DAD and RD detectors.</p> <p>In compliance with ISO, AOAC, EPA methods;</p> <p>QA / QC system is formally in place, with detailed procedures under development</p>	<p>Sample preparation: food and non-food samples, pharmaceutical products</p>	<p>sample preparation, 1 IT/data specialist 2 QA/QC specialists (mng.), 1 engineer, 1 engineer-metrologist, no samplers</p>	<p>practices are fully developed</p>

Institution/Laboratory	Existing Technical Capacities for Conducting OPs Testing	Analytical Method(s) / Instrumentation, QA/QC Procedure	Sampling Capacity and Type of Samples	Human Resources/ Expert Capacity	Condition of Infrastructure
“Centre for Molecule Structure Studies” SNCO, of National Academy of Sciences (NAS) <u>Not certified</u>	Only potential for analysis of OCPs, dioxins, and others OPs Research is carried out on OCPs and other complex organic compounds (containing phosphorus, nitrogen, sulfur) Require upgrades to undertake external work	Operational equipment - 2 GCs (GC-MS Gas Chromatograph with MS detector), 1 Raman Spectrometer (Thermo Scientific Nicolet), 1 Fourier transform infrared spectroscopy (Thermo Scientific Nicolet), 1 NMR spectroscopy Varian Mercury 300Mhz; For analysis of OCPs, dioxins and other OPs: GC-MS Gas Chromatograph with MS detector EPA / ISO / GOST methods QA / QC system is formally introduced (some elements), ensuring data quality	Limitations on samples storage and processing; No sampling equipment/practices in place	Highly qualified staff, 5 chemists-analysts, 3 chemist-assistants in sample preparation, 3-4 data processing and interpretation specialists	Overall adequate lab space and conditions; equipment maintenance practices are fully developed
Analytical Laboratory of “Institute of Chemical Physics” SNCO, of National Academy of Sciences (NAS) <u>Not certified</u>	Theoretically tasked with analysis of OCPs and others Ops. Research is carried out on OCPs (oxidation products and metabolites) and other organic compounds (containing phosphorus, nitrogen, sulfur), no dioxins Require upgrades to undertake external work	Operational equipment - 4 GCs: 2 - CVET 500 with detector FID and ECD 2 - Chrome 5 with detector FID EPA / ISO / GOST methods QA / QC system is not formally introduced	Limitations on samples storage and processing; Sampling preparation practices: Soils/sludge - available Water – sufficient Plants/crops – absent Food/animal products – absent	Highly qualified staff: 10 chemists-analysts, 2-3 samplers, 3-4 chemist in sample preparation, 3-4 in data processing and interpretation	Limitations related to lab conditions but developed equipment maintenance practices in place

Institution/Laboratory	Existing Technical Capacities for Conducting OPs Testing	Analytical Method(s) / Instrumentation, QA/QC Procedure	Sampling Capacity and Type of Samples	Human Resources/ Expert Capacity	Condition of Infrastructure
Centre for Ecological and Noosphere Studies of National Academy of Sciences (NAS)	The laboratory division for organic substances testing was originally established for POPs testing and is in compliance with international requirements (the certification of International inter-laboratory testing since 2006). The standard POPs substances forbidden by the Stockholm convention are in place.	<p>The works are executed in accordance with EPA, ISO, DIN, GOST, HST and other appropriate methodologies.</p> <p>Equipment. TRACE DSQ- with capillary column Gas chromatograph-MS (Thermo Electron Corporation)</p> <p>START E – microwave extortion system (MILESTONE) with capacity of 12 samples simultaneous processing</p> <p>Spectrophotometers: Specord UV-VIS (Carl Zeiss Jena) SF 46 , SF 26- (LOMO)</p> <p>IRF-22 Refractometer</p> <p>The OA/OV Procedure corresponding to ISO/MEK 17025</p>	<p>The center has an experienced sampling group: having necessary field testing and sampling equipment. The sampling is implemented according to ISO standards, depending on the sampling environment:</p> <p>The types of the samples:</p> <ul style="list-style-type: none"> -Soil -Water -Plants -Dust -Air -Food -Food raw materials -Minerals -Mineral ore -Precipitations -Sludge -Bio-substratum 	<p>1 specialist – responsible for quality (PhD in Chemical Sciences)</p> <p>3 Chemists-analysts- (2 PhD in Chemistry)</p> <p>2 specialists responsible for samples preparation</p> <p>4 specialists – taking the samples</p> <p>The main part of the specialists have passed the training courses: The respective expert group is working for the organization of the entire cycle of the study –starting from the sampling and finishing with the mapping, and formulation of the conclusions:</p>	<p>The respective division for provision of geological analysis of the sites, sampling, transportation, accepting, storage, preliminary processing, analysis, the processing of the results, the results preservation and compiling the conclusions are in place</p>

II. Barriers

The main barriers which presently exist in relation to eliminating POPs pesticides and obsolete pesticides in Armenia as well as addressing hazardous waste and chemicals management issues generally are identified as the following:

Institutional barriers: Overall there are a number of institutional stakeholders with a legitimate interest in the current project and related general issues. This is further elaborated in Section III on Stakeholder Analysis. The primary institutional players involved are:

- *Ministry of Nature Protection* have overall legal and regulatory authority for hazardous waste and contaminated sites management, as well as the licensing and approval process required to actually undertake the work at both Nubarashen and related to OP stockpile sites. They serve as the focal point ministry for the relevant international conventions and the evolving national chemicals management framework.
- *Ministry of Emergency Situations* will be the primary operational proponent for work on the Nubarashen site based on the emergency order of the government related their operational capability and mandate in addressing issues of public safety. Similarly they will act in the same proponent capacity as the owner and operator of the proposed HW storage and potential host treatment site for purposes of this project.
- *Ministry of Agriculture* have a national implementing role for the EU/FAO project that serves as co-financing for the current project and subject to the results of that work will be involved with MNP and MES in transfer to the current project of stockpiles for destruction and in any more invasive detailed assessment site remediation undertaken on OP storehouse sites.
- *Other institutional players* include the City of Yerevan as the legal owner and regulated party in respect to the Nubarashen burial site, Ministry of Health, Ministry of Transport, Customs authorities, national public safety authorities and the major national financial and economic planning ministries (Ministry of Finance, Ministry of Economy).

The barrier presented to the project is the potential for overlapping authorities, jurisdiction and bureaucratic agendas that may impede efficient development, processing and implementation of the project work. This includes: i) the uncertain and to date absent role of local authorities in assuming any responsibility for obsolete pesticide stockpiles and waste (particularly the City of Yerevan in relation to the Nubarashen site); ii) the overriding licencing and environmental approval authority of MNP respecting obsolete pesticides as hazardous waste potentially needing to be reconciled with mandated role of MES and traditional but currently relatively passive role of MoA; and iii) the institutional processing imperatives associated with timely mobilization of the required public sector co-financing through ministerial budgets within the national fiscal planning framework. As has been initiated through the PIF and PPG phases of the project, this will be addressed through frequent and comprehensive consultation with institutional stakeholders, operation of an effective and now expanded Inter-Agency supervisory mechanism, and direct involvement from the Ministerial level as required based on the national priority attached to the project.

Legal and regulatory barriers: As described above in the situation analysis, while a basic regulatory framework exists for waste management in Armenia, there are a number of overlaps, conflicts and gaps. These, in combination with the relatively complicated institutional

environment, create potential legal and regulatory barriers that will need to be resolved on a project specific basis. This includes potential conflicts within the national regulations and between these and international standards and practices in areas such as methodologies used to approve treatment and disposal technologies, licensing of HW transport, and exporting country procedures under the Basel Convention. These also include the need for strict compliance with requirements for EIA, permitting and facility licensing approvals both to be done in accordance with national and international standards. The applications involved are also new application of these practices in Armenia with the associated learning curve risks. Additionally, there remain outstanding issues in relation to specific jurisdictions and legal proponent obligations related to licensing for storehouses and contaminated site remediation. At an international level, a potential barrier also exists in relation to the export of hazardous waste, given the need for transit country approvals under the Basel Convention and where the European Union is involved increasingly strict over-site and procedures respecting imports as well as other agreements specific to this region.

Information and awareness barriers: Despite advocacy efforts of NGOs, various international projects and the government, there remains a relatively low level of awareness respecting POPs pesticide and OP issues, and actions required to address them, both at the institutional and broader public level. This is in part a product of limited and fragmented information on the situation and options for solutions being available at least until now. Overall this situation could create barriers to decision making on the project and its implementation within the government, and equally important potential public resistance to the solutions proposed, particularly among local communities where perceived impacts may exist. This creates an imperative for the project to prioritize public consultation and input, as has been initiated during the PPG stage but will need to be sustained throughout. This in turn is substantially facilitated by the more systematic and comprehensive information base and the solutions relative to the issue that are now available and documented herein.

Technical capacity and supporting infrastructure barriers: As illustrated in the situation analysis on technical capacity above, there are a number of deficits in available technical capacity that could present barriers to effective project implementation and achievement of its objectives. Notwithstanding a strong national technical human resource intellectual base for generally applicable engineering, environmental and chemicals related disciplines, there is limited direct individual and service provider experience in the specific required disciplines such as site and risk assessment, HW storage and treatment facility design and operation, and supporting sampling and analytical services. While the Project could be cost effectively implemented using contracted international expertise in these areas, the opportunity also exists to use the project to foster development of sustaining expertise and infrastructure in the country through effective national/international partnerships, particularly with the private sector.

Financial barriers: A chronic barrier to addressing the POPs pesticide and OP issue in Armenia like many countries is the absence of effective resources to deal with the issue. While the government has responded to the issue where seen as a direct threat as was the case at Nubarashen, this has generally been reactive and constrained in scope by available budget funds. Similarly, international efforts to date have been somewhat ad hoc and fragmented, and largely been oriented toward studying the issue and selectively providing exposure to international practices, rather than on physically addressing these legacy issues that have existed for many years. The current project represents a unique and potentially one time opportunity to mobilize

substantial funding from both international and national sources to essentially eliminate the issue.

III. Stakeholder analysis

The project has a wide range of national stakeholders as defined along with potential interests and roles in the following. Initial stakeholder analysis and follow up consultation on the project was undertaken during the preparation of the PIF as reported therein and has continued after that time under the auspices of MNP and AWHHE. During the PPG stage this analysis was updated and further elaborated in directed studies undertaken by national consultants addressing both institutional stakeholders in the context of their statutory involvement in the project, and more broadly for non-government stakeholders including affected publics. Three major workshops were also held during the PPG, namely: i) Inception Workshop (December 2012), ii) PPG Technical Planning Workshop (March 2013), and iii) Draft Project Document Stakeholders Consultation Workshop (January 2014). Additionally, a formal stakeholder analysis was undertaken as part of the OSCE project by AWHHE and documented as part of that project^{22,23}. This also provided valuable guidance in the GEF project's stakeholder analysis as reported herein. The general results and conclusions of this stakeholder analysis is described as follows, as specifically applicable to potential project activities related to dealing with the obsolete pesticide issue in Armenia.

Institutional Stakeholders:

As in most countries, a wide range of institutional stakeholders will exist for any hazardous waste and chemicals management project, all having some interest through impacts on them or benefits that may come from the project, or more importantly through statutory obligations and responsibilities that they assume. This is the case for this particular project where the scope specifically applies to a relative high profile specific hazardous waste and contaminated site issue involving obsolete pesticides. Table 9 below summaries the roles and function of the identified institutional stakeholders involved or potentially involved in this context.

The principle and governing stakeholder institutions are the Ministry of Nature Protection and Ministry of Emergency situations. MNP has comprehensive regulatory authority over the management of obsolete pesticides as a hazardous waste, ranging from policy through to operational licensing and inspection. The unique status of the Nubarashen site and the establishment of the Inter-Agency Commission on the Elimination of Obsolete Pesticides in 2010 placed the Ministry of Emergency Situations as the premier operational stakeholder with respect to the issue, having been the primary institutional partner for most international initiatives to date. This Ministry is nominated to take control of the site, affect emergency measures to protect it and its operational custody since that time gives material substance to this principal operational stakeholder role. MES are effectively the national proponent for addressing the issue. The evolution of prevailing administrative arrangements within the government have also nominally delegated a similar operational proponent role for the historical OP storehouse sites to the Ministry of Agriculture, noting that in fact they do not actually having any direct legal authority and in the formal stakeholder analysis conducted by for OSCE are in fact considered a passive stakeholder. Their role appears to date historically from the assignment of

²² Site Assessment and Feasibility Study of the Nubarashen Burial Site of Obsolete and Banned Pesticides in Nubarashen, Armenia, Phase 1 and 2 investigation report", Tauw/OSCE, September 2013.

²³ Site Assessment and Feasibility Study of the Nubarashen Burial Site of Obsolete and Banned Pesticides in Nubarashen, Armenia, Phase 3 Selection & pre-design of long term technical solutions", Tauw/OSCE, December 2013

responsibility in 2003 for developing and maintaining inventories of OPs at storehouse sites and hosting periodic and somewhat fragmented international studies. The Ministry of Health also theoretically should constitute a major institutional stakeholder based on statutory responsibilities but in practice have maintained a relatively passive interest and low level of participation. This somewhat fragmented distribution of national level institutional stakeholder roles in practice highlights a general awareness or perhaps level of interest issue among major institutional stakeholders and an overall institutional stakeholder interface issue that the project will have to address. This includes a number of policy and legal issues such as the general acceptance of the principle that OPs generally and POPs pesticide waste in particular are a regulated hazardous waste and would be managed as such under the regulatory authority of MNP consistent with international practice. This applies particularly to OP storehouses where responsibilities to date have not been clear and this has been a factor in their not being appropriately managed over an extended period.

As illustrated in Table 7 a number of other institutional stakeholders also exist and will at various points in project development and implementation have an interest, role and function. Perhaps the most significant of these are local governments, including the City of Yerevan, who have an un-exercised responsibility for permitting of storage sites, both historical and as may be developed under the project. In practice, the most important of these will be Kotayk Marz and the local self-governing body with jurisdiction for the proposed Kotayk hazardous waste management facility site but also extends to the need to engage local authorities in relation to OP storehouses, and in the case of the Nubarashen site, the City of Yerevan.

Other institutional stakeholders need to be aware and informed regarding the project primarily in relation to their normal statutory duties that will be warranted to varying degrees. In particular, permitting by the Ministry of Transport and Communications of road transport carriers and likely consultation respecting travel routes for hazardous waste removed from the subject sites, this would be additional to but require coordination with the transport licensing required under MNP regulations. The involvement of the Ministries of Economy and Finance will be important in the process of arranging appropriate national budget co-financing and their engagement and awareness should be maintained. Ministry of Defence have been an active stakeholder participant in the OP issue through involvement of the Radiological, Chemical and Biological Defence Department. Finally, a role at least as technical peer reviewers and potentially service providers of the state scientific establishment would be beneficial.

An overall observation from the formal stakeholder analysis undertaken for or in association with the project (specifically that done by AWHHE) is that there remains a significant awareness deficiency related to the issue and its context among some institutional stakeholders. This underlines the importance of having an ongoing, functioning, expanded Inter-Agency Commission on the Elimination of Obsolete Pesticides to oversee the Project and to serve as vehicle for facilitating institutional stakeholder engagement and coordination, achieving collective decision making on key issues, as well as resolving the several potentially critical issues related to regulatory jurisdiction and authority that could be counterproductive to implementing the project. While nominally in place and having a role in both the PPG work and the OSCE initiative, to date this mechanism has not been fully exploited and as concluded in the PPG stakeholder analysis undertaken needs to be strengthened.

Table 7. Roles and functions of principle institutional stakeholder

Ministry/ department/subsidiary organization	Roles and Functions (in accordance with adopted legislation and regulations)
<p>Ministry of Environment Protection</p> <ul style="list-style-type: none"> - Hazardous Policy and Waste Policy Division - National Environmental Inspectorate - Bio-Resource Management Agency - Waste and Atmosphere Emissions Management Agency - “Environmental Impact Monitoring Center” SNCO (ArmEcoMonitoring) - SNCO "Wastes Research Centre" 	<ul style="list-style-type: none"> • General Waste Management (Under RA Law on Waste) <ul style="list-style-type: none"> - participation in the formulation of state waste management policy; - drafting targeted programs in waste management; - state accounting of waste; - approval of waste placement limits for legal entities and private entrepreneurs; - defining the inventories of hazardous and banned waste; - establishment of waste inventories based on hazard classification; - proposals on issuance of permits for transboundary shipment of hazardous waste; - approval of the sites for waste management facilities; - approval of waste certificates as compiled by waste generators; - creation of a data bank for the amounts of generated waste; - as prescribed by law, performing state environmental assessment of design documentation and integrated programs for construction, renovation and operation of landfills or facilities and other special allocated sites during waste generation, processing, utilization, placement and disposal; - maintaining the state waste cadastre; - sharing information with other agencies about low-waste and wasteless technologies; - compilation, maintaining and monitoring of registers for waste generation, processing and utilization facilities and landfills; - drafting legal acts regulating waste management and adoption of secondary legislation within its competence; - signing international cooperation agreements on waste management and international inter-agency agreements on transboundary waste shipment; - sharing information on waste utilization with international organizations and competent states; - other competences stipulated by law. • Designed national waste management authority (RA Government resolution of May 19, 2005 No. 599-N) • Under charter and staffing of MNP (Government Resolution of August 8, 2002, No. 1237-N) <ul style="list-style-type: none"> - drafts and implements the waste management policy - environmentally safe management of hazardous chemicals and wastes produced and used in Armenia; - drafting procedures for state monitoring of the environment, including

Ministry/ department/subsidiary organization	Roles and Functions (in accordance with adopted legislation and regulations)
	<p>waste disposal sites;</p> <ul style="list-style-type: none"> - hazard-based classification of chemicals and generated industrial and consumption waste produced and used in Armenia; - state accounting of waste, creation of a state cadastre and a register for waste generation, processing and utilization facilities and disposal sites, and defining the maintaining procedure thereof - state environmental inspection and supervision related to waste. <ul style="list-style-type: none"> • Implementation of international Chemicals and Waste Conventions: <ul style="list-style-type: none"> - Stockholm Convention on POPs (Government Resolution October 29, 2004, No. 1483-N) - Rotterdam Convention on Prior Informed Consent (Government Resolution October 29, 2004, No.1508-N) - Basel Convention on importation, exportation and transit of waste (Government Resolution December 8, 1995, No. 97) • Mandated directly controlled Non-for Profit supporting organizations: <ul style="list-style-type: none"> - Environmental Impact Monitoring Center” SNCO (ArmEcoMonitoring) provides regulatory control analytical and monitoring - Waste Research Centre provides research and technical support to MNP on calculation of the waste generation classifiers, processing and utilization facilities and disposal sites, collection/analysis of information on waste utilization and decontamination, low-waste technologies, and analytical services. • Inter-Agency Commission chair rendering conclusions on: <ul style="list-style-type: none"> - rules for the management of obsolete pesticides - procedure for licensing of processing, decontamination, storage, transportation and placement of hazardous waste • Jointly with Ministry of Health supervises the compliance with the requirements and conditions licenses for processing, decontamination, storage, transportation and placement of hazardous.
Ministry of Emergency Situations Armenian Rescue Service	<ul style="list-style-type: none"> • Provides preventive measures for the protection of the population (Law “On the protection of population in emergency situations” of December 2, 1998, HO 265) as follows: <ul style="list-style-type: none"> - monitoring and supervision of the radiological, chemical and bacteriological contamination of the environment, territory and facilities - population protection from radiological, chemical and bacteriological substances - develops population protection programs for the prevention of consequences of emergency situations, reduction and elimination of the potential consequences, and ensures implementation thereof; - aiding the exposed population in emergency situations, creates and accumulates financial, food, medical and other material assets, funds and reserves, and ensures their purposeful usage; - organizes state expert assessment of facilities, items, processes, designs and solutions believed to be the potential cause of emergency situations; - organizes certification of rescuers and population’s training on population safety issues in emergency situations, as prescribed by the Government;

Ministry/ department/subsidiary organization	Roles and Functions (in accordance with adopted legislation and regulations)
	<ul style="list-style-type: none"> - coordinates and supervises the activity of national executive, governance, territorial and local self-government bodies, enterprises, institutions, and organizations in terms of population's protection; - organizes population's notification and information in case of emergency situations; - implements other competences in terms of population protection as provided in the legislation of Armenia - establish rescue forces are established for rescue activities and professional aid to the population, keep these in a constant readiness, inclusive of state, NGO and institutional rescue units that in emergency situations they operate under centralized command and control within reasonable risk
Ministry of Agriculture Division of Plant Production and Plant Protection	<ul style="list-style-type: none"> • Regulatory supervision of the storage, handling and storage safe use of agro-chemicals including pesticides. • Establishment of a working group for the coordination of the disposal of obsolete pesticides developing an action plan for the disposal of these substances including the accounting of obsolete pesticides within three months (Prime Minister's Resolution of September 22, 2003, No.452-A). • Nominal ownership and custody of state assets formally used for the storage of pesticides.
Ministry of Health	<ul style="list-style-type: none"> • General Waste Management (Under RA Law on Waste) <ul style="list-style-type: none"> - the development of safety requirements for human health in the secondary legislation related to waste management, - the development of sanitation and anti-epidemic regulations and norms to rule out dangerous impacts on the human body during waste generation, collection, shipment, storage, processing, utilization, disposal, decontamination and burial, and supervision over the implementation of these requirements; - development of priority measures in protecting human health from hazardous waste impact and submitting the latter to the Government of the Republic of Armenia; - approval of the sites for waste management facilities; - sanitation and hygiene requirements to products manufactured from waste and issuance of hygiene conclusions; - participation in the compilation of the hazard-based classified inventory of waste; - other competencies stipulated by law • Administration of rules and norms on the management of hazardous chemical waste and the requirements to storage and shipment of hazardous chemical waste (Resolution of the RA Minister of Health of October 29, 2009, No.20-N) in their application to obsolete pesticides (Government Resolution "On the adoption of Obsolete pesticide utilization rules" of February 17, 2011, No.195-N)
Ministry of Transportation and Communications	<ul style="list-style-type: none"> • Permitting the shipment of hazardous cargo including hazardous waste by road (Law "On the shipment of hazardous cargo and un-decontaminated containers by automobile transport" of February 27, 2012, HO 30-N)
Ministry of Territorial	<ul style="list-style-type: none"> • Operational direction and coordination of solid waste management

Ministry/ department/subsidiary organization	Roles and Functions (in accordance with adopted legislation and regulations)
Administration	facilities development policy and financing specifically for municipal waste management activities.
Ministry of Foreign Affairs International Organizations Department	<ul style="list-style-type: none"> • Coordinating responsibility for activities of diplomatically accredited international organizations operating in Armenia and bi-lateral relations related to foreign assistance.
Ministry of Economy	<ul style="list-style-type: none"> • Overall economic policy and planning authority with a specific interest in net economic development benefits from projects involving national and international financial commitments, and in the facilitation of public private partnerships in such developments.
Ministry of Finance	<ul style="list-style-type: none"> • National authority for approval of national budget commitments as would be associated with project co-financing
Ministry of Defence	<ul style="list-style-type: none"> • Maintained observer status on the issue • Expert participation on the Inter-Agency Commission on Elimination of Obsolete Pesticides through Radiological, Chemical and Biological Defence Department • Potential provision of trained personnel for site operational work
National Academy of Science	<ul style="list-style-type: none"> • Through institutes and laboratories supplies technical expertise and participation on relevant interagency commissions. • NAS Centre for Ecological-Noosphere Studies has actively participated in addressing the issue
State Revenue Committee	<ul style="list-style-type: none"> • Responsibility for Customs control as may relate to import of technology and export of waste
Republic of Armenia Police	<ul style="list-style-type: none"> • Site security control functions
Local Self-Governing Bodies (Marz, Yerevan, and Municipal Governments)	<ul style="list-style-type: none"> • General Waste Management (Under RA Law on Waste) <ul style="list-style-type: none"> - participation in state policy formulation in waste management; - participation in the drafting of state programs in waste management; - drafting local programs in waste management and coordination of implementation thereof; - issuance of permits in coordination with the authorized state body for waste disposal; - drafting sanitary cleaning schemes and supervision over garbage collection; - compilation and maintaining of logs for waste generation, processing, disposal and utilization facilities; - accounting of waste generation, decontamination, utilization and disposal and certification thereof; - liquidation of uncontrollable and unauthorized garbage dumps within their administrative territory; - engaging the population in the collection of not hazardous waste that is a valuable resource; - other competences stipulated by law. • Issuing permissions at the Marz (and City of Yerevan) level for hazardous waste storage sites such as OP stockpile stores in their territory

Ministry/ department/subsidiary organization	Roles and Functions (in accordance with adopted legislation and regulations)
	(additional to national licensing requirements under MNP)

External Non-government Stakeholders

In addition to the institutional stakeholders above, a number of non-government stakeholders exist and should be actively aware and engaged in the project. Paramount among these are the local communities that will be affected by the project, particularly as highlighted in the AWHHE stakeholder analysis, among sub-groups within these communities that may be considered to be of higher potential risk should direct exposure to OP contaminated sites exist. Similarly the potential national service providers required and who benefit from the project need to be engaged, noting that there is significant cross over in this area with other stakeholder groups, not the least of which are already engaged ENGOs who would be valuable and knowledge assets for project implementation. Various national civil society organizations like ENGOs clearly are stakeholders both in the context of critical oversight in implementation but also as proactive advocates for the solutions offered and assisting in keeping the project's objectives in context. Table 8 below provides a general list of such stakeholders and potential interests and roles.

