REQUEST FOR CEO ENDORSEMENT

PROJECT TYPE: Full-sized Project
TYPE OF TRUST FUND:GEF Trust Fund

For more information about GEF, visit TheGEF.org

PART I: PROJECT INFORMATION

Project Title: Removal of Technical and Economic Barriers to Initiating the Clean-up Activities for Alpha-HCH, Beta-HCH and Lindane Contaminated Sites at OHIS			
Country(ies):	The Former Yugoslav Republic of Macedonia	GEF Project ID:[1]	4385
GEF Agency(ies):	UNIDO (select) (select)	GEF Agency Project ID:	100109 for PPG and 100122
Other Executing Partner(s):	Ministry of Environment and Physical Plannig	Submission Date:	12/09/2014
GEF Focal Area (s):	Persistent Organic Pollutants	Project Duration(Months)	60
Name of Parent Program (if applicable): ➢ For SFM/REDD+ ☐ ➢ For SGP ☐ ➢ For PPP ☐		Project Agency Fee ($):	294,500

A. FOCAL AREA STRATEGY FRAMEWORK[2]

Focal Area Objectives	Expected FA Outcomes	Expected FA Outputs	Trust Fund	Grant Amount ($)	Cofinancing ($)
(select) CHEM-1	Outcome 1.4 POPs waste prevented, managed, and disposed of, and POPs contaminated sites managed in an environmentally sound manner.	Output 1.4.2 "Countries receiving GEF support for environmentally sound management of obsolete pesticides including POPs"	GEF TF	3,100,000	12,450,000
(select) (select)			(select)		
(select) (select)			(select)		
(select) (select)			(select)		
(select) (select)			(select)		
(select) (select)			(select)		
(select) (select)			(select)		
(select) (select)			(select)		
		Total project costs		3,100,000	12,450,000

B. PROJECT FRAMEWORK

[1] Project ID number will be assigned by GEFSEC.
[2] Refer to the Focal Area Results Framework and LDCF/SCCF Framework when completing Table A.

Project Objective: The project objective is to set up a sustainable mechanism to ensure a sustainable clean up operation at the selected HCH contaminated site for future industrial use, and to protect human health and the environment from their adverse effects by reducing and eliminating the releases of and exposure to HCHs (6,000 m^3 or 10,700 tons to be disposed of within the project period).

Project Component	Grant Type	Expected Outcomes	Expected Outputs	Trust Fund	Grant Amount ($)	Confirmed Co-financing ($)
Legal framework and institutional capacities	TA	1. Legal framework and institutional capacities to support, justify and evaluate the clean-up of the OHIS site contaminated by alpha-HCH, beta-HCH and lindane established, enhanced and enforced	1.1: Legal acts and institutional and technical tools prepared to ensure the completion of the OHIS site clean up operations and building capacities towards contaminated sites management in general 1.2: Technical tools (guidelines, procedures, instructions) for contaminated site management prepared and approved 1.3: Environmental officers, contaminated site owners and the potential contaminated site clean up operators trained on practical usage of the prepared guidelines, procedures and instructions 1.4: Laboratory personnel trained for sampling and analyses standards and protocols for POPs/HCH	GEF TF	123,500	24,150
Characterization of the site and risk assessment	TA	2. Characterization of the HCH contaminated site completed, risk assessed and risk management options defined	2.1: Site characterization, i.e. detailed site investigation completed 2.2: Survey of groundwater for drinking and irrigation purposes conducted 2.3: The current risk assessment analyses updated and the risk management options defined	GEF TF	110,300	1,761,100
Clean up strategies and plan	TA	3. Contaminated site clean up plan and strategies established and key stakeholders including local communities ready to cooperate	3.1: Contaminated site clean up operation/remediation plan and groundwater management plan prepared for prevention of further contamination and adverse human health impact 3.2: Consensus among the general public and major stakeholders built for the establishment/ improvement of the OHIS contaminated site 3.3: City development plan and zoning of the OHIS site reviewed and revised	GEF TF	73,300	1,003,900
Establishment of clean up mechanism	Inv	4. Clean up operation initiated and the	4.1: ToR for the selection of the technical service providers for the HCH	GEF TF	2,514,800	8,956,750

and operations		execution mechanism in place to sustain the clean up operations beyond the project period	contaminated site remediation prepared 4.2: Technical service providers selected 4.3: Parties (private sectors, state owned companies or PPP contractual agreement form) interested as potential operators identified and investors as potential clean up operators consulted 4.4: Operating entity selected and established 4.5: Clean up operation/remediation and business plan prepared by the selected operating entity in consultation with the technical providers and all stakeholders and approved by the PSC 4.6: Needed permits for the technology treatment installation (EIA, IPPC) obtained 4.7: A monitoring program, system established at the location 4.8: Clean up operation executed (6,000 m^3 or 10,700 tons to be disposed of)			
Project monitoring and evaluation	TA	5. Project management structure established, and monitoring and evaluation conducted	5.1: Project results monitored and reported 5.2: Project implementation evaluated meeting the GEF's evaluation criteria	GEF TF	78,100	9,600
			Subtotal		2,900,000	11,755,500
			Project management Cost (PMC)[3]	GEF TF	200,000	694,500
			Total project costs		3,100,000	12,450,000

C. SOURCES OF CONFIRMED COFINANCING FOR THE PROJECT BY SOURCE AND BY NAME ($)

Please include letters confirming cofinancing for the project with this form

Sources of Co-financing	Name of Co-financier (source)	Type of Cofinancing	Cofinancing Amount ($)
National Government	Ministry of Environment and Physical Planning	Cash	6,275,000
National Government	Ministry of Environment and Physical Planning	In-kind	6,125,000
GEF Agency	UNIDO	Cash	50,000
(select)		(select)	

[3] PMC should be charged proportionately to focal areas based on focal area project grant amount in Table D below.

(select)		(select)	
(select)		(select)	
(select)		(select)	
(select)		(select)	
(select)		(select)	
Total Co-financing			12,450,000

D. TRUST FUND RESOURCES REQUESTED BY AGENCY, FOCAL AREA AND COUNTRY[1]

GEF Agency	Type of Trust Fund	Focal Area	Country Name/ Global	(in $)		
				Grant Amount (a)	Agency Fee (b)[2]	Total c=a+b
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
Total Grant Resources				0	0	0

[1] In case of a single focal area, single country, single GEF Agency project, and single trust fund project, no need to provide information for this table. PMC amount from Table B should be included proportionately to the focal area amount in this table.
[2] Indicate fees related to this project.

F. CONSULTANTS WORKING FOR TECHNICAL ASSISTANCE COMPONENTS:

Component	Grant Amount ($)	Cofinancing ($)	Project Total ($)
International Consultants	172,000	0	172,000
National/Local Consultants	245,900	46,000	291,900

G. DOES THE PROJECT INCLUDE A "NON-GRANT" INSTRUMENT? No

(If non-grant instruments are used, provide in Annex D an indicative calendar of expected reflows to your Agency and to the GEF/LDCF/SCCF/NPIF Trust Fund).

PART II: PROJECT JUSTIFICATION

A. DESCRIBE ANY CHANGES IN ALIGNMENT WITH THE PROJECT DESIGN OF THE ORIGINAL PIF[4]

1. The information presented in this document builds on the one provided in the approved PIF. Minor amendments have been made to further strengthen and elaborate certain components. The main alteration from the original PIF is the reduction of the quantities for the remediation from 13,000 m^3 to 6,000 m^3. In the initial calculation for the purposes of the PIF preparation, only the low contaminated soil (2 -1,000 ppm) was taken in consideration for the remediation by using on-site technology. Consequently, it was decided first to remediate to the delta-HCH dump, for which the price of the remediation increased since its contamination is mixed (up to 800,000 ppm), i.e. the costs for applying relevant technologies are higher than those initially foreseen for the treatment of the low contaminated soil, and therefore resulting in reduction of the volumes that are to be remediated.

[4] For questions A.1 –A.7 in Part II, if there are no changes since PIF and if not specifically requested in the review sheet at PIF stage, then no need to respond, please enter "NA" after the respective question.

A.1 National strategies and plans or reports and assessments under relevant conventions, if applicable, i.e. NAPAS, NAPs, NBSAPs, national communications, TNAs, NCSA, NIPs, PRSPs, NPFE, Biennial Update Reports, etc.

2. The Former Yugoslav Republic of Macedonia ratified the Stockholm Convention on the 27th of May 2004 and as the first step towards meeting the obligations under the Convention was the development and formulation of the National Implementation Plan (NIP). The NIP was prepared and transmitted to the Stockholm Convention Secretariat on the 9th of February 2005.

3. To address the problem of the HCH technical waste was identified as one of the highest priorities set in the first **National Implementation Plan** that was prepared under the UNIDO/GEF project (GEF ID: 1518) "Enabling Activities to Facilitate Early Action on the Implementation of the Stockholm Convention on Persistent Organic Pollutants (POPs)".

4. Although at that time HCH was not yet included in the list of POPs chemicals, it was included in the strategic planning, due to the existing quantities of industrial waste containing technical mixture of HCH isomers in the Former Yugoslav Republic of Macdonia. The initial NIP identified the following priorities relevant to the POPs contaminated sites issue:

   - Inventory of "hot spots";
   - PCB/OCP containing waste management;
   - Preparation of new and amendment of existing legislation;
   - Monitoring of POPs;
   - Public awareness and education;
   - Control of HCH.

5. For addressing the identified country-specific objectives and priorities, specific action plans (see Annex 2) related to the remediation of the POPs contaminated sites were developed as necessary to meet the requirements of the Stockholm Convention.

6. The recently revised National Implementation Plan on POPs listed the HCH contamination at OHIS site as one of the highest priorities in the field of POPs management. NIP foresees several action plans related to the management of POPs contaminated sites:

   a. Clean-up and remediation of contaminated locations with POPs including their ultimate disposal (NIP/ Action plan 15.7) is mostly addressed to the remediation of the lindane-HCH production and storage site at OHIS;
   b. Establishment of National laboratory for monitoring and analysis of the POPs (NIP/Action plan 15.10);
   c. Establishment of a system for Eco-Bio Monitoring (NIP /Action plan 15.9) proposed activities related to strengthening the capacity of health and laboratory organizations to assess and monitor the effects of POPs on human health and the environment;
   d. Raising awareness and capacity building of all stakeholders about the potential risk of product, processes and chemicals containing POPs on human health and the environment (NIP/ Action plan 15.2);
   e. Raising awareness and strengthening capacities to control the POPs emissions from the industry (NIP/ Action plan 15.2a).

7. **National Waste Management Strategy** adopted in 2008 (Official Gazette of RM No. 29/08), reflects the national policy in the area of the waste management and represents the basis for preparation and implementation of the integrative system of waste management that will be effective according to the costs. With this strategic document, the Former Yugoslav Republic of Macedonia defines the fundamental direction in the area of the waste management in the following period of 12 years (2008-2020), on the basis of the acknowledgement that inadequate waste management, today and in the past, generate serious consequences to the environment and nature and determined the basic directions for graduated establishment of the system for waste management.

8. The following action plans, with prescribed measures and actions for accomplishing the Waste Management Strategy objectives related to the hazardous waste disposal and contaminated site remediation, are planned to be undertaken:

- Designing of facilities and landfills for hazardous wastes;
- Construction/Management of facilities and landfill for hazardous wastes;
- Remediation of hotspots.

9. In the frame of the **CARDS 2001 project** (Community Assistance for Reconstruction, Development and Stabilisation) for development of the National Waste Management Plan with Feasibility Studies, 16 Industrial Contaminated Sites - "hotspots" were identified and ranked according to environmental indicators. The OHIS Chemical Industry site was ranked as number one priority for the remediation.

Table 1: Identified hotspots in Macedonia

Nr.	Site ('hotspot')	Municipality	Status of operation	Environmental Liability
1.	OHIS Chemical Industry	Skopje	Abandoned, partly operational	Macedonia /OHIS
2.	Silmak Ferro/Silicium Smelter (former HEK Jugochrom)	Jegunovce	Dumpsite closed	Arbitrary
3.	MHK Zletovo Lead/zinc Smelter	Veles	Closed (2 yrs)	Due diligence
4.	Lojane Chromium/antimony Mine	Lojane	Abandoned (30 yrs)	Macedonia
5.	Toranica Lead/zinc Mine	Kriva Palanka	Closed (>5 yrs)	Macedonia
6.	Zletovo Lead/zinc Mine	Probistip	Closed (3 yrs)	Macedonia
7.	Sasa Lead/zinc Mine	Makedonska Kamenica	Closed (3 yrs)	Macedonia
8.	Bucim Copper Mine	Radovis	Operational	Arbitrary
9.	REK Bitola (lignite mine/power plant)	Bitola	Operational	REK Bitola
10.	REK Oslomej (lignite mine/power plant)	Kicevo	Operational	REK Oslomej
11.	Makstil Steelworks	Skopje	Operational	Makstil
12.	OKTA (petroleum refinery)	Skopje	Operational	OKTA
13.	Tane Caleski (metal products)	Kicevo	Closed (3 yrs)	Macedonia
14.	MHK Zletovo Fertilizer Plant	Veles	Closed (2 yrs)	Macedonia
15.	Godel Tannery	Skopje	Closed (5 yrs)	Macedonia
16.	Feni Industry (ferro-nickel alloys)	Kavadarci	Operational	Feni industry

Box A1.1: Hot spots remedial actions/Air pollution

According to the available information some of the remedial actions performed in Macedonia were implemented as emergency, temporary solutions for some of the high risk sites.

Some examples include the Lojane mine, where part of the dump site was capped with clay soil, and the Silmak site, where a dumpsite with material contaminated with hexavalent chromium was capped and a surface water monitoring system was built around the place. The monitoring system is operational, however, however only basic parameters are monitored and not the pollutants of concern.

Therefore, further work is needed to successfully complete the remedial or preventive comprehensive measures with

increased focus on supervision and post-remedial monitoring.

Macedonia also faces problem of the high dustiness (PM_{10} limits are exceeded especially in winter). Part of the pollution originates in resuspension of dust from unsecured active or abandoned mining activities (e.g. smelter in Veles, abandoned mining site and smelter in Lojane, Bucim copper mine, metallurgical complex for ferro-nickel alloys and open coal mines) or other environmental hotspots (e.g. OHIS chemical plant near Skopje). Such a dust is also contaminated by heavy metals and organic pollutants (lindane) respectively.

10. A **National Waste Management Plan** (for the period 2008 – 2014) was prepared in 2005 and adopted in 2006, giving the basics for future waste management activities, setting the strategic objectives and specifying the short term actions / measures.

11. The **Strategic Approach into International Chemical Management (SAICM)** project (2008-2010) resulted in the preparation of the National Action Plan for SAICM implementation. This document identifies national priorities in the area of chemical management, among which elimination and soil remediation restoration of the historical waste Lindane (HCH) at the OHIS plant and elimination of mercury containing waste and complete remediation of the OHIS plant, and defines action plans addressing these prioritiesnvironment, as well as remediation of contaminated soil.

A.2. GEF focal area and/or fund(s) strategies, eligibility criteria and priorities.

12. The proposed project is responding to the GEF-5 Strategy for Chemicals approved on the Council meeting, in November 2010. The GEF-5 strategy follows the recommendation of COP which at its fourth meeting in May 2009 reaffirmed the central guiding principle that the GEF should "take into account the priorities identified by Parties in their implementation plans transmitted to the Conference of the Parties". The project is in consistency with CHEM-1 of the GEF-5 Strategy "Phase out POPs and reduce POPs releases", Outcome 1.4 "POPs waste prevented, managed, and disposed of, and POPs contaminated sites managed in an environmentally sound manner", and Output 1.4.2 "Countries receiving GEF support for environmentally sound management of obsolete pesticides including POPs".

A.3 The GEF Agency's comparative advantage:

13. UNIDO plays a leading role in the implementation of the Stockholm Convention on POPs, assisting developing countries and transition economies to meet their obligations to the Convention. UNIDO as part of its thematic priority on environmental management, recognizes the relationship between poverty and the potential exposure to toxic substances, pollutants and wastes and that eliminating the health and environmental impacts of POPs leads to a sustained and more equitable economic development. UNIDO has carried out projects to establish the ESM of POPs which is the UNIDO's comparative advantage. In addition, UNIDO has accumulated extensive experiences in environmentally sound management of PCBs in the Eastern European and Balkan Region. Moreover, UNIDO also developed its contaminated site approach which can be applied to this particular project.

14. UNIDO also has experience in investment promotion, which is a component in many UNIDO projects and is important for the present project as well. This experience will assist to raise the required co-financing and strengthen the local private sector in hazardous waste management. UNIDO is fully supported by the relevant Ministries and its project office in Macedonia established for the on-going PCB and NIP update projects which were implemented by UNIDO and thus, safeguards the successful implementation of the project.

15. UNIDO is promoting inclusive and sustainable industrial development (ISID) in which the following objectives are set (1) every country achieves a higher level of industrialization in their economies, and benefits from the globalization of markets for industrial goods and services; (2) No one is left behind in benefiting from industrial growth, and prosperity is shared among women and men in all countries; (3) Broader economic and social growth is supported within an environmentally sustainable framework; (4) Unique knowledge and resources are combined of all relevant development actors to maximize the development impact of ISID. This project will aim at developing an environmental sector in the area of contaminated soil management delivering UNIDO's services to help achieve ISID.

A.4. The baseline project and the problem that it seeks to address:

16. During the PPG phase, a baseline analysis, i.e. the current contaminated sites management practices in the country were assessed by evaluation of the regulatory and insitutional framework, technical capacities (including the analytical and research capacities, the previous HCH-dump site investigation and studies, storage and disposal facilities in the country as well as the transportation issue). Other aspects that were taken into consideration include the public participation in the decission making process and their awareness of the ecological problems, especially the ones with the OHIS contaminated site.

17. As a result of these analyses, a number of barriers for sound management of the contaminated sites have been identified. Corresponding corrective measures and activities proposed in order to ensure successful execution and achievement of project objectives have also been articulated. See Annex C for more details about the activities performed in the PPG phase.

A.4/I. BASELINE ANALYSES

A.4/I.a Regulatory Framework

18. During the PPG phase, lack of regulation related to the contaminated site, i.e. hot spot management was identified. In order to meet the country's obligations under the Stockholm Convention, the Ministry of Environment and Physical Planning (MoEPP) has adopted several legislative acts regulating the contaminated site management.

Box A4.1: Legislative acts

In 2003, the country started the harmonisation of the national environmental legislation with the EU legislation. Five basic laws (Law on Environment Protection, Law on Waste Management, Law on Waters, Law on Nature and Law on Ambient Air Quality) and several sub-laws (Integrated Pollution Prevention and Control (IPPC) Decree for determining the installations for which an integrated permit is required and time schedule for submission of the adjustment plans; IPPC Ordinance regulating the procedure for an integrated environmental permit; Regulation on Transportation; Recording and Reporting on Wastes; List of Wastes) were prepared. The main aspects are the enforcement of polluter-pays principle, state of the environment, mitigation measures for new projects, site inspection and mitigation measures in the process of IPPC permitting and obligation for further monitoring of the environment, obligation under environmental liability legislation, risks of accidents, obligation during the decommissioning of the installation and after - care obligations. All above mentioned laws and sub-legislation refer completely or to some extent to municipal and hazardous waste management, but none of them directly mentions or regulates "industrial hotspots", i.e. contaminated sites (see Annex 3 for more details).

A.4/I .b Institutional Framework

19. Institutional framework, legal responsibilities and competencies for the activities in the field of waste management in the Former Yugoslav Republic of Macedonia are defined by the relevant legislation, environmental strategic documents and other relevant strategic documents.

20. The NIP binds the commitment of several ministries in addressing the issue of contaminated sites, in particular: the Ministry of Environment and Physical Planning (MoEPP), Ministry of Health, Ministry of Agriculture, Forestry and Water Economy, Ministry of Finance, Ministry of Economy (see Annex 4 for more details).

Box A4.2: Institutional infrastructure

There is a department within MoEPP, POPs Unit, responsible for designing and realization of projects related to the Stockholm Convention implementation.

In Macedonia, there is no permanent inter-governmental or inter-institutional coordination bodies established for the coordination of contaminated sites management. Generally, when some specific project is intended to be carried out, inter governmental and or/inter institutional working groups are established and authorized.

In Macedonia, the organizations responsible for the inspection of remedial work, for deciding if the remediation reaches

the required limits and if the remediation has been completed are the state inspectorates.

Despite the existence of several state level inspectorates (inspectorate for industry/mining, geological inspectorate for geological examination, mine inspectorate for mining activities, agro inspectorate for agricultural land) the degree of remediation of already treated hotspots has not been checked quantitatively by authorities in the previous interventions.

21. During the PPG phase, a training event for policy-makers, policy implementers, and private sector was organized as an initial step in generating private sector interests in the OHIS remediation efforts. The training aimed to: present real-life examples of private sector investment in socially responsible initiatives; obtain insight in the benefits and pressures that motivate companies to invest in socially responsible initiatives; elaborate the regulatory environment for investment in socially responsible initiatives, in public benefit projects, or in public-private partnerships; present existing incentive mechanisms; discuss their shortcomings and the unaddressed needs of the private sector in this regard; present the regulatory and policy developments in Europe.

A.4/I .c Technical Capacities

A.4/I.c1 Analytical and research capacities

22. Laboratories working with environmental media and biological matrices samplings and analysis need to have accreditations by the Accreditation Body of Macedonia according to MKS EN ISO/IEC 17025:2006 standard (see Annex 5 for the overview of the analytical capacities in the country).

23. In addition, a certification system is in place in Macedonia for companies that perform the site investigation, design or implementation of the remedial projects and legal requirements that the companies must fulfil for the realization of drilling and other geological works. There is a methodology for authorising consultants for appraisal of value of goods, environmental damage and environmental impact assessment (EIA). The accreditation is obtained through education and exams.

Box A4.3: Accreditation system

During the PPG phase it was noted that in the Former Yugoslav Republic of Macedonia, POPs analysis is conducted by accredited and authorised organisations. Systematic control of defined matrices is authorised by responsible ministries, while accreditation of organisations carries out the Accreditation Board of Macedonia, in accordance with MKS EN ISO/IEC 17025:2006 standard. Information on the laboratories and their accreditation status are available from the official website of the Accreditation Board of Macedonia.

24. Exposure to POPs and related human health impacts have never been systematically monitored and comprehensively studied in Macedonia. Research-development programmes in the field of POPs are sporadic, leading to the conclusion that Macedonia is not integrally solving the problem of POPs. There are research teams ofscientists and experts in Macedonia that partially address the considered problem within their research activities, but there are no projects and research teams which are specialised to address problems of POPs.

Table 2: Research studies

Research studies	Findings
Institute of Pathology at the Faculty of Medicine	Many research studies were undertaken in the Institute of Pathology at the Faculty of Medicine on fetal and placenta tissue. It could be relevant and useful for further investigation regarding POPs chemicals. Some of the results led to the assumption that many of the congenital malformations detected in the area of Skopje, could be connected with the possible contamination of the environment with PCBs and some other POPs chemicals. In the last 15 years (1988-2002), there was a significant increase in the mid 90's with a trend of slight decrease in the last 5 years in the number of congenital malformations.
Paediatric Clinic	The scientific study conducted by the Pediatric clinic, at the State University Hospital in Skopje investigated the premature puberty development of young Macedonian girls. Tha analysis showed the elevated levels of Lindane in the blood serum of the examined group, but unexpectedly much higher levels were detected in the control group. There were not differences between rural and urban population.

MONET	The Former Yugoslav Republic of Macedonia was involved in the regional monitoring introduction project carried out by the countries of the region. The main objective of this monitoring program was to evaluate whether the POPs actually were reduced or eliminated, which means that information on environmental levels of the chemicals categorized as POPs should enable detection of trends over time. The evaluation focused on the substances listed in the Annexes of the Stockholm Convention, on the information available on some new POPs (hexachlorocyclohexanes, pentachlorobenzene) and on regionally very relevant pollutants such as polycyclic aromatic hydrocarbons (PAHs), which are also on the list of pollutants of the UN ECE Convention on Long-Range Transboundary Air Pollution (CRLTAP) which practically covers the entire Central and Eastern European region. The results on all isomers of hexachlorocyclohexane (α, β, γ, δ-HCH) obtained in a study are given below in Table 3. It shows that extremely high levels were detected in Skopje, particularly close to the OHIS factory. The average value at this spot was 297.2 ng/filter, which is close to 3 ng/m^3 and is among the highest in the region.

Table 3: Statistical data for HCH concentrations in 4 passive samplers in 6 measurement stations 2007[5]

Measurement station/ HCH	MIN (ng filter^{-1})	MAX (ng filter^{-1})	Average (ng filter^{-1})	MEDIAN (ng filter^{-1})
Lazaropole	8.3	10.9	9.9	10.2
Skopje-Ohis	219.2	343.5	297.2	313.1
Skopje-rektorat	119.5	284.3	170.3	138.6
Refinery	16.4	19.3	17.9	17.9
Bitola	12.1	19.4	16.2	16.7
Strumica	13.7	21.5	16.9	16.2

Table 4: The averages and standard deviations of the total atmospheric concentrations of the analyzed semi volatile organic compounds (SVOCs) at six sampling locations during the period 14 May 2003 - September 2007[6]

Location	PAHs (ng/m^3)	PCBs (pg/m^3)	HCHs[a] (pg/m^3)	DDTs[b] (pg/m^3)	HCB (pg/m^3)	PeCB (pg/m^3)
Lazaropole	11.38 ± 4.67	23.91 ± 5.87	100.99 ± 11.4	35.91 ± 11.94	45.66 ± 2.81	9.69 ± 2.43
Skopje-OHIS	46.19 ± 1.44	256.62 ± 28.05	3033.16 ± 552.6	153.83 ± 37.56	34.18 ± 1.32	8.16 ± 1.86
Skopje-MEPP	123.33 ± 14.00	277.54 ± 21.10	1737.23 ± 797.1	245.66 ± 10.85	51.02 ± 11.21	10.46 ± 2.93
Bujkovci	20.33 ± 0.69	174.48 ± 12.53	182.37 ± 14.7	125.51 ± 15.07	36.99 ± 7.70	11.22 ± 1.86
Bitola	24.75 ± 11.20	74.21 ± 8.72	165.54 ± 31.0	206.38 ± 4.88	41.07 ± 9.69	10.97 ± 2.26
Strumica	15.53 ± 2.57	75.73 ± 14.26	172.17 ± 36.7	106.11 ± 46.03	34.95 ± 4.67	8.67 ± 2.43

[a] The total content of α-, β-, γ- and δ-HCH
[b] The total content of *o,p'*- and *p,p'*-isomers of DDT, DDD and DDE

[5] Holoubek, I., Klánová, J., Kočan, A., Čupr, P., Dudarev, A., Boruvková, J., Chromá, K. (2008), Global Monitoring Plan for Persistent Organic Pollutants Under the Stockholm Convention Article 16 on Effectiveness Evaluation. First Regional Monitoring Report Central and Eastern European and Central Asian Region: 283

[6] Stafilov, T., Škrbić, B., Klánová, J., Čupr, P., Holoubek, I., Kočov, M. and Đurišić-Mladenović, N. (2011), Chemometric assessment of the semivolatile organic contaminants content in the atmosphere of the selected sites in the Republic of Macedonia. J. Chemometrics, 25: 262–274. doi: 10.1002/cem.1374

The Department of Environmental Protection from the Commonwealth of Massachusetts in 1995 set the Allowable Ambient Limit (annual average) of Lindane as 0.003µg/m^3

Box A4.4: Exposure limit values

In the Netherlands, Germany, Denmark, and the USA (ACGIH, NIOSH, OSHA), the current occupational exposure limit is 0.5 mg/m^3. Having in mind that in the Former Yugoslav Republic of Macedonia there are no exposure and ambient air limit values for the HCH isomers, the concentration of Lindane in the ambient air at OHIS site exceeds the ambient air limit values from the Department of Environmental Protection from the Commonwealth of Massachusetts.

A.4/I.c2 Previous site investigations and studies

25. The Government of the Former Yugoslav Republic of Macedonia has undertaken several steps in the process of finding proper solution for this dump site. A number of feasibility studies were developed, separate on-site investigations and laboratory analysis were conducted and most of them with a substantial assistance from the international community- Czech and Italian Governments. In the last 14 years several studies were conducted with a purpose to identify the real situation and found the most applicable solution (see Annex 6 for more details).

26. As a summary of all these studies, the following could be concluded:

Lindane production plant

27. The industrial chemical plant OHIS AD is located at the south-eastern edge of the city of Skopje near the Vardar River (See Annex 7). The lindane complex in OHIS AD – Skopje had the plants HCH, lindane and TCB, where HCH, lindane, thrichlorobenzene and hydrochloric acid were produced, respectively. The lindane process was gradually developed into full operation since 1964 and was functioning until 1977, when it was abandoned and ceased to function due to ecological reasons and change in market conditions.

Box A4.5: Lindane production

In the HCH plant technical γ-HCH (12-14% content) was produced with photosynthesis of chlorine and benzene. This technical HCH was further treated to obtain pure gamma isomer 99.9%, i.e. lindane, while some of the non-active isomers such as alpha, beta and delta which were extracted in the lindane plant were turned into thrichlorobenzene (TCB) and hydrochloric acid in the TCB Plant

The gamma isomer was extracted from technical HCH with methanol in a closed-loop process. The process of obtaining thrichlorobenzene and hydrochloric acid from the non-active isomers was performed with thermal degradation in presence of active coal as a catalyst, but the efforts to utilize them for the production of TCB (trichlorobenzene) and HCl failed, and as a consequence the inactive isomers (alpha, beta and delta-isomers) were dumped on the very site. Alpha and beta isomers are mixed in one dump and the delta isomer is in a smaller dump consisting of 5 concrete basins.

The total lindane production was around 2,800 tons resulting in a generation of around 25,000 tons of inactive isomers that were improperly dumped, causing secondary contamination of the soil and groundwater, and emissions to air as well.

HCH dumps

28. The inactive isomers were dumped in two adjacent locations at the OHIS plant, so called α-HCH and β-HCH dump and δ -HCH dump.

Table 5: Basic Parameters of the HCH dumps

Analysis of samples of waste disposed in the **α-HCH and β-HCH dump** found almost pure α-HCH. The waste was disposed in this dump onto the natural ground without any protection (Annex 7: Satellite Map of Dumps). Based on analysis of the α- and β HCH dump, it contains 88% of α-HCH, 11-12% of β-HCH, and 1-2% of γ-HCH.Thickness of waste (of white colour and loose, powdery consistency) varies from 3.2 to 4.6 m. Waste isomers are covered by a layer of	The **δ -HCH dump** consists of 5 concrete basins with a total area of approximately 940 m^2. The bottom of the basins is situated at approximately 1.7 m below ground level (bgl). The waste was dumped also beyond the perimeter of the basins (total planar area of the dump is 1,240 m^2). The average thickness of the δ-HCH waste is 1.65 m. Based on analysis of the δ-HCH waste, it contains 16% of α-HCH, 1% of β-HCH, 44% of γ-HCH and 39% of δ-HCH. The δ-HCH waste is covered by

humus loam and sandy clay of the thickness of 0.5 up to 1.6 m (1 m in average). The content of HCH in the soil cover of the dump is 897.13 mg/kg. The Planar area is 5,140 m^2 and the surface area is 5,270 m^2. The outputs of the investigation are summarized in table below.			sandy and clay layers with various content of individual HCH isomers. The uppermost layer comprises humus loam 0.4 to 0.6 m thick. The total content of HCH is in order of tens of thousands of mg/kg. Based on the surveying a 3D model was developed, planar and surface areas and volume of waste were calculated. The Planar area is 1,240 m^2 and the surface area is 1,250 m^2. The investigation results are summarized in table below.		
Material	**Value**		**Material**	**Value**	
	Volume(m^3)	**Mass (tons)**		**Volume (m^3)**	**Mass (tons)**
Soil (top)	5,200	9,400	Soil (top)	2,010	3,620
Soil (underneath and aside)	1,500	2,700	Soil (underneath and aside)	2,300	4,140
HCH waste	15,000	28,100	HCH waste	620	930
Concrete	200	400	Concrete	1,000	2,000
Sum	**21,900**	**40,600**	**Sum**	**5,930**	**10,700**

Results of investigations

29. At the OHIS site various media are impacted (soil, construction materials, waste, indoor and outdoor ambient air, groundwater) with various contaminants (HCH, organochlorine solvents, and mercury). Current unacceptable risks to human health were identified mainly in connection to HCH waste and HCH-contaminated soils. However risky exposure scenarios related to other impacts also exist.

Table 6: Summary of the investigations

Media	Findings
Soil investigation	Soil of the superficial layer (to the depth of 1 m bgl) is impacted by HCH isomers in most of the assessed area of the OHIS property. The highest concentrations of HCH were found under and next to both HCH waste dumps where total HCH concentrations exceed by 100 times the Dutch Intervention Limit (2 mg/kg). Soil contamination by HCH isomers sharply becomes negligible with depth. Nevertheless, under the both HCH dumps, in the vicinity of the δ-HCH dump and sporadically also in other locations HCH concentrations are still high - exceeding the Dutch Intervention Limit by more than one order even in the deepest sampled interval (4.6 – 4.8 m bgl.) The topsoil of the agricultural land some 100 m to the north of the site found the total HCH concentration slightly exceeded the Dutch Intervention Value.
Ground water investigation	Contamination of groundwater by HCH isomers exceeding the Dutch Intervention Value (1μg/l) was found in groundwater of most on-site wells. Maximal HCH concentrations in groundwater exceeding the Dutch Intervention Limit by 50 times and 29 times, respectively were found next to probable source of contamination - Lindane production and storage buildings and the dump of α-HCH and β-HCH. Concentration of total HCH slightly below the Dutch Intervention Value was found in direction of groundwater flow to the east towards a domestic well located around 600 meters from the HCH dump sites.
Street sweepings and sediment of the on-site sewer investigation	Laboratory analyses of sediment of the on-site sewer found elevated concentrations of HCH (3.84 mg/kg) exceeding the Dutch Intervention Limit for soil and residues of other chlorinated pesticides such as endosulfan (0.47 mg/kg), DDE (0.12 mg/kg),

	DDD (0.24 mg/kg) and DDT (1.24 mg/kg). The sample of street sweepings collected on a paved road on the eastern side of the electrolysis plant contained elevated total concentration of HCH (2.88 mg/kg), insignificantly exceeding the Dutch Intervention Value for soil. Elevated total concentration of PCB (2.97 mg/kg) was found.
Construction material investigation	Analyses of samples of construction materials found extremely high contents of HCH isomers in inner mortar and masonry in a former storage of HCH and production of TCB building, and in the concrete floor of the Lindane production building. Total concentrations of HCH in these samples exceed 1,000 mg/kg.
Migration of contamination	Results of the assessment of HCH migration can be summarized as follows. • Low-permeable layers of clay silt to silty clay overlying the aquifer serve as protective layer. Nevertheless it is not sufficient due to the influx volume of contaminants leaching from above ground contamination sources. Based on the mathematical modelling of contaminant transport approximately 30 kg/year of HCH isomers seep through the unsaturated zone to the aquifer. • Velocities of migration of HCH in groundwater was estimated considering advection and sorption. HCH isomers migrate in groundwater by velocity of approximately 0.08 to 0.9 m/day (30 to 330 m/year). • Natural attenuation processes are not very likely of such significance that would prevent further migration of groundwater contamination by HCH off-site. Sorption is the main process that prevents significant spread of HCH contamination in groundwater. However sorption only retards the migration rather than decrease the total amount of the contaminant.