Table 8. Roles and functions of external (non-government) stakeholders

Stakeholder Category/Organization	Interests and Potential Roles
Local communities and land holders affected by OPs and project activities - Neighbouring the Nubarashen site (including agricultural users) - Neighbouring OP storage sites - Public along transport routes	<ul style="list-style-type: none">• In the case of communities neighbouring Nubarashen the elimination of stockpiles of OPs, POPs waste and associated contamination constitutes a benefit in terms of local environmental quality and reduction in possible long term health risk• At the same time the physical operations accomplishing this represent some increased short term risk.• In the case of communities in the vicinity of the Kotayk site and to a lesser extent those along transportation routes, the project represents at least perceptually a potential increased risk as well as in the case of Kotayk a local benefit through new economic activity.• These communities need to be fully informed of these benefits and potential risks in transparent manner with provision for their informed input and active participation as the project is implemented.
Environmental service providers - Environment/engineering consultants - Civil contractors - Transportations firms - Analytical laboratories	<ul style="list-style-type: none">• The project will offer opportunities for a range of environmental service providers both in terms of being the primary beneficiary of the project's technical capacity strengthening activities and through business opportunities it may offer, all of which should improve national environmental management capacity.• To optimize national involvement the project needs to proactively make these stakeholders aware of the project and it's potential, as well ensure they are a primary target of training and technical capacity strengthening.
Civil society organizations/ENGOs - AWWHE - Ecolur and Khazer - Other ENGOs - Women's advocacy groups - Affected public interest groups (taxpayers)	<ul style="list-style-type: none">• The active civil society groups particularly those such as AWHHE who have been key to date in promoting public awareness and advocating for environmentally sound solutions of the issue need to remain engaged, be kept fully informed and should be actively engaged, particularly in critical advocacy and promotion of the solutions the project offers.• In addition to a strong advocacy role AWHHE acts as a key technical service provider for international and national projects on the issue.

Stakeholder Category/Organization	Interests and Potential Roles
Academic institutions - Universities/higher education institutions - Non-government research institutes - Primary and secondary schools	<ul style="list-style-type: none"> • The project offers both a teaching and possible niche R&D stimulation opportunity relative to hazardous waste and contaminated sites management, which have broader long term value to the country, beyond the short term priority of OP management addressed in the project. • Involvement as peer reviewers and potentially direct participants can be fostered by ensuring they are aware of the project's activities. • American University of Armenia is an example of an independent academic institution active in contaminated site investigations with international NGOs
General public	<ul style="list-style-type: none"> • The public generally have both a role and an interest in the project and the broader issues of hazardous waste, chemicals and contaminated sites in recognition of the need to “mainstream” these issues in the overall social consciousness as well as raise their profile for public policy makers. • This should be supported by general public awareness both about the project and the broader long term issues with linkages to more mainstream issues such as SWM being highlighted.
International Organizations International Financial Organizations Multi-lateral agencies Bi-lateral assistance agencies International NGOs/civil society organizations	<ul style="list-style-type: none"> • The international community. Particularly those resident and active in the country, represent stakeholders largely through their role in providing ley and coordinated international assistance as they have to date. • As such it is important that the project fully acknowledge these past contributions and provide well defined ongoing opportunities for continuing support.

As was the case for institutional stakeholders, the overall conclusion of the national stakeholders analysis done specifically by AWHHE was that there is generally low awareness and interest of external non-government stakeholders, beyond the directly engaged ENGOs and some academic and service provider organizations. Associated with this was the conclusion that significant technical and management deficits in all stakeholder organizations exist that should be addressed through training and information provision. Finally, a priority should be attached to targeting awareness and consultation initiatives at the local level to those where real or perceived potential impacts may be felt, particularly among those who may have direct exposure to OP containing or contaminated sites and that consultation with them on measures being implemented to protect them be emphasized. In that context, one valuable message that came out of the final workshop on the OSCE project was the need for the advocates of public awareness and consultation, specifically ENGOs and the international agencies and organizations involved in these projects, to strike an appropriate balance between creating awareness of risks and critical advocacy of solutions such that an overreaction to perceived risk does not itself become a barrier to the solutions practically available.

IV. Linkages with on-going projects and country drivenness

Since independence, the Government of Armenia has placed a high priority on addressing the reduction of pollution and eliminating related anthropogenic pressures and impacts to the natural and human environment, particularly those associated with historical legacies. Maintaining an efficient utilization of natural resources, with comprehensive environmental regulation and protection is among the factors serving the fundamental values of Republic of Armenia (RA) National Security Strategy adopted in 2007. The document specifically specifies the introduction of sound environmental practices, the supervision of storage of hazardous chemicals, radioactive materials and waste as a priority in implementation of national reforms.

Consistent management of chemicals, including development of methodological approaches for assessment and reduction of the risks from the impact of chemicals, development of methods and procedures on proper elimination of medical wastes, expired drugs, non-useful chemicals and pesticides is part of activities from the “List of Actions for 2009-2011 to Ensure Implementation of ENP RA-EU Action Plan” approved by the RA president in May 2009.

Sound management of chemicals is reflected in the Second National Environmental Action Plan (NEAP). It particularly prioritizes waste management both solid waste management (SWM) and hazardous waste management as is reflected in the legal and regulatory framework that is implemented for the country.

Relevant to the project, the Individual Partnership Action Plan (IPAP) that lays out the programme of cooperation between Armenia and NATO, emphasises the importance of strengthening national capacities, namely laboratory capacities in the country to ensure monitoring of POPs in different environmental media.

RA Government commitment relative to hazardous waste, chemicals and contaminated sites management is evidenced by the country’s ratification of the all relevant MEAs, notably the Stockholm (2005), Basel (1999) and Rotterdam (2003) Conventions, its signing of Minamata Convention (2013) and its participation in the SAICM initiative where it has an active designated focal point for coordination of such activities in relation to the international obligations assumed under these MEAs. A number of activities are specifically mentioned in the “List of measures for implementation of Armenia’s obligations under multilateral international environmental agreements” approved by the Government of the RA in November, 2011.

In terms of other project linkages, the current project does constitute the principle international and national initiative in the country with respect to hazardous waste, chemicals and contaminated site management. However it has direct and indirect synergies with a number of current and pending international projects as described below and which the project has and will continue to develop cooperative and coordinated ties.

- *Development of national SWM infrastructure:* As noted previously, Armenia is engaged in a major long terms initiative to upgrade and expand its national SWM infrastructure such that it meets international standards and in particular is harmonized with this in the EU. Development of environmentally sound SWM infrastructure and effective overarching means to institute waste diversion and reduction are fundamentally linked to dealing with hazardous

waste management issues including those addressed in this project. In the simplest terms having that capability that precludes the primary traditional option for HW disposal supports the development of parallel HW management infrastructure such as initiated in this project. More specifically, the development of the proposed regional landfill/transfer station and integrated collection system will eliminate the current practices and address legacies associated with past SWM practice. This directly reduced potential POPs release associated with open burning and chemicals release to land and water including OPs. Indirectly, it forces the requirement for effective HW and chemical waste management solutions as being fostered by the current project. Recognition of this linkage has created a linkage between the current project and the efforts of various IFIs, notably ADB, as a well as institutional coordination between the primary national institutions, namely MNP and Ministry of Territorial Administration.

- EU initiative on obsolete pesticides in the CIS: The project has direct synergy with the pending EU initiative related to OP legacies generally in the CIS, including Armenia as is being administered by FAO and executed by MoA. As such, its contribution has been formally integrated into the project scope as described under Sub-Component 1.3 in Section V below. It has been agreed between MNP and MoA under the auspices of the Inter-Agency Commission that the EU project will handle the assessment of OP storehouse sites in the country as defined during the PPG stage (Table 5) and execute the secure packaging of OP stockpiles and clean-up activities. Upon completion, this GEF project will accept the relatively small quantities involved for secure storage and ultimately environmentally disposal using GEF and national resources. This arrangement is described in more detail in Section V below. At the implementing agency level UNDP will coordinate with FAO as required noting that no crossover of budget, supervisory or advisory roles are envisioned recognizing the need for simplicity in implementation arrangements. This will not preclude informal professional exchange of experience and lessons learned as may be mutually beneficial including as applicable inclusion of FAO guidance material as well as sharing training opportunities as they present themselves.
- Other GEF financed POPs projects: As described above a number of past and current GEF projects are active in Armenia, particularly as being undertaken by UNIDO. These are all administered through PMU arrangements under MNP which ensures overall coordination and linkages that may be productive. This UNDP GEF project is already providing inventory data related to OPs and national capacity as documented herein to the current NIP update work and the linkage related to SWM described above substantively addresses the open burning of SW being studied in a separate GEF project. A linkage also exists for any follow on work that might be undertaken either with GEF support or other international/national funding related to dealing with PCB stockpiles and potentially with PCB contaminated sites. The project will also serve to assist in Armenia's participation in the GEF/UNEP Global POPs Monitoring Program.
- American University of Armenia/Blacksmith Institute²⁴: This initiative undertaken through the AUA Acopian Center for the Environment with international NGO funding from the

²⁴ <http://newsroom.aua.am/2013/04/04/aua-evaluates-25-toxic-waste-sites-near-communities-in-armenia/>

Blacksmith Institute has identified 25 sites in 5 regions of the country, largely associated with mining and industrial resource processing contaminated with a variety of heavy metals and chemical wastes. The results of this initiative have been provided to MNP and the Ministry of Health for inclusion in developing data base materials on contaminated sites. Currently, they are pursuing development of containment and clean up initiatives as well as promoting public awareness. The GEF project's capacity strengthening and public awareness initiatives will have a number of synergies with this broader chemicals contaminated site issue in terms of raising opportunities and exchange of lessons learned.

V. Strategy and project design

The overall strategy adopted for the project is based on the approach of ensuring the capture, securing to prevent continuing release, and the elimination of the substantive POPs pesticides stockpiles and wastes as identified above in Section II (Situation Analysis). This would be done on a prioritized basis that allocates resources in accordance with the actual concentration of POPs involved, hence maximizing the amount of actual POPs dealt with and the level of protection for human health and environment calibrated to the availability of financial resources. Associated with this is utilization of the project to also address the less substantive but nevertheless important public issue of non-POPs OPs and to strengthen national institutional, technical and physical capacity generally in the area hazardous waste and contaminated site management as a key part of overall national chemicals management capability.

For purposes of prioritization of POPs pesticides and wastes, the project design utilizes the system of categorization of developed jointly with the OSCE international consultant during the PPG (Table 4). For the overall volumes to be used in the project design, Table 9 illustrates this prioritization by category of material being managed to show the inverse relationship between physical volumes and actual POPs or OPs captured, contained and/or eliminated from the primary stockpile and waste source (Nubarashen burial site). For project design purposes quantities are increased in some cases from those estimated during the PPG to account for anticipated growth and as yet accurately defined aspects. It also accommodates disposal of the relatively minor OP stockpiles and potential amounts that may come from priority storehouse site clean ups for which detailed site assessments have yet to be undertaken, all under the assumption that the promised FAO intervention using an EU grant along with material contributions from the Ministry of Agriculture materialize.

Table 9. POPs waste volumes by prioritized category used for project design

POPs Waste Categories in Order of Priority by Source	Estimated POPs Waste Bulk Quantity (t)	Estimated OP Quantity (t)	Estimated POPs Pesticide Quantity (t)
Category 1: Pure Pesticides and Associated Material >30% pure pesticides)			
Pure pesticides from 5 Nubarashen burial cells	605	605	284
Contaminated clay adjacent to cells (assume 50% Average pure pesticides)	120	60	28
Segregated pure pesticides removed from soil outside cells	175	175	82
OP stockpiles from storehouses	150	150	-

POPs Waste Categories in Order of Priority by Source	Estimated POPs Waste Bulk Quantity (t)	Estimated OP Quantity (t)	Estimated POPs Pesticide Quantity (t)
Category 1 Total	1,050	990	394
Category 2: Soil and other materials with significant potential for heavy contamination above the direct health risk threshold of 1,500 ppm (Assume average 5,000 ppm POPs pesticide) or visual presence of pure pesticides			
Soil from top cover and fenced area with pure pesticides	7,000	83	39
Estimated allowance from priority OP stores remediation/clean-up	100	1	0.5
Category 2 Total	7,100	84	39.5
Category 3: Soil and other materials with contamination levels less than the direct health risk threshold but with potential to be above agricultural risk threshold of 0.7 ppm DDT (assume average 50 ppm POPs pesticides)			
Contaminated soil without traces of pure pesticides from Nubarashen top cover, landfill body, area around site, liner support.	12,550	1.3	0.6
Mechanically cleaned synthetic cover and cleaned ceramic materials/rubble	50	<0.1	<0.1
Estimated allowance from priority OP stores remediation/clean up	100	<0.1	<0.1
Category 3 Total	12,700	1.3	0.6

The above shows that the priority is the elimination of the Category I material which accounts for 91% of the actual POPs pesticides and OPs but only 5% of the actual physical volumes of POPs waste that will have to be managed.

The resulting project design involves the designation of three principle project components in addition to the normal Project Monitoring and Evaluation component provision as was defined in the approved PIF. These three components are:

- Component 1: Capture and Containment of Obsolete Pesticide Stockpiles and Wastes which covers the removal and secure storage at a newly developed HW storage facility of Category 1 and Category 2 POPs wastes from Nubarashen and OP stockpiles from store houses, and the containment of remaining Category 3 POPs waste at the Nubarashen site which will be stabilized, restored and maintained under long term restricted land use.
- Component 2: Obsolete Pesticide Stockpile and Waste Elimination which covers the export of the Category 1 POPs waste for environmentally sound destruction and the treatment/remediation of Category 2 contaminated soil either in Armenia at the HW facility site developed for the project or exported to a qualified facility.
- Component 3: Institutional and Regulatory Capacity Strengthening for Sound Chemicals Management and Contaminated Sites covers selected supporting technical assistance related to improvement of the general legal/regulatory framework and technical capacity for hazardous waste and contaminated sites management.

The detailed project design inclusive of cost estimates is elaborated by Component against each outcome, output and detailed activities in Table 10 below. Detailed descriptions follow in this Section. This is further defined in Annex A in the Project Results Framework in terms of indicators, corresponding baseline and project cycle targeted outputs.

Table 10. Elaborated project design framework and cost estimate by Outcome, Output and Activity

Outcome	Outputs	Activity Description	Cost Estimate (US\$)		
			GEF	Other	Total
Component 1: Capture and Containment of Obsolete Pesticide Stockpiles and Wastes					
Outcome 1.1 Removal of priority POPs pesticide waste from the Nubarashen burial site, secure containment of residual contamination on-site, site stabilization and restoration, with the site secured under appropriate institutional arrangements providing effective access limitations, monitoring and future land use control, all endorsed by an informed public.	1.1.1Design documentation, tender specification, implementation procedures to undertake the required works. 1.1.2 EHS procedures documented and promulgated in support of the works required. 1.1.3 EIA and Environmental Expertise approval to proceed with the works 1.1.4 Removal to secure storage of 900 t of pure pesticides and high concentration POPs wastes from the Nubarashen burial site 1.1.5 Removal to secure storage of 7,000 t of POPs pesticide waste in the form of highly contaminated soil from the Nubarashen burial site completed 1.1.6 Onsite secure containment of 12,000 t of low and moderately contaminated soil in an engineered landfill within the Nubarashen site in place. 1.1.7 Restoration and access control provisions for the Nubarashen burial site are in place and civil works to stabilize the surrounding land and drainage are completed. 1.1.8 Training delivered to 20 national technical and regulatory staff in support of Nubarashen operations. 1.1.9 5 public consultation events held and 10 public	1.1.1 Detailed site assessment, clean-up design, geotechnical/hydrological stabilization design, EIA, permitting and tender document preparation for excavation/packaging/containment and site works supervision including on-site screening analysis capability for segregation of POPs pesticide waste categories.	225,000	710,500	935,500
		1.1.2 Installation of site access and safeguarding infrastructure for recovery and restoration activities	-	618,000	618,000
		1.1.3 Excavation, packaging and removal of OP burial cells and other associated priority POPs pesticide wastes involving estimated 900 t Category 1 POPs pesticide wastes (pure pesticides and POPs pesticide wastes >30% pure pesticides)	115,000	319,700	434,700
		1.1.4 Redistribution, segregation and initial containment of Category 2 and 3 soils		305,000	305,000
		1.1.5 Excavation, packaging and removal of 7,000 t Category 2 POPs wastes (high concentration soils using health risk criteria of > 1,500 ppm), packaging and removal	75,000	240,000	315,000
		1.1.6 On-Site final Containment of 12,700 t Category 3 POPs waste (< 1,500 ppm health risk criteria, >0.7 ppm agricultural risk criteria)	-	415,000	415,000
		1.1.7 Site restoration, undertaking area site geotechnical/hydrological stabilization, and drainage improvements. installation of monitoring and establishment of long term land use control arrangements	20,000	475,000	495,000
		1.1.8 Operational and safeguards training for hazardous waste and contaminated site	25,000	25,000	50,000

Outcome	Outputs	Activity Description	Cost Estimate (US\$)		
			GEF	Other	Total
	documents/web/media products delivered.	management including site excavation, packaging and restoration operations – Estimated 20 national technical staff trained for work on site.			
		1.1.9 Supporting public consultation for design, permitting, operational and restoration/monitoring phases of Nubarashen site work. Estimated 5 formal events held and 10 public documents/web/media products produced.	10,000	60,000	70,000
		Outcome 1.1 Total	470,000	3,168,200	3,638,200
Outcome 1.2: Development of the Kotayk national hazardous waste management site at equipped with secure storage and basic infrastructure to allow introduction of HW treatment soil remediation technologies constructed and operated for the secure storage of POPs pesticide waste and OP stockpiles, and the treatment of POPs pesticide contaminated soil.	1.2.1 Design documentation, tender specification, implementation procedures to undertake the Kotayk HW facility site development.	1.2.1 Detailed design, EIA, permitting and tender development and construction supervision for the Kotayk HW facility site development	70,000	300,000	370,000
	1.2.2 Applicable EHS procedures documented and promulgated in support of the works required.	1.2.2 Storage Facility upgrading and construction works for indoor secure storage capacity for 1,100 t of Category 1 POPs pesticides and OPs from Nubarashen and OP storehouses, and covered external secure on-site storage of up to 7,100 t of highly contaminated soil (Category 2) from Nubarashen and OP storehouse clean ups	175,000	2,405,000	2,580,000
	1.2.3 EIA and Environmental Expertise approval to proceed with the Kotayk HW facility site development	1.2.3 Receiving storage and custody operations for Category 1 and Category 2 material received from Nubarashen and OP stockpiles from storehouses	-	300,000	300,000
	1.2.4 Kotayk national HW management site developed to and operated to international standards.	1.2.4 Technical and safeguards training for hazardous waste facility operation. Estimated 20 operational staff from MES or contracted service providers involved	20,000	50,000	70,000
	1.2.5 Operation of the facility for the storage of 1050 t of POPs pesticide waste and OP stockpiles pending export for environmentally sound destruction.	1.2.5 Supporting public consultation for design, permitting, and operational phases of Kotayk facility development. Estimated 5 formal events held and 10 public documents/web/media products produced.	10,000	30,000	40,000
	1.2.6 Operation of the facility to host remediation technology treating 7.100 t of soil highly contaminated with POPs pesticide in an environmentally sound manner.				
	1.2.7 20 HW facility operational				

Outcome	Outputs	Activity Description	Cost Estimate (US\$)		
			GEF	Other	Total
	staff trained and equipped with respect HW management, safeguards and EHS practices. 1.2.8 5 public consultation events held and 10 public documents/web/media products delivered.				
	Outcome 1.2 Total		275,000	3,085,000	3,360,000
Outcome 1.3: Remaining significant historical OP storehouses have OP stocks packaged and removed for destruction and residual site contamination cleaned up.	1.3.1 Screening assessments completed/documented on 24 identified historical OP stockpile sites and 150 t of OP stockpiles and clean up residuals packaged and removed to the Kotayk HW facility.	1.3.1 OP Storehouse screening assessments, stockpile packaging and surficial clean up and removal to the Kotayk storage facility (150 t of OP and clean up residuals from 24 sites) and export of 150 t for destruction	-	550,000	550,000
	1.3.2 Detailed contaminated site and risk assessments and remediation/clean up designs on 6 identified priority sites completed/documented	1.3.2 Follow up detailed site assessment, clean up design, and supervision permitting on 6 priority sites identified during PPG but subject to results of Activity 1.3.1 above.	-	75,000	75,000
	1.3.3 Excavation/removal, remediation and/or containment on 6 identified priority sites completed	1.3 3 Excavation/Removal, containment and/or remediation up to 200 t Category 2 and 3 contaminated soil of the 6 priority sites	-	200,000	200,000
	1.3.4 6 public consultation events held at 6 priority sites and 10 public documents/web/media products delivered.	1.3.4 Supporting public consultation for design, permitting, and operational phases of clean ups under 1.3.2-1.3.3 on 6 priority sites. Estimated 6 formal events held and 10 public documents/web/media products produced	-	50,000	50,000
	Outcome 1.3 Total		-	875,000	875,000
Component 1 Totals			745,000	7,128,200	7,873,200
Component 2: Obsolete Pesticide Stockpile and Waste Elimination					
Outcome 2.1: Removal from Armenia of all substantially all high priority POPs pesticides, associate very high concentration wastes and OP stockpiles.	2.1.1 Export of 900 t of Category 1 POPs pesticides, priority POPs pesticide wastes, and OPs from the Kotayk facility for destruction in a qualified international facility	2.1.1 Export of 900 t of Category 1 POPs pesticides, priority POPs pesticide wastes, and OPs from the Kotayk facility for destruction in a qualified international facility	1,800,000	50,000	1,850,000
Outcome 2.2: Environmentally sound remediation of heavily POPs	2.2.1 7,100 t of heavily contaminated POPs contaminated	2.2.1 Environmentally sound remediation of 7,100 t of Category 2 POPs pesticide	1,590,000	5,550,000	7,140,000

Outcome	Outputs	Activity Description	Cost Estimate (US\$)		
			GEF	Other	Total
pesticide contaminated soil inclusive of destruction of extracted POPs pesticides demonstrated.	soil (POPs pesticide waste) remediated to levels below the low POPs content returned and contained on the Nubarashen site 2.2.2 Commercially viability of in-country remediation of POPs contaminated soil demonstrated 2.2.3 Operational training of 20 national technical personal on a modern contaminated soil technology	contaminated soil (7,000 t from Nubarashen and 100 t from 6 OP storage sites), involving the removal and destruction of residual POPs pesticide contaminants (to <50 ppm) at market selected soil remediation facilities either operated at the Koyatk site or a qualified facilities in another country.			
Component 2 Total			3,390,000	5,600,000	8,990,000
Component 3: Institutional and Regulatory Capacity Strengthening for Sound Chemicals Management and Contaminated Site					
Outcome 3.1: Legal/regulatory and technical guidance tools for management of chemical wastes, including POPs, and, contaminated sites management within a national sound chemicals management framework strengthened	3.1.1:Policies, legislation and regulatory measures respecting hazardous chemical wastes and contaminated sites management reviewed, updated and appropriate revisions implemented	3.1.1 Rationalization, updating and revision of policies, legislation and guidelines covering hazardous chemicals waste and contaminated sites management	25,000	275,000	300,000
	3.1.2. Adopted technical guidelines on operational safety procedures for hazardous chemicals waste handling, transport, storage and disposal, developed in accordance with international practice and 50 relevant national personal trained	3.1.2 Preparation and adoption of technical guidelines on operational safety procedures for hazardous chemicals waste handling, transport, storage and disposal, developed in accordance with international practice, including national training.	25,000	284,384	309,384
	3.1.3 Guidance documentation on environmental and health risk assessment methodologies and practices applicable to hazardous waste stockpiles and contaminated sites developed in accordance with international practice introduced and adopted, and 50 professional trained.	3.1.3 Introduction of environmental and health risk assessment methodologies and practices applicable to hazardous waste stockpiles and contaminated sites developed in accordance with international practice inclusive of training programs. . Estimated 18 institutional, academic, industrial, private service provider and NGO professionals trained	25,000	200,000	225,000
Outcome 3.2:	3.2.1 Qualification test burns	3.2.1 Undertaking technical and environment	100,000	2,830,000	2,930,000

Outcome	Outputs	Activity Description	Cost Estimate (US\$)		
			GEF	Other	Total
Technical/environmental performance evaluation and upgrading requirements for existing national destruction capability	undertaken based in international standards on the EcoProject incineration facility to determine appropriate HW streams for its application. 3.2.2 Technical assessment produced defining upgrading and investment requirements for expanded application	performance assesment of the EcoProject incineration facility inclusive of an international standard test burn on characteristic waste streams and a design assessment to define required upgrading requirements			
Outcome 3.3: Basic national capacity for effective hazardous chemicals sampling and analysis for multi-environmental media and contaminated sites in place, operational and certified to international standards	3.3.1 Adopted national strategy for rationalization and upgrading national laboratory capability to serve a sound chemoicals management framework including hazardous waste and contaminated sites management.	3.3.1 Development of a national laboratory rationalization and optiminzation strategy	5,000	100,000	105,000
	3.3.2 3 national laboratories, including one each in the regulatory, academic and private sector upgraded with suitable capability for hazardous chemical waste and contaminated site sampling and analysis	3.3.2 Laboratory infrastructure and equipment upgrading as required to optimize national capacity	40,000	1,496,800	1,536,800
	3.3.3 30 laboratory and associated personel training upgraded	3.3.3 3 Training of laboratory personal on site and multi-environmental media sampling, laboratory analysis and QA/OC procedures. Estimated 30 professional staff willl be trained	10,000	100,000	110,000
	3.3.4 3 laboratories with international certification and international methods and practice in place	3.3.4 International laboratory ceritification support for selected labs in accoradnce with the strategy. 3 designated national labortatories to be certified.	10,000	100,000	110,000
		Component 3 Total	240,000	5,386,184	5,626,184
4.0 Project Monitoring and Evaluation			100,000	130,000	230,000
Sub-Total			4,475,000	18,244,384	22,719,384
Project Management Costs			225,000	1,040,000	1,265,000
Total Project Costs			4,700,000	19,284,384	23,984,384

Component 1: Capture and Containment of Obsolete Pesticide Stockpiles and Wastes (GEF finance - US\$745,000; co-finance - US\$7,128,200)

Component 1 involves the site specific activities related to the capture containment or removal, local transport; secure storage of POPs/OP stockpiles and waste, principally as found at the Nubarashen burial site but also at OP storehouses as these are made available. The scope involves the removal of Category 1 and 2 material from these sites and secure storage at the site being developed as part of this component under the auspices and operational custody of MES near Hrazdan in Kotayk Marz north of Yerevan. The rationale for using an offsite facility is twofold. The first is recognition of the difficult access, lack of key support services (electricity and water), poor geotechnical stability, and complications of developing such storage even on an interim basis at the location in relatively close proximity to the ecological reserve and general area of recreational properties associated with the Nubarashen site itself. The second is the opportunity presented to stimulate the development of a much needed piece of national hazardous and chemicals management infrastructure in Armenia. The Component is defined by three major Outcomes corresponding to site works at Nubarashen, development of the Kotayk HW facility, and site activities relating to the OP storehouses. The following describes the activities and outputs associated with each outcome.

Outcome 1.1 (Nubarashen Burial Site Works): This outcome covers activities to be undertaken on the Nubarashen site including the final design/assessment/approvals for the works, the sequential removal of priority POPs pesticide waste (Category 1 and 2 materials) from the Nubarashen burial site, the secure containment of residual contamination on-site, and stabilization and restoration of the site. This also covers the arrangements made to secure the site in the long term under appropriate institutional arrangements providing for effective access limitations, monitoring and future land use control, all endorsed by an informed public. The approach proposed is based generally on the conceptual design and works sequence developed during the PPG through the OSCE work (Preliminary Design Scenario 2) and involves a series of steps defined by the activities listed in Table 8 and described below. It is based on undertaking the work in four stages likely over a two to three year period, these stages being: i) detailed design/approvals and initial site preparation works including stabilizing the site; ii) excavation, packaging and removal of the main body of Category 1 material and initial containment of exposed Category 2 and 3 material; iii) excavation, segregation of remaining material into Category 2 and 3, along with excavation, packaging and removal of Category 2 material; iv) final permanent containment of remaining Category 3, recovering and restoration of the site cover and implementation of aftercare measures. This sequencing is selected recognizing a need to phase the storage, subsequent disposal and treatment/remediation activities based at the Kotayk site as addressed in Component 2. It also facilitates flexibility in addressing potential financing constraints and implementation risks associated with treatment and disposal options as is further discussed below under option analysis and in Annex C. The specific activities involved are described below:

- *Activity 1.1.1 – Detailed design and approvals:* This activity involves the updating the preliminary conceptual design concept developed during the PPG to document the detailed clean-up design, something that will involve undertaking additional site sampling and

analysis to more accurately delineate areas and depths of contamination. Specific outputs will be design drawings, data sheets and works specifications necessary to produce tender documents and select the works contractors. Additionally, it is anticipated that a formal EIA will be prepared which, together with the design documentation, will be subject to the national environmental expertise process required for approval to proceed with the work. It is planned to contract this design and approvals work to an engineering/environmental management consulting firm or joint venture involving both national and international expertise. This GEF funded contract package will include the site assessment sampling and analytical capability preferably including an on-site screening analysis capability that can remain available into the works phase for purposes of defining actual contamination levels and facilitating discrimination between Category 2 and 3 materials. The contract is also expected to also cover on-site supervision of the works through to the completion of the site activities. The listed co-financing also includes the preparatory work during the PPG stage financed by OSCE, the Czech Republic (UNDP-Czech Trust Fund), as well as additional UNDP supervisory expert contracting during implementation and in-kind contributions from MNP and MES.

- *Activity 1.1.2 – Preparatory site work:* This activity involves the preparation of upgraded access such that the road to the site has reasonable all weather capability for heavy equipment and vehicles, and the necessary support and safeguarding infrastructure to service the works activities over a two to three year period. This will include i) delineation of working areas including defined clear and contaminated areas and travel/working paths; ii) staff and support facilities (gate house, shower/change house, washing facility, water tank); iii) depot area for interim storage of excavated soil; iv) removal of top cover (clay layer, original synthetic liner and coarse sand layer) to the depot area; and v) construction of a temporary mat to prevent further erosion and cover of exposed pesticides in the burial areas. Additionally, the geological and hydrogeological stabilization works upstream the burial site would be undertaken involving upgrading of the culvert structure, repair of the leaking water main and works to redirect all surface run-off in this area towards the culvert such that the perched water table would drain and excess run off causing instability in and around the burial site would be reduced. Down-stream drainage improvements would also be affected to stabilize the land movement and through drainage in this area as well. These works will be primarily financed by government contribution with the overall co-financing including the significant investment by the government through MNP and MES since 2010 in securing, stabilization and maintenance of the site in preparation for the GEF project.
- *Activity 1.1.3 – Excavation, packaging and removal of Category 1 material:* This activity covers the excavation of the five cells containing pure pesticides along with clay or ceramic material immediately surrounding the cells that are assumed to be highly contaminated. In the case of the brick/concrete associated with Cell 1 this will be dried and mechanically cleaned on site with residues packaged with the Category 1 material and the cleaned material stored for eventual containment on site as Category 3 material. The estimated quantities are shown in Table 7 including an allowance for visually identified and segregated quantities of pure pesticides that might be excavated at this stage from the top cover or other areas as well as what might appear at a later stage of the work. It is assumed that 1 m³ capacity UN dangerous goods rated “big bags” will be generally used for nominally dry solid material

with transfer undertaken with suitable filling equipment. Provision will also be made for wet material as might be encountered in Cell 1 to be packaged in 200 l HDPE barrels. A contractor supplied portable weighting system will be used to weight each big bag or barrel upon loading each of which will have a unique bar coded identifier for tracking and inventory recording purposes. The scheduling of this work will be based on availability of the Kotayk facility to receive material with transport being undertaken by appropriately licenced contractors and operators in accordance with national MNP and Ministry of Transport requirements. This work will be primarily financed by the government except for GEF finding of purchase of containers.

- *Activity 1.1.4 – Redistribution, segregation and temporary containment of Category 2 and 3 materials:* Following removal of the primary source of POPs contamination through Activity 1.1.3, this activity is directed to stabilizing the site pending further excavation and preparation for final containment. This includes installation of a bottom liner for the final on-site containment structure, segregation and relocation of Category 2 and 3 soil to the containment structure, installation of a temporary top cover and drainage layer, and its temporary closure pending availability of capability to manage Category 2 material off site. Allowance in designing the containment structure will exist to return treated Category 2 material. This work will be financed by the government.
- *Activity 1.1.5- Excavation, packaging and removal of Category 2 POPs waste:* This activity would be undertaken when arrangements are in place for the treatment/remediation of Category 2 highly contaminated soil segregated in the containment structure during Activity 1.1.4. It is currently estimated that 7,000 t of this material would be involved and would be packaged, weighted and identified as described above for Category 1 material using “big bags”. It is likely that this work can start when laydown storage capacity for this material is available at the Kotayk storage facility and could potentially be undertaken immediately after Activity 1.1.3 without the temporary on-site containment stage (Activity 1.1.4). However, this will depend on timing and coordination with technology selection and tender of the treatment/remediation work as well as removal for export from Kotayk of the Category 1 material. This work will be financed by the government.
- *Activity 1.1.6 – On-Site Containment of Category 3 POPs waste:* Once the Category 2 contaminated soil is removed, the works required to institute final containment of the remaining Category 3 material will be undertaken. This will include further investigation of lower level contamination outside of the present fenced area and excavation of it as necessary for containment. It will also include re-installation of the top cover and drainage layers as well as temporary stabilization measures if further entry into the containment structure is required as may be the case if treated Category 2 material is to be returned. For purposes of preliminary design the amount at Nubarashen is estimated to be approximately 12,550 t of material. At this stage, availability of containment capacity is also being provided for an estimated 150 t of contaminated soil from OP storage site clean ups undertaken under Activities 1.3.1 and 1.3.3 depending on the timing of these activities, particularly those managed by MoA under the EU funded work. The work involved in Activity 1.1.6 will be financed by the government.

- *Activity 1.1.7 - Site restoration and aftercare arrangements:* This final on-site activity involves completing the surface restoration of the site and its surroundings including planning of erosion resistant vegetation, redirection of run-off from to isolate the landfill site, installation of final slope stabilization erosion control measures in catchment area of the landfill, installation of the phytoremediation pond and sediments trap at end of the newly installed site drainage system, removal of all remaining infrastructure, operationalizing the monitoring system, installation of any supporting aftercare support (buffer zone fencing, signage etc.), and transfer of as-built drawings, records and after care procedures from the supervising consultant. It would also involve the formal transfer of the site responsibility and assumption of aftercare and monitoring responsibility under permanent institutional arrangements. These are envisioned to be the inclusion of the site itself, the designated access restricted buffer area and the overall drainage catchment are upstream of the neighbouring summer house community into the Erebuni State Natural Reserve under the administration of the Bio-recourses Management Agency of MNP with technical support from its Waste Management Department. The work involved in Activity 1.1.7 will be financed by the government.
- *Activity 1.1.8 – Supporting Training:* This activity involves the provision of the necessary operational and safeguards training to the staff that are to be directly involved in the work on the Nubarashen site. It would be provided in advance of starting actual site work and be updated throughout the period of work on the site as required. The scope of the training would cover overall hazardous waste and contaminated site management with specific emphasis on site excavation, packaging and restoration operations. The curriculum for the training will utilize the various international guidance materials available including those published by the Basel Convention, FAO²⁵ and IHPA. Additionally it would draw on documentation and lessons learned from completed GEF and other relevant projects, specifically the UNDP POPs pesticide elimination project in Vietnam and the World Bank POPs Stockpile and Waste project in Belarus, both of which have been cooperating in the preparation of this project. The latter project is particularly relevant given it has successfully eliminated a very similar burial site to Nubarashen and training will make provision for direct exchange of experience and lessons learned between the two respective national Ministries of Emergency Situations and environmental authorities. Overall it is estimated that at least 20 national technical staff trained for work on site including those in supervisory, operational and regulatory positions as well as making provision for local stakeholder and NGO exposure to the materials. The training would be delivered under experienced international supervision with targeted train the trainers elements to provide a national core of trainers for expanded general training in these areas as may be required in the future. This activity will be supported by both GEF funds and in-kind government contribution.
- *Activity 1.1.9 – Supporting public awareness and consultation:* This activity covers the required public consultation and awareness work needed to support the Nubarashen works activities above and is essentially a continuation of the work initiated during the PPG. It will be focused primarily on local stakeholders in the immediate area of the site and on the access

²⁵ <http://www.fao.org/agriculture/crops/obsolete-pesticides/resources0/en/>

route into Yerevan. It would also include what broader consultation related to the Nubarashen site in the context of the overall project, particularly in Yerevan and linking to similar public consultation being undertaken for the Kotayk site (Activity 1.2.5). It is proposed that this work would be locally contracted independently of the technical design and supervision of the works (Activity 1.1.1) but would be closely coordinated with that activity throughout the works period and particularly during the front end approval activities. The contracting of this work locally will be GEF funded with in-kind and other contributions from the government supporting the program and its linkage to broader public awareness initiatives.

Outcome 1.2 – Development and operation of the Kotayk Hazardous Waste Facility: This Project Outcome covers activities and outputs associated with the development of a permanent hazardous waste management facility site near Hrazdan in Kotayk Marz under the ownership and operation control of MES, along with its use as an interim storage facility for Category 1 and 2 POPs and POPs wastes and potentially as a site for in-country treatment/remediation of the Category 2 POPs waste managed during this project.

The decision to locate the storage facility and site for any in-country treatment/remediation away from the Nubarashen site was made for a number of policy, technical and logistics reasons. The Nubarashen site itself is unsuitable for any industrial development given its remote location, poor access, absence of any utilities (let alone the robust industrial level requirements of such an installation) and incompatibility with surrounding land use (residential and ecological reserve). Attempting to exercise such an option would also significantly reduce the potential of any long term national benefits from developing this kind of needed hazardous waste management infrastructure.

Based on the PPG conceptual design basis for the facility it would provide a secure site would be fully equipped with necessary water and power utilities, access, security in the form of gating and fencing, high quality storage structures, hard surface laydown and/or working pad, and surface water management system. For the current project this would offer inside secure priority storage for approximately 1,200 t of HW and additional temporary secure covered storage for approximately 7,000 t of material such as contaminated soil, as well as the potential option of undertaking soil treatment using an imported remediation technology. The specific activities involved are described below:

- ***Activity 1.2.1 – Detailed Design and Approvals:*** This activity is essentially a continuation of the conceptual design and feasibility work undertaken during the PPG stage and extending to design drawings, data sheets and works specifications necessary to produce tender documents and select the works contractors and equipment suppliers. Additionally, it is anticipated that a formal EIA will be prepared which, together with the design documentation, will be subject to the national environmental expertise process required for approval to proceed with the work. The work would be undertaken by engineering expertise drawn from a qualified local firm who would have access to international expertise related to developing and operating hazardous waste facilities. This firm would also be assumed to provide supervision during the work to upgrade the site. An option would exist to combine this with the similar contract covering the Nubarashen site which might better facilitate the necessary coordination

between these two aspects of Component 1. This activity will be partially GEF funded and partially funded by the Government.

- *Activity 1.2.2 – Kotayk facility development:* This activity covers the implementation development work to international standards. This would have a fully licensed and operational facility capable of temporary secure storage of 1,050 t of priority Category 1 POPs wastes as soon as possible after project release and by the second year of the project the provision to securely store 7,100 t of Category 2 POPs waste either for on-site treatment and remediation or export for disposal at a qualified international facility. In terms of timing this activity along with the previously described Activity 1.2.1 are effectively on the critical path for the overall project and would be required to be operational by the end of the first year of the project's implementation such that it could begin accepting Category 1 material for storage. This activity will involve GEF funding for speciality equipment purchases required for facility upgrading and by the Government from direct budget allocations mainly for works. The Government's contribution also includes the value assigned to the facility site and infrastructure.
- *Activity 1.2.3 – Kotayk facility project operation:* This activity is covers the operation of the Kotayk facility for a three year period during the project required to store and handle either for export or on-site remediation the Category 1 and Category 2 POPs wastes respectively. It is assumed that this would be done by MES or as they may sub-contract this to a designated national private sector service provider. The assumption is that this operation continues on into the future on a commercial basis as a key piece of national hazardous waste management capability. This activity will be financed by government contribution.
- *Activity 1.2.4 – Supporting training:* This activity involves the provision of the necessary operational and safeguards training to the facility operational staff that are to be directly involved at the Kotayk facility. It would be provided in advance of starting operation and be updated throughout the project period. The scope of the training would cover overall hazardous waste management with specific emphasis on physical handling procedures, inventory control and record keeping, site monitoring, emergency response and overall safeguards related EHS practices and procedures. Specialist training respecting contaminated soil treatment/remediation would be included as required. The curriculum for the training will utilize the various international guidance materials available including those published by the Basel Convention and FAO. Overall it is estimated that at least 20 national technical staff trained for work on site including those in supervisory, operational and regulatory positions as well as making provision for local stakeholder and NGO exposure to the materials. The training would be delivered under experienced international supervision with targeted train the trainers elements to provide a national core of trainers for expanded general training in these areas as may be required in the future. Recognizing the cross over with Activity 1.1.8, consideration will be given to combining the contracting of these two training activities. Additionally inclusion of this into the scope of contracts covering Activities 1.1.1 and 1.2.1 would be an option for purposes of efficient coordination and continuity. Activity 1.2.4 will be partially funded by GEF through contracting of international expertise with the remainder of the costs being co-financed by the Government.

- *Activity 1.2.5 - Supporting public awareness and consultation:* This activity covers the required public consultation and awareness work needed to support the development of the Kotayk facility and is essentially a continuation of the work initiated during the PPG. It will be focused primarily on local stakeholders in the immediate area of the site and local authorities and be coordinated with similar public consultation being undertaken for the Nubarashen site (Activity 1.1.9). It is proposed that this work would be locally contracted independently of the technical design and supervision of the works (Activity 1.2.1) but would be closely coordinated with that activity throughout the works period and particularly during the front end approval stage. The contracting of this work locally will be GEF funded with in-kind and other contributions from the government supporting the program and its linkage to broader public awareness initiatives.