Environmental and health impacts

30. Risk analysis was performed in order to evaluate potential risks for human health and the environment posed by the historical and ongoing impact of site operations and release of HCH waste dumps to soil, groundwater, surface water, and air.

Table 7: Environmental and health impacts

Impact	Description
Impact of HCH isomers on soil and groundwater	The impact of the former production and existing HCH dump site on soil was from the environmental point view evaluated by Eptisa (2007) as **tolerant**, or (related to the long period of the abandoning of the production) as **low.** The EPTISA study (2007) showed the existence of HCH isomers and other organic pollutants in groundwater. Some of the reported values exceed legal levels according to the Dutch standards. Due to the low biodegradation potential of HCH and low solubility in water, the impact of former production and the existing HCH dump site on ground water was rated by Eptisa from the environmental point of view as **moderate.**
Surface Water Impacts	The impact of HCH on the aquatic ecosystem in the surroundings of the OHIS plant caused by identified contamination sources was considered by ENACON (2009) as negligible. The Vardar River is at present hydraulically "protected" by active abstraction well Lisice 2 that intercepts impacted groundwater. Even in the case that the Lisice 2 well is not pumped dilution factor is such that natural drainage of impacted groundwater does not significantly affect the Vardar surface water quality.
Health Impacts	Generally there are hazard identification and potential health risk due to stored HCH isomers in enormous quantities for employees and population in Skopje (see table 8 and 9).

Table 8: Distribution of hazards, possible health effects and potential number of exposed people by hazardous sides

Hazardous site	Hazards	Possible health effects	Potential number of exposed people
OHIS Skopje	Organic chemical plant; HCH isomers are stored;	Carcinogenic on humans (liver, kidney and immune system diseases and other non-carcinogenic effects	470,000 inhabitants 700 workers

31. The potential risk acceptors and the exposure scenarios are summarized in the Table below.

Table 9: Risk acceptors

Risk acceptor	Localization in relation to the site	Reasoning
On-site worker	On-site	Unpaved areas are sources of dust and fine particles those can be inhaled. Furthermore, the inhalation of dust and fine particles released from contaminated construction material and/or soil gas vapors intruded into buildings is considered.
External workers performing temporary excavation activities	On-site	Accidental ingestion of soil, inhalation of fine particles and/or soil gas vapors and dermal contact with soil can occur during excavation works
Residents	Area northerly the site	Residents use ground water for irrigation of their gardens and small fields. Furthermore, dust and fine particles are transported by wind from the site in the northern direction. The contact with ground water and soil during gardening occurs; further homegrown vegetables are part of the residents' diet.

Box A4.6: Human health risk

According to risk assessment by ENACON (2009) the acceptable level of human health risk has been exceeded in case of inhalation of dust and fine particles released from soil and construction material on-site (α-HCH), inhalation of TCE vapours intruding into production buildings, further in case of contact with soil and soil gas during excavation activities on-site and in case of consumption of homegrown root vegetables due to transfer of α- and β-HCH from soil and of β-HCH and PCE from groundwater used for irrigation. For other identified priority contaminants the level of risk has been assessed as acceptable.

Proposed remediation scenarios

32. The ENACON's feasibility study proposes and assesses alternative remedial actions aiming at reducing and/or eliminating risks related to the existence of hexachlorocyclohexane (HCH) waste dumps and HCH-contaminated superficial soil beneath and in the surroundings of the HCH dumps (see Annex 8 for details).

33. During the PPG phase, cost evaluation of the available disposal, remediation technologies for the HCH-contaminated site was performed and the technology selection screening matrix was developed by ENACON.

34. Review of potentially applicable remedial technologies was performed, using information collected during elaboration of a feasibility study in 2008 updated by a desk study and communications with potential technology vendors and/or operators. Initially, a list of technologies recommended by the UNEP Secretariat for destruction or irreversible transformation of POPS (update proposal of II/2014) was used:

1. Sodium Reduction (SR) or Alkali metal reduction
2. Base-Catalysed Decomposition (BCD)
3. Catalytic hydrodechlorination (CHD)
4. Cement kiln co-incineration
5. Gas-phase chemical reduction (GPCR)
6. Hazardous-waste incineration
7. Photochemical dechlorination (PCD) and catalytic dechlorination (CD) reaction
8. Plasma arc (PLASCON)
9. Potassium tert-Butoxide (t-BuOK) method
10. Supercritical water oxidation (SCWO) and subcritical water oxidation
11. Thermal and metallurgical production of metals
12. Waste-to-gas conversion
13. Plasma Waste Converter

35. Adequacy of each technology to HCH destruction, commercial availability and market accessibility were searched. Based on that, the following technologies were pre-selected for further assessment:

1. Base-Catalysed Decomposition (BCD)
2. Cement kiln co-incineration
3. Gas-phase chemical reduction (GPCR)
4. Hazardous-waste incineration
5. Plasma arc (PLASCON)
6. Indirect Thermal Desorption
7. Bioremediation
8. Solidification/stabilization

36.

37. Box A4.7: Technology Alternative Scenarios

Technology Alternative Scenarios 0 to 8 were developed (see Annex 8 for details). Alternative Scenario 0 is related to the containment of the α, β-HCH waste dump, while Alternatives 1 to 8 are related to remediation of the δ-HCH waste dump using the preselected technologies stated above. Thus, total costs result from summing costs of Alternative 0 and one of Alternatives 1 to 8. Proposed remediation alternatives were prepared in order to cover possibilities of on-site irreversible destruction of HCH (Alternatives 1, 2, and 3) as well as solutions relying on existing off-site waste treatment facilities (Alternatives 4, 7, and 8). Alternative 5 is a combination of on-site remediation unit (ITD) with final off-site destruction by incineration.

Alternative Scenario 0 – temporary capping of the α, β-HCH waste dump
Alternative Scenario 1 – ITD + BCD
Alternative Scenario 2 – ITD + Plasma Arc
Alternative Scenario 3 – ITD + MCD
Alternative Scenario 4 – cement kiln
Alternative Scenario 5 – ITD + off-site incinerator
Alternative Scenario 6 – ITD + cement kiln
Alternative Scenario 7 – cement kiln + off-site incinerator
Alternative Scenario 8 – underground depository + off-site incinerator

38.

39. An economical assessment of technology alternatives is summarized in Table 10 and graphically in Fig. 1. Moreover, a projection of the costs for the entire clean up (including α-, β- and δ-HCH dumps) was prepared using the same pre-selected technologies stated above.

Table 10: Available disposal options' cost assessment for the remediation of the δ-HCH and for the both (α, β and δ) HCH dumps

Alternative	Contam. Medium	On-site Technology	Off-site Technology	Cost of Alternative δ-HCH (USD)	Cost of Alternative 0 (USD)	Total costs incl. Alternative 0 δ-HCH (USD)	Total costs incl. both HCH dumps α, β and the δ (USD)
Alternative 0 - capping		capping (alfa,beta HCH dump)			196,000		
Alternative 1 – ITD + BCD	Waste	BCD					
	Soil	ITD + BCD		11,904,000	196,000	**12,101,000**	**191,800,000**
Alternative 2 – ITD + Plasma Arc	Waste	Plasma Arc					
	Soil	ITD + Plasma Arc		8,882,000	196,000	**9,078,000**	**123,900,000**
Alternative 3 – ITD + MCD	Waste	MCD					
	Soil	ITD+ MCD		11,437,000	196,000	**11,633,000**	**251,275,000**
Alternative 4 – cement kiln	Waste		cement kiln				
	Soil		cement kiln	10,812,000	196,000	**11,008,000**	**59,394,000**
Alternative 5 – ITD + off-site incinerator	Waste		incineration				
	Soil	ITD	incineration	6,883,000	196,000	**7,079,000**	**67,012,000**
Alternative 6 – ITD + cement kiln	Waste		cement kiln				
	Soil	ITD	cement kiln	5,103,000	196,000	**5,299,000**	**44,294,000**
Alternative 7 – cement kiln + off-site incinerator	Waste		incineration				
	Soil		cement kiln	11,203,000	196,000	**11,400,000**	**79,866,000**
Alternative 8 – underground depository + off-site incinerator	Waste		incineration				
	Soil		underground depository	13,253,000	196,000	**13,449,000**	**84,465,000**

40. Complete rehabilitation of the area is extremely technically, economically and timely demanding. Financial sources currently allocated (8.1 Million USD) are significantly lower than the estimated total cost for the complete site rehabilitation allowing at least its future commercial use (26 Million to 60 Million USD according to the

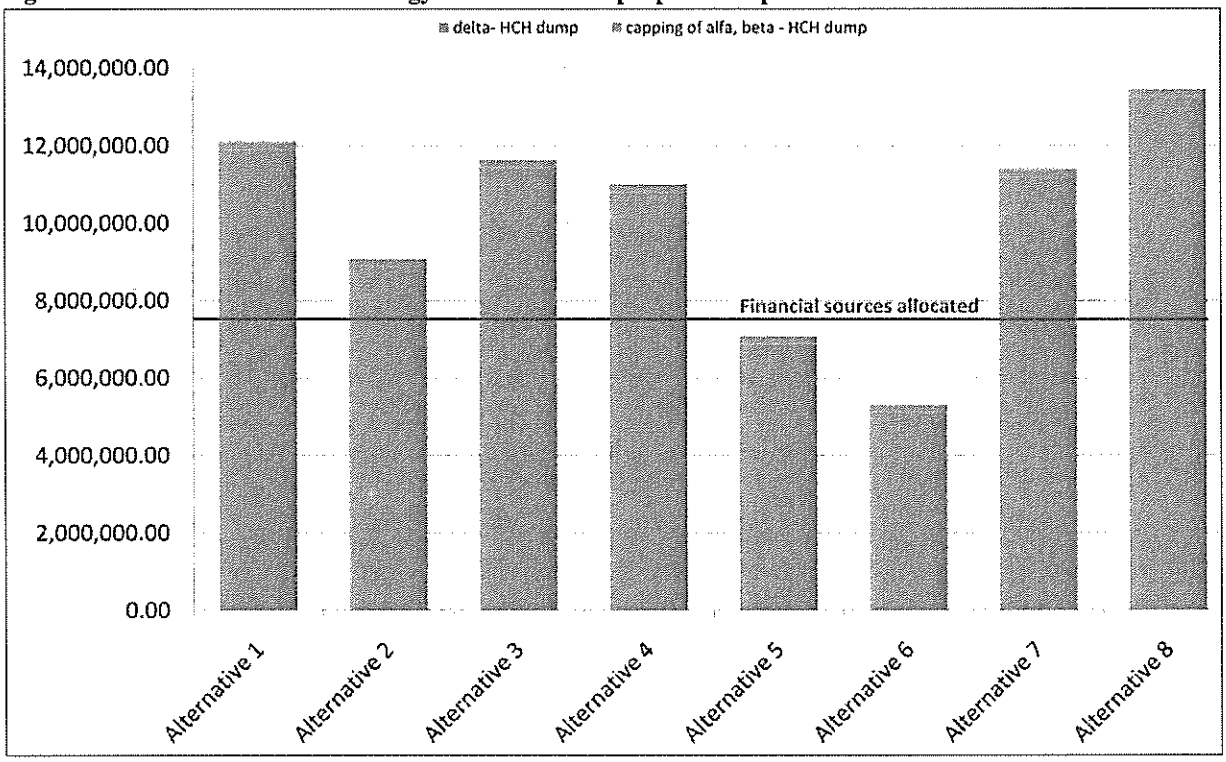
feasibility study of ENACON 2009 or 44 Million to 250 Million USD according the updated evaluation of the remedial/disposal technologies prepared in 2014)

Box A4.8: Technmology alternatives pre-selection

As a result of the assessment, execution of remediation Alternatives 2 (ITD + Plasma Arc), 5 (ITD + off-site incineration) or 6 (ITD + cement kiln) seem like the most promising technological solutions and can be recommended. However, further validation based on the results of the contaminated material characterization is necessary.

It is evident that Alternative 5 (ITD + off-site incinerator) and Alternative 6 (ITD + cement kiln) are significantly cheaper than the other possible technologies; the currently allocated financial sources (8.1 Million USD) should cover the proposed scope of remedial activities. The cost estimates even indicate that financial sources could also be sufficient also for starting the partial removal of the α,β-HCH dump. However, Alternative 6 must be currently considered as a desk study as no cement kiln which would be permitted to receive HCH contaminated soil or even pure HCH waste was identified. The estimated cost for indirect thermal desorption and destruction of HCH by plasma arc technology exceeds the currently allocated financial sources, however should be considered for further assessment.

Figure 1: Costs estimates of technology alternatives for proposed scope of remedial measures for the δ-HCH dump



41. Thus, reasonable remedial targets and prioritization of individual remedial steps are necessary in order to mitigate risk in the most efficient way. It is proposed first to safeguard risks posted by the α, β-HCH waste dump (causing release of vapours and contaminated dust particles as well as leaching of HCH to groundwater) with temporal capping and then to focus on removal of the δ-HCH waste dump and on treatment of HCH-contaminated soil beneath and aside of the δ-HCH dump.

42. Once removal of the δ-HCH dump and treatment of related HCH-contaminated soil will be completed, technology will be used for gradual remediation of the α, β-HCH dump. Adequacy of potentially applicable technologies for HCH destruction, their commercial availability and market accessibility were searched. Based on that, 8 technology alternatives were developed and their economic assessment was performed as described in the above.

A.4/I.c3 HCH waste interim storage/disposal facilities

43. The installation of hazardous waste storages is subject to the IPPC permitting procedure. There are several storages in the country authorized as interim storage of hazardous waste, but none of them for HCH waste.

44. There is one incinerator in the city "Drisla" for medical waste that does not satisfy the requirements of the Directive 2000/76/EC. The company possessing the incinerator has completed the EIA procedure for a new incinerator for hazardous waste (currently the facility is getting upgraded).

45. Between 2012-2014 several trials were performed in order to confirm the applicability of the potential HCH remediation technologies.

Table 11: Pilot demonstration projects

Company	Technogy description
SETCAR	In November 2012, a pilot project with the aim to demonstrate the feasibility of some of the proposed technologies/techniques to solve the HCH-waste problem was implemented. The project was financed by German company, K+S and Romanian company, SETCAR. A mobile unit of thermal desorption was installed by Setcar and treatment of 10 tons of HCH-contaminated soil was demonstrated. The demonstration treatment could be summarized as follows: ➢ The input HCH concentration was about 4,000 ppm, while the output of around 4 ppm with destruction and removal efficiency of 99.88%; ➢ The temperature for desorption was 400 °C; ➢ The process flow was about 0.3t/h due to very high input HCH presence in the contaminated soil. The material was processed twice in order to get destruction and removal efficiency of 99.88%; ➢ The following by-products were generated during the thermal desorption treatment: water used in the scrubberand the concentrate produced by condensation of desorbed HCH from treated soil. The above two companies submitted a proposal, as a possible option to solve the HCH problem: HCH contaminated soil up to 1,000 ppm can be treated on-site by the thermal desorption; soil with concentrations between 1,000 and 400,000 ppm will be packed, transported and stored in underground salt mines in Germany; soil with concentrations above 400,000 ppm will be sent for incineration in Europe (the reference costs for these options could be around EUR 100/ton for thermal desorption and storage, EUR 300/ton for storage in an old salt mine, EUR 800/ton for incineration).
YUNIRISK	During the PPG phase, a company Yunirisk located in Belgrade, Serbia was visited in order to evaluate the effectiveness of its treatment technology (solidification/stabilization) that they employ for the treatment of different types of hazardous wastes, and to evaluate its applicability particularly for the HCH contaminated waste. Previously, in June 2013 the company confirmed the technology performances for the treatment of the HCH contaminated soil (not for "pure" HCH) by performing experimental laboratory testing. The technology is based on a physico-chemical reaction between the waste and the additives (CaO, CaOH), where the HCH containing waste is decomposed, i.e. transferred to non hazardous material, neutral, that can be used for construction purposes, i.e. production of e.g. bricks, or pavement material. According to the information given by the company's representative, the treatable concentrations of the HCH waste could be up to 7,000 ppm and the output material of the process is neutral. The endurance of the neutral material is confirmed for the temperatures of up to 450 °C and pressure up to 5 bars.
BREM GROUP	During the PPG phase, a company Brem Group from Serbia performed a trial treatment of the HCH contaminated soil using bioremediation. The trial was conducted after laboratory analysis and preparation of inoculum of active zymogenous consortium of microorganisms (AZCM) isolated *in situ* and then selected and adopted. The efficiency of the microorganisms was confirmed. The HCH content in soil of 1,000 ppm was decresed to 30 ppm. One parcel of about 50 m^3 contaminated soil or "artificial soil" with HCH up to maximum 1,000 mg/kg of dry substance was prepared and started to be treated with AZCM. The microorganisms transform HCH by dechlorination to derivates which are neither toxic nor ecotoxic before it is further completely mineralized. The initial bioremediation process of HCH produces its own by-products that increase the hydrophobicity of the substrate. The laboratory-scale results of the biotechnological process has proven, under various oxygenation conditions during about three months in the PPG phase, so far the level of pollution of a total of 1,000 mg /kg-HCH could be improved by 90% (reduced the HCH concentration down to 100 mg/kg-HCH).