Outcome 1.3 – Management of OP Storehouses: This Project Outcome covers activities and outputs associated with dealing with the lesser but still reasonably important issue of residual OP stockpiles in old storehouses under the nominal supervision of MoA, and possible associated site POPs pesticide contamination that might remain from historical use and practice. This falls under the overall framework of this GEF project but the actual initial on-site activity involved will be undertaken with EU funding provided to MoA through FAO under a pending separate funding agreement which is understood to be the equivalent of US\$770,000.

- *Activity 1.3.1 – OP storehouse stockpile packaging and basic clean-up:* This activity broadly covers that work that will be undertaken under MoA’s supervision and funding from the EU on the currently identified 24 sites defined in the MNP/UNDP PPG work described in the above situation analysis (information provided to MoA and FAO). It is assumed that this will involve analytical assessment and stockpile site verification, preparatory regulatory approvals work including site licencing and access negotiation. It will also cover contracting of qualified service providers to package the stockpiles and transport them for export destruction and undertake necessary surficial clean-up of the sites, such services being understood to be arranged independently by FAO. The GEF project through MES, would provide access to the Kotayk facility for interim storage of recovered OPs and clean up residuals.
- *Activity 1.3.2 – Detailed site assessment and clean up design of priority storehouse sites:* Following completion of Activity 1.3.1, a more in-depth analytical and risk assessment of those sites identified as having more serious POPs waste contamination with the intention of designing remediation/clean-up options to be pursued with GEF and co-financing support. The PPG work as summarized in Table 5 tentatively identified the a number of locations (OJSC “Masis berriutyun” in Masis, “Ararat intraregional warehouse” in Yeraskh village, Arm berriutyun association central warehouse” in Jrarat village, OJSC “Ejmiadzin berriutyun” in Ejmiadzin, OJSC “Tumanyan Productivity” in Odzun village, OJSC “Vardenis AgroService” in Vardenis and OJSC “Ashtarak Productivity”, Ashtarak) as potential sites that might require more invasive clean-up and remediation.
- *Activity 1.3.3 – Remediation and/or removal of highly contaminated soil from priority storehouse sites:* While details of site specific actions on up to six priority sites cannot yet be described in any detail, the likely approach will be the removal of soil general falling into

Categories 2 and 3 will be excavated, packaged and transported off site. Category 2 material would go to the Kotayk facility for interim storage pending disposal by under-arrangements made by FAO Category 3 material would be accepted under the GEF project at the Nubarashen containment structure.

- *Activity 1.3.4 – Supporting public consultation:* This activity relates to the required supporting consultation required for Activities 1.3.2 and 1.3.3 above and would have a similar scope to that described for Outcomes 1.1 and 1.2 with public information events held in each subject community and relevant public information products produced. While primarily funded by the parallel EU/FAO project and in-kind support from the government and potentially participating NGOs, the GEF funded public consultation initiatives would be available as support.

To summarize the allocation of financial resources to Component 1, the financing will largely be co-financed by the government (Sub-Components 1.1 and 1.2), and EU/FAO (Sub-component 1.3). This funding will cover all of the works contracting and principal local costs. GEF funding will be used to selectively cover a substantive part of the detailed design and supervisory consultant contracts, foreign purchases of equipment and materials particularly waste packaging, site screening analytical equipment, and speciality materials handling and EHS equipment for the Kotayk facility. The GEF will also support training and public consultation expenditures.

Component 2: Obsolete Pesticide and POPs Waste Elimination (GEF finance - US\$3,390,000; co-finance - US\$5,600,000)

Component 2 is the main focus of the GEF funding and is directed to the environmentally sound destruction of the maximum amount of the POPs pesticides captured and secured as described in Component 1 above. Consistent with the overall project design strategy the first of two Component Outcomes targets the elimination of the pure pesticides and very highly contaminated associated POPs waste classified as Category 1 material which account for in excess of 90% of the actual identified national POPs pesticide chemical stockpiles, as well as including for convenience the relatively nominal amount of OP stockpiles. The second Outcome covers the treatment of the Category 2 contaminated soil which effectively covers the remaining POPs pesticides chemicals. The distribution of GEF funding is appropriately biased to the Category 1 material which is considered the most cost effective use of grant resources in terms of global environmental benefit. The following describes the activities and outputs associated with each of these outcomes.

- ***Outcome 2.1/Activity 2.1.1 – Destruction of Category 1 POPs pesticide wastes:*** This project outcome which is essentially defined by a single activity and output involves the export of a total estimated 900 t of appropriately packaged Category 1 POPs waste from the Kotayk facility to a technically qualified, commercially determined, hazardous waste destruction facility outside of Armenia. The selection of the facility or facilities used will be based on a proven performance based technical specification whose requirements will be consistent with the prevailing international guidance documents issued by the Basel Convention^{26,27} and the

²⁶ <http://www.basel.int/Portals/4/Basel%20Convention/docs/pub/techguid/tg-POPs.pdf>

GEF STAP²⁸. The principle performance specifications will include a demonstrated capability to achieve a destruction efficiency (DE) of 99.99%, destruction removal efficiency of 99.9999%, and a maximum PCDD/F emission limit of 0.1 ng TEQ/Nm³. A two stage internationally advertised tendering process in accordance with UNDP established procedures and having a turn-key scope from collection at the Kotayk site through to final destruction will be used. The first stage will involve submission of an Expression of Interest (EOI) inclusive of technical and execution capability qualifications. The second stage would involve a detailed technical and execution proposal as well as a commercial proposal based on a composite guaranteed all in price expressed in \$/t. Based on recent commercial experience with similar tenders both from the former Soviet Union and elsewhere, at least six well established hazardous waste management service providers familiar with undertaking this scope and utilizing one of a number of potentially qualified destruction facilities mainly in Western Europe employing high temperature incineration (HTI) are currently available in the market. For purposes of estimating the cost a composite price of US\$2,000/t has been used, noting this is considered to be conservative in relation to recently seen commercial quotations. However, this level of conservative pricing has been used noting the potential complexity of export transactions from Armenia. There are potentially transit country barriers involving transit through Georgia that a service provider would have to resolve and recent experience indicates there is also increasing transaction cost and delays associated with entry into and transit within the EU. The intent is that the GEF will effectively cover the contract costs associated with this activity,

- **Outcome 2.2/Activity 2.2.1 – Treatment/Remediation of Category 2 POPs Waste:** This project outcome which is also essentially defined by a single activity and output involves the treatment or remediation of 7,100 t of Category 2 soil. Two overall options will be tested commercially namely; the attraction of a transportable soil remediation technology that can be established and operated at the Kotayk site, or export of the soil to a qualified treatment facility, likely in Western Europe. The preferred option would be the in-country option to avoid transportation issues and potentially leave a resident soil remediation capability in the country. However, ultimately the most cost effective option meeting an appropriate performance based specification. Overall, a soil remediation efficiency of > 90% and treated soil quality of <than the SC interim low POPs content (50 ppm) or such lower level as may be determined for the final disposition of this material will be targeted with the fate of all initial POPs contaminants and U-POPs by products being accounted for and meeting a restriction of releases to land, air and water being consistent with applicable international standards. For the in-country option the principle practical performance criteria will be the remediation of the soil by destruction and/or removal of POPs pesticides such that a minimum clean up criteria of less than 50 ppm is achieved in the treated soil. This essentially produces soil that would be classed as Category 3 material and could be suitable to be returned for containment at the Nubarashen site. However if the technology achieved and guaranteed a soil quality as measured in residual POPs pesticide content that allows unrestricted future use this would be given a preference. In the case of an export option, the performance standards applicable in the jurisdiction hosting the facility will generally apply

²⁷ <http://www.basel.int/Portals/4/Basel%20Convention/docs/pub/techguid/ddt/tgDDTe.pdf>

²⁸ <http://www.stapgef.org/selection-of-persistent-organic-pollutant-disposal-technology-for-the-gef/>

to the remediation efficiency and soil clean up levels achieved conditional on demonstration that the fate of all initial POPs contaminants and U-POPs by products being accounted for and meeting a restriction of releases to land, air and water limited by applicable international standards. A variety of generic and specific proprietary soil remediation technology options are commercially available including various configurations of ball milling or mechanic-chemical de-halogenation, thermal desorption, soil washing and active bio-remediation techniques as well as other technologies such as base catalytic de-halogenation (BCD), copper mediated destruction (CDM) and super critical water oxidation. The approach to selecting the technology will be to include a pilot demonstration feature in the standard two stage procurement cycle described above for destruction of Category 1 POPs wastes. At the point of short listing candidate vendors, those selected for short listing will be provided with a suitable quantity and selection of Category 2 POPs waste to run pilot demonstrations on, with results serving as the basis for demonstration of remediation performance in their final technical, execution and commercial proposal. For purposes of cost estimating a conservative unit cost of US\$1,000/t for treatment and remediation (including disposal of the treated soil) has been used which allows some flexibility in selecting between the various options, based on current market prices. GEF financing for this component will be focused on the selection, demonstration and initial treatment stages of the activity with government financing covering the remaining requirements.

Component 3: Institutional and Regulatory Capacity Strengthening for Sound Chemicals management and Contaminated Sites (GEF finance - US\$240,000; co-finance - US\$5,386,184)

Outcome 3.1 – Legal, regulatory and technical guidance tools prepared:

- *Activity 3.1.1 – Updating and revision of policies, legislation and regulations:* This activity will support a systematic process within MNP to review and rationalize the current regulatory framework covering POPs and hazardous waste generally. While this framework current provides a good basis for a comprehensive modern system it remains a system with contradictions and residual inconsistencies inherited from the original system used in the Soviet Union. This includes issues related to waste classification and differentiation between hazardous and municipal solid waste management. With the current public policy focus on upgrading national SWM capability this offers a strong synergistic opportunity. Likewise it also offers an opportunity to remove and/or rationalize some of the contradictions and conflicts related to licensing of specific waste management activities both by providing for separate licensing of specific functions (i.e. handling, packaging, storage, transportation, treatment and disposal) and addressing overlaps with other Ministries and local government levels. Supplementary to the specifically targeted guideline development described in Activity 3.1.2 below this activity will also work to systematically filling gaps in guidance development generally within the framework. As a basic approach throughout will be to ensure progress in general harmonization of hazardous waste management legislation and regulations with EU standards and directives, and ensuring they are fully consistent with current Stockholm and other chemicals convention obligations, utilizing the work being done in the current NIP update. GEF funding for this activity will support international inputs to the substantive direct and in-kind funding earmarked by MNP and MoH over the project

period in this area. It along with other Outcome 3.1 activities will provide opportunities for bilateral funding, particularly EU initiatives.

- *Activity 3.1.2 – Preparation of technical guidelines for hazardous chemicals and waste management:* This Activity will target the specific gap in the current hazardous waste regulatory framework relating to the legislative requirement to put in place specific technical, safety, and environmental performance guidelines covering the operational procedures and standards for hazardous and chemicals management. This specifically covers handling, storage, transport, treatment and disposal. This will link back to the licensing work in Activity 3.1.1 and aim to ensuring the practical application of international standards. Embedded in this will be generation of appropriate guidance documentation and training programs. The operational activities described above in Component 1 and 2 will serve as useful practical training and as pilots for this activity. GEF funding will support international inputs and training with supporting local experts contracted using government resources and in-kind support.
- *Activity 3.1.3 – Preparation of environmental and health risk assessment methodologies and practices:* This activity will target developing and integrating formal environmental and health risk assessment methodologies and practices as applied to hazardous waste generation and stockpiles, and contaminated site evaluation and prioritization. This will rely on the utilization of international experience, standards and practice and include a broadly based training program. The direct beneficiaries of this will include MNP, Ministry of Health, MES as well as private sector service providers and NGOs. As in the above activities, GEF funding will focus on international inputs and training with supporting local experts contracted using government resources and in-kind support from beneficiaries.

Outcome 3.2 – Technical/Environmental performance evaluation and upgrading requirements for existing national destruction capacity:

- *Activity 3.2.1 – Eco-Protect chemical/biological waste incineration facility technical and environmental performance assessment:* This activity involves undertaking an international standard technical and environmental assessment of the performance of this facility to determine its capability as an ongoing commercial hazardous waste disposal option for Armenia. This will involve a test burn first on a baseline waste feed and then on the same waste plus various concentrations of chemical waste including Ops and potentially POPs wastes. The scope of the test burns will include comprehensive evaluation of DE and DRE as well as air emissions including U-POPs (PCDD/F). Additionally, the facility will be assessed technically in relation to potential modifications that may increase its utility (i.e. waste handling systems, efficiency (i.e. control systems) and environmental performance (i.e. APCs), all with a view to potentially expanding the range and concentrations of key chemical waste streams including POPs. GEF funding will be directed to the design, supervision and analytical services required for the test burns as well as expert technical assessment of the facility. This will be matched by direct and in-kind enterprise investment and the substantial investment in this facility serves also services as co-financing.

Outcome 3.3 – National Hazardous chemicals and analysis capacity upgraded:

- *Activity 3.3.1 – Development and Implementation of a national hazardous chemicals laboratory strategy:* In recognition of the overarching conclusion of the PPG assessment of national laboratory commitment indicating fragmented analytical and sampling capacity in this area, this activity involves undertaking a systematic detailed assessment of national capability and development of a strategy to rationalize, optimize and upgrade it consistent with national needs. This will specifically involve a study that will produce a national strategy in this area for adoption and implementation which will include government regulatory, academic and private sector laboratories and designated expertise centres. The GEF funding will support this study work inclusive of linkage to international experience and practice.
- *Activity 3.3.2 – Upgrading of designated laboratory infrastructure and equipment:* Based on the definition of upgrading requirements applicable to infrastructure, human resource development and sustainable equipment provision defined through Activity 3.3.1, this activity involves the implementation of an adopted medium term national investment and laboratory support program that will further expand the optimized national laboratory system in the relevant sectors. It will be funded by national budget resources and will also present opportunities for targeted bilateral assistance similar to that already provided in the past.
- *Activity 3.3.3 – Delivery of laboratory personnel training:* Supporting the above activities and in association with Activity 3.3.4 below, this activity will support targeted training in analytical and sampling methods with designated beneficiaries. This will cover field training in association with Component 1 activities, broader multi-medium chemicals analysis in the general environment, food and human receptors and associated laboratory methods and QA/OC practice. Funding will be jointly supported by GEF, specifically with respect to international practices and references, and national resources from the government and specific beneficiaries. This will also present opportunities for bilateral assistance program participation.
- *Activity 3.3.4 – Certification of designated laboratories in international standards:* This activity will focus on achieving a standardization international certification of at least three national laboratories, one in each of the government, academic and private sectors capable of basic POPs and chemicals management analytical and sampling work in support of sound chemicals management. This will involve systematic assessment of capability, improvement of practices and procedures to the required levels and verification of performance through comparative analytical programs with international accredited laboratories. Funding will be jointly supported by GEF, specifically with respect to international practices and references, and national resources from the government and specific beneficiaries. This will also present opportunities for bilateral assistance program participation.

Component 4: Project Monitoring and Evaluation (GEF finance – US\$100,000; co-finance – US\$130,000)

The component aims at monitoring and evaluation of results achieved to improve the implementation of the project and disseminate lessons learnt domestically and internationally. The outputs of the component are:

- M&E and adaptive management are applied to provide feedback to the project coordination process to capitalize on the project needs; and
- Lessons learned and best practices are accumulated, summarized and replicated at the country level.

Further details are provided in Section IX. Monitoring Framework and Evaluation.

Project Design Options and Risk Management

In developing the above project strategy and design sufficient flexibility has been built into it to allow several specific potential institutional, technical, environmental, social, and financial risks inherent in the project to be addressed and accommodated. This is accomplished by allowing several default options to be exercised, such that the project's objectives can be substantially achieved even in a worst case. Additionally, in the case of environmental and social risks by incorporating internationally benchmarked EIA, social assessment (SA) and public consultation into the project design and resource allocation that form mandatory obligations on the side of both UNDP and the government through signing of this project document.

The principle technical, financial, and direct environmental risks associated with the project design are:

- i) The high concentration POPs pesticides and wastes (Category 1 material) could not be exported immediately due to political barriers in transit countries or insufficient resources.
- ii) The high concentration POPs contaminated soil (Category 2 materials) could not be economically treated to a sufficiently low concentration, or otherwise be exported for treatment.
- iii) Notwithstanding the strong government co-financing commitment, circumstances could develop at some point that sufficient direct cash funding was not available to complete either/or Component 1 and 2, particularly considering environmental risks associated with not being able to complete on-site work such that there would be increased potential for POPs pesticide release.

The above risks will be mitigated by the step by step process described in the detailed description of Component 1 and 2 above. This relates specifically to: i) sequencing the excavation and removal or securely containing restoring contaminated material from the Nubarashen site, and ii) coordinating sequencing of the actions taken with respect to the treatment and disposal of the Category 1 and 2 material respectively. The principles applied are twofold:

1. The first principle is to focus initially on the capture, secure storage and then determination of disposal feasibility of the Category 1 material. This recognizes its recovery, and secure storage essentially removes the primary risk posed by this site and the POPs pesticides and wastes deposited therein, as they presently exist and are of immediate concern. In excess of 90% of the actual POPs and concentrated Ops are removed from a place where the current inevitable medium to long term risk of release exists. The next priority is determining it can be immediately destroyed in an environmentally sound manner and implementing this destruction assuming there are no political barriers to such export. If such barriers exist, the default option of longer term secure storage is provided for, noting that options for export disposal will inevitably appear in time. Georgia, which is nominally where potential transit issues have been identified in relation to the current cost effective option of export to Western Europe, should be advised that it is also a GEF beneficiary and specifically one that will require export of POPs. This raises a moral as well as GEF policy and eligibility issues on how to deal with a GEF beneficiary country that blocks the solution to a significant global environmental problem while obtaining funding from the GEF. If this were not resolved, the project would default to consideration of other export options that will develop in the longer term as other qualified facilities are developed in the region. Such initiatives are in the advanced planning stages in Kazakhstan through the World Bank, and potentially in the Russian Federation although this would be anticipated to be much longer term and less competitive. More immediately a parallel GEF project is qualifying highly competitive HTI facilities in Turkey that will offer an outlet as the anticipated restoration of trade relations over time develop with that country.
2. The second principle is recognition that the work should always be staged and executed at Nubarashen such that the resources are always sufficient to finish and secure the site such that the risk of any release is minimized, should the next stage of the work be delayed or cancelled for any reason. Likewise an environmentally sound fate of any material removed must be known in advance. In effect the disposition of the material in terms of secure storage, and environmentally sound treatment and disposal must be proven to exist physically and technically, and the resources to accomplish this must be fully available. As for Category 1 material (as illustrated above), limiting excavation and removal to this material initially along with ensuring all Category 2 and 3 materials are securely contained and the site stabilized is part of this. Additionally the Category 1 material will be exported for destruction as soon as possible with a contingency plan available for secure storage. The subsequent stage of the work involving excavation and removal of Category 2 material would only be undertaken if there was sufficient secure interim storage off site to safely house it, and, most importantly, there was a proven treatment option available, preferably in Armenia but alternatively at an export facility. This will require a demonstration of candidate technologies for treatment and determination of their affordability (including availability of financial resources to complete the whole amount) before undertaking its large scale excavation and removal. In the absence of any of the technical, physical or financial conditions the default approach would simply be to make the engineered containment structure on site a

permanent secure HW landfill with appropriate incremental monitoring, access and after care provisions, and any additional site stabilization that might be warranted.

The general environmental, social and related institutional risks that can be associated with the project design, particularly as have been identified through the project's safeguards review process under UNDP's ESSD procedures are:

- i) Inadequate environmental protection measures are not built into the detailed design and/or actually implemented for the various activities involved with the excavation, handling, packaging, transport, storage and treatment/destruction of Ops and POPs waste such that unacceptable releases to the environment and exposure of those directly involved and potentially a broader public occur.
- ii) In sufficient consideration of possible social impacts inclusive of inadequate public consultation and input results in significant unanticipated and/or unaddressed social impacts from project activities and the absence of public acceptance of project actions, which may negatively affect sustained political and institutional support for key project activities (i.e. clean-up activities at Nubarashen, development of the Kotayk site and ability to transport POPs wastes.
- iii) Institutional commitment to the project's intentions and objectives related to environmental standards and social considerations is not sustained

The above risks will be mitigated by a number of features that are built into the project design as described above and are highlighted as follows:

1. *Management of project related environmental risks:* As is inherently the case with any activity that involves the management of a hazardous waste (or the large volumes of dangerous goods of any kind that are handled daily) there are inherent risks of release with consequential environmental contamination and human exposure with potential negative health implications. This can occur through poor organization and planning, inadequate/inexperienced design of activities, failure to adhere to set environmental performance standards, poorly executed implementation practice, accidents and inadequate emergency response, lack of proponent/IA/regulatory oversight, and inadequate of resources and expertise. The approach built into the design of this project is based on several principles that are specifically operationalized with the designation of directed activities and resource allocations as well as the linkage of these through this project document as agreed mandatory obligations of both UNDP and the government. These principles and operationalized activities include:
 - a) International technical support, oversight, and adoption of international standards: The project is designed with development objectives associated with creating and strengthening national capacity respecting the management of HW and contaminated sites which involves a strategy of providing for international expertise to support the key components jointly with national expertise and also to have international

- oversight applied through the IA. The overall mandate in both cases will include the adoption and transfer of best international standards and practice in these fields as referenced above including as mandatory those associated with the treatment and destruction of POPs waste.
- b) Internationally benchmarked EIA requirement: The project generally and specifically the two primary site specific aspects (Nubarashen and Kotayk sites) will be subject to the national environmental assessment and expertise approvals process but with the condition that this be benchmarked against a reasonable standard of international practice. To ensure this, the activity in both cases will be the responsibility of a qualified internationally led consultant team undertaking the detailed design and implementation supervision inclusive of dedicated EIA professionals, and by the inclusion on UNDP's side of international expert oversight on technical and environmental matters as noted above. A specific product of the EIA process will be an Environmental Management Plan (EMP) to be approved by UNDP that will serve as a monitoring baseline for implementation work for purposes of M&V activities.
 - c) Provision for extensive operational training to international standards: Both key components include dedicated operational training activities supported by GEF for national participants. This training will utilize one or more recognized international guidance documents referenced above and include familiarization with the EMP, application site specific EHS procedures, technical training on key operational activities and adherence to mandatory containment and release mitigation, emergency response procedures, and undertaking worker health monitoring.
 - d) Inclusion of environmental performance verification as part of the M&E process: The overall project M&V activity described in Section IX below will include an evaluation of adherence to internationally benchmarked environmental practice and performance consistent with UNDP's safeguards policy.
2. *Management of project related social impact risks*: Generally the social impact risks associate with the project's implementation as proposed are considered low with the overall impacts being substantially positive specifically through the removal of POPs and OP stockpile and contamination of locations have public exposure through itinerant agricultural, recreational and general uncontrolled public access. The latter is particularly true for the Nubarashen site where water resources utilized nearby recreational and agricultural communities are threatened by the burial site if left unaddressed and broadens with time if unaddressed. The inherent long term risks associated with the specific chemicals involved are also generally associated with specific impacts on more vulnerable populations (young, female, and lower income). While arguably substantially less critical, the impact of the distributed OP storehouse stockpiles and historical POPs contamination has similar implications, noting that this is primarily being addressed by an EU/FAO initiative. In the case of the Kotayk site, its relatively remote location and the inherent security provided by its administration by a national paramilitary organization (MES) minimize the direct social impact that this development would have. Having said the above, the one identifiable possible social impact involved relates to the final land use plan associated with the Nubarashen site which involves incorporation of the overall area into the adjacent ecological preserve and creation of immediate public access exclusion are of 100 m distance around the contained/remediated site. This would

impact the access of the area for occasional grazing and mushroom harvesting apparently practiced periodical by the local population.