A.4/I.c4. Transport of hazardous materials

46. There are some companies transporting hazardous materials according to the requirements of the European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR) and regulations concerning the international carriage of dangerous goods by rail (RID), which are incorporated in the Law of Transportation of Hazardous Materials. There are no companies licensed for transport of HCH waste in the country.

A.4/I.d Public participation and awareness on POPs

47. Public participation is incorporated throughout the project planning. There will be full public participation in the environmental impact assessment (EIA), strategic environmental assessment (SEA), Integrated Pollution Prevention and Control (IPPC) procedures, adoption of laws, adoption of planning documents and etc. and access to environmental information according to the rules of the Aarhus Convention. The provisions of this Convention are also built-in in the Law on Environment and corresponding by-laws.

48. In the Former Yugoslav Republic of Macedonia, to keep the public informed especially on environmental issues is an important aspect of non-formal population education. *The Questionnaire - Public Awareness Indicator: Environmental Issues and Pollution* was prepared by the Public Awareness Advisor in immediate collaboration with the National POPs Unit, at the Ministry of Environment and Physical Planning. As an initial effort for preliminary analysis of the situation, it is a fundamental component of the Public Awareness efforts and activities envisioned under the Project Preparation Grant (PPG) phase.

49. In the period between the year 2000 and today, number of feasibility studies were conducted in 'OHIS' with a purpose to test the level of HCH soil pollution. The 'Public Awareness Indicator' has a multi-faceted purpose; the main objective is to directly and indirectly examine whether or not the respondents - citizens of Skopje, are aware of the current situation in 'OHIS', and whether or not they would support any initiative or undertaking of a specific activity for the clean-up of old contaminated locations and 'hot spots'. In addition, the 'Public Awareness Indicator' was prepared with a broad aim to sense the general environmental awareness of the respondents, the level of pollution in Skopje according to the respondents, prioritizing which issues are of importance, possibilities in finding solutions, and the citizen's perceptions towards the future of environment protection efforts (see Annex 3).

Box A4.9: Public awareness survey

It is indisputable that answers provided by the respondents could be used as relevant reference and verification during the conception phase as well as the implementation phase of certain actions and activities which may be undertaken. Nevertheless, respondents' perspectives, knowledge, experience, educational and professional background, competence and interest level, to name a few, should be taken into not only consideration but detailed analysis as they are an affective filter for the research conducted. From the analysis gathered, respondents' opinions are to a certain level unified in regards to the level of pollution, the situation of 'OHIS' and actions which need to be undertaken. It is prudent to note however, that out of the 62 respondents, more than half of them (58%) responded that they are not informed of the situation with the former factory 'OHIS'. Awareness, of the real issues at stake is still required for this particular segment. Awareness raising should be in a continuous and poised manner

A4/II. *BARRIERS ANALYSIS*

A number of barriers for sound POPs contaminated site management have been identified in Macedonia. These barriers can be roughly divided into legal, awareness and know-how related, institutional and technical capacity, economic and financial. The proposed FSP has been designed to address a variety of barriers in order to ensure its successful execution and achievement of project objectives. These barriers, listed in the order of project outcomes are as follow.

A4/II a. Legal Barriers

Lack of regulation of soil protection

50. During the PPG phase a gap analysis of the existing regulation has been performed and several gaps in the legal framework have been identified, which the project intends to resolve through legislation improvement and capacity building.

51. The legal framework of the country does not give a clear picture and solutions for remediation of the industrial hotspots, i.e. the contaminated sites. According to the national law, there are no specific definitions of "contaminated site", "contaminated soil" or "contaminated site management". In addition, there are no explicit values to describe whether a site is contaminated or not. However, there are limit values for heavy metals in soil, harmful substances in different classes of waters and limit values for quality of ambient air. Therefore, under the environmental liability legislation, the contamination of the site is determined by risk assessment and it is related to the aimed use of the land approved by the urban and spatial plans.

52. Generally, there is no law which will regulate the protection of the soil against contamination. Such a law could be a legal base for subsequent legislation for remediation of contaminated sites, which could include technical guidelines for remediation of "hotspots", terminology regarding "hotspots", also the question of environmental liability and time frame for the responsibility of clean up.

53. Apart from having neither regulations, nor limits or quality criteria for soil protection, there are no systematic methods and approaches for identification, addressing and remediation of environmental hotspots in Macedonia. No legislation framework related to the issue of contaminated sites management exists.

54. According to the national legislation, there is no legal requirement to conduct investigation at potentially contaminated sites (e.g. in case of sale of a property/land), however, clean-up and redevelopment of the hotspots (industrial contaminated sites and non-compliant municipal waste landfills) are included in all planning documents (National Strategy on Waste Management, National Plan on Waste Management, National Environmental Investment Strategy etc.).

Box A4.10: Draft Law on Soil Protection

MoEPP prepared the draft version of the Law on Soil Protection in April 2014 and it plans to adopt the Law in 2015. The main objective of this draft Law is establishing a system for soil protection with an aim to improve the condition of the soil towards long term protection and its sustainable use. It contains the aspects of proper management of contaminated sites.

This draft Law foresees additional preparation of relevant sub laws such as:

- Rulebook on the manner and elements for identification of the risk areas in each process of land degradation
  - Methodology for identification of contaminated locations.
  - Rulebook on types and levels of concentrations of hazardous substances in soil
- Methodology on determining the level of concentrations of hazardous substances
- National plan for remediation of contaminated sites
- Annual programme for soil monitoring
- Methodology, manner, procedures, methods and means for soil monitoring
- Decree on form, content and manner of keeping data and information collected during the soil monitoring

55. There is no official National Strategy for remediation of contaminated sites, but there are published documents that include information on contaminated sites and industrial polluted areas. These publications are the National Strategy on Waste Management (2008), National Plan on Waste Management (2008 – 2014) and its Special Studies on HZW arising and "Hot spots", National Environmental Investment Strategy as well as the National Strategy for Environmental Approximation–Sector Approximation Strategy–Waste Management Sector (2007).

Lack of technical guidelines for practical management of contaminated sites in an environmentally sound manner

56. There are no specific methodological guidelines for investigation of contamination, human health and/or environmental risk assessment, prioritizing the need of actions and management of contaminated sites adopted as national guidelines. However, these issues are eminent elements incorporated in the overall EIA and IPPC permitting processes. This means that if such cases arise, it is expected that the scope of the EIA study will incorporate mitigation measures related to the contamination of the site.

57. A set of guidelines, procedures, and practices for sound management of contaminated site are missing. These guidelines will describe in details how the interested parties can implement in practice the related regulations, decrees, and rules.

No threshold levels, maximum allowable concentrations (MACs) for POPs/HCH in different media

58. There is currently no legislation that addresses health considerations relative to the concentrations of POPs and HCH specifically, in food for human or animal consumption. Moreover, there are no threshold levels, i.e. maximum allowable concentrations (MACs) for POPs in environmental media like air and soil (there are for the HCH in the surface and drinking water which is 0.1μg/l), as well as in the biological matrices, then no concentrations that indicate significant contamination, remediation values of POPs in soil and groundwater.

A4/II.*b Institutional barriers*

Insufficient institutional capacity for contaminated site management

59. In Macedonia, there are no permanent inter-governmental or inter-institutional coordination bodies established for the coordination of contaminated sites management. Generally when a specific project is intended to be carried out, inter-governmental and/or inter-institutional working groups are established and authorised.

60. Despite the existence of several state level inspectorates (inspectorate for industry/mining, geological inspectorate for geological examination, mine inspectorate for mine activities, agro inspectorate for agricultural land) the degree of remediation of already treated hotspots has not been checked quantitatively by authorities in the previous interventions.

61. Intensive capacity building, transfer of experience in terms of demonstrative case studies and training of local experts based on implementing projects in the field are prerequisites for sound development of the Macedonian institutional capacity related to the contaminated land management.

62. Human, technical and financial resources remain limited and substantial investments in environmental projects and institutional capacity are needed. Shortage in institutional capacity is critical especially at municipal level where there are not enough authorised environmental inspectors to perform monitoring.

Lack of financial mechanism for contaminated site remediation

63. Lack of sufficient financing sources in Macedonia is often seen as one of the main constraints for implementation of environmental improvements. Raising domestic finances for major environmental investments such as remediation of industrial hotspots in the Former Yugoslav Republic of Macedonia has proven difficult. Apart from the shortage of financial resources for environmental investments, there is an evident lack of strategy for investment, as well as staff to implement high cost infrastructure projects. It has been mostly donors who have financed site investigation and remediation activities. In general, the support from donors represents the highest input of finances for environment protection. Currently, there is very poor government coordination of donor funding. Moreover, polluters are not obliged to have environmental liability insurance as an instrument for recovering the environmental impairments.

64. It is advisable to establish missing national and regional environmental funds and environmental project incentives in order to strengthen financial capacities on the governmental, regional and local levels to support implementing environmental projects, as well as managing the environmental hotspots where the state is liable for treatment.

Lack of human resources and knowledge on contaminated sites management issues

The system lacks specialists experienced in contaminated land management and, moreover, there is no institutional body responsible for this issue. Therefore, it is necessary to develop complex legislative framework, methodologies and guidelines (for hotspots' identification, risk assessment and investigation, liability clarification and site prioritization, etc.), as well as defining the responsibilities in implementing and enforcement of this legislation body. There is lack of practical experience in dealing with HCH (and hazardous waste in general) treatment.

65. The enforcement authorities must be empowered to be able to perform monitoring of all the steps of the contaminated sites management cycle (preliminary investigation, risk assessment evaluation, feasibility study evaluation, remediation etc.) effectively.

A4/II.c *Technical barriers*

Insufficient analytical and research capacities

66. There is no monitoring programme for POPs in Macedonia, neither in the environmental media (soil, water, air) nor in the biological matrices. Establishing of the national reference laboratory is one of the priority topics for the Macedonian environmental policy. A new governmental committee on environment and health was established in order to create such a laboratory based on the existing central laboratory of the Ministry of Environment and Physical Planning and in cooperation with universities that can offer know-how and trained experts.

67. There are very limited number of organisations capable for POPs analysis in Macedonia in different environmental and biological matrices. There is a need to improve and strengthen their capacities (trained personnel, equipment, accreditation of the methods, institutional stability, financing) for conducting continuous monitoring of POPs chemicals.

No secure storage facility for POPs/HCH containing waste

68. There are no secure POPs storage locations identified in the country. None of the licensed hazardous waste storages is authorized to store the POPs/HCH waste.

No facilities for environmentally sound disposal of HCH waste

69. A major obstacle in remediation projects is non-existence of facilities for disposal/remediation of hazardous waste and the contaminated sites in the country. There is neither a hazardous waste landfill in the country nor a capacity for environmentally sound treatment and disposal of the HCH-containing equipment and waste. The only authorized incinerator, located in landfill Drisla, is for medical waste and does not satisfy the requirements of the Directive 2000/76/EC. Moreover, the IPPC permit of the cement factory "Titan" in Skopje does not include burning, i.e. co-processing of the HCH waste.

A4/II.d *Awareness and knowledge barriers*

Low level of public participation and awareness on the POPs associated risks and dangers

70. Public awareness and participation in legislative initiatives is weak and need to be fostered. There is low level of knowledge related to POPs generally across all stakeholders (workers, public, media, NGOs, students, vulnerable population, etc.).

71. The largest gap has so far been in awareness among the policy makers at various government institutions, as well as the general public. Progress in understanding the POPs issues has been attained during the NIP and preparatory stages of this project. Though certain information flow to the stakeholders has been ensured through the PPG phase, there still remains an insufficient level of knowledge on the POPs issues, and environmental and health risks among the regulatory authorities. This implies the need for improving the existing and preparing new awareness materials specifically dedicated to POPs/HCH, and finding a proper way of presenting this information to all target groups.

A. 5. Incremental /Additional cost reasoning: describe the incremental (GEF Trust Fund/NPIF) or additional (LDCF/SCCF) activities requested for GEF/LDCF/SCCF/NPIF financing and the associated global environmental benefits (GEF Trust Fund) or associated adaptation benefits (LDCF/SCCF) to be delivered by the project:

72. With this GEF funding, Macedonia would initiate, by leveraging its governmental budget, its actions to eliminate the releases of POPs from alpha-HCH, beta-HCH and Lindane contaminated sites and establish an operation mechanism to continue the decontamination operation at the OHIS premise that is now situated within the expanded capital city of Skopje. The GEF resource will help secure governmental cash contribution in addition to in-kind co-financing contribution related to the daily operation of the state-owned company, OHIS.

73. During the project phase, governmental in-kind co-financing will support administrative work at OHIS for the project activities. The cash co-financing contribution will provide technical operations of OHIS including water, electricity, fuel and other energy sources needed for the clean up operation. The GEF fund is expected to set up the equipment and technical routine procedures for the government to continue its clean up operation after the GEF project ends. The governmental co-financing contribution is planned for 5 years including the project period.

74. The GEF scenario will support the baseline project by providing a comprehensive environmentally sound management of POPs/HCH contaminated sites in Macedonia. Without this GEF funding, there is a great possibility that POPs/HCH from the contaminated sites will be continuously released to the environment with subsequent environmental and human exposure. In a business-as-usual scenario, Macedonia would be unable to comply with the Stockholm Convention in respect to the management of contaminated sites. As a consequence, those involved in current operations at the site, communities living close to the contaminated areas as well as the global environment will remain at risk from exposure to the HCH. Public awareness of the issues would continue to be low and the current analytical capacities for POPs monitoring of the environmental media and biological matrices will remain insufficient. The incremental activities proposed in the project are addressed to tackle the barriers identified by establishing environmentally sound management system for POPs/HCH contaminated sites that will be supported by law, and consequently by strengthening the local technical and institutional capacity.

75. The global environmental benefit of the project is the mitigation or elimination of risks associated with the release of HCHs into the environment and their subsequent global distribution with their ecotoxicological and human health effects from exposure to these chemicals. This will be achieved directly during the project period by activities related to the remediation of 6,000 cubic meters (10,700 tons) of HCH waste and contaminated soil. It will also be achieved indirectly though strengthening technical, regulatory and institutional capacities for sound management of the contaminated sites.

76. Generating knowledge, skills and experiences on the POPs contaminated sites management, the Former Yugoslav Republic of Macedonia will enhance national capacities for meeting the country's obligations under the Stockholm Convention and will also indirectly contribute to the objectives of the Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and Their Disposal when transporting the HCH containing waste originated from the contaminated site outside the country.

77. The long-term project objective is to have the OHIS contaminated site free from HCH waste and other hazardous contaminants for future industrial use, that lead to the protection of human health and the environment from the adverse effect of the contaminants at the contaminated site. The immediate objective of the project is to assist the Former Yugoslav Republic of Macedonia in fulfilling the Stockholm Convention requirements related to the POPs contaminated sites by enhancing the national policy, institutional and technical capacities for management of contaminated sites through establishing a financially and technically sustainable mechanism for securing continuation of the remedial activities of the HCH contaminated site in a safe manner.

78. For achieving the objectivs, the project has 5 outcomes which provide a comprehensive framework to develop and establish environmentally sound management of POPs contaminated sites in the country and to initiate the clean up operations. These project outcomes can be further divided into outputs as presented below.

Outcome 1: Legal framework and institutional capacities to support, justify and evaluate the clean-up of the OHIS site contaminated with alpha-HCH, beta-HCH and lindane established, enhanced and enforced

This outcome will prepare, enhance and enforce regulatory acts and technical tools for environmentally sound management of the contaminated sites that are in compliance with the Stockholm Convention and EU requirements, and internationally accepted standards and practices. Institutional and technical structures will be enhanced and capable for site identification, risk assessment and management/clean-up of the contaminated sites.

Output 1.1: Legal acts and institutional and technical tools prepared to ensure the completion of the OHIS site clean up operations and building capacities towards contaminated sites management in general

79. The gap analysis report on the compliance of the national legislation towards the Stockholm Convention, EU requirements and the internationally accepted practices for contaminated site management prepared during the PPG phase, identified that there is no national legislation governing the management of the contaminated sites.

80. Based on the recommendations stated in the gap analysis report, and in order to support, justify and evaluate the clean-up of the OHIS site, the responsible legislative bodies will prepare regulative acts for improvement of the policy framework by preparation of government decrees, rules, rulebooks as needed to enable proper management of the contaminated sites. A comprehensive regulatory system addressing contaminated sites will be developed, harmonized in accordance to the Stockholm Convention, EU requirements, and the internationally accepted practices for contaminated site management, by respecting the country specific conditions. The following regulatory acts, decisions, and provisions are planned to be developed and established:

- Rulebook on contaminated site management with provisions related to the identification, securing and protection of the site and surrounding of further contamination and human exposure, remediation and monitoring requirements;
- Threshold levels, i.e. maximum permissible concentrations for POPs in environmental media (air, soil, water), food, feed, human receptors, then concentrations that indicate significant contamination, remediation values of POPs in soil and groundwater consistent with international standards. In addition the following tools are going to be developed in order to enhance the technical aspect of this legal framework:

- Methodology for identification of contaminated locations;
- Rulebook on types and levels of concentrations of hazardous substances in soil;
- Methodology on determining the level of concentrations of hazardous substances.