The main mitigation practice related to social impacts generally is the support of an extensive ongoing public consultation supported by the GEF at all critical site areas and more generally with the general population, particularly along transportation routes. Historically this has been extensive in relation to the Nubarashen site and OP storehouses, largely through the efforts of the NGO AWHHE, and this has carried on through the PPG specific to the proposed activities under the project. In general, public response is positive in that they are both aware of the risk that these sites pose and reflect public demand to ensure they are addressed. The project design continues and expands this process through project implementation at all locations, and will utilize the substantial civil society capacity in Armenia as part of this process.

3. *Formalizing environmental and social impact management as a legal obligation:* The final aspect of the environmental and social risk management strategy is to ensure the sustained commitment of the IA and government to the measures included in the project design, specifically international benchmarking of things like EIA and environmental performance standards and effective public consultation as legal commitments assumed by the parties through being a signatories to this Project Document.

Non-GEF Baseline Project (Estimated baseline co-financing US\$4,600,000)

The theoretical baseline project developed for incremental cost reasoning (Section VI) is described in the following by Component, sub-component and major activity. It is based on the assumption that some portion of national and other international co-financing as committed to herein is available but GEF funding is not. The discounting of co-financing availability is applied in recognition that a portion of this is in fact leveraged by the prospect of GEF financing materializing and would otherwise not be available. It is also recognized that what co-financing is available, primarily from national budgets, is spread over a much longer period.

- *Component 1.0 Capture and Containment of Obsolete Pesticide Stockpiles and Wastes (Estimated baseline Co-financing US\$1.9 million):* In a baseline project, action on the Nubarashen site (Outcome 1.1) in the near term would be limited to its containment, geotechnical/hydrological stabilization, and monitoring. A piecemeal excavation program being undertaken as national budget resources are made available would occur but over a relatively long timeframe depending on availability of storage infrastructure and elimination options for accumulated POPs waste. It would be anticipated that some investment in secure central storage (Outcome 1.2) would occur but likely on a more ad hoc basis than contemplated under the project where permanent long term HW infrastructure is planned as part of broader national infrastructure. It would also not necessarily provide for completion of the work to international standards, nor fully provide for the required training and technical assistance appropriate to undertaking such operations given that such activities would require acquisition of other international assistance likely from bilateral donors. A conceptual design for this baseline scenario was developed as part of the OSCE work based on a projected time frame of up to 20 years being involved in fully addressing the

Nubarashen site and dealing with the Ops involved. The activity related to the secondary OP storehouse issue (Outcome 1.3) would proceed in the baseline project under the assumption that the pending arrangements for funding from the EU to MoA were consummated. Otherwise this component of the baseline is mainly financed by the government primarily through in-kind and cash contributions drawn from the budgets of MES and MNP.

- *Component 2.0 Obsolete Pesticide Stockpile and Waste Elimination (Estimated baseline co-financing – US\$ 0 million):* The baseline project would effectively not provide for any treatment and destruction of the Ops and POPs pesticide wastes in the near term recognizing this would be the primary application of GEF funding with any additional international financing being seen as conditional on the GEF funding. The originally planned bilateral commitments identified in the PIF to be applied to destruction (from Brazil and Korea) have not materialized and what untied resources that might be available would have to come from national sources and would be well into the future as assumed in the baseline case developed as the OSCE worst case scenario noted above. This speculative longer term elimination of Ops and POPs wastes material if it occurred would presumably occur in some staged fashion with the first priority be applied to the export disposal for environmentally sound destruction of Category 1 material, and then at some point possible actual treatment of the Category 2 POPs waste.
- *3.0 Institutional and Regulatory Capacity Strengthening for Sound Chemicals Management and Contaminated Sites (Estimated Baseline co-financing – US\$ 1.050 million):* The baseline project for this component would undertake the various initiatives but a somewhat reduced levels, spread over a long period. The development of regulatory instruments, technical guidelines and methodology, training (Outcome 3.1) would eventually occur in a piecemeal fashion, largely being dependant on national budgets and what small fragmented bilateral programs may appear. It is unlikely that any systematic evaluation or further development of the Eco-Protect treatment/disposal facility would occur (Outcome 3.2). Support for development and implementation of laboratory strategy (Outcome 3.3) would generally occur but over a longer period and without a systematic strategy or plan. In general, the baseline project would depend primarily on both in-kind and grant contributions from the government mainly MNP, supplemented by what small periodic bilateral programs may appear from time to time depending on donor interest and priorities, both of which are diminished in the absence of a GEF framework with which to work.

Table 11. Baseline project and cost estimate (Expected Expenditures during the planned 4-5 year project without GEF funding)

Component/Sub-Component		Baseline Activity Description	Cost Estimate (US\$)	Notes
Component 1: Capture and Containment of Obsolete Pesticide Stockpiles and Wastes				
Sub-Component Addressing the Nubarashen burial site,	1.1	Detailed site assessment, clean-up design, geotechnical/hydrological stabilization design,	300,000	Expenditures limited to PPG expenditures by (OSCE/UNDP)
		Site access maintenance/ and temporary improvements for limited works. Undertaking area site geotechnical/hydrological stabilization, and drainage improvements.	75,000	Site infrastructure maintained as is with minor upgrades for small periodic excavation of Category 1

Component/Sub-Component	Baseline Activity Description	Cost Estimate (US\$)	Notes
			material. Basic stabilization and drainage improvements
	Excavation, packaging and removal of one or two OP burial cells involving Category 1 POPs pesticide wastes	50,000	Token removal of some pure pesticides possible but potentially simply contained
	On-Site final containment of all material on site including a semi-permanent cover	250,000	Design to ensure cover and hydraulic isolation of heavily contaminated areas.
	Site restoration, installation of monitoring and establishment of long term land use control arrangements	100,000	Ensuring no public access to the site and buffer area
	Sub-Component 1.1 Total	775,000	
Sub-Component 1.2: Development of hazardous waste storage capability	Design, EIA, permitting and construction supervision for a small temporary storage facility with capacity of 200 t	50,000	Assume an ad hoc temporary warehouse with basic security established and operated either by MES or a licensed private operator -
	Storage Facility upgrading and construction works for indoor secure storage capacity for 200 t of Ops and POPs waste from OP stores and possible Nubarashen	150,000	
	Receiving storage and custody operations for Ops and POPs waste received from Nubarashen and OP stockpiles from storehouses	50,000	
	Sub-Component 1.2 Total	250,000	
Sub-Component 1.3: Remaining significant historical OP storehouses addressed.	OP Storehouse screening assessments, stockpile packaging and surficial clean-up and removal to a designated central storage facility (150 t of OP and clean up residuals from 24 sites)	875,000	Assume that the EU/MoA project undertakes this as described
	Sub-Component 1.3 Total	875,000	
Component 1 Totals		1,900,000	
Component 2: Obsolete Pesticide Stockpile and Waste Elimination			
Sub-component 2.1: Removal from Armenia of all substantially all high priority POPs pesticides, associate very high concentration wastes and OP stockpiles.	No activity unless alternative international funding appears.	-	
Outcome 2.2: Environmentally sound remediation of heavily POPs pesticide contaminated soil inclusive of destruction of extracted POPs pesticides demonstrated.	No activity unless alternative international funding appears.	-	
Component 2 Total		-	
Component 3: Institutional and Regulatory Capacity Strengthening for Sound Chemicals Management and Contaminated Site			
Sub-Component/Outcome 3.1: Legal/regulatory and technical guidance tools for management of chemical wastes, including POPs, and, contaminated sites management within a national sound chemicals	Rationalization, updating and revision of policies, legislation and guidelines covering hazardous chemicals waste and contaminated sites management	200,000	This work will continue but without stimulus of international inputs and likely a reduced pace
	Preparation and adoption of technical guidelines on operational safety procedures for hazardous chemicals waste handling, transport, storage and disposal,	100,000	This work will continue but without international inputs and training and likely a reduced pace

Component/Sub-Component	Baseline Activity Description	Cost Estimate (US\$)	Notes
management framework strengthened	developed/		
	Introduction of environmental and health risk assessment methodologies and practices applicable to hazardous waste stockpiles and contaminated sites developed including supporting training.	50,000	Limited activity will occur in this area in the near term in the absence of international support
Sub-Component/Outcome 3.2: Technical/environmental performance evaluation and upgrading requirements for existing national destruction capability	3.2.1 Undertaking technical and environment performance assesment of the EcoProject incineration facility inclusive of an international standard test burn on characteristic waste streams and a design assessment to define required upgrading requirements	2,000,000	Existing facility with current investment would remain but no improvement or assessment would occur
Sub-Component/Outcome 3.3: Basic national capacity for effective hazardous chemicals sampling and analysis for multi-environmental media and contaminated sites in place, operational and certified to international standards	Strategy development for an optimized national laboratory system across the institutional, academic and private sector leading to the development and adoption of a national action plan for laboratories under a formal National Program	25,000	Assuming the current situation of fragmented capability is recognized, some planning to rationalize it may be undertaken although without the project the status quo may prevail
	3.3.2 Laboratory infrastructure and equipment upgrading as required under the adopted strategy and national action plan	400,000	Some continuing investment in upgrading capability can be expected but it will occur more slowly
	3.3.3 Training of laboratory personal on site and multi-environmental media sampling, laboratory analysis and QA/OC procedures.	50,000	Training will be less comprehensive and sporadic as dictated by fragmented opportunities
	3.3.4 International laboratory certification support for selected labs in accordance with the strategy. 3 designated national laboratories to be certified.	50,000	Some efforts expected in this area but at a reduced priority
Component 3 Total		2,875,000	
Total Baseline Project Costs		4,775,000	

VI. Incremental reasoning and benefits

Incremental reasoning

The basis for the incremental reasoning supporting the project and GEF funding is provided in the description of the Project Baseline above and summarized in Table 11.

Activity in relation to the primary focus of the project and where the large majority of both global environmental benefits (GEB) and national development benefits are is addressing the Nubarashen burial site. The baseline project in relation to the Nubarashen site would be limited primarily to securing all the POPs waste in place with effective surface containment civil works as well as undertaking some of the basic geotechnical and hydrological works upstream of the site to ensure its stability in the contained configuration. It is also assumed to that the site would be placed under adequate care and custody including monitoring, with appropriate land use and access restriction. These measures, at least in the near and medium term, could provide a basic level of management for risks that the site and contained POPs waste presents to health and environment. However, in the absence of the GEF project, these risks are not eliminated and no progress is made in their elimination and, from GEB perspective, the POPs and other Ops that it contains remain in the national and global inventory with the inevitability of ultimate release. Provision for environmentally sound destruction of the Category 1 POPs wastes which contain 90% of the actual POPs pesticides in the country is entirely dependent on GEF funding and would not otherwise occur unless an alternative source of international funding exists. Likewise the core funding for the remediation of the Category 2 POPs waste largely in the form of contaminated soil would involve GEF funding with other co-financing being practically tied to the GEF funding that supports the front end development of technology options and introduction of international practice.

The secondary benefit of at least packaging and securely storing the relatively minor OP stockpiles in storehouses is assumed to be achieved in the baseline project based on the expectation of the reduced EU/FAO funding through the MoA being directed to this and there is sufficient national budget commitment to make up for the short fall in originally anticipated EU/FO funding as well as either continue with the development of a national HW storage facility through MES or to make alternative temporary arrangement for such storage. The baseline project assumes the latter would be the case.

With respect to the institutional, regulatory and technical capacity building supported by the project, some portion of these activities will continue in the Baseline project through MNP budget and in-kind activities but likely a slower pace and without critical international support and inputs. The country in effect will more or less continue as it has done noting that the critical impact of the GEF project and its funding is effectively to focus and accelerate public policy and priorities on the issue of HW and contaminated sites management.

Global Environmental Benefits

The principal GEF benefit from the project will be the elimination of 1,050 t of OPs (including 150 t of storehouse material) of which 900 t are POPs pesticides waste from Nubarashen

containing an estimated 284 t are pure POPs pesticides. Overall, a total of 7,900 t of POPs waste as defined by the SC will be eliminated and an additional 12,700 t of relatively low concentration POPs wastes will be securely contained to substantially decrease probability of any release and/or impact on health and environment.

Other GEBs from the project are the increase in capacity in this region and by extension globally in the management of POPs waste and more generally in HW and contaminated sites management within a sound chemicals management framework. This includes i) demonstrating a practical mix of in-country and export POPs waste management options to achieve the most cost effective solutions; and ii) expanding and sustaining technical capability in key disciplines and service areas such as risk assessment, HW management practices, and analytical capability, and POPs monitoring capability.

National Development Benefits

The national development benefits essentially track those reflected above, namely elimination of a major national priority environmental problem, development of national institutional and technical capability related to HW, contaminated sites and perhaps most significantly the use of the project to stimulate the development of a national HW management facility site and potentially a qualified modestly scaled chemicals destruction facility. The latter, gives Armenia a basis to develop modern HW infrastructure and commercial service capability characteristic of a modern developed country as well as providing a key supporting element for a well-integrated overall waste management system which is an overall national priority.

VII. Replicability

The project generally supports the progressive development of HW, contaminated sites and general sound chemicals management capability in a relatively small country with an economy in transition but one with strong environmental policies, developing governance practices and an active civil society. In this regard, the project has in fact benefited from experience with completed or completing GEF projects in the same area, notable the POPs stockpile elimination project in Belarus and the POPs pesticide elimination project in Vietnam.

As such, the project has a number of features that will serve as examples and provide direct implementation experience in a number of areas that can support replication, both in Armenia and elsewhere. These include:

- Applying an approach to POPs stockpiles, waste and contaminated site elimination based on prioritizing the cost effectiveness, risk mitigation, and global environmental benefit as a primary criteria in incrementally capturing, securing and ultimately eliminating the POPs waste and associated risk.
- Ensuring an appropriate mix of developing national capability and utilizing established, international capability to obtain the most cost effective, sustainable and practically achievable results.
- Exploiting and building on national capability and capacity to provide a sustainable expertise core and physical capability in critical areas such as risk assessment, HW management

practices, contaminated site assessment/containment/monitoring, and development of optimized analytical support capability.

- Integrating of proactive public consultation and awareness activities into the planning and implementation of sensitive HW and contaminated sites projects inclusive of a prominent role taken by civil society organizations.

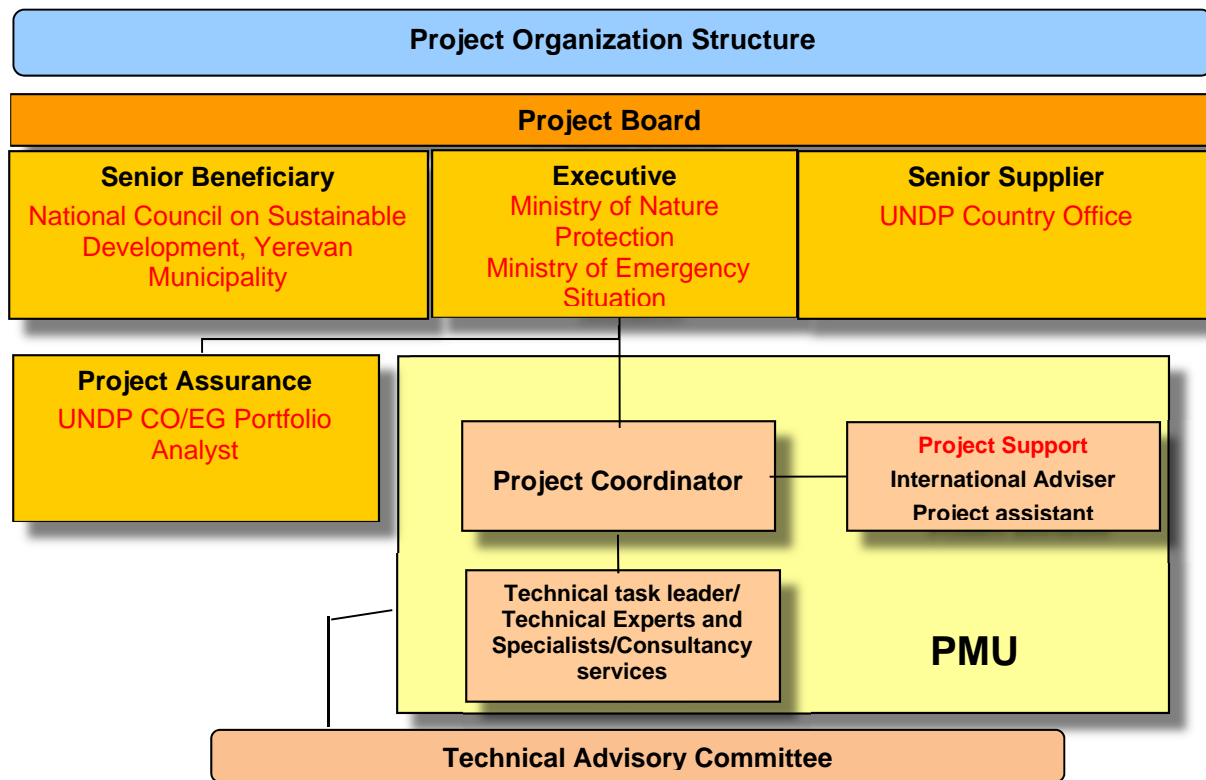
VIII. Management Arrangements

The project will be implemented through UNDP national execution modality (NIM). UNDP CO will act as the GEF implementing agency for the project and support project implementation activities in accordance with UNDP rules and procedures and in line with the GEF requirements.

The UNDP CO will ensure project accountability, transparency, effectiveness and efficiency in implementation. UNDP will provide the Implementing Partner with the following major support services for the activities of the project in accordance with UNDP corporate regulations: (i) Identification and/or recruitment of project personnel; (ii) procurement of goods and services; (iii) financial services, based on LoA on DPS costs (Annex G).

Financial oversight, including approval of expenditures and independent audits, monitoring and mid-term and final evaluation of progress and results will be also ensured by the country office. The UNDP Regional Technical Advisor will provide regular programmatic, technical, and administrative support, advice and oversight as well.

The project organization structure (summarized in the figure below) will consist of a Project Board (PB), Project Assurance, Project Management Unit (PMU), as well as Advisory Committee.



Project Board (PB) will be responsible for making consensus based decisions, in particular when guidance is required by the Project Coordinator (PC). The Board will play a critical role in project monitoring and evaluations by assuring the quality of these processes and associated products, and by using evaluations for improving performance, accountability and learning. The Project Board will ensure that required resources are committed. It will also arbitrate on any conflicts within the project and negotiate solutions to any problems with external bodies. Specific responsibilities of the PB should include:

- (i) For the processes of justifying, defining and initiating a project:
 - Agree on Project Coordinator's and Project Management Team's responsibilities;
 - Appraise and approve work plans submitted by the Project Coordinator;
 - Delegate Project Assurance roles as appropriate;
 - Commit project resources required by the work plan.
- (ii) For the process of running a project:
 - Provide overall guidance and direction to the project, ensuring it remains within any specified constraints;
 - Review project quarterly and annual plans and approve any essential deviations from the original plans;

- Review and approve progress and annual, as well as mid-term and final evaluation's project reports, make recommendations for follow-up actions;
- Provide ad-hoc direction and advice for exception situations when project manager's tolerances are exceeded;
- Assess and decide on conceptual project changes if necessary;
- Assure that all planned deliverables are delivered satisfactorily and programme management directives are compiled;

(iii) For the process of closing a project:

- Assure that all products/outputs are delivered satisfactorily;
- Review and approve the end project report;
- Make recommendations for follow-up actions and post project review plan;
- Notify project closure to the stakeholders.

Project Board decisions shall be made in accordance with international standards that shall ensure management for development results, best value for money, fairness, integrity, transparency, and effective international competition.

Members of the Project Board will consist of key national government representatives, UNDP senior official and other stakeholders. Potential members of the Project Board will be reviewed and recommended for approval during the Local Project Appraisal Committee (LPAC) meeting. The Project Board will contain of three distinct roles:

Executive Role- representing the project ownership. It is expected the Ministry of Nature Protection and the Ministry of Emergency Situation – will serve as a major implementing partners for the project. The *Ministry of Nature Protection* has overall legal and regulatory authority for hazardous waste and contaminated sites management, as well as the licensing and approval process required to actually undertake the work at both Nubarashen and related to OP stockpile sites. It serves as the focal point ministry for the relevant international conventions, in particular Stockholm and Basel conventions, and the evolving national chemicals management framework. The *Ministry of Emergency Situations* is the primary operational proponent for work on the Nubarashen burial site based on the emergency order of the government related their operational capability and mandate in addressing issues of public safety. Similarly they will act in the same proponent capacity as the owner and operator of the proposed HW storage and potential host treatment site for purposes of this project. The decision-makers from the above mentioned ministries will be nominated to the Project Board and will co-chair the group.

Senior Supplier Role: This requires the representation of the interests of the funding parties for specific cost sharing projects and/or technical expertise to the project. The Senior Supplier's primary function within the Board will be to provide guidance regarding the technical feasibility of the project. This role will rest with UNDP Armenia and represented by the Deputy Resident Representative.