81. The final version of the acts and regulations will be submitted to the Ministry of Justice/ regulatory commission for their approval. There is a plan in MoEPP to adopt a Law on Soil Protection in the year 2015, and the above mentioned legal acts will have a form of sub law to the Law on Soil Protection. The MoEPP/PMU will take all necessary steps to facilitate and accelerate the adoption of the acts.

82. The establishment of an operating entity designated to be responsible for the OHIS site clean up, if a private sector/investment is involved, will need to be compliant with the Law of Concession and Public Private Partnership as well as Law of Public Procurement. This activity is linked to Output 4.3.

Output 1.2: Technical tools (guidelines, procedures, instructions) for contaminated site management prepared

83. Detailed technical tools, i.e. guidelines, manuals protocols and procedures in accordance with international standards and practices for contaminated site management will be developed. The guidelines will describe in details how the interested parties can implement in practice the related regulations, decrees and rules. The guidelines, manuals, and instructions prepared by respective international organizations will be used for the preparation of the country specific guidelines, protocols and procedures which will reflect the country specific conditions, national legislation and technical standards.

84. The guidelines, protocols and procedures will cover the following:

- Identification and management of POPs-contaminated sites: As one of the requirements of the Stockholm Convention is to identify sites contaminated by POPs and their remediation in an environmentally sound manner. The guideline will describe how to conduct a site investigation and management by: i) conducting preliminary site investigation in order to estimate the likelihood of POPs contamination that may be present at a site by performing desk analyses, site visits, interviews and to confirm the POPs contamination by limited sampling and analyses, ii) definition of the sampling plan, procedure, methodology; iii) site risk assessment with the identification of the pathways and potential receptors, i.e. assessing the human health risks near sites contaminated by POPs; managing the contaminated sites and description of the remediation technologies. The "POPs contaminated site investigation and management toolkit" prepared by UNIDO will be used as basic document for the preparation of the country specific guideline.
- Classification system for determining the status of endangered environment and determining the remediation priorities: A classification system for determining the priorities for clean-up of contaminated sites will provide assistance during establishment of priorities for the clean-up of the contaminated sites. It will also prescribe limit and remediation values of POPs in groundwater and soil.

- Safety manual for sites contaminated by POPs: A manual prescribing the necessary safety measures, equipment and health impact preventing actions when dealing with POPs contaminated sites will be prepared.

85. In order for the developed guidelines to reflect the country-specific conditions, national legislation and technical standards, round table discussions with the government stakeholders, representatives of NGOs, and the industry will be organized. Their comments and suggestions will be taken into consideration and incorporated into the previously drafted guidelines. NGOs with gender perspectives will be also invited at the round table discussions.

Output 1.3: Environmental officers, specialists, contaminated site owners and the potential contaminated site clean up operators trained on practical usage of the prepared guidelines, procedures and instructions

86. Three trainings for environmental officers, contaminated site owners and the potential contaminated site clean up operators will be organized in order to gain practical experience in the implementation of the provisions and instructions prescribed in the guidelines. This will improve their knowledge and capacities to manage the contaminated sites in a proper and safe manner. The training will entail not only technical requirements for the clean up operations, but also institutional and financial conditions to be selected as clean up operation entity of the OHIS Lindane contaminated site.

Output 1.4: Laboratory personnel trained for sampling and analyses standards and protocols for POPs/HCH

87. In order to meet the requirements of the Stockholm Convention on inventory and monitoring of POPs, the project will built capacities to the MoEPP laboratory and the Public Health Institute to increase the services offered and meet the expected demand.

88. Laboratory personnel from the MoEPP and Public Health Institute laboratories will be trained on methodology, standards and protocols for sampling and analysis of HCH and other POPs chemicals in different environmental media (air, soil and water) and biological matrices as well (food, feed, milk, and blood).

89. The fine-tuning of the laboratories for POPs/HCH analysis will be done in cooperation with some recognized laboratory, e.g. RECETOX laboratory in the Czech Republic, which is also a Regional Centre for the Stockholm Convention in the region.

90. Improved analytical capacity will also enable the government to determine the present levels and trends of POPs exposure of Macedonian people and the environment, so as to promote the safe and efficient use of POPs alternatives, to ensure compliance and enforcement of the POPs legislation (e.g., standards), to track progress on elimination of POPs in Macedonia, and to monitor progress on the effectiveness of NIP implementation. The analysis of the present levels and trends of POPs exposure of the population in Macedonia will be conducted in a gender sensitive way and additional sex-disaggregated data will be collected.

Outcome 2: Characterization of the HCH contaminated site completed, risk assessed and risk management options defined

This outcome will determine the scope of contamination, the risk to human health and the environment will be assessed and the risk management options for the OHIS contaminated site defined by performing detailed site investigation, including sampling, analyses and interpretation of the results.

Output 2.1: Site characterization, i.e. detailed site investigation completed by sampling and analyses based on the sampling plan developed during the PPG

91. Detailed site investigation will be carried out by collecting and analyzing samples from the media of concern (ambient air, soil and groundwater) at sampling locations according to the methodology defined in the sampling plan that was prepared during the PPG phase. This detailed site investigation will validate the extent of the contamination and characteristics of the site in order to prevent failure of the remediation project, i.e. selection of ineffective remedial actions as a result of inadequate site characterization.

92. The size, depth and extent of contamination of the site will be identified including:

- the physical, chemical and biological properties; and
- the horizontal and vertical profiles of the contamination.

This will help prepare a 3 dimensional scheme with isoconcentration lines where different contamination levels will be expressed in cubic meters/weight.

Output 2.2: Survey of groundwater for drinking and irrigation purposes conducted

93. Besides assessment of the contamination of the groundwater on site, a survey of the groundwater contamination by different contaminants of concern (HCH, tetrachloroethane, tetrachloroethene, trichloroethene, mercury, trichlorobenzene and DDD, DDE and DDT) will be prepared for the groundwater from the domestic wells in the vicinity of the OHIS plant.

94. Based on the analytical results, the wells with water inappropriate for drinking and irrigation purposes will be identified and labelled, and then the local community will be informed and instructed about water restriction requirements.

Output 2.3: The current risk assessment analyses updated and the risk management options defined

95. Previously developed risk assessment analyses that were part of several feasibility studies, will be updated according to the analytical results provided from the detailed site investigation. The updated environmental risk assessment will evaluate the risk to human health due to the actual presence of the contaminants causing the adverse impacts as a result of the exposure

96. Risk management options will be defined in order to control one of the risk components: contaminant, exposure pathways and the receptors. It will integrate a remediation strategy with technical, political, legal, social and economic considerations to develop risk reduction and prevention strategies. Generally, the risk management option will involve one or more of the following:

- contaminant removal or reduction
- modifying or limiting use by receptor
- interception or removal of exposure

Outcome 3: Contaminated site clean up plan and strategies established and key stakeholders including local communities ready to cooperate

This outcome will develop clean up plan and strategies that are effective in securing adequate human health and environmental protection and in providing local community cooperation.

Output 3.1: Contaminated site clean up operation/remediation plan and groundwater management plan prepared for prevention of further contamination and adverse human health impact

97. A site remediation plan including a groundwater management plan will be further articulated in details as input to the ToR drafted in Output 4.1 by prescribing the necessary activities and measures needed to be undertaken to ensure environmentally sound remediation of the HCH- contaminated site and groundwater protection from further contamination. Site remediation goals will be set, and all risk-reducing procedures and plans need to be designed to achieve an acceptable level of risk for the current or proposed site's land use.

98. The purpose of land use after the clean up is critical to determine to what extent the clean up operation needs to be done. The European Agency for Reconstruction Feasibility Study - 2007 ranked the opportunities at the OHIS site after the completion of the clean up operation as below. The free trade zone and business incubator/business office

were suggested as priorities of the landuse.

Table 36_Ranking different opportunities (from 0 to 5)

Indicator	Option 0 No Activities	Option 1 Free Trade Zone	Option 2 Business Incubator	Option 3 Administrative Center	Option 4 Residential area
Development of the region	0	3	2	5	1
Wider development impact	0	4	5	3	1
Direct Revenue Generator	0	3	4	5	2
Low start up-costs	0	5	4	3	3
Return of Investment	0	4	2	5	2
Social impact	0	5	4	2	5
Technological impact	0	4	4	2	0
Competitive advantage	0	4	5	3	0
Capacity to organize	0	5	2	5	5
Sustainability	0	3	4	5	5
TOTAL	**0**	**40**	**36**	**38**	**24**
Ranking	**5**	**1**	**3**	**2**	**4**

(Ref. EU 2007)

99. The financial aspect of the clean up plan will be assessed using the UNIDO's financial tool, Computer Model for Feasibility Analysis and Reporting (COMFAR). This tool is particularly useful for assessing financial flow when involving the business model with revenues or private investment. In this project, the operating entity is expected to retain its operations beyond the project period until the decontamination operation is completed. The tool will be engaged with support from UNIDO in order to assess several scenarios of the operating entity's modality and scope.

Output 3.2: Consensus among the general public and major stakeholders built for the establishment/improvement of the OHIS contaminated site

100. Awareness raising campaigns will be organized in order to build consensus among the general public and major stakeholders for the forthcoming clean up activities. Awareness raising workshops on health and environmental hazards posed by POPs/HCH, on regulatory requirements, and on the establishment of sustainable operation for the OHIS contaminated site will be organized among different target groups (government institutions, local community, the media, NGOs, and the general public as well, especially the vulnerable population). Gender elements will be embedded throughout the awareness raising workshops and stakeholders that work on gender issues (and) environment will be invited as well (including ministerial gender focal points, NGOs, university professors, women associations etc.).

101. Information propagation materials (brochures, leaflets) will be prepared jointly with NGOs. Moreover, a POPs website will be upgraded to provide the general audience with gender sensitized information on HCH health effects, policies and regulations and technical information and guidelines pertaining to the sound POPs

management and information on the HCH contaminated site's ongoing management activities. The POPs website will be updated periodically to include new information and disseminate project progress.

102. Increased awareness and knowledge among the different target groups will result in elimination of eventual reluctance by the various groups, especially the general public, on the execution of the foreseen activities. Moreover, the public participation for the projects that might impact the environment and human health is secured through the EIA and IPPC procedure where the public opinion and suggestions are taken into consideration when making decisions.

103. Having in mind the possibilities of the media and NGOs for direct contact with the general public, special attention will be placed on training of the representatives of media and NGOs on POPs/HCH issues for encouraging proper dissemination of the information while avoiding any serious concerns raised by the general public. The importance of incluing gender considerations throughout the implementation of the project will be underlined during the trainings for the reprentatives of media and NGOs.

104. Moreover, a cost-benefit analysis will be prepared by quantifying expected costs and the social, public health benefits from the intervention in order to disseminate how this project will be benefitial to the society and therefore justifying the clean up activities.

Output 3.3 City development plan and zoning of OHIS site reviewed and revised

105. The city's general/detailed urban plans will be reviewed and revised/developed where the future usage of the land will be defined in cooperation between the scientific institutions and the City Council. The future, intended usage of the land (agriculture, residential, commercial or industrial) will determine the remediation values, and subsequently the remediation costs.

106. An evaluation assessment will clarify whether reaching some remediation values is technically and economically feasible. The costs for reaching the remediation values related to certain land use will be compared to the estimated revenues that are expected to be obtained when selling the land according to certain usage options as well as social benefits. Moreover, when setting the remediation values, the background HCH contamination of the surroundings will be taken into consideration as well. Attention will be paid to forbid any use of the land that is not in accordance with the reached remediation values for the selected land use in order to ensure that the remaining pollutans do not pose a risk to human health and the environment.

Outcome 4: Clean up operation initiated and the execution mechanism in place to sustain the clean up operations beyond the project period

This outcome will establish a remediation option which is appropriate for the HCH site remediation and will secure conditions for setting up an execution mechanism sufficient to sustain the clean up operations beyond the project period. There are two main key roles to be taken up: technology provider and operation service provider for the execution of the project's clean-up activities. The UNIDO's procurement rules and regulations will be applied in selecting the providers. Two options will be proposed in the UNIDO's bidding process: i) to seek a technology/operation service provider to accomplish the full scope of services or ii) to acquire technology to be operated by the operating entity (service provider) which will be separately set up following governmental due diligence. The scope and structure of the clean-up execution mechanism is illustrated in Figure 2. The bidders will be requested to submit their offers taking into consideration the two options. After the evaluation of the offers, the Government of the Former Yugoslav Republic of Macedonia/Ministry of Environment and Physical Planning in the cooperation with UNIDO will make the final decision on the option that is to be employed.

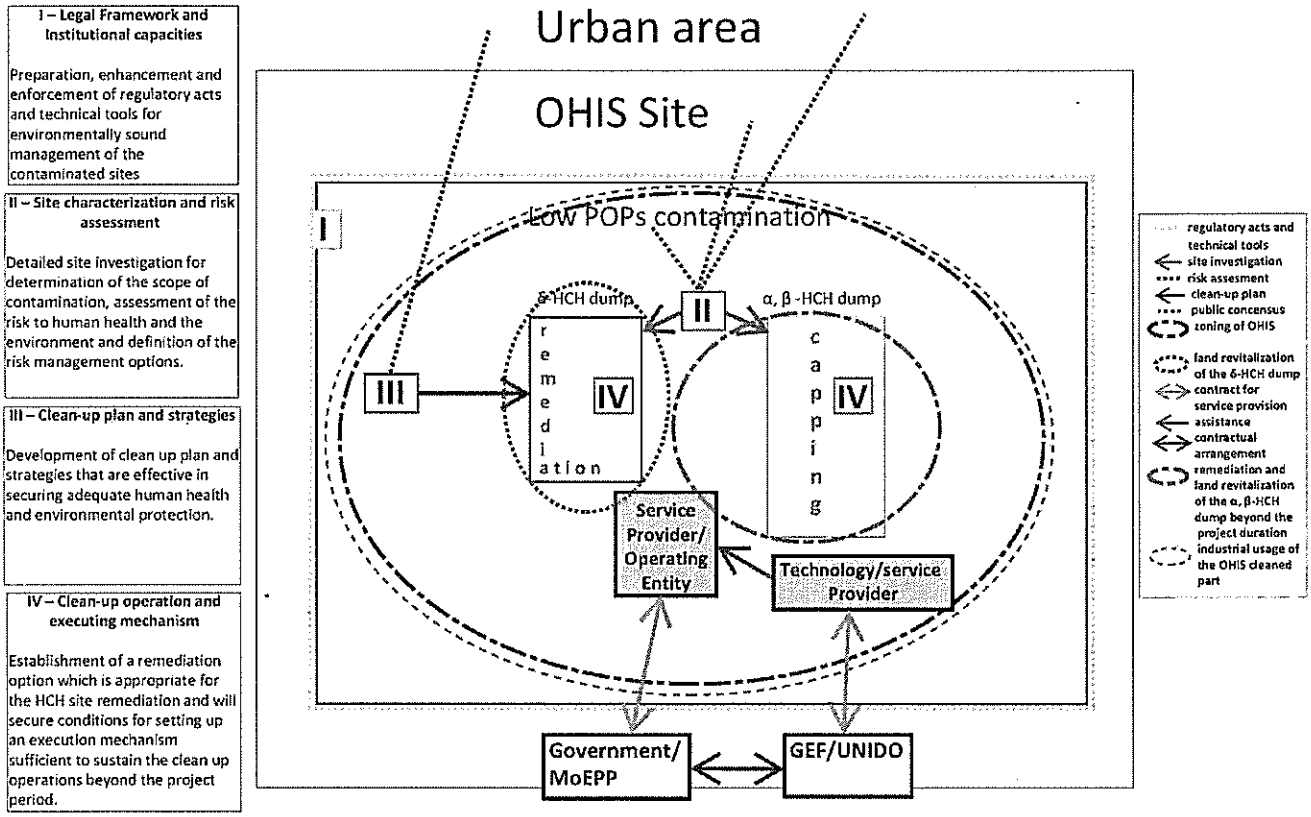
TABLE 12: Roles and responsibilities of technology provider and service provider/operating entity

Items	**Responsibilities and roles**	
	Technology provider	**Service Provider/Operating entity**

Alpha and beta HCH dump site	Capping of the alpha and beta HCH dump	Ensuring the capping operation by the technology provider meets the international and national standard
Installation of HCH contaminated soil remediation technology at OHIS site	Delivery and installation of HCH contaminated soil remediation technology at OHIS site Training of the service provider/operating entity personnel by treatment of the HCH contaminated soil in quantities of 500 tons	Ensuring the technology delivered meets the technical specifications described in the Terms of Reference and UNIDO's contract Selecting qualified engineers/technicians who will operate the technology Accommodating and making logistical arrangement for smooth demonstration of remediation of 500 tons of the HCH contaminated soil
δ-HCH dump site	Developing and execution of a monitoring plan related to the remediation of 500 tons of the HCH contaminated soil (monitoring of the successfulness of the treatment, environmental media monitoring for eventual pollution during the remediation)	Treatment of the δ-HCH contaminated soil in quantities of 9,760 tons Packing and temporary storage of around 930 tons of the HCH waste and the quantities of the treatment by-products for final disposal at licensed facility

UNIDO will select the technology/service provider based on the criteria (as described in Box A5.1) set according to the investment requirement and technical guidance such as POPs Disposal Technology in GEF Projects and the POPs Site Investigation and Management Toolkit. In case that the service provider is selected separately by the government, the criteria described in Box A5.2 will be applied. The details of both criteria will be further elaborated in the Terms of Reference and bidding documents. There will be contractual agreements to be exchanged between each of the parties (the Government/MoEPP, UNIDO, technology provider, and operating entity (or operation service provider)) clearly specifying the roles and obligations of each party as well as the activities that are to be covered by the Government/MoEPP and those by UNIDO with clearly defined payment sequences.