Senior Beneficiary Role: This role requires representing the interests of those who will ultimately benefit from the project. The Senior Beneficiary's primary function within the Board will be to

ensure the realization of project results from the perspective of different stakeholders and beneficiaries. Yerevan Municipality with its communities neighboring Nubarashen burial site is the primary beneficiary. The elimination of stockpiles of OPs, POPs waste and associated contamination constitutes a benefit in terms of local environmental quality and reduction in possible long term health risk for local population. In this particular case beneficiary role will also rest with the respective nominee from the National Council for Sustainable Development under prime-minister of the Republic of Armenia represented by major governmental institutions and as well as selected representative from NGO sector.

The project will be subject to the Project Board meetings at least twice every year and on ad hoc basis whenever deemed necessary

Project Assurance: The Project Assurance role supports the Project Board Executive by carrying out objective and independent project oversight and monitoring functions which are mandatory on all projects.

The Project Assurance role supports the Project Board by carrying out objective and independent project oversight and monitoring functions. Project Assurance has to be independent of the Project Manager; therefore the Project Board cannot delegate any of its assurance responsibilities to the Project Manager. The Project Assurance role will rest with the Environmental Governance Portfolio Analyst of UNDP CO.

The following list includes the key suggested aspects that need to be checked by the Project Assurance throughout the project as part of ensuring that it remains consistent with, and continues to meet, a business need and that no change to the external environment effects the validity of the project:

- Maintenance of thorough liaison throughout the project between the supplier and the customer;
- Beneficiary needs and expectations are being met or managed;
- Risks are being controlled;
- Adherence to the Project Justification (Business Case);
- Constant reassessment of the value-for-money solution;
- The project remains viable, the scope of the project is not “creeping upwards” unnoticed;
- Internal and external communications are working;
- Applicable standards are being used and followed;
- Any legislative constraints are being observed
- Adherence to quality assurance standards.

Project Management Unit (PIU): will be established under the UNDP Environmental Governance management team comprising of permanent staff including a Project Coordinator (PC), Technical task leader (TL) and a Project Assistant. The Project Coordinator will be selected on a competitive basis in accordance to UNDP procedures with the authority to run the project on behalf of the Implementing Agency within the constraints laid down by the Board.

The PC will be responsible for overall project coordination and implementation, consolidation of work plans, preparation of quarterly/annual progress reports and supervising the work of the project experts and other project staff. The project team will be formulated to support in daily implementation. The team may be headed by Technical Task Leader, which will recruited on a competitive basis with the authority to run the project operational activities on a day-to-day basis and provide technical backstopping to the PC. The project task leader's prime responsibility is to ensure that the project produces the results specified in the project document, to the required standard of quality and within the specified constraints of time and cost. Project team of national and international consultants, as well as professional consultancy services will be brought at the different stage of implementation.

Considering the complexity of the project, limited local knowledge in the subject area and absence of experience in implementation projects of similar nature in Armenia, long term international adviser may be hired to support project coordinator with overall guidance and structuring the project implementation planning as well as support the Project Assurance role, particularly with respect to due diligence related to POPs elimination.

Under the direct supervision of the PC, the Project Administrative Assistants will provide programme support and be responsible for full administrative, logistical and financial issues. In order to ensure smooth startup and successful implementation of the project activities, it is strongly recommended to use the accumulated knowledge, expertise and capacities generated at the project preparatory phase (PPG).

Advisory Committee: As the main requirement for successful implementation of the project is sustained political commitment and broad-based public support. Thus the involvement of other national authorities and stakeholders will be necessary. For this purpose multi-stakeholder advisory committee will be established as an advisory body to provide technical and operational guide for the project implementation policy ensuring the project's consistency and synergy with the other ongoing development processes in the country. Representatives from line ministries, such as Ministry of Emergency Situation, Ministry of Health, Ministry of Agriculture, Ministry of Transport, Custom Authorities, Public Safety Institutions, Yerevan Municipality, scientific institutions, NGOs and related international organizations will be invited for membership. Advisory board will be co-chaired by representatives from UNDP CO and national implementing agencies (list and responsibilities of major stakeholders are indicated in Tables 7 and 8). The meeting of the Committee will be held once in year unless otherwise required and will be guided by decisions and recommendations of the project board.

IX. Monitoring Framework and Evaluation

The project will be monitored through the following M&E activities. The M&E budget is provided in the table below.

Project start:

A Project Inception Workshop will be held within the first two months of project start with those with assigned roles in the project organization structure, UNDP country office and where

appropriate/feasible regional technical policy and programme advisors as well as other stakeholders. The Inception Workshop is crucial to building ownership for the project results and to plan the first year annual work plan.

The Inception Workshop should address a number of key issues including:

- a) Assist all partners to fully understand and take ownership of the project. Detail the roles, support services and complementary responsibilities of UNDP CO and RCU staff vis-à-vis the project team. Discuss the roles, functions, and responsibilities within the project's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms. The Terms of Reference for project staff will be discussed again as needed.
- b) Based on the project results framework and the relevant GEF Tracking Tool if appropriate, finalize the first annual work plan. Review and agree on the indicators, targets and their means of verification, and recheck assumptions and risks.
- c) Provide a detailed overview of reporting, monitoring and evaluation (M&E) requirements. The Monitoring and Evaluation work plan and budget should be agreed and scheduled.
- d) Discuss financial reporting procedures and obligations, and arrangements for annual audit.
- e) Plan and schedule Project Board meetings. Roles and responsibilities of all project organisation structures should be clarified and meetings planned. The first Project Board meeting should be held within the first 12 months following the inception workshop.

An Inception Workshop report is a key reference document and must be prepared and shared with participants to formalize various agreements and plans decided during the meeting.

Quarterly:

- Progress made shall be monitored in the UNDP Enhanced Results Based Management Platform.
- Based on the initial risk analysis submitted, the risk log shall be regularly updated in ATLAS. Risks become critical when the impact and probability are high. Based on the information recorded in Atlas, a Project Progress Reports (PPR) can be generated in the Executive Snapshot.
- Other ATLAS logs can be used to monitor issues, lessons learned etc. The use of these functions is a key indicator in the UNDP Executive Balanced Scorecard.

Annually:

- Annual Project Review/Project Implementation Reports (APR/PIR): This key report is prepared to monitor progress made since project start and in particular for the previous reporting period (30 June to 1 July). The APR/PIR combines both UNDP and GEF reporting requirements.

The APR/PIR includes, but is not limited to, reporting on the following:

- Progress made toward project objective and project outcomes – each with indicators, baseline data and end-of-project targets (cumulative)

- Project outputs delivered per project outcome (annual).
- Lesson learned/good practice.
- AWP and other expenditure reports
- Risk and adaptive management
- ATLAS QPR
- Portfolio level indicators (i.e. GEF focal area tracking tools) are used by most focal areas on an annual basis as well.

Periodic Monitoring through site visits:

UNDP CO and the UNDP RCU will conduct visits to project sites based on the agreed schedule in the project's Inception Report/Annual Work Plan to assess first hand project progress. Other members of the Project Board may also join these visits. A Field Visit Report/BTOR will be prepared by the CO and UNDP RCU and will be circulated no less than one month after the visit to the project team and Project Board members.

Mid-term of project cycle:

The project will undergo an independent Mid-Term Evaluation at the mid-point of project implementation (November 2016). The Mid-Term Evaluation will determine progress being made toward the achievement of outcomes and will identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about project design, implementation and management. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the project's term. The organization, terms of reference and timing of the mid-term evaluation will be decided after consultation between the parties to the project document. The Terms of Reference for this Mid-term evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF. The management response and the evaluation will be uploaded to UNDP corporate systems, in particular the UNDP Evaluation Office Evaluation Resource Center (ERC).

The relevant GEF Focal Area Tracking Tools will also be completed during the mid-term evaluation cycle.

End of Project:

An independent Final Evaluation will take place three months prior to the final Project Board meeting and will be undertaken in accordance with UNDP and GEF guidance. The final evaluation will focus on the delivery of the project's results as initially planned (and as corrected after the mid-term evaluation, if any such correction took place). The final evaluation will look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/goals. The Terms of Reference for this evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF.

The Terminal Evaluation should also provide recommendations for follow-up activities and requires a management response which should be uploaded to PIMS and to the UNDP Evaluation Office Evaluation Resource Center (ERC).

The relevant GEF Focal Area Tracking Tools will also be completed during the final evaluation.

During the last three months, the project team will prepare the Project Terminal Report. This comprehensive report will summarize the results achieved (objectives, outcomes, outputs), lessons learned, problems met and areas where results may not have been achieved. It will also lay out recommendations for any further steps that may need to be taken to ensure sustainability and replicability of the project's results.

Audit: The project will undergo annual audit by a certified auditor according to UNDP rules and regulations, policies and procedures.

Learning and knowledge sharing:

Results from the project will be disseminated within and beyond the project intervention zone through existing information sharing networks and forums.

The project will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks, which may be of benefit to project implementation though lessons learned. The project will identify, analyse, and share lessons learned that might be beneficial in the design and implementation of similar future projects.

Finally, there will be a two-way flow of information between this project and other projects of a similar focus.

Communications and visibility requirements:

Full compliance is required with UNDP's Branding Guidelines. These can be accessed at <http://intra.undp.org/coa/branding.shtml>, and specific guidelines on UNDP logo use can be accessed at: <http://intra.undp.org/branding/useOfLogo.html>. Amongst other things, these guidelines describe when and how the UNDP logo needs to be used, as well as how the logos of donors to UNDP projects needs to be used. For the avoidance of any doubt, when logo use is required, the UNDP logo needs to be used alongside the GEF logo. The GEF logo can be accessed at: http://www.thegef.org/gef/GEF_logo. The UNDP logo can be accessed at <http://intra.undp.org/coa/branding.shtml>.

Full compliance is also required with the GEF's Communication and Visibility Guidelines (the "GEF Guidelines"). The GEF Guidelines can be accessed at: http://www.thegef.org/gef/sites/thegef.org/files/documents/C.40.08_Branding_the_GEF%20final_0.pdf. Amongst other things, the GEF Guidelines describe when and how the GEF logo needs to be used in project publications, vehicles, supplies and other project equipment. The GEF Guidelines also describe other GEF promotional requirements regarding press releases, press

conferences, press visits, visits by Government officials, productions and other promotional items.

Where other agencies and project partners have provided support through co-financing, their branding policies and requirements should be similarly applied.

Monitoring Framework and Evaluation, and Budget (based on cash contributions from GEF – US\$100,000)

<i>Type of M&E activity</i>	<i>Responsible Parties</i>	<i>Budget (US\$) excluding project staff time; all figures are indicative</i>	<i>Time frame</i>
Inception Workshop (IW) & associated arrangements	<ul style="list-style-type: none"> ▪ Project Coordinator (PC) ▪ UNDP CO 	5,000	Within first two months of project start up
Inception Report	<ul style="list-style-type: none"> ▪ Project Team ▪ UNDP CO ▪ National and international consultant support if needed 	0 (included in routine project staff activity)	Immediately following IW
APR/PIR	<ul style="list-style-type: none"> ▪ PC ▪ UNDP CO 	0 (included in routine project staff activity)	Annually
Meetings of Technical Advisory Board and relevant meeting proceedings (minutes)	<ul style="list-style-type: none"> ▪ PC ▪ UNDP CO ▪ Other stakeholders 	3,000	Following Project IW and subsequently at least once a year
Meetings of the Project Board and relevant meeting proceedings (minutes)	<ul style="list-style-type: none"> ▪ PC ▪ UNDP CO ▪ National implementing agency 	3,000	Twice a year, ideally immediately following Technical Advisory Board meetings
Quarterly status reports	<ul style="list-style-type: none"> ▪ Project team 	0 (included in routine project staff activity)	To be determined by Project team and UNDP CO
Technical monitoring, evaluation, and reporting within project components,	<ul style="list-style-type: none"> ▪ Project team ▪ National and international consultants as needed ▪ Safeguards monitoring 	18,000	Continuous, starting from project inception
Midterm Evaluation (external)	<ul style="list-style-type: none"> ▪ Project team ▪ UNDP CO ▪ UNDP/GEF RCU ▪ External Consultants (i.e. evaluation team) 	20,000	At the midpoint of project implementation.
Final Evaluation (external)	<ul style="list-style-type: none"> ▪ External Consultants (i.e. evaluation team) 	20,000	At the end of project implementation

<i>Type of M&E activity</i>	<i>Responsible Parties</i>	<i>Budget (US\$) excluding project staff time; all figures are indicative</i>	<i>Time frame</i>
	<ul style="list-style-type: none"> ▪ Project team ▪ UNDP CO ▪ UNDP/GEF RCU 		
Final Report	<ul style="list-style-type: none"> ▪ External Consultant ▪ Project team ▪ UNDP CO 	(costs included in Terminal Evaluation, above)	At least one month before the end of the project
Compilation of lessons learned	<ul style="list-style-type: none"> ▪ Project team ▪ UNDP CO ▪ UNDP/GEF RCU 	0 (included in routine project staff activity)	Annually
Financial audit	<ul style="list-style-type: none"> ▪ UNDP CO ▪ Project team 	11,000	Annually
Visits to field sites	<ul style="list-style-type: none"> ▪ PC ▪ UNDP CO ▪ UNDP/GEF RCU (as appropriate) ▪ National implementing agency 	10,000	Permanently
Project final workshop	<ul style="list-style-type: none"> ▪ Project team ▪ UNDP CO ▪ UNDP/GEF RCU ▪ Other stakeholders 	10,000	At least one month before the end of the project
TOTAL INDICATIVE COST		100,000	
(Excluding project team staff time, UNDP staff and travel expenses, government in-kind contribution)			

X. Legal Context

This Project Document shall be the instrument referred to as such in Article I of the Standard Basic Assistance Agreement (SBAA) between the Government of Armenia and the United Nations Development Programme, signed by the parties on 8 March, 1995. The host country implementing agency shall, for the purpose of the Standard Basic Assistance Agreement, refer to the government co-operating agency described in that Agreement.

The UNDP Resident Representative in Yerevan is authorized to effect in writing the following types of revision to this Project Document, provided that he/she has verified the agreement thereto by the UNDP-GEF Unit and is assured that the other signatories to the Project Document have no objection to the proposed changes:

- a) Revision of, or addition to, any of the annexes to the Project Document;*
- b) Revisions which do not involve significant changes in the immediate objectives, outputs or activities of the project, but are caused by the rearrangement of the inputs already agreed to or by cost increases due to inflation;*
- c) Mandatory annual revisions which re-phase the delivery of agreed project inputs or increased expert or other costs due to inflation or take into account agency expenditure flexibility; and*
- d) Inclusion of additional annexes and attachments only as set out here in this Project Document.*

This document together with the CPAP signed by the Government and UNDP which is incorporated by reference constitute together a Project Document as referred to in the SBAA and all CPAP provisions apply to this document.

Consistent with the Article III of the Standard Basic Assistance Agreement, the responsibility for the safety and security of the implementing partner and its personnel and property, and of UNDP's property in the implementing partner's custody, rests with the implementing partner.

The implementing partner shall:

- a) Put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the project is being carried;
- b) Assume all risks and liabilities related to the implementing partner's security, and the full implementation of the security plan.

UNDP reserves the right to verify whether such a plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder shall be deemed a breach of this agreement.

The implementing partner agrees to undertake all reasonable efforts to ensure that none of the UNDP funds received pursuant to the Project Document are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by UNDP hereunder do not appear on the list maintained by the Security Council Committee established pursuant to resolution 1267 (1999). The list can be accessed via <http://www.un.org/Docs/sc/committees/1267/1267ListEng.htm>. This provision must be included in all sub-contracts or sub-agreements entered into under this Project Document.

Audit clause

Financial reporting will follow the provisions of UNDP/GEF. Any Audits will be conducted in accordance with the UNDP Financial Regulations and Rules and applicable audit policies on UNDP projects.

The present Project Document is made in two copies in English and Russian languages. In case of inconsistencies between the two versions, the English version shall prevail.

XI. Annexes

Annex A. Project Results Framework

This project will contribute to achieving the following Country Programme Outcome as defined in CPAP or CPD: Armenia is better able to address key environmental challenges including climate change and natural resource management
Country Programme Outcome Indicators: <i>Ind: Environmental Performance Index (EPI)</i>
Applicable Outcome and Output (from UNDP's 2014-17 Strategic Plan): Outcome 1: Growth and development are inclusive and sustainable, incorporating productive capacities that create employment and livelihoods for the poor and excluded Output 1.3. Solutions developed at national and sub-national levels for sustainable management of natural resources, ecosystem services, chemicals and waste
Applicable GEF Strategic Objective and Program: GEF-5 Chemicals Strategy: Objective CHEM-1: Phase out POPs and Reduce POPs Releases
Applicable GEF Expected Outcomes: Outcome 1: POPs waste prevented, managed and disposed of, and contaminated sites managed in an environmentally sound manner. Outcome 1.5: Country capacity built to effectively phase out and reduce releases of POPs.
Applicable GEF Outcome Indicators: Indicator 1.4.2 Amount of obsolete pesticides, including POPs, disposed of in an environmentally sound manner; measured in tons. Indicator 1.5.1 Progress in developing and implementing a legislative and regulatory framework for environmentally sound management of POPs, and for the sound management of chemicals in general, as recorded in the POPs tracking tool.

	Indicator	Baseline	Targets		Sources of verification	Risks and assumptions
			Mid-term	End of project		
Objective: Protection of health and environment through elimination of obsolete pesticide stockpiles and addressing contaminated sites within a sound chemicals management strategy	Obsolete Pesticide stockpiles including POPs Pesticides and wastes are securely packaged, contained and stored pending elimination	<ul style="list-style-type: none"> The major current obsolete pesticide stockpile site and major remaining location of POPs pesticides is at the Nubarashen burial site in a state that creates a risk to health and the environment. And has expanded to create a significant contaminated site. Lesser stockpiles and associated site contamination exist unaddressed at 24 OP storehouses. Contaminated soils classified sufficiently to constitute a potent risk remain uncontained at some of these storehouse sites. 	<ul style="list-style-type: none"> The major stockpiles of pure pesticides 605 t including 284 t of pure POPs pesticides along with 295 t of highly contaminated POPs waste excavated, packaged and removed from the Nubarashen burial site. 150 t of obsolete pesticide stockpiles packaged for removal from 24 storehouses. National HW facility site operational and 1,050 t of consolidated priority obsolete pesticides and POPs waste securely stored pending environmental sound destruction. 7000 t of highly contaminated POPs waste (soil) and 12,500 t of POPs contaminated soil contained at the Nubarashen site 	<ul style="list-style-type: none"> Removal and export of Pure obsolete pesticides and highly contaminated POPs waste for environmentally sound destruction 12,700 of POPs contaminated soil securely from the Nubarashen site and OP storage sites permanently contained and monitored at the restored and stabilized Nubarashen site. 7,100 of treated Category 2 POPs waste contained at the Nubarashen site. 	<ul style="list-style-type: none"> Inventory control documentation of excavated, packaged and transported material Supervisory consultant reports. Regulatory inspection reports Citizen/NGO independent monitoring 	<ul style="list-style-type: none"> Substantive cash direct government co-financing is available for the civil works required at the Nubarashen and the physical infrastructure improvements required at the Kotayk site. Public acceptance and regulatory approvals are in place for the Kotayk storage facility in a timely manner. Timely implementation of the EU funded activities at the OP storehouses through MoA.
	Major stockpiles of Obsolete Pesticides and POPs pesticide wastes have been destroyed in an environmental sound manner	<ul style="list-style-type: none"> No elimination of national stockpiles of obsolete has been attempted 	<ul style="list-style-type: none"> Commercial arrangements made for the export of 1,050 t of pure obsolete pesticides and highly contaminated POPs waste. Technology selection and demonstration along with commercial arrangements made for the treatment/remediation of 7,100 t of POPs waste in the form of heavily contaminated soil 	<ul style="list-style-type: none"> 1,050 t of pure obsolete pesticides and highly contaminated POPs waste exported and destroyed. 7,100 t of POPs waste in the form of heavily contaminated soil treated/remediated 	<ul style="list-style-type: none"> Inventory control, shipping manifest, tracking and destruction certificate documentation of material shipped, received and destroyed Operational management and project supervision reports. Independent due diligence peer 	<ul style="list-style-type: none"> No major barriers prevent the export of pure obsolete pesticides and highly contaminated POPs waste for environmentally sound destruction. Appropriate cost effective commercial contaminated soil treatment/ remediation technology is

	Indicator	Baseline	Targets		Sources of verification	Risks and assumptions
			Mid-term	End of project		
					review reports • Regulatory inspection reports	available either for application in Armenia or at facilities outside the country.
	National legal instruments and regulatory framework for hazardous waste and contaminated sites update with gaps filled, conflicts resolved and consistent with relevant international requirements.	<ul style="list-style-type: none"> Current legal and regulatory framework for hazardous waste and contaminated site management has significant gaps and conflicting provisions 	<ul style="list-style-type: none"> Complete definition of current gaps and requirements for legal and regulatory changes documented and actions agreed (To be completed when Component 3 inputs received) 	<ul style="list-style-type: none"> Fully updated regulatory framework for hazardous and chemicals waste management implemented 	<ul style="list-style-type: none"> Operational management and project supervision reports. 	<ul style="list-style-type: none"> Full commitment of MNR and government generally to improvement of the waste management legal and regulatory framework. Failure to fully engage the necessary institutional stakeholders
	Core national technical capacity in place relative to hazardous waste management, risk assessment and contaminated site management	<ul style="list-style-type: none"> Limited technical capacity in key areas of expertise and support infrastructure 	<ul style="list-style-type: none"> Identification and documentation key methodologies and scope for the required risk assessment and initial application on a pilot 	<ul style="list-style-type: none"> Environmental and health risk assessment methodologies documented, disseminated and implemented as part of the national regulatory assessment process for contaminated sites. Professional in regulatory agencies, academia, NGOs and environmental service providers trained on their application 	<ul style="list-style-type: none"> Operational management and project supervision reports Independent peer review of results 	<ul style="list-style-type: none"> Active cooperation of all beneficiaries in the development and implementation of the risk assessment initiative Failure to fully engage the necessary institutional stakeholders
Component 1: Capture and Containment of Obsolete Pesticide Stockpiles and Wastes						
Outcome 1.1: Removal of priority POPs pesticide waste from the Nubarashen burial site, secure containment of residual contamination	Detailed site assessment, design documentation, tender specification, implementation procedures including EHS procedures, EIA	<ul style="list-style-type: none"> Preliminary site assessment completed during PPG Conceptual excavation, containment, site 	<ul style="list-style-type: none"> Detailed design in place with supporting tender documents and construction specifications. 	<ul style="list-style-type: none"> Implementation of design, operational procedures and conformance with approval conditions verified 	<ul style="list-style-type: none"> Peer review of technical documentation. Supervisory consultant reports. 	<ul style="list-style-type: none"> Preliminary site assessment and conceptual design does not fully define scope/

	Indicator	Baseline	Targets		Sources of verification	Risks and assumptions
			Mid-term	End of project		
on-site, site stabilization and restoration, with the site secured under appropriate institutional arrangements providing effective access limitations, monitoring and future land use control, all endorsed by an informed public.	and required approvals in place to initiate Nubarashen burial site works	stabilization sign completed during the PPG. • No formal EIA or site approvals initiated. • No national standards and procedures in place	• Contracting complete • EIA and formal approvals in place • Operational procedures including EHS procedures in place and utilized.		• Regulatory submission/ approval documents • Citizen/NGO independent monitoring	• More complex EIA an approval processes than foreseen are applied. • Public acceptance of activities proposed will be obtained
	Removal of pure pesticides/.high concentration POPs wastes (Category 1) and soil highly contaminated with POPs pesticides (Category 2) from the Nubarashen burial site to secure storage	• An estimated 7,900 t of pure pesticides, high concentration POPs waste and soil highly contaminated with POPs have been identified is found in and around the Nubarashen burial site. • Risk assessments identify the need to ensure removal of high risk POPs waste	• Excavation, packaging and removal to secure storage of 900 t of pure pesticides and high concentration POPs wastes (Category 1) from the Nubarashen burial site to secure storage	• Removal to secure storage of 7,000 t of POPs pesticide waste in the form of highly contaminated soil (Category 2) from the Nubarashen burial site.	• On-site visual and analytical screening records differentiating between Category 1, 2 and 3 POPs wastes • Inventory control documentation of excavated, packaged and transported material. • Supervisory consultant reports. • Regulatory inspection reports • Citizen/NGO independent monitoring	• Actual estimated quantities are reasonable accurate. • Effective affordable on-site analytical screening is available • Effective trained labour and on-site supervision is used
	Onsite secure containment of 12,000 t of low and moderately contaminated soil (Category 3) in an engineered landfill within the Nubarashen site in place	• Containment of pure pesticide burial cells compromised. • Contamination has spread to soil across and around the Nubarashen site	• Onsite secure temporary containment of 7,000 t of POPs pesticide waste in the form of highly contaminated soil and 12,000 t of low and moderately contaminated soil in an engineered landfill within the Nubarashen site in place	• Onsite secure permanent containment of 12,000 t of low and moderately contaminated soil in an engineered landfill within the Nubarashen site in place	• On-site visual and analytical screening records differentiating between Category 1, 2 and 3 POPs wastes • Inventory control documentation of excavated, packaged and transported material	• Actual estimated quantities are reasonable accurate. • Effective affordable on-site analytical screening is available • Effective trained labour and on-site supervision is used

	Indicator	Baseline	Targets		Sources of verification	Risks and assumptions
			Mid-term	End of project		
					<ul style="list-style-type: none"> • Supervisory consultant reports. • Regulatory inspection reports • Citizen/NGO independent monitoring 	
	Restoration, monitoring and access control provisions for the Nubarashen burial site are in place and civil works to stabilize the surrounding land and drainage are completed.	<ul style="list-style-type: none"> • Only temporary containment works in place involving basic drainage, and cover of the burial site itself. • Site is generally intact but poorly maintained and sparsely vegetated, subject to erosion, drainage blockage and surrounding geotechnical and hydrogeological instability. • Basic ground water monitoring capability in place • Site security and access control as part of a an emergency measures order but general public access to area permitted 	<ul style="list-style-type: none"> • Upgraded and enforced public access controls in place for works activities. • Upgraded access roads, security controls and site protection measures suitable for the active excavation and restoration works are in place. • Temporary repairs and modification to on-site as well and upstream and downstream drainage to assure minimum water ingress during active site excavation and remediation civil works 	<ul style="list-style-type: none"> • Site fully restored with sustainable phytoremediation vegetation, appropriately fenced and gated with signage including a 100m buffer zone around the former burial site. • The site drainage system upgraded and functional inclusive of a monitored phytoremediation reed bed downstream pond. • Permanent measures to maintain land stability upstream and downstream of site including removal of perched water table and upstream ponds. • Long term monitoring program in place and funded by national budgets. • Institutional arrangements respecting long tern land use of the site and surrounding territory involving its administration as part of the adjoining ecological reserve. 	<ul style="list-style-type: none"> • Supervisory consultant reports. • Regulatory inspection reports • Citizen/NGO independent monitoring • Site monitoring data 	<ul style="list-style-type: none"> • Public and City of Yerevan acceptance of land use restrictions and protected area designation. • MNP capability to establish and maintain appropriate protected area land use arrangements. • National budget commitments made for site maintenance and monitoring.
	Availability of trained capability in the practical management of hazardous chemicals wastes and contaminated site clean up	<ul style="list-style-type: none"> • Limited national capability in the practical management of hazardous chemicals wastes and contaminated site clean up 	<ul style="list-style-type: none"> • Training delivered to 20 national technical and regulatory staff in support of Nubarashen burial site POPs wastes excavation, packaging, transportation and site containment/ restoration operations 	<ul style="list-style-type: none"> • Sustainable operational capability in the public and private sector for hazardous chemical waste management and contaminated site clean-up in place 	<ul style="list-style-type: none"> • Supervisory consultant reports. • Reports on training delivered • Information on availability of services in other applications 	<ul style="list-style-type: none"> • Availability of suitable candidates and operating entities for training.
	High level of public	<ul style="list-style-type: none"> • Limited awareness of the 	<ul style="list-style-type: none"> • 3 public consultation 	<ul style="list-style-type: none"> • 2 additional public 	<ul style="list-style-type: none"> • Feedback from 	<ul style="list-style-type: none"> • Immediately

	Indicator	Baseline	Targets		Sources of verification	Risks and assumptions
			Mid-term	End of project		
	awareness, engagement and support for the clean-up activities and ongoing custody and monitoring arrangements for the Nubarashen burial site supported by appropriate awareness products,	site, its risks and activities being undertaken with respect to its clean up.	events held and 50 public documents/web/media products produced	consultation events held and 5 public documents/web/media products produced. • Survey indicating the views of affected public stakeholders upon completion	public events. • Independent media reports. • Citizen/NGO independent monitoring	affected public will recognize the benefit of dealing with the Nubarashen site. • Responsive and proactive approach by institutional stakeholders to public concerns and input
Outcome 1.2: Development of the Kotayk national hazardous waste management site at equipped with secure storage and basic infrastructure to allow introduction of HW treatment soil remediation technologies constructed and operated for the secure storage of POPs pesticide waste and OP stockpiles, and the treatment of POPs pesticide contaminated soil	Detailed design documentation, tender specification, implementation procedures including EHS procedures, EIA and required approvals in place to initiate development of the Kotayk HW facility site	<ul style="list-style-type: none"> • MES site in Kotayk Marz assessed as suitable for development. • Preliminary conceptual design survey and cost estimate complete. • Initial public consultation with authorities and local public undertaken. 	<ul style="list-style-type: none"> • Detailed design in place with supporting tender documents and construction specifications. • Contracting complete • EIA and formal approvals in place • Operational procedures including EHS procedures in place and utilized. 	<ul style="list-style-type: none"> • Implementation of design, operational procedures and conformance with approval conditions verified 	<ul style="list-style-type: none"> • Peer review of technical documentation. • Supervisory consultant reports. • Regulatory submission and approval documents • Citizen/NGO independent monitoring 	<ul style="list-style-type: none"> • No unforeseen institutional or legal barriers exist to accessing the site. • Preliminary site assessment and conceptual design sufficiently defines scope. • More complex EIA an approval processes than foreseen are applied. • Public acceptance of activities proposed will be obtained
	Kotayk national HW management site developed to and operated to international standards	<ul style="list-style-type: none"> • No suitable HW storage or management facilities available in Armenia. 	<ul style="list-style-type: none"> • Upgrading works on the Kotayk national HW management site completed to national and international standards • Kotayk national HW management site operational and being used for the project. 	<ul style="list-style-type: none"> • Kotayk national HW management site utilized for general HW management activities on a sustainable basis. 	<ul style="list-style-type: none"> • Supervisory consultant reports. • Regulatory inspection reports • Site environmental monitoring reports. • Citizen/NGO independent monitoring • Future business and operational plans for the facility and site. 	<ul style="list-style-type: none"> • Site proves suitable for project and ongoing operations • National commitment remains to sustain its operation.
	Successful operation of the facility for the storage	No suitable HW storage capacity currently exists in	<ul style="list-style-type: none"> • Secure receiving and storage of 1,050 t of 	<ul style="list-style-type: none"> • Secure receiving and storage of any contingency 	<ul style="list-style-type: none"> • Inventory control and 	<ul style="list-style-type: none"> • Amount received is as estimated

	Indicator	Baseline	Targets		Sources of verification	Risks and assumptions
			Mid-term	End of project		
	of Category 1 POPs pesticide waste and OP stockpiles pending export for environmentally sound destruction.	Armenia that would meet project requirements.	Category 1 pesticide waste and OP stockpiles <ul style="list-style-type: none"> Handling and export shipment of 1,050 t of Category 1 pesticide waste and OP stockpiles for environmentally sound destruction. 	volumes of Category 1 pesticide waste and OP stockpiles from Nubarashen and OP stockpile site remediation operations. <ul style="list-style-type: none"> Handling and export shipment of any contingency volumes of Category 1 pesticide waste and OP stockpiles from Nubarashen and OP stockpile site remediation operations for environmentally sound destruction. 	shipping manifest documentation of material received and placed in storage. <ul style="list-style-type: none"> Operational management and project supervision reports. Regulatory inspection reports Citizen/NGO independent monitoring 	<ul style="list-style-type: none"> Facility operates as designed and expected. Survey indicating the views of affected public stakeholders. Responsive and proactive approach by institutional stakeholders to public concerns and input
	Successful operation of the facility to host treatment/remediation technology treating for soil highly contaminated with POPs pesticide in an environmentally sound manner.	No HW qualified site for the operation of HW treatment and soil remediation technology currently exist in Armenia that would meet project requirements.	<ul style="list-style-type: none"> Secure receiving and secure storage of 7,000 t of Category 2 material (soil highly contaminated with POPs pesticide) from Nubarashen. 	<ul style="list-style-type: none"> Secure receiving and secure storage of approximately 100 t amount of additional soil highly contaminated with POPs pesticide) from OP storehouse cleanup activities. Treatment and remediation of at least 7,100 t of Category 2 material from Nubarashen and OP storage site clean-ups or alternatively export of this material to suitable treatment and remediation facilities elsewhere. 	<ul style="list-style-type: none"> Inventory control and shipping manifest documentation of material received and placed in storage. Operational management and project supervision reports. Regulatory inspection reports Citizen/NGO independent monitoring 	<ul style="list-style-type: none"> Competitive treatment and remediation technology can be attracted through an international tendering process for establishment on the Kotyak site. Infrastructure developed and provided by the facility is suitable.
	Availability of trained and equipped staff for the practical operation of the Kotayk HW management facility including safeguards and EHS practices	<ul style="list-style-type: none"> Limited national capability in the practical management of hazardous chemicals wastes and particularly the operation of HW storage and treatment facilities 	<ul style="list-style-type: none"> Training delivered to 20 national technical and regulatory staff in support of Kotayk HW facility operations. 	<ul style="list-style-type: none"> Sustainable operational capability for hazardous chemical waste management facility in place 	<ul style="list-style-type: none"> Supervisory consultant reports. Reports on training delivered Information on availability of services in other applications 	<ul style="list-style-type: none"> Availability of suitable candidates and operating entities for training.
	High level of public awareness, engagement and support for the	<ul style="list-style-type: none"> Initial public consultations with local authorities and affected 	<ul style="list-style-type: none"> 3 public consultation events held and 5 public documents/web/media 	<ul style="list-style-type: none"> 2 public consultation events held and 5 public documents/web/media 	<ul style="list-style-type: none"> Feedback from public events. Independent 	<ul style="list-style-type: none"> Sustained acceptance by immediately affected

	Indicator	Baseline	Targets		Sources of verification	Risks and assumptions
			Mid-term	End of project		
	Kotayk HW facility site activities and ongoing operations supported by the delivery of appropriate awareness products and activities delivered.	public stakeholders undertaken.	products delivered	products delivered	media reports. • Citizen/NGO independent monitoring	public for the operation of the facility.
Outcome 1.3: Remaining significant historical OP storehouses have OP stocks packaged and removed and residual site contamination cleaned up.	Screening assessments completed/documentated on identified historical OP storehouse stockpile sites and OP stockpiles and clean up residuals packaged and removed to the Kotayk HW facility.	<ul style="list-style-type: none"> Fragmented historical assessment and inventory work consolidated for project preparation 24 OP stockpile sites identified and up to 6 sites considered priorities for substantive clean up. Preliminary commitment for EU funding of initial work pending 	<ul style="list-style-type: none"> EU/MoA/FAO administered site assessment, packaging and surficial clean up undertaken to a make available 150 t of OPs and residuals for storage at the Kotayk facility. Environmentally sound disposal of 150 t of OPs arranged by FAO Public consultation conducted at all OP storehouse sites 	<ul style="list-style-type: none"> Under MoA supervision all former OP stores are maintained in other productive uses. 	<ul style="list-style-type: none"> Inventory control and shipping manifest documentation of material received and placed in storage. Operational management and project supervision reports. Regulatory inspection reports Citizen/NGO independent monitoring 	<ul style="list-style-type: none"> The EU funding will be confirmed and acted upon over the next two years. The preliminary estimates of quantities and site conditions are generally accurate. Acceptance of access and involvement of private sector owners and/or appropriate regulatory action. Institutional and legal issues related to local jurisdiction and licensing requirements resolved
	Detailed contaminated site and risk assessments and remediation/clean up designs on identified priority sites completed/documentated	<ul style="list-style-type: none"> Limited site assessment work done by local and international NGOs 	<ul style="list-style-type: none"> Preliminary site assessment reports received from, MoA and assessed. Priority sites for substantive clean up agreed with MoA and MNP 	<ul style="list-style-type: none"> Detailed contaminated site and risk assessments and remediation/clean up designs on identified on up to 6 priority sites completed/documentated 	<ul style="list-style-type: none"> Peer review of technical documentation. Supervisory consultant reports. Regulatory submission/ approval documents Citizen/NGO independent monitoring 	<ul style="list-style-type: none"> The preliminary identification of priority sites through EU/MoA/FAO work generally accurate. Acceptance of access and involvement of private sector owners and/or appropriate regulatory action.
	Excavation/removal, remediation and/or containment on identified	<ul style="list-style-type: none"> No clean up activity undertaken at any OP stores. 	<ul style="list-style-type: none"> No action 	<ul style="list-style-type: none"> Excavation/removal, remediation and/or containment of 200 t of contaminated soil from up to 	<ul style="list-style-type: none"> Inventory control and shipping manifest documentation of 	<ul style="list-style-type: none"> No unforeseen institutional, legal jurisdictional barriers exist to accessing the

	Indicator	Baseline	Targets		Sources of verification	Risks and assumptions
			Mid-term	End of project		
	priority sites completed.			6 identified priority sites completed	material received and placed in storage. <ul style="list-style-type: none"> Operational management and project supervision reports. Regulatory inspection reports Citizen/NGO independent monitoring 	site. <ul style="list-style-type: none"> Preliminary site assessment and conceptual design sufficiently defines scope. Regulatory approvals are available Public acceptance of activities proposed will be obtained
	Public consultation events held at 6 priority sites and public acceptance of actions are obtained	<ul style="list-style-type: none"> No dedicated public consultation activities on priority sites to date. 	<ul style="list-style-type: none"> No Action 	<ul style="list-style-type: none"> 6 public consultation events held at 6 priority sites 	<ul style="list-style-type: none"> Feedback from public events. Independent media reports. Citizen/NGO independent monitoring 	<ul style="list-style-type: none"> Immediately affected public will recognize the benefit of dealing with the site issues. Responsive and proactive approach by institutional stakeholders to public concerns and input
Component 2: Obsolete Pesticide Stockpile and Waste Elimination						
Outcome 2.1: Removal from Armenia of all substantially all high priority POPs pesticides, associate very high concentration wastes and OP stockpiles.	Destruction of Category 1 POPs pesticide wastes from Nubarashen and OP stockpiles in an environmentally sound destruction in accordance with the SC Article 6, Basel Convention and GEF guidance performance requirements.	<ul style="list-style-type: none"> No destruction of POPs pesticides, POPs wastes or OPs yet undertaken 	<ul style="list-style-type: none"> International pre-qualification, tender and contract documents prepared and implemented Shipment and environmental sound destruction of 900t Category 1 POPs pesticide wastes and 150 t of OP stockpiles at a qualified competitive export destruction 	<ul style="list-style-type: none"> Shipment and environmental sound destruction of any contingency volumes of Category 1 pesticide waste and OP stockpiles from Nubarashen and OP stockpile site remediation operations at qualified competitive export destruction facility. 	<ul style="list-style-type: none"> Inventory control, shipping manifest, tracking and destruction certificate documentation of material shipped, received and destroyed Operational management and project supervision reports. Independent due diligence peer 	<ul style="list-style-type: none"> Qualified and competitive export facilities and supporting logistics service providers are available. Timely export, transit country and destination import approvals are available.

	Indicator	Baseline	Targets		Sources of verification	Risks and assumptions
			Mid-term	End of project		
			facility. supported		review reports • Regulatory inspection reports	
Outcome 2.2: Environmentally sound remediation of heavily POPs pesticide contaminated soil inclusive of destruction of extracted POPs pesticides demonstrated.	Treatment/remediation of Category 2 heavily contaminated POPs contaminated soil (POPs pesticide waste) remediated to levels below the low POPs content and demonstration of its commercial viability in Armenia for remediation of POPs contaminated soil	<ul style="list-style-type: none"> No highly contaminated soil treatment/remediation facilities available in the country 	<ul style="list-style-type: none"> International pre-qualification, tender and contract documents prepared and implemented Trial treatment testing on candidate shortlisted technologies completed. Site preparation arrangements for hosting the required technology as may be required completed. 	<ul style="list-style-type: none"> Shipment and environmental sound destruction of 7,100 t of Category 1 heavily contaminated POPs contaminated soil (POPs pesticide waste) remediated to levels below the low POPs content at the Kotayk site and returned/contained on the Nubarashen site, or exported to a qualified facility. 	<ul style="list-style-type: none"> Inventory control, shipping manifest, tracking and destruction certificate documentation of material shipped, received and treated/remediated Operational management and project supervision reports including analysis of treated soil. Independent due diligence peer review reports Regulatory inspection reports 	<ul style="list-style-type: none"> Qualified and competitive export facilities and supporting logistics service providers are available. Feasibility of primary option of treatment and remediation in Armenia. Timely export, transit country and destination import approvals are available as a contingency.
	Operational training of national technical personal and service providers on a modern contaminated soil treatment/remediation technology	<ul style="list-style-type: none"> No currently qualified technical personal or service providers in Armenia for treatment/remediation of POPs contaminated soil. 	<ul style="list-style-type: none"> 20 national technical personal trained on a modern contaminated soil treatment/remediation technology 	<ul style="list-style-type: none"> 20 national technical personal operationally qualified and experienced on a modern contaminated soil treatment/remediation technology. Commercial service provider capability available for other contaminated soil treatment/remediation projects in Armenia. 	<ul style="list-style-type: none"> Supervisory consultant reports. Reports on training delivered Information on availability of services in other applications 	<ul style="list-style-type: none"> Availability of suitable candidates and operating entities for training.
Component 3: Institutional and Regulatory Capacity Strengthening for Sound Chemicals Management and Contaminated Sites						
Outcome 3.1:	Policies, legislation and	<ul style="list-style-type: none"> Basic framework 	<ul style="list-style-type: none"> Systematic review and 	(List of specific legislative	•Project	<ul style="list-style-type: none"> Broad institutional

	Indicator	Baseline	Targets		Sources of verification	Risks and assumptions
			Mid-term	End of project		
Legal/regulatory and technical guidance tools for management of chemical wastes, including POPs, and, contaminated sites management within a national sound chemicals management framework strengthened	regulatory measures respecting hazardous chemical wastes and contaminated sites management reviewed, updated and appropriate revisions implemented	legislation in place but has gaps, inconsistencies and conflicts with international standards and MEA obligations	clarification of HW management and contaminated sites existing legislation and regulation completed. • Action plan for streamlining and filling gaps in existing legislation consistent with international practice adopted and implemented,	and regulatory measures to be provided by MNP/UNDP CO)	supervision reports. • Peer reviews of documents produced	support for the development process across government stakeholders. • Sustained high level government commitment to the adoption of required legislation and regulations.
	Adopted technical guidelines on operational and EHS procedures for hazardous chemicals waste handling, transport, storage and disposal, developed in accordance with international practice and relevant national personnel trained	<ul style="list-style-type: none"> While requirements exist in legislation requiring technical guidelines on operational safety procedures for hazardous chemicals waste handling, transport, storage and disposal to be in place these have not been developed and adopted. Limited national expertise exist in implementation of operational procedures for HW management. 	<ul style="list-style-type: none"> Draft guidance materials on operational and EHS procedures for hazardous chemicals waste handling, transport, storage and disposal consistent with international practice prepared and under public review. Training program hazardous chemicals waste handling, transport, storage and disposal developed with a designated accredited national institution. 	<ul style="list-style-type: none"> Adopted guidance materials operational and EHS procedures for hazardous chemicals waste handling, transport, storage and disposal consistent with international practice implemented. National training program delivered to at least 50 relevant technical personnel in regulatory and private sector service provider positions who would attain relevant certification. 	<ul style="list-style-type: none"> Project supervision reports. Peer reviews of documents produced 	<ul style="list-style-type: none"> Qualified personnel are available and interested in the field. Private sector service provider interest. Availability of a qualified training institution
	Guidance documentation on environmental and health risk assessment methodologies and practices applicable to hazardous waste stockpiles and contaminated sites developed in accordance with international practice introduced and adopted, and relevant national professional trained.	<ul style="list-style-type: none"> No nationally adopted guidance materials exist for environmental and health risk assessment. 	<ul style="list-style-type: none"> Draft guidance materials on environmental and health risk assessment methodologies and practices applicable to hazardous waste stockpiles and contaminated sites developed in accordance with international practice prepared and under public review. Training sessions involving at least 10 train the trainers is undertaken 	<ul style="list-style-type: none"> Adopted guidance materials on environmental and health risk assessment methodologies and practices applicable to hazardous waste stockpiles and contaminated sites developed in accordance with international practice implemented. Training of at least 50 professionals from regulatory authorities, academia, NGOs and environmental service providers 	<ul style="list-style-type: none"> Project supervision reports. Peer reviews of documents produced 	<ul style="list-style-type: none"> Qualified personnel are available and interested in the field. Private sector service provider interest. Availability of a qualified training institution

	Indicator	Baseline	Targets		Sources of verification	Risks and assumptions
			Mid-term	End of project		
Outcome 3.2:	The EcoProject incineration facility is fully qualified based on international standards for management of HW and chemical wastes.	<ul style="list-style-type: none"> • Facility has been constructed and is operational for biomedical and other industrial waste destruction with its operator expressing interest in expanding its range of wastes to various HW up to and including POPs wastes 	<ul style="list-style-type: none"> • Test burn program designed, baseline studies undertaken and wastes identified for testing assembled. 	<ul style="list-style-type: none"> • Full test burn program completed and licensing decisions made on an expanded menu of HW made. • A technical assessment and upgrading investment plan is completed for purposes of improving facility efficiency and environmental performance including potential application to chlorinated waste streams. 	<ul style="list-style-type: none"> • Project supervision reports. • Test burn results and technical assessment study documents • Peer reviews of documents produced 	<ul style="list-style-type: none"> • Continued enterprise financial commitment to further investment as a HW service provider. • Maintenance of public acceptance of the facility and its location in Yerevan. • An efficient and technical sound regulatory licensing regime exists and is applied.
Outcome 3.3: Basic national capacity for effective hazardous chemicals sampling and analysis for multi-environmental media and contaminated sites in place, operational and certified to international standards	Adopted national strategy for rationalization and upgrading national laboratory capability to serve a sound chemicals management framework including hazardous waste and contaminated sites management.	<ul style="list-style-type: none"> • Highly fragmented under equipped and resourced laboratory infrastructure distributed across the regulatory, academic and private sector. • Lack of fully creditable capability to service the needs of regulators and the industrial/private sector 	<ul style="list-style-type: none"> • National laboratory strategy developed, endorsed by major institutional and public stakeholders and endorsed for implementation by the government. 	<ul style="list-style-type: none"> • National strategy implemented as reflected by availability of effective support capability for sound chemicals management particular hazardous waste management and contaminated sites. 	<ul style="list-style-type: none"> • Project supervision reports. • Peer reviews of documents produced 	<ul style="list-style-type: none"> • Consensus on a strategy is achieved • Government commitment and political will is sustained to make necessary decisions on rationalization of existing infrastructure and effective allocation of resources to focus capability in sufficient quantity.
	Designated national laboratories, including one each in the regulatory, academic and private sector upgraded with suitable capability for hazardous chemical waste and contaminated site sampling and analysis	<ul style="list-style-type: none"> • Reasonably good but somewhat dated capability in MNR regulatory laboratory and one modern academic laboratory. • Growing private sector laboratories. 	<ul style="list-style-type: none"> • Selection of three designated laboratories, one in each of regulatory, academic and private sector for capital and infrastructure upgrading. • Approved specifications and plans for upgrading endorsed by the government 	<ul style="list-style-type: none"> • Three designated laboratories upgraded and operational. • Long term national budget commitments and/or business plans in place ensuring sustainable operation 	<ul style="list-style-type: none"> • Project supervision reports. • Peer reviews of documents produced 	<ul style="list-style-type: none"> • Consensus on a selection of designated laboratories. • Sustained government commitment and funding available.