Fig. 2 Illustration of the scope of each project component at the OHIS site



In case that the service provider is selected separately by the government, the operating entity will invest its own resources for enhancing their capacities for accomplishing the treatment of the foreseen quantities of contaminated soil. After the finalization of the project, UNIDO will transfer the ownership of the technology to the Government/MoEPP following the UNIDO's procurement rules and regulations. The Government/MoEPP will cover the costs incurred by the Operating Entity.

Output 4.1: ToR for the selection of the technology/service providers for the HCH contaminated site remediation prepared

107. The ToR to be finalized in this output will be a part of the bidding documents for UNIDO's international bidding to acquire the technology and select a subcontractor. The ToR will describe the requirements of the remediation technology taking into consideration their applicability and relevance to the country strategy, existing and planned programs as well as the BAT and BEP standards. The advisory document on POPs Disposal Technology in the GEF Projects and the POPs Site Investigation and Management Toolkit will be consulted for the selection of the environmentally sound POPs disposal technologies.

Box A5.1: Treatment technology selection criteria

The Terms of Reference (ToR) for the selection of the treatment technology will be prepared according to the latest results derived from the detailed site investigation. The ToR will give the opportunity to select the technology that is able to destroy/irreversible transform the HCH from the contaminated soil, render it inert or technology able to separate/concentrate the HCH from the contaminated soil. In the latter case, the concentrated contaminant will be sent for final destruction. One part of the ToR will explain the site characterization as a result of performed investigations, feasibility studies, risk assessments, estimation on the quantities subject for treatment and subsequent HCH concentration(s), and target remediation values. The other part of the ToR will define the technical, environmental and economic criteria.

Technical criteria	Environmental criteria	Economic criteria
Capacity (volume and concentration),	(BAT/BEP technology, destruction	Treatment costs, capital costs,

comprehensiveness - ability to treat broad spectrum waste fractions, e.g mercury, maintenance needs and consumables requirement, transfer of know-how, occupational health, operational risks and mobility	efficiency, materials and energy consumption- electricity, chemicals, fuels, pressure air, light, water, nitrogen, hydrogen, by-products generation, emissions including the green house gases, worker and community safety, demonstrably and inherently safe	indirect costs like: repackaging costs, pre-treatment costs, transportation costs, costs for safe residues handling and disposal, revitalization plant costs, monitoring costs, management and administration costs

108. This ToR will give the opportunity whether to purchase the remediation technology and deliver to the operating entity or to lease it in order to engage the most reasonable technology/service provider to accomplish the entire scope of services. The final decission about the option that is to be implemented will be made by the Government/MoEPP of the Former Yugoslav Republic of Macedonia in cooperation with UNIDO.

109. A technical vendor meeting will be organized for interested potential technology providers to present their products and services to the wide range of stakeholders and share information concerning recent development of the alternative disposal/destruction technologies for management and disposal of the HCH contaminated sites. Moreover, this could be an opportunity for the vendors to be acquainted with the real needs of the country in order to be able to submit in the future tender offer that is to be applicable, and technically and financially acceptable.

Output 4.2: Technology/ service provider selected

110. A technology selection screening matrix with specific evaluation criteria for technology selection will be developed as well as an appropriate evaluation system, i.e. weighing factors for each evaluation criteria will be assigned.

111. The most applicable BAT/BEP disposal/remediation technologies will be selected based on the application of the screening matrix and evaluation of the technologies performances and cost effectiveness for the site specific conditions. Having in mind that there is no single technology that would be able to economically and practically address all HCH wastes fractions (low, high concentrations and pure HCH substance) it is therefore necessary that a good disposal plan be mapped out to realistically optimize the provided resources.

112. Two or more different technologies could be used together for more effective treatment. They can either be integrated processes or a series of treatments combined in sequence to provide the necessary overall degree of treatment. The treatment combinations might be used to render a medium more easily treated by one of the technologies, to reduce the amount of waste requiring treatment by a more expensive technology, to prevent the emissions of volatile contaminants and/or to minimize the overall cost of treatment.

113. The bidding process and final selection of the technology vendor will be done by UNIDO respecting their procurement policies.

Output 4.3: Parties (private sectors, state owned companies or PPP contractual agreement form) interested as potential operators identified

114. In order to secure the sustainability of the future remediation activities, the project might acquire a remedial technology to be installed in the country. Therefore, potential operators and investors with interests to run the clean up operating entity will be identified.

115. Possible operators would be selected from the private sector or the state owned companies (e.g. current waste management companies, comunal waste companies, etc.). Several approaches/modalities might be employed when selecting/contracting the Operating Entity: i) announcing international bidding by the Government whether to engage the Operating Entity in a form of Public Private Partnership modality or as an ordinary public procurement of servisec, ii) decission by the Government for the selection of the company to act as Operating Entity, and iii) establishing a new public enterprce by the Government.

116. The Government will announce an international bidding for the selection of the Operating Entity. A feasibility study for the justification of awarding a PPP contract will be prepared for the needs of the public sector (Government, local community) which will demonstrate the most suitable mode of engagement of the private sector for the foreseen cleanup activities, i.e. whether as ordinary public procurement of services or in a form of a

Public Private Partnership. The feasibility study will consist of three parts: technical, financial and legal. A feasibility study is required by the Law on Concession and Public Private Partnership.

117. The Public-Private Partnership (PPP) modality might be adopted as a possible form of cooperation between the private and state/local government institutions in order to obtain more "value for money", i.e. to produce reduced life-cycle costs, better risk allocation, faster execution of public works and services, improved service quality and additional revenue streams. The PPP contract should comply with the provisions of the "Law of Concessions and Public Private Partnership" ("Official Gazette" of RM no. 6/12) and the "Law on Waste Management" ("Official Gazette" of RM no. 68/04, 107/07, 102/08, 143/08, 124/10, 51/11, 123/12 and 163/13). The ordinary public procurement might also be adopted as mode of Operator selection and engagement (according to the Law on Public Procurements ("Official Gazette" of RM no. 136/07, 130/08...130/14).The experience shows that when engagement some company for accomplishing the ordinary public procurement of services is requested for a longer period and it requires substantional infrastructural and logistical means to be provided, in such cases, in order to be as competitave as possible, the international companies usually establish a local company, employing local personnel.

118. As possible modality for the Operating Entity selection will be also considered the decission of the Government to choose the company that will provide the requested services. This kind of decission will be based on the Governmental plans to increase the capacities of some public communal enterprice in order to be able to treat the contaminants beyond the project duration (keeping in mind that within the project scope only minor part of the pollution will be tackled), in a maner and arrangement that is most suitable for the Government.

119. Another possibility to select the Operating Entity is for the Government to establish a new public enterprice that will be specifically formed to clean the entire OHIS site and, according to the technology applicability, the other contaminated locations as well.

120. The parties (private or public sector) that is to be engaged as operating entity, i.e. service provider will need to invest in enhancing of their own capacities (infrastructure and logistics) by providing appropriate equipment, mechanization, analytical tools (e.g. X-ray fluorescent analyzer), personnel, etc. The Government/MoEPP will pay the operational costs incurred by the Operating Entity and will transfer the ownership of the technology to the Operating Entity after the finalization of the project. Having in mind that the project will seek the possibility that the selected technology to be applicable for broader spectrum of waste contaminants, this will increase the business potential of the Operating Entity. Moreover, the Operating Entity might use this technology in the countries in the region facing similar problems. The enhancement of the technical capacities in the country with the provision of the remediation technology, the transferring of the know-how and the successfulness of the remediation of 10,700 tons of the HCH waste and contaminated soil, can be a motivating factor for the Government to obtain additional resources for the continuation of the clean-up activities in order to have the OHIS contaminated site free from HCH waste and other hazardous contaminants and to revitalize the site for future industrial use.

121. The Government owns the OHIS contaminated land, but in the arrangements with the private sector, i.e. the operating entity, the Government might transfer the ownership of the treated land to the operating entity as an additional incentive measure for attracting the potential operators.

Output 4.4: Operating entity selected and established

122. The Terms of References (ToR) for the selection of the operating entity will be developed with the selection criteria including those listed below.

Box A5.2: Criteria for the selection of the operating entity

The eligible criteria for the operating entity will include the following critera, but not limited to: (i) existing waste disposal site; (ii) license to operate hazardous waste facility; (iii) experience in handling toxic wastes; (iv) trained and experienced staff; (v) provision of comprehensive services including packaging, transport and disposal of hazardous wastes; (vi) Quality Certificate (e.g., ISO, etc.) and/or other similar certificates, accreditations, awards and citations received; (vii) clean track record and free from penalties resulting from environmental infractions, (viii) commitment of investing its own resources and capitals for the clean up operation; (ix) realized profit in the last 5 years; and (x) total annual turnover in each of the last 5 years separately.

123. In case the operation service is not included in the UNIDO's contract in selecting a technology provider, the operating entity selection will be undertaken by the Government of Macedonia. The final selection of the operating entity will be made by the Government/MoEPP, Project Steering Committee, Ministry of Economy, and other relevant agencies or institutions in the country considering the set criteria and the country's policy.

Output 4.5: Operation and business plan prepared by the selected operating entity in consultation with the technical providers and all stakeholders and approved by the PSC

124. The site clean up operation and business plan will be further refined by the operating entity in cooperation with the technical service provider and the stakeholders with a purpose to provide sufficient directions and information on remediation activities. The Ministry of Labor and ILO will be considered as a partner to help address occupational safety and health and other worker rights considerations when designing the clean-up operation plan. This process will provide opportunities, through a consultation process with the selected technology provider/operating entity, to reflect the business challenges and financial planning into the refined clean up operation plans. It also needs to reassess measures on how to overcome the possible impairments and risks that might lead to violation of the safety operating conditions and in bankruptcy and subsequent cessation of the remediation work. The PSC will review and endorse the plan.

Output 4.6: Needed permits for the technology treatment installation (EIA, IPPC) obtained

125. The Chapter XII of the Law on Environment (Integrated Environmental Permits for Operation of Installations with an Environmental Impact) describes the process to obtain the permit. The needed permits for the installation and operation of the HCH disposal technology system will be obtained in a timely manner. The documents necessary for obtaining the environmental permits (EIA, IPPC, and Permit for storage and treatment of hazardous waste) will be prepared by elaborating the technical features of the technology, the treatment process, the measures to identify, eliminate and mitigate the risks and negative impacts on the environment and the human health that might arise from the treatment and storage activities at the operating entity. The application process for the permit requires the information sharing and consultation with citizens' associations established for the purpose of environmental protection and improvement for their feedback and comments, as articulated in Article 98 and 99 of the Law on Environment.

126. The environmental baseline will be set by carrying out the environmental monitoring before the clean up operation will commence. The details are described in Output 4.7.

Output 4.7: Monitoring program, system established at the location

127. A monitoring plan will be developed and established by the technical service povider and the operating entity for:

128. monitoring of the successful completion of the treatment by sampling and analyses of the treated soil and water samples;

129. monitoring of the environmental media for the eventual pollution during the remediation process i.e. controlling of the air emissions, liquid discharges such as effluents as well as regular medical check up of the workers of the operating entity;

130. post remediation monitoring, i.e. after the site has been remediated, there will be verification that it meets the regulatory requirements. Soil, sediment or water samples will be collected from the previous sampling locations, a laboratory analysis will be conducted, and comparisons will be made against the permissible levels of the contaminant of concern. The levels obtained from such testing must be below the permissible levels. If needed, long-term monitoring of the groundwater quality will be established using monitoring wells and sediment quality by chemical analysis.

131. The monitoring plan will be also referred to when setting the environmental baseline before the commencement of the clean up operation. A risk mitigation response plan to rectify the environmental levels will be developed in case environmental levels higher than pre-determined standards are detected from regular environmental monitoring.

Output 4.8: Clean up operation executed

132. The clean up operation will be executed either by the technology service provider or by the operating entity according to the previously developed remediation plan. The remediation plan will include: health and safety plan and operational risk analyses, which will put in place procedures for the safe operation and with the aim to identify, and mitigate for, all hazards and risks posed by the planned operations on the health and the environment; emergency plans in case of accidents; control measures to minimize fugitive air emissions, surface water control, as well as worker health and safety.

133. The remediation technology will be installed by the technology/service provider, and if the operating entity is going to be established, then the operating entity will provide all needed support for equipment installation. The acceptance report will be issued by the service provider as required by the UNIDO's procurement policy and the subcontract that will be issued by UNIDO. In case the technology provider and operating entity are separately selected, the subcontract for the technology provider will need to entail the technology transfer resources and activities including operation manuals, occupational safety know-how and operation training. In close consultation with the national executing partners, all the costs of the technology transfer resources and activities will need to be included at the time of the technology selection.

134. In case to purchase and deliver the technology to the Operating Entity, the technical service provider will train the operating entity personnel in proper handling of the remediation technology (technical aspect related to the maintenance, repair and operation of the plant), and on safety aspects related to the protection of the workers and environment during the operation.The technical service provider will accomplish the trainnig program with practical demonstration of the remediation activities by cleaning a certain amount (e.g. 500 tons) of the HCH contaminated soil. Such training may include on-site as well as a short-term training at the headquarters of the technology provider. The proposed training activities will need to be properly evaluated at the time of technical and commercial evaluation in order to select the technology provider.

135. Those quantities included in the project that can not be treated by the installed technology will be exported for final disposal to a subcontractor abroad during the project phase.

136. In order to secure the sustainability of the clean up activities beyond the project lifetime, the government should adopt a mechanism for continuous provision and generation of funds that are particularly needed after the project phase for ensuring the complete remediation of the contaminated site.

137. Several alternative approaches can be applied to establishing an effective financing system for remediation of contaminated sites in Macedonia. Selection of the most appropriate financing system should be made taking into account lessons learned by the international community while meeting the national conditions:

- The legal framework for environmental liabilities for past pollution;
- The stage of the privatisation process;
- The existing system of environmental financing;
- Experience with the operation of the Environmental Fund;
- Potential sources of revenue from pollution taxes and environmental fees;
- Potential sources of revenue from privatisation of state owned companies;
- Potential sources of funding from bilateral donors, international organisation and the EU;
- The existing human capacity for preparation and cleanup of contaminated sites;

138. The key principles that can be applied to develop an effective financing system include:

- The "polluter pays principles" - should be applied where feasible. Consequently, regarding the liability for past pollution the state should be liable for the cleanup;
- The principle of earmarking - revenues from various pollution & environmental taxes and user fees etc should be spent on the environmental management cost (including cleanup of contaminated sites);
- The principle of concentration of funding sources - ideally, all earmarked environmental funds and donor assistance funding should be concentrated in one Fund that will disperse the funds in an efficient way and at relatively low operating costs;

139. Within the project period, the total of 6,000 m^3 or 10,700 tons of HCH waste and contaminated soil will be disposed of.

Outcome 5: Project management structure established, and monitoring and evaluation conducted

This outcome will establish project coordination mechanism, i.e. functional groups responsible for project implementation, execution, supervision, monitoring, and evaluation. The evaluation of the efficiency and effectiveness of the project implementation will be adequately conducted according to the GEF's standard.

Output 5.1: Project results monitored and reported

140. This will include establishment of the Project Management Unit (PMU), consisting of National Project Manager, Assistant Project Manager and Project Specialist, who will be responsible for day-to-day coordination and monitoring of the project execution. In addition, a Project Steering Committee will be formed, i.e. decision making body of the project composed of members from relevant ministries, representatives from hazardous wastes management companies, and the NGOs.

141. The project progress will be permanently monitored towards the designed impact indicators. Project Reports enabling monitoring of project execution will be timely prepared. Please see the section B.1 for more details.

Output 5.2: Project evaluated meeting the GEF's evaluation criteria

142. Independent evaluations will be organized and adequately conducted according to the GEF's standard. Please see section C for more details.

A.6 Risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and measures that address these risks:

143. During the PPG phase a number of risks that may hamper the achievement of project goals were identified. Each of these risks and the measures taken by the project to mitigate that risk are shown in Annex A "Project Logical Framework". The summary of the risks and mitigation measures are described in Table 13.

Table 13: Summary of the identified risks and risks mitigation measures

Risks	Level	Mitigation measures
Outcome 1: Legal framework and institutional capacities to support, justify and evaluate the clean-up of the OHIS site contaminated by alpha-HCH, beta-HCH and lindane established, enhanced and enforced		
Delays in adoption of legal framework, specific policy and technical guidance may hamper execution and cause delay in the project implementation	L	Government officials are closely involved in project planning to ensure the new regulations are practical, enforceable, meeting the needs at the national governments and municipalities; Project staff will monitor, review and enactment of legal and regulatory measures and technical tools and provide the relevant counterparts with technical support;
Outcome 2: Characterization of the HCH contaminated site completed, risk assessed and risk management options defined		
Risk management options inadequate for achieving human and environmental protection	L	Involvement of accredited, licensed and experienced institutions in the site characterization, risk assessment site management option definition;
Outcome 3: Contaminated site clean up plan and strategies established and key stakeholders including local		

communities ready to cooperate		
Lack of interest of the public towards the awareness raising campaigns, which might result in reluctance among the public audience and the local community for initiation of the clean up activities	L	Identification of potentially conflicting stakeholder interests through involvement of stakeholders in the project design process;
Lack of private sector's interest to invest in setting the clean up infrastructure due to insecure economic conditions to guarantee sustainable financial input	M	Potential private sectors will be kept informed of the project updates and major decisions and the Government/local community will set conditions that atract private sector investment;
Outcome 4: Clean up operation initiated and the execution mechanism in place to sustain the clean up operations beyond the project period		
Opportunism, reluctance among the local community for establishing the eventual treatment facility	L	Round table discussions between the Government, local community authorities and NGOs with assurance that the facility will meet the highest safety standards and operate respecting the best working practices and procedures for protection of human health and the environment, supported by regular inspections and monitoring program;
Unavailability of the operating entity to continue with the remediation due to inconsistent financial input from the Government	M	Commitment letter from the Government secures cash flow for timely execution of the needed activities; Additional round table discussions with the Governemnt/comunal authorities and their inclusion in plans development process and continuous information dissemination on project decisions and progress;
High environmental and human health risk related to the climate change impact (temperature, rain, flood, wind, vulnerability to storms etc.)	L	Evaluation of the fluctuating atmospheric conditions (atmospheric temperature, rainfall regime, storm frequency and attendant drought/flood cycles), along with historical cases of how the site is affected by these conditions and the natural geological and hydrological features of the area; If the flood risk is indeed higher, the project will evaluate the cost-effectiveness of a project activity to secure the contaminated site from a possible flood occurrence;
High environmental risk during the treatment operations, i.e. accidents and environmental releases during clean up operations including excavation, treatment, handling, packaging and transportation of HCH wastes which will result in exposure of the operators and workers of the facilities and the community to the hazards of the contaminants	M	Frequent inspections ensure the Operating Entity to follow the best working practices in order to ensure safe handling and incident avoidance; Following the best working practices to ensure safe handling and incident avoidance and training on emergency preparedness and preparation of emergency prevention and response plans;
Outcome 5: Project management structure established, and monitoring and evaluation conducted		

Due to insufficient political will, administrative support and financial commitment of the government to the project delays may occur in completing and achieving the outlined tasks in a timely manner	M	High-level consultations, as well as civil society and NGOs could play a major role in regaining political commitment. The signed endorsement letter confirms the commitment of the Government. Additional fund raising activities and funds/donors will be sought;
Inefficient and ineffective project executions as well as monitoring and evaluation may cause delays in holding regular project management and M&E meetings and issuing required reports	L	Carefully selected and well-trained project staff will be appointed, clear mandate and impact indicators will assure compliance to the work plan and budget;

H-high; M-moderate; L-low

A.7. Coordination with other relevant GEF financed initiatives

144. Currently, under the implementation, there are several GEF financed projects in the Former Yugoslav Republic of Macedonia (see: http://www.thegef.org/gef/project_list?keyword=&countryCode=MK&focalAreaCode=all&agencyCode=all&projectType=all&fundingSource=all&approvalFYFrom=all&approvalFYTo=all&ltgt=lt&ltgtAmt=&op=Search&form_build_id=form-NXANiXo4FSc8_1SZJTEVtEbRQeZXFre4ZFi0TKcqkNI&form_id=prjsearch_searchfrm)

145. The Former Yugoslav Republic of Macedonia is currently finishing a POPs related project "Enabling Activities to Review and Update the National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants (POPs)" and this project will jointly establish synergy and will support the execution of the NIP update project.

146. This project has been identified as one of the top priorities in the updated NIP draft. The inventory in the updated NIP will receive the latest contaminated site inventory information collected during the implementation phase of this project.

147. The only UNDP project that has some links with the OHIS project is the regional project that is expected to start at the end of this year. The project for "Enhancing Capacity, Knowledge and Technology Support to Build Disaster and Climate Resilience in Armenia, Macedonia and Moldova" will increase institutional capacity, mobilize knowledge and transfer appropriate best-practice innovation technologies within the three countries: Armenia, Macedonia and Moldova. The project will particularly focus on strengthening collaboration between the urban centres (including two capital cities) of the three countries within the frame of the Global City Resilience Campaign, including Yerevan, Skopje and Hincesti. A number of innovative techniques and methodologies will be piloted/tested. These actions will support the development of a new dimension of international co-operation in the areas of disaster and climate risk reduction and contribute to a conceptual transition in Armenia, Macedonia and Moldova from a response-focused towards a more prevention-oriented approach.

B. ADDITIONAL INFORMATION NOT ADDRESSED AT PIF STAGE:

B.1 Describe how the stakeholders will be engaged in project implementation.

148. The PPG phase has identified the main stakeholders and their relevant roles and responsibilities, ensured a widespread consultation and participation at the national level, as well as meeting with possible co-funding partners. The same stakeholders will be involved in the exectuion of the FSP according to their respective roles and competencies. The main stakeholders will be participating in the project by contributing the identified co-financing resources. The key stakeholders are as follows:

149. The Executing Partner for the overall project will be the **Ministry of Environment and Physical Planning/POPs Unit** which acts as the national focal point for the Stockholm Convention and Project

Management Unit (PMU) of this project as described in the Project Monitoring and Evaluation section C. The MoEPP is the lead agency for the project and has taken its role to coordinate, participate, facilitate and monitor project execution at national level.

150. The **Ministry of Environment and Physical Planning (MoEPP)** is the main body of the public administration responsible for enforcement of the Law on Waste management, development of the Strategy on Waste Management and adoption of a Waste Management Plan, as well as development of secondary legislation linked to the Law on Waste. Several departments of the MoEPP are dealing with waste management: Sector for European Union- responsible for the development of regulations and standards; the Administration of Environment- responsible for implementation of waste management policy, as well as permitting and EIA procedure; the Environmental Inspectorate- responsible for inspection supervision over the implementation and enforcement of the Law on Waste; the Macedonian Environmental Information Center- responsible for monitoring, data gathering and data management; the Public Relations Department- public relations and awareness rising activities and the Department for Sustainable Development and Investment- responsible for overall coordination and development of strategic, planning and program documents for waste management and coordination and implementation of capital investments. The Ministry of Environment and Physical Planning is charged by law with leading the efforts of the country in the field of creation of the environmental policy and environmental protection and careful use of physical space and other natural resources. Following the guidance of the EU and other international waste management regulations, the Ministry is developing a comprehensive legal framework dealing with all types of wastes and all aspects of the waste management cycle. The most important objectives to achieve are waste prevention, recycling, as well as reducing the amounts of waste generated. A fundamental function for the MoEPP arising from the Law on Waste management is the involvement in developing and implementation, and reporting on the implementation of strategic, planning and program documents for waste management including: Strategy for Waste Management, Waste Management Plan, and annual programs for the implementation of the waste management plans. The MoEPP has an extended function regarding the adoption of new general and particular standards and regimes on: management of communal, inert waste, management of hazardous waste, waste oil and other categories of waste, construction and other conditions for landfills, incineration or co-incineration of waste, import, export and transit of waste throughout the territory of the country, etc.

151. In May 2002 the Ministry of Environment and Physical Planning established a body responsible for the implementation of the national activities dedicated to the reduction, elimination and control of POPs. The **POPs Unit's** first task was to coordinate preparation of the National Implementation Plan on POPs Reduction and Elimination. The Unit staff worked on different issues, starting from the establishment of the Steering Committee and selection and training of the working group members to the definition of the final structure of the NIP. After the adoption of the NIP by the Macedonian Government in 2005 (the document contains obligation for the "Ministry of Environment and Physical Planning", through its POPs Unit, to coordinate the activities towards implementation of the action plans in the NIP on POPs.), the POPs Unit undertook a number of activities towards implementation of the NIP's action plans. It prepares concrete projects related to the elimination of the different groups of POPs chemicals and participates in providing technical and financial support for the definition and realization of activities.

152. The MoEPP/POPs Unit gained great experience in the field of POPs, and generally chemical management through active participation in the execution of the following projects:

- "Energy Efficient Distribution Programme" – output on environmentally sound management/disposal of PCB containing equipment (LV and MV capacitors);
- "Phasing out of PCBs and PCB-containing equipment";
- "PPP - Establishment of the Management System for PCB contaminated electrical equipment in the Former Yugoslav Republic of Macedonia";
- Elimination of hazardous chemicals (DDT, MeBr, Cyclon B) stored in the Institute for Public Health in the City of Skopje;
- "Disposal of laboratory waste chemicals from the Institute of Public Health of the Former Yugoslav

Republic of Macedonia";

- "Public awareness activities for PCBs management";
- "Inventory Development and Initial Mainstreaming of the PCB Management within the National Policy Framework";
- "Mainstreaming Safe Management of Chemicals Considerations into MDG Based National Planning"
- "Establishment of Waste Oils Management System - Private Partnership Programme";
- "Feasibility Study for Remediation of HCH (Lindane) and Conceptual design for remediation of HCH (Lindane)";
- "Enabling activities to review and update the National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants (POPs) in Macedonia";

153. The **State Environment Inspectorate (SEI)** under the MoEPP is the central competent authority for inspection and supervision over the enforcement of laws and regulations in the area of environment. However, the inspectorate functions also exist in other Ministries and in the local government. The inspectorates are subject to significant resource constraints. The represenatives from the SEI will participate in the training of the environmental officers on sound contaminated sites management (Output 1.3), and will be responsible for random monitoring of the clean-up activities and monitoring of the export of the HCH waste and treatment by-products abroad (Output 4.8).

154. The **Ministry of Health** is responsible for the preparation of regulations on poison management. It participates in plant protection substance management, the procedure for classification of substances (new chemicals) in the group of poisons, and their inclusion in the list of approved chemicals. It is also involved in inspections. The Ministry of Health is responsible for the first stage of the registration procedure of new plant protection substances through toxicological analysis and classification in toxic groups. The analysis is undertaken at the Institute for Pre-Clinic and Clinic Pharmacology and Toxicology and the Institute for Toxicological Chemistry. The project will also involve the **Ministry of Health/Institute of Public Health** to ensure that the project intervention will be properly monitored for occupational health and safety of workers involved in the project activities as well as the exposure of residential communities in the neighborhood to the air-borne particles caused by the project activities (Output 1.4 and 4.7).

155. The **Ministry of Economy**, pursuant to the competences stipulated by Law, works on the creation of conditions for development of the industry, regulation of the internal market, development of the energy sector, creation of conditions for stimulating business and investment climate for growth of the business activities and investments, development of the entrepreneurship and the small and medium enterprises, use of the natural mineral resources, increase and promotion of the export, development of the public private partnership and development of tourism. It will be responsible for the eventual involvement and management of OHIS in this project, and for identification of the parties as potential operators (Output 4.3) and the selection of the same (Output 4.4).

156. **Ministry of Finance** is responsible to maintain stable public financing and stable macroeconomic framework so as to provide for continuation of the process if economic reforms and acceleration of the economic growth, contributing to better welfare and improvement of the living standard of the Macedonian citizens. It approves and disburses the governmental co-financing in cash during and after the project phase.

157. According to the 'Law on **Local Self-Government'** the local self-government units (LSGU) are competent for regulation and performance of affairs of public interest of local relevance, specified by the law. The Law also specifies the list of exclusive competences of the local self-government units, including environment and nature protection, protection from impacts for noises and odors, sewage treatment of public waste water, and collection, transport and treatment of municipal solid waste and technological waste. Given the fact that the decentralization is a very recent process, many weaknesses still need to be resolved – such as local financial resources, lack of technical capacity for inspection of 'Permit B' installations, roles and the distribution of responsibilities between the City of Skopje and its 10 municipalities.**Local Government** will be represented by the responsible officer working under the the City of Skopje acting as a

member of the Steering Committee .The municipality of Kisela Voda to which OHIS belongs with its location will be in direct communication with the POPs Unit for different aspects of the project execution (collaboration with City of Skopje, awareness raising of the municipality's population, etc.). The environmental officers from the Local Government will participate in the training of the environmental officers on sound contaminated sites management (Output 1.3), and will be responsible for development of the city development plan and zonning (Output 3.3) and for the arrpoval of the environmental permits for the technology installation and operation (Output 4.6).

158. **President's Office** will be continuously updated with the developments of the project through its nominated focal point for the purposes of the project. Its role will be to provide direct political support for the whole duration of the project execution.

159. If it will be decided to install the technology in the country, then one of the important issues that needs to be addressed is the selection of the **Operating Entity** (OE) of the technology that will be engaged/delivered by the project and will execute the main component of the project- the ESM and disposal of the HCH contaminated site at OHIS. Several companies already expressed their willingness to act as Operating Entity and consequently to invest in improving of their infrastructure, technical and personnel capacities in order to meet the regulatory acts and the safety standards and protocols for sound management of the contaminated sites. There could be several scenarios for the Operating Entity establishment: i) to select some private or state owned company to act as Operating Entity with sufficient logistical, technical and personnel capacities to perform the remediation. The company will receive from the project the treatment technology, while the operating costs related to the remediation will be covered by the government; ii) to form some company based on the PPP concept as a possible form of the cooperation between the private and state/local government institutions in order to obtain more "value for money", i.e. to produce reduced life-cycle costs, better risk allocation, faster execution of public works and services, improved service quality and additional revenue streams. This company will receive the treatment technology and will invest financial sources in enhancing their capacities for sound treatment, while the government will cover the operational costs for the clean-up of the foreseen quantities of the HCH contaminated soil.

160. **Ministry of Labour and Social Policy** (MLSP) is responsible for the issues related to professional exposure. The Law on labor protection, and also the gender issues. The focal point for the ILO gender equality Conventions under this Ministry and has direct communication and cooperation with the POPs Unit and the MoEPP in general. The Ministry of Labor and Social Policy and the ILO representative will be involved in the preparation and design of the clean-up plans in order to address occupational safety and health and other worker rights (Output 3.1 and 4.5) and also in monitorig and inspection of the clean-up activities related to the Occupational Health and Safety procedures and measures (Output 4.8).

161. Active contribution of, **NGOs, women's organization** and the **media** will be further encouraged towards as successful execution of the project, particularly in the domain of public awareness raising activity (Output 3.2), in the preparation of the legal acts and technical tools (Output 1.1) and participation in the public hearing when approving the environmental permits (Output 4.6). The **civil societies** identified so far include the Macedonian Ecological Society, the Macedonian Chamber of Commerce, and the Center for Climate Change. During the PPG phase, the experts and their roles and contribution were identified. The involvement of these civil society organizations will help the local community and vulnerable groups further understand the importance of the project intervention and how the project will clean up the contaminated site (Output 3.2). A particular attention should be paid to the environmental pollution risk caused by the project intervention (Output 3.1 nad 4.5), as well as the transportation risk of the processed contaminated soil to a final disposal site (Output 4.8). A gender mainstreaming considerations and activities will be also taken into account in designing the project activities through the NGOs assistance.