	Indicator	Baseline	Targets		Sources of verification	Risks and assumptions
			Mid-term	End of project		
	Training program for laboratory and associated personal delivered.	<ul style="list-style-type: none"> Variable levels of training and qualifications in existing laboratory personnel 	<ul style="list-style-type: none"> 15 key laboratory personal from designated laboratories trained 	<ul style="list-style-type: none"> 15 additional key laboratory personal from designated laboratories trained 	<ul style="list-style-type: none"> Project supervision reports. Peer reviews of documents produced 	<ul style="list-style-type: none"> Consensus on a selection of designated laboratories. Sustained government commitment and funding available.
	Designated national laboratories with international certification and international methods and practice in place	<ul style="list-style-type: none"> Only one laboratory with partial international certification 	<ul style="list-style-type: none"> 3 designated laboratories initiated formal international certification 	<ul style="list-style-type: none"> 3 designated laboratories achieved full international certification 	<ul style="list-style-type: none"> Project supervision reports. Peer reviews of documents produced Certification documentation 	<ul style="list-style-type: none"> Consensus on a selection of designated laboratories. Sustained government commitment and funding available.
Component 4: Monitoring, learning, adaptive feedback, outreach, and evaluation						
Outcome 4: Monitoring, learning, adaptive feedback, outreach, and evaluation.	M&E and adaptive management applied to project in response to needs, mid-term evaluation findings with lessons learned extracted.	<ul style="list-style-type: none"> No Monitoring and Evaluation system No evaluation of project output and outcomes 	<ul style="list-style-type: none"> Monitoring and Evaluation system developed. Mid-term-evaluation of project output and outcomes conducted with lessons learnt at 30 months of implementation. 	<ul style="list-style-type: none"> Final evaluation report ready in the end of project 	<ul style="list-style-type: none"> Project document inception workshop report. Independent mid-term evaluation report. 	<ul style="list-style-type: none"> Availability of reference material and progress reports Cooperation of stakeholder agencies and other organizations.

Annex B. Total Budget and Work Plan

Award ID:	00081909				Project ID(s):			00091031			
Award Title:	Elimination of Obsolete Pesticide Stockpiles										
Business Unit:	ARM10										
Project Title:	“Elimination of obsolete pesticide stockpiles and addressing POPs contaminated sites within a sound chemicals management framework”										
PIMS no.	4905										
Implementing Partner (Executing Agency)	United Nations Development Program										
GEF Outcome/Atlas Activity	Responsible Party/Impl. Agent	Fund ID	Donor Name	Atlas Budgetary Account Code	ATLAS Budget Description	Amount 2015 (USD)	Amount 2016 (USD)	Amount 2017 (USD)	Amount 2018 (USD)	Total (USD)	See Budget Note:
Component 1: Capture and Containment of Obsolete Pesticide Stockpiles and Wastes	MNP	62000	GEF	71200	International consultants	19,500	25,000	0	0	44,500	1
				71300	Local consultants	10,000	15,000	10,000	0	35,000	2
				71400	Contr services-individuals	8,100	8,100	8,100	8,100	32,400	3
				72100	Contractual services - companies	215,000	234,000	75,000	0	524,000	4
				72200	Equipment&furniture	40,000	0	0	0	40,000	5
				73100	Rental&maint. Premices	1,500	1,500	1,500	1,500	6,000	6
				72300	Materials &goods	42,500	2,500	2,500	2,500	50,000	7
				72800	Information technology equipment	7,100	0	0	0	7,100	8
				74200	Audio visual&print. Production costs	2,000	0	0	0	2,000	9
				74500	Miscellaneous	1,000	1,000	1,000	1,000	4,000	10
					sub-total GEF	346,700	287,100	98,100	13,100	745,000	
					Total Outcome 1	346,700	287,100	98,100	13,100	745,000	
Component 2: Obsolete Pesticide Stockpile and Waste Elimination	MNP	62000	GEF	72100	Contractual services-companies	0	1,800,000	1,590,000	0	3,390,000	11
					Sub-total GEF	0	1,800,000	1,590,000	0	3,390,000	
					Total Outcome 2	0	1,800,000	1,590,000	0	3,390,000	

Component 3: Institutional and Regulatory Capacity Strengthening for Sound Chemicals Management and Contaminated Site	MNP	62000	GEF	71200	International consultants	0	13,500	13,500	0	27,000	12
				71300	Local consultants	0	10,000	10,000	10,000	30,000	13
				71400	Contractual services-individuals	8,100	8,100	8,100	8,100	32,400	14
				72100	Contractual services-companies	30,000	70,000	0	0	100,000	15
				72300	Materials&goods	0	0	40,000	0	40,000	16
				72500	Supplies	1,500	1,500	1,500	1,100	5,600	17
				74200	Audio visual&print. Production costs	1,250	1,250	1,250	1,250	5,000	18
					sub-total GEF	40,850	104,350	74,350	20,450	240,000	
					Total Outcome 3	40,850	104,350	74,350	20,450	240,000	
Component 4: Monitoring, learning, adaptive feedback, outreach, and evaluation	MNP	62000	GEF	71200	International consultants	0	20,000	0	20,000	40,000	19
				71400	Contractual services-individuals	4,500	4,500	4,500	4,500	18,000	20
				71600	Travel	2,500	2,500	2,500	2,500	10,000	21
				74100	Prof. services (Audit)	0	0	11,000	0	11,000	22
				75700	Workshops	5,000	3,000	3,000	10,000	21,000	23
					sub-total GEF	12,000	30,000	21,000	37,000	100,000	
					Total Outcome 4	12,000	30,000	21,000	37,000	100,000	

Project Management	MNP	62000	GEF	71400	Contractual services-individuals	24,000	24,000	24,000	24,000	96,000	24
				72400	Communications & Audio visual equipment (phone, fax, internet)	2,000	2,000	2,000	2,000	8,000	25
				73300	Rental&maint. of info tech. equipment	875	875	875	875	3,500	26
				74599	UNDP cost recovery chrgs-bills	29,375	29,375	29,375	29,375	117,500	27
					sub-total GEF	56,250	56,250	56,250	56,250	225,000	
	MNP	62000	UNDP	71200	International consultants	15,000	25,000	10,000	10,000	60,000	28
				71400	Contractual services-individuals	21,450	23,400	23,400	23,400	91,650	29
				71600	Travel	5,000	5,000	5,000	5,000	20,000	30
				73300	Rental&maint. of info tech. equipment	1,000	1,000	1,000	1,000	4,000	31
				74200	Audio visual&print. Production costs	5,150	4,800	4,800	4,800	19,550	32
				74500	Miscellaneous	1,200	1,200	1,200	1,200	4,800	33
					sub-total UNDP	48,800	60,400	45,400	45,400	200,000	
					Total Management	105,050	116,650	101,650	101,650	425,000	
PROJECT TOTAL (GEF only)						455,800	2,277,700	1,839,700	126,800	4,700,000	
PROJECT TOTAL (incl. UNDP)						504,600	2,338,100	1,885,100	172,200	4,900,000	

Budgetary notes:

1. Support site assessment, verification of Tender docs, supervision
2. Supporting public consultation for design, permitting and operational phases of Nubarashen site work, local EIA, local engineer – 467 working days x 75\$/day
3. Salary of Technical task leader - 39.5%
4. Constr. Services for sight assessment clean-up design, excavation, packaging and removal of pesticides, storage facility upgrading, op& safeguard training
5. Purchase of vehicle for project needs
6. Utility costs
7. Purchase of containers and monitoring eq.; vehicle maintenance costs
8. Office equipment: 4 work stations & 2 notebooks
9. Translations and promotional materials

10. Miscellaneous costs
11. Export and elimination of 900t Category 1 POPs and remediation of 7100 t of Category 2 POPs pesticides contaminated soil
12. To support with health risk assessment methodologies, and provision of TOT, elaboration of operational safety procedures 45working days x 600\$/day
13. Local experts 400 working days x 75 \$/day
14. Salary of Technical task leader - 39.5%
15. Technical and environmental Performance Assessment of incineration facility
16. Laboratory equipment
17. Office stationery
18. Printing and publication of project materials
19. Mid-term & final evaluation: Evaluation expert salary
20. Technical Task leader - Technical monitoring, evaluation and reporting - 21%
21. Monitoring visits to field sides
22. External financial Audit
23. Inception, final workshops, meetings of project and Advisory boards
24. Salary of Project Coordinator - 48 months x 2000 USD/month
25. Land phone charges postage and pouch costs
26. Internet connectivity
27. Direct Project service Costs
28. International Supervision, due diligence -100 working days x 600\$/day
29. Site visits, in-country missions
30. Internet connectivity
31. Translation costs
32. Translation costs
33. Sundry

Summary of funds (US\$)	Year 2015	Year 2016	Year 2017	Year 2018	Total
GEF	455,800	2,277,700	1,839,700	126,800	4,700,000
GEF Total	455,800	2,277,700	1,839,700	126,800	4,700,000
Gov-t of Armenia	6,000,000	4,000,000	3,020,000	3,000,000	16,020,000
UNDP	110,000	50,000	50,000	50,000	260,000
Private sector		1,320,000	1,320,000		2,640,000
Others	91,096	91,096	91,096	91,096	364,384
Co-finance Total	6,201,096	5,461,096	4,481,096	3,141,096	19,284,384
Grand Total	6,656,896	7,738,796	6,320,796	3,267,896	23,984,384

Annex C. Risk analysis

The overall risk rating attached to project is considered high.

Minor climate change risks may be associated with the project largely through fossil fuel consumption associated with its physical implementation including a significant materials handling and transportation element, and its use of high temperature incineration or other thermal or moderately high energy consumption processes for the treatment and destruction of POPs pesticides and wastes. However, these are small considering the future climate impact of these contaminants becoming more widely distributed in the environment and then much large volumes of contaminated material having to be captured and treated.

The following provides an overall risk matrix that identifies and rates specific risks identified and mitigation strategy adopted

Risk	Risk rating	Risk mitigation strategy
Lack of institutional cooperation between key stakeholders, particularly Ministry of Nature Protection, Ministry of Emergency Situations, Ministry of Agriculture and ministry of Health	Low	The project's preparation and implementation arrangements build upon the long positive working relationship between these key institutional stakeholders is addressing the POPs and OP issue in the country through a formally constituted Inter-Agency Commission. Additionally, a clear understanding and agreement exists respecting each institution's roles and responsibilities for various aspects of the project during implementation. The Project Board is a continuation of the above IAC mechanism with representation at a senior level from each will proactively ensure the resolution of operational issues as they appear.
Failure of the current framework for hazardous and chemicals waste to adequately and efficiently cover project activities and requirements	Low	In the PPG stage, it has been recognized that there are gaps in the present framework and this is the focus of specific key TA initiatives in Component 3 particularly in areas where requirements applicable to the handling, transportation, storage, treatment and disposal of HW are involved. For its part the project has adopted referenced international standards and guidelines in these areas. This will serve to pilot and inform national regulatory authorities in these areas through project implementation with the results that tested approaches applied by well-informed regulators and operators will develop.
In ability to export pure POPs pesticides and OPs	Moderate	As detailed in Section V above, the option to not exporting selected waste streams and retaining it in secure storage is provided for as a default option recognizing this substantially removes immediate and critical risks they currently pose and allow development of regional options that will likely become available in the medium term.
In ability to provide for cost effective treatment of highly contaminated soil (Category 2 materials) in an environmental sound manner.	Moderate	The stepwise process of tendering and having pilot out of country demonstration of capability of candidate technologies ensures that technical and environmental performance requirements to remediate soil below the SC low POPs content will be determined prior to large scale commitment of resources. A fall back is available for treatment in export facilities subject to the above. In the event this is unachievable the default option

Risk	Risk rating	Risk mitigation strategy
		of secure containment will be exercised.
Environmental damage resulting from delay or non-completion of Nubarashen site clean-up, stabilization residual containment and restoration	High	The step by step process that restricts excavation and removal and provides for interim containment of contaminated material mitigates operation period impacts. The further constraint of not starting a specific step in the process until resources to complete it is provided had been imposed.

The specific political, technical and financial risks noted above associated with issues such as allowance of waste export, feasibility of in-country application of treatment technologies, environmental risks associated with partially completed excavation and removal; and interruption of co-financing required to pay for committed activities are further discussed in Section V.

The project will be monitored and evaluated on a regular basis according to applicable GEF and UNDP procedures for results-based management. An annual reporting exercise in the form of the project implementation review (PIR) will take place, where the project will be tracked for progress against the relevant performance indicators, evaluated for progress made towards development results, and assessed with regard to its degree of adaptive management and its flexibility to respond to changing circumstances.

Annex D. Agreements and Letters of Support

Attached separately to the submission package

Annex E. Terms of Reference of Key Project Personnel

Key technical TORs will be discussed at the Project Inception Workshop for approval, and then be prepared for formulation and advertisement to establish the project management team.

1. Project coordinator

Scope of work:

Under the overall guidance of UNDP environmental governance Portfolio Analyst and direct supervision of the Programme Policy Adviser, the Project Coordinator (PC) will be recruited with the authority to run the project technical and operational activities on a day-to-day basis. PCs prime responsibility is to ensure that the project produces the results specified in the project document, to the required standard of quality and within the specified constraints of time and cost. Project team of national and international consultants will support coordinator in implementing project activities.

I. DUTIES AND RESPONSIBILITIES:

- *To support in developing detailed project work plan and relevant activities as per the outputs; ensure efficient and timely implementation of those activities;*
- *To provide substantive support in identifying and recruiting the competent staff and subcontractors, formulate task's technical specifications, organize and participate in the selection processes;*
- *To monitor and analyze the adequacy and content of the technical reports and project deliverables to achieve the project outcomes/outputs;*
- *To provide substantive support in the development of the project monitoring plan in line with the requirements indicated in the project document; support in developing TOR for mid-term and final evaluation;*
- *To prepare quarterly, semi-annual and annual progress reports in line with the project requirements for UNDP and the GEF, implementing partner, advisory board; Ensure provision of information for Atlas reporting (logs) on permanent basis;*
- *To liaise with the Government, regional and local authorities, relevant civil society organizations, international partners to ensure participatory approach along the implementation process for achievement of project objectives;*
- *To provide technical backstopping and guidance to the national team of experts and subcontractors; Lead, supervise, and monitor technical expert's team work, ensure timely delivery of outputs and conduct their performance appraisal;*
- *To manage financial input delivery as per AWP document, develop financial reports; proceed with payments;*
- *To coordinate the development of networking and information system activities relevant to the project implementation in the scope of related donor-funded activities;*

- *To prepare briefing and informative notes, meeting agendas, background papers and presentations in close cooperation with the Policy Adviser;*
- *To ensure maintenance and update of the project office inventory records in line with UNDP rules and regulations;*
- *To develop project terminal report;*
- *To perform other duties as required.*

II. REQUIRED QUALIFICATIONS:

I. EDUCATION:

Advanced University Degree in waste management, chemical engineering, natural resource management and other relevant discipline. A relevant university degree in combination with qualifying experience in the area may be accepted in lieu of the advanced university degree.

II. EXPERIENCE:

Minimum of 5 years of related working experience in project implementation and management is required. Experience and good knowledge of the national waste/chemicals management agenda. Demonstrated ability in co-operating with different stakeholders at all levels, such as government officials, scientific institutions, NGOs, private sector and international financing institutions. Prior relevant experience with UNDP funded projects can be an asset.

III. SKILLS:

Strong interpersonal skills with ability to establish and maintain effective work relationships with people of different social and cultural backgrounds. Strong managerial skills, excellent coordination and collaboration skills, proven ability to work under time pressure and handle multiple activities and tasks concurrently.

Proven knowledge of communication tools, excellent writing skills, track record with producing high quality research/analytical reports and papers. Ability to express ideas clearly in both verbally and in writing. Ability to work independently and to participate effectively in a team based information sharing.

Good computer literacy, knowledge of MS office software and web based applications. Fluency in Armenian and English is required.

2. Project assistant

Scope of Work

Under the overall guidance and supervision of Project Coordinator, the Project Assistant will provide support for implementation of tasks associated with the day-to-day management and operation of the project. S/he will be responsible for operational, administrative and financial project management support functions.

I. DUTIES AND RESPONSIBILITIES:

- *To support the Project Coordinator and Technical Task Leader in planning, daily implementation and monitoring of annual work plan activities;*
- *To support the project in liaising with Government entities and other stakeholders on consultations, providing information related to the expected project outputs;*
- *To assist in preparation of quarterly and annual progress reports as per the requirements to UNDP, Government and donor entity, briefing notes, outcome board materials; Maintain Atlas logs on a quarterly basis;*
- *To assist the project experts' team through information dissemination, technical backstopping, report preparation, translations. To assist in drafting information for web-pages and ensure regular updates;*
- *To support project management during the audits and evaluations;*
- *To assume administrative responsibility for organization of seminars, press conferences, workshops, advisory board meeting and other public campaign. Draft agendas; prepare leaflets, information note, press releases for media and stakeholders;*
- *To maintain properly records, necessary documents on project activities, communication and transactions. Keep appropriate the filing system;*
- *To draft correspondence relating to assigned project areas; clarifies, follows up, responds to requests for information, ensuring e proper communication and information exchange within the Project Team;*
- *To ensure accurate observance of administrative rules, regulations and procedures within the framework of Project and in line with UNDP SOPs for SC/IC/Procurement/Finance;*
- *Make all necessary arrangements for procurement/recruitment within the framework of the project. Support in preparation of procurement /recruitment plans, selection notes, and expert evaluation documents;*
- *To make logistical arrangements for missions and expert's visits, prepares briefing kits and background materials;*

- *To take notes and draft minutes of working meetings, workshops, advisory board meetings, etc.*
- *To support with translation of relevant communication, information notes, short reports, etc.;*
- *To maintain updated inventory of the Project's equipment, e.g. machinery, electrical, furniture, miscellaneous. Participates in Physical verification process;*
- *To maintain accurate records of leave taken and due for all Project personnel;*
- *To assist the Project Coordinator in preparation of AWP, to prepare first draft budget revisions and drafts monthly, quarterly and annual financial reports for the project;*
- *To develop request for payments, to ensure smooth financial operation of AWP activities as a whole and follows up on all financial transactions;*
- *To maintain financial records, monitors and reconciles expenditures, balances, payments, statements, other data for day-to-day transactions and reports, prepares requisitions;*

II. REQUIRED QUALIFICATIONS:

***Education:** University degree in social, natural sciences, business administration, economics, other related disciplines.*

***Experience:** Minimum 3 (three) years of relevant administrative experience is required, preferably with International organizations/Embassies. Prior relevant experience with UNDP and/or EU funded and implemented projects will be an asset.*

Competencies and skills:

Strong interpersonal skills with ability to establish and maintain effective work relationships with people of different social and cultural background. Ability to work under time pressure and handle multiple activities. Ability to work independently and to participate effectively in a team based information sharing.

Proven knowledge of communication tools, excellent writing skills. Experience in the usage of computers, office software packages (MS Word, Excel, etc) and office equipment; knowledge of spreadsheet and database packages, experience in handling of web based management systems is an asset.

Fluency in English, Armenian. Knowledge of Russian is an asset.

Annex F. UNDP Environmental and Social Screening Report

Attached separately to the submission package in PDF format

Annex G. Letter of Agreement on Direct Project Services

Attached separately to the submission package. For details on the estimated Direct Project Costs please refer to the TBWP table, and the Project Management Section in particular.

Annex H. GEF POPs tracking tool

Attached separately to the submission package in Excel format

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