162.

le 14: Stakeholder responsibilities

Interventions	Responsibilities

Outcome 1: Legal framework and institutional capacities to support, justify and evaluate the clean-up of the OHIS site contaminated with alpha-HCH, beta-HCH and lindane established, enhanced and enforced	
Output 1.1: Legal acts and institutional and technical tools prepared to ensure the completion of the OHIS site clean up operations	**MoEPP, PMU, other ministries, Ministry of Justice/ regulatory commission, NC, contaminated sites owners, NGOs**
Output 1.2: Technical tools (guidelines, procedures, instructions) for contaminated site management prepared	**MoEPP, NC**
Output 1.3: Environmental officers, specialists, contaminated site owners and the potential contaminated site clean up operators trained on practical usage of the prepared guidelines, procedures and instructions	**MoEPP, Operating Entity, Local Self-Government**
1.4: Laboratory personnel trained for sampling and analyses standards and protocols for POPs/HCH	**MoEPP/SEI, MoH/IPH**
Outcome 2: Characterization of the HCH contaminated site completed, risk assessed and risk management options defined	
Output 2.1: Site characterization, i.e. detailed site investigation completed by sampling and analyses based on the sampling plan developed during the PPG	**MoEPP, NC**
Output 2.2: Survey of ground water for drinking and irrigation purposes conducted	**MoEPP, NC**
Output 2.3: Current risk assessment analyses updated and the risk management options defined	**MoEPP, NC**
Outcome 3: Contaminated site clean up plan and strategies established and key stakeholders including local communities ready to cooperate	
Output 3.1: Contaminated site clean up operation/remediation plan and groundwater management plan prepared for prevention of further contamination and adverse human health impact	**MoEPP, local community, NC, MLSP/ILO, Civil Society**
Output 3.2: Consensus among the general public and major stakeholders built for the establishment/improvement of the OHIS contaminated site	**MoEPP, Local Self-Government, NC, NGOs, Civil Society**
Output 3.3: City development plan and zoning	**MoEPP, Local Self-Government/City planning department, NC**

Outcome 4: Clean up operation initiated and the execution mechanism in place to sustain the clean up operations beyond the project period	
Output 4.1: ToR for the selection of the technology/service providers for the HCH contaminated site remediation prepared	**UNIDO, NC**
Output 4.2: Technology/service providers selected	**UNIDO, MoEPP**
Output 4.3: Parties (private sectors, state owned companies or PPP contractual agreement form) interested as potential operators identified and investors as potential clean up operators consulted	**MoEPP, MoE, Chamber of Commerce**
Output 4.4: Operating entity selected and established	**MoEPP, MoE, Government, NC**
Output 4.5: Operation and business plan prepared by the selected operating entity in consultation with the technical providers and all stakeholders and approved by the PSC	**Service provider, Operating Entity, NC, MLSP/ILO, Civil Society**
Output 4.6: Needed permits for the technology treatment installation (EIA, IPPC) obtained	**MoEPP, City Council**
Output 4.7: Monitoring program, system established at the location	**MoEPP, MoH/IPH, NC**
Output 4.8: Clean up operation executed	**Service provider, Operating Entity, MLSP, Civil Society, SEI**
Outcome 5: Project management structure established, and monitoring and evaluation conducted	
Output 5.1: Project results monitored and reported	
➢ Establishment of Project Management Unit (PMU)	**UNIDO, MoEPP/POPs Unit**
➢ Establishment of Project Steering Committee (PSC)	**UNIDO, Key stakeholders (MoEEP, Local community, NGOs)**
➢ Organization of Inception Workshop	**PMU, MoEPP**
➢ Measure project indicators	**PMU, PSC, UNIDO**
➢ Organization of the Project Closure Workshop	**PMU, UNIDO, MoEPP**
➢ Preparation of Annual Project Reports (APR)	**PMU**
➢ Preparation of Project Implementation Review (PIR)	**PMU, UNIDO**
➢ Preparation of Biannual Progress Reports	**PMU**

➢ Preparation of Periodic Thematic Reports	**PMU, UNIDO**
➢ Preparation of Project Terminal Report	**PMU**
Activity 5.2: Project evaluated meeting the GEF's evaluation criteria	
➢ Perform mid-term external evaluation	**Independent evaluator**
➢ Perform terminal external evaluation	**Independent evaluator**

B.2 Describe the socioeconomic benefits to be delivered by the Project at the national and local levels, including consideration of gender dimensions, and how these will support the achievement of global environment benefits (GEF Trust Fund/NPIF) or adaptation benefits (LDCF/SCCF):

163. **Socioeconomic benefits** through the introduction, transfer and application of new types of disposal technology in the country, generation of safe livelihood and gain of special expertise will result from the project, aside from the environmental and health benefits associated with disposal of HCH waste. The execution of the measures for reduction and control of POPs pollution and emissions will not only reduce or prevent their negative social effects, but will also, with the establishment of the Operating Entity in the country, create opportunities for new businesses connected to the disposal of the HCH and other waste flows, and will create opportunities for opening new jobs.

164. While it may be theoretically possible to apply cost-benefit analysis to the process, the lack of reliable baseline data and the controversial aspects related to the valuation of human life make such an analysis impractical. It is nonetheless absolutely clear that the social benefits from reducing damage to the environment and human health from releases of POPs pesticides will substantially exceed the costs associated with implementing this project, particularly due to the central location of the OHIS site in the current expanded residential area of Skopje. The fact that the air concentration of HCH at the Ministry of Environment and Physical Planning located in the middle of the capital is 10 times higher than the background concentration (Table 4) supports the argument that the benefits of this clean up operation will overweight the cost suggested in this project.

165. The OHIS site is nowadays partially dismissed, due to prolonged poor results and a number of economic and environmental reasons. Starting from 2009 up to 2013 the Government announced 11 biddings to sell the OHIS company, but without any positive result. In 2011 it was proposed for the contaminated part of the factory yard to be separated from the other operational part in order to facilitate the bidding and attract more potential investors. Even under this condition where the investor does not have any obligation towards the contaminated part of the OHIS premise the bidding produced no positive results.

166. With this project it is expected that the decontamination process will contribute toward the improvement of the property value and the reduction of the human exposure in the vicinity of OHIS and the City of Skopje to the more acceptable values than it is the case in the current period. As the long term project objective is to have the OHIS contaminated site free from lindane and other hazardous contaminants, which will enable the revitalization of the OHIS site for future industrial use, this will create positive ambient for attraction of future investments in that area leading to new employment opportunities.

167. **Gender Dimensions**: Efforts to ensure the sound management of chemicals, including Persistent Organic Pollutants (POPs), have important gender dimensions. In daily life, men, women, and children are exposed to different kinds of chemicals in varying concentrations. Biological factors — notably size and physiological differences between women and men and between adults and children — influence susceptibility to health damage from exposure to toxic chemicals. Social factors, primarily gender-determined occupational roles, also have an impact on the level and frequency of exposure to toxic chemicals, the kinds of chemicals encountered, and the resulting impacts on human health. Hence, gender awareness- raising activities will be a vital component of the

implementation of the project. Additonal sex-disaggregated data will be also collected in order to show which parts of the population are affected the most by the exposure to toxic chemicals.

168. Often, gender dimensions are considered to be 'women affairs', the widely accepted concept (and in line with UNIDO strategy on Gender Mainstreaming) considers "gender" to refer to the socially constructed rather than biologically determined roles of men and women (and children) as well as the relationships between them in a given society at a specific time and place. Gender mainstreaming means being equally concerned with the needs of women and men - which considerably vary in different contexts.

169. With respect to the management and disposal of POPs/HCH, it can be assumed that the majority of workers employed in the production, then waste management and disposal processes are men. On the other hand, women and children, who spend most of their time within their communities, might be at greatest risk from close proximity to POPs contaminated areas which was confirmed by the case study prepared at the Paediatric Clinic in Skopje. As part of the awareness raising activities particularly the one targeting the local residents, this project will emphasize its importance of being aware of the potential risks posed by agricultural products and groundwater in the vicinity of the OHIS site. In consultation with the human health expert who is a member of the Project Steering Committee, the awareness raising activities will be carefully designed to ensure the information will be passed to the vulnerable groups in the neighborhood in a sensitive and yet effective manner. As part of the proposed project, the protocols for sampling and analysis in different human matrices (e.g. blood and breast milk), will contribute to determining which populations are at the greatest risks of exposure to POPs chemicals.

170. These gender dimensions will need to be reflected at both site- and policy-level interventions for the sound management of chemical and the sound management of HCH in particular. The project will monitor gender balance in all aspects of the project execution including administration, technical experts, chemical analysts, transportation, waste management, and managerial positions and will ensure the management arrangements (e.g. composition of the project management team, implementing partners, Steering Committee) to promote gender balance.

B.3. Explain how cost-effectiveness is reflected in the project design:

171. The remediation of the HCH contaminated site will be heavily co-financed in cash and in-kind resources by the Government and the private sector parties through allocating financial sources and personnel for regulation development, and specialized trainings, operational costs related to the remedial activities, monitoring on compliance with the sound management practices, and carrying out local works required for the upgrade of the infrastructure and logistics. While these project components will be at activity level at medium cost for the GEF, the provided high co-financing will promise high cost effectiveness for the GEF funds to achieve impact.

172. During the disposal operations, the project will ensure striking a value for the use of allocated funds through careful planning of HCH's final disposal in terms of using international tenders to identify offers with the best value for the fixed budget. The cost assessment study on available disposal technologies, developed during the PPG phase, will be upgraded with new technologies and used for identification and selection of the cost-effective option. The technological option meeting BAT/BEP requirements, as well as this country's needs and capacities, will be selected based on the stakeholders' commitment that were identified during the project preparation phase.

173. Having in mind that a large share of the costs in the treatment/disposal projects belongs to the service provider staff costs (managers, technicians, etc.), with the selection of a domestic company that will act as Operating Entity, the operational costs related to the remediation activities will be drastically decreased in comparison to the remediation activities which are to be performed by the technology/service provider itself.

174. The project aims to provide a proven way for treatment of the HCH contaminated waste, and moreover, the project will seek the possibility that the selected technology will be applicable for broader spectrum of waste contaminants e.g. mercury, by which contamination is also significant at the OHIS site.

175. Other countries with economies in transition will benefit from this experience as they could adopt similar technologies. Moreover, the transfer of environmentally sound treatment technologies for the proper disposal

of HCH containing and other types of hazardous wastes will provide an inexpensive alternative to the owners of such wastes in Macedonia to properly treat the balance of these harmful chemicals within the country and to prevent releases of these chemicals into the environment.

176. The disposal cost during the project period will vary depending on the technological options described in Table 9. For the disposal of 10,700 tons the options 5 and 6 would be estimated to cost USD 60 cents/kg and 50 cents/kg, respectively.

C. DESCRIBE THE BUDGETED M &E PLAN:

177. Monitoring and evaluation will facilitate tracking execution progress toward the outcomes and objective. Likewise, it will facilitate learning, feedback, and knowledge sharing on results and lessons among the primary stakeholders to improve knowledge and performance.

178. Project monitoring and evaluation will be conducted in accordance with established UNIDO and GEF procedures and will be arranged by the project team and the UNIDO Headquarters in Vienna. The Project Logical Framework provides performance and impact indicators for project implementation along with their corresponding means of verification (Please see Logical Framework in the Annex).

179. This section of the project document presents a concrete and fully budgeted monitoring and evaluation plan of the project.

180. According to the Monitoring and Evaluation policy of the GEF and UNIDO, follow-up studies including Country Portfolio Evaluations and Thematic Evaluations can be initiated and conducted. All project partners and contractors are obliged to (i) make available studies, reports and other documentation related to the project and (ii) facilitate interviews with staff involved in the project activities

Table 15: Monitoring and evaluation plan

M&E activity	Responsible Parties	Budget US$	Time frame
Organize Inception Workshop	PMU, UNIDO, MoEPP	4,000	At project start
Regular monitoring and analysis of performance indicators	PMU, PSC, UNIDO	0*	Day-to-day
Prepare Biannual Project Progress Reports	PMU	0*	Biannually
Hold Project Steering Committee meeting	MoEDEP/EPA	13,100	Biannually
Prepare Annual Project Reports	PMU	0*	Annually
Prepare Project Implementation Reviews	PMU, UNIDO	0*	Annually

Prepare Periodic Thematic Reports	PMU	0*	As and when called by UNIDO
Carry out mid-term external evaluation	Independent evaluator	24,000	At mid-point of the project implementation
Organization of the Project Closure Workshop	PMU, UNIDO, MoEPP	3,000	Last month of project operation
Complete Project Terminal Report	PMU	0*	Within 3 months after the completion of the project implementation
Carry out final external evaluation	Independent evaluator	34,000	Within 6 months of completion of external evaluation
Total budget		**78,100**	

***- The costs are covered under project management costs**

Project Inception Phase

181. The project Inception Phase will involve the establishment of the Project Management Unit, appointment of the members of the Steering Committee, the project launching through an Inception Workshop (IW) and convening of the first Project Steering Committee (PSC) meeting.

- Establishment of Project Management Unit (PMU)

182. This will set up the project management unit, coordination links, definition of the responsibilities of each partner and monitoring and evaluation mechanism on the project progress, i.e. the measurement of impact indicators will be incorporated into the routine tasks of PMU so that the project execution status could be assessed against the indicators. It will establish a project team consisting of a National Project Manager, Assistant Project Manager and Project Technical Specialist. The job descriptions of these positions are provided in the Annex H.

183. The National Project Manager (NPM) will be engaged on a full-time basis, who reports to the Project Steering Committee (PSC) and UNIDO. NPM will assume overall responsibility for the successful execution of project activities and the achievement of planned project outputs. NPM will be responsible for overseeing the day-to-day management of the project and will ensure adherence to the work plan, which will be updated during the first phase of the project execution. His/her main responsibilities will include advising on, and monitoring of, all technical aspects of the project execution, as well as the financial review over the project execution. NPM will work in close cooperation with the POP's focal point and UNIDO project manager. NPM will be responsible for facilitating UNIDO's project monitoring duties, which includes preparing technical and financial reports to UNIDO and GEF, organizing meetings and appointments during field evaluations, and confirming the quality of the project's outputs.

184. The Assistant Project Manager will assist activities related to national coordination and stakeholder consultation. S/he will participate in day-to day activities related to project execution and provide assistance to the NPM, be responsible for daily communication with project partners and assigned project work (such as organizing workshops, meetings, trainings, preparation of minutes of the meetings and background documents), then to participate in project team and PSC meetings, and maintain day-to-day records of project execution.

185. The Project Technical Specialist will work in close consultation with key stakeholders i.e. ministries, government commissions, major private sector associations and NGOs relevant to the project and provide strategic guidance in her/his areas of expertise. S/he will ensure that highly technical documents are translated in a plain language understandable for the decision makers, stakeholders, and the broader public. S/he will propose candidates for the task teams and prepare the terms of references for their positions. Organize and/or provide, with international technical expert assistance, training and guidance to the task teams. S/he will be responsible for verifying the work for the various task teams, ensuring the technical validity of their work and products. S/he will be responsible for compiling the products of the task team work and for producing (with or without international technical expert assistance) the final reports as agreed with the NPM. The Technical Specialist will closely cooperate with the international expert in his or her field of expertise and provide the international expert with the necessary local support.

186. For the engagement of the Project Management Team Members UNIDO will issue contracts and reserve the right to choose the consultants.

- Establishment of Project Steering Committee (PSC)

187. The Project Steering Committee (PSC) that was established in the PPG phase will serve as the coordinating committee for the execution of this project and will be chaired by the Deputy Minister of MoEPP. This committee is the project coordination body of the project and responsible to provide recommendations to PMU which is operated under the responsibility of UNIDO. Relevant ministries, representatives of the owners of contaminated sites, representatives from hazardous wastes management companies, and the NGOs will become members of the committee in the implementation phase. The PSC will decide on the frequency of the meetings and its working procedures. The PSC will hold its regular sessions throughout the execution, but additional meetings can be held if necessary. The PSC will review, comment on, and endorse the work plan. All conclusions of the committee, such as respective responsibilities, timelines and the budget will be clearly communicated to PMU, other stakeholders and UNIDO as its recommendation. Some activities will be executed through subcontracts. Submitted tender documentation, contracts and Memorandums of Understanding between the Government and project partners will be reviewed and evaluated by the PSC in accordance with existing national procedures. Any major changes in the project plans or programmes will need to be processed following the relevant GEF policy. PSC members will facilitate the execution of project activities in their respective organizations, ensure that cooperative activities are implemented in a timely manner and facilitate the integration of project-inspired activities into existing programmes and practices. Representatives of key stakeholders and co-funding organizations not represented in the PSC will be invited to attend the PSC meetings as needed.

Project Execution, Monitoring and Reporting

188. One month before the starting of each execution year, the PMU will draft an annual work plan, complying with requirements and formats established for the first annual work plan at the inception workshop. The annual work plan will be submitted to UNIDO for review. The annual work plan will set the target against which project performance shall be measured at the end of each execution year.

- Measure project indicators

189. Day to day monitoring of project execution progress will be the responsibility of the National Project Manager based on the project's annual work plan and its indicators. The National Project Manager and Project Technical Specialists will fine-tune the progress and performance/impact indicators for the project in consultation with the full project team at the inception workshop. Specific targets for the first year execution progress indicators together with their means of verification will be developed at this workshop. These will be used to assess whether execution is proceeding at the intended pace and in the right direction, and will form part of the annual work plan. Targets and indicators for subsequent years will be reviewed annually as part of the internal evaluation and planning processes undertaken by the POPs Unit.

190. All the impact indicators will be monitored annually with effective means of verification. Indicators of project goal, progress and performance will be continuously monitored and evaluated throughout the whole project life. The PM, will inform UNIDO of any delays or difficulties faced during execution so that the appropriate support or corrective measures can be adopted in a timely and remedial manner.

- Preparation of Project Implementation Review (PIR)

191. The Project Implementation Review (PIR) is an annual monitoring process mandated by the GEF. It is an essential management and monitoring tool for project managers and offers the main vehicle for extracting lessons from ongoing projects. Once the project is under execution for a year, the project team and UNIDO shall complete the PIR. Costs for each step of cleaning operations will be included in the PIR.

- Preparation of Biannual Progress Reports

192. Following the UNIDO's technical cooperation guideline, this report outlining the main updates in project progress should be provided biannually to UNIDO by the project team.

- Preparation of Periodic Thematic Reports

193. As and when called for by UNIDO, the project team will prepare Specific Thematic Reports, focusing on specific issues or areas of activity. The request for a Thematic Report will be provided to the project team in written form by UNIDO and will clearly state the issue or activities that need to be reported on. These reports will be used as a form of lessons learned exercise, specific oversight in key areas, or as troubleshooting exercises to evaluate and overcome obstacles and difficulties encountered.

- Preparation of Project Terminal Report

194. During the last three months of the project, the project team will prepare the Project Terminal Report (PTR). This comprehensive report will summarize all activities, achievements and outputs of the project, lessons learned, objectives met (or not met), and structures and systems implemented. The PTR will be the definitive statement of the Project's activities during its lifetime. 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 activities.

- Organization of the Project Closure Workshop

195. The Project Closure Workshop will summarize the achieved results, obstacles during the project execution, lessons learned, the sustainability of the established contaminated site management system and recommended activities for further improvement of the management system.

Independent Evaluations

196. The project will be subject to at least two independent external evaluations as follows:

- Perform mid-term external evaluation

197. An independent Mid-Term Evaluation will be undertaken at the end of the second year of project execution. The Mid-Term Evaluation will measure progress made towards the achievement of outcomes and will identify corrections if needed. The evaluation will focus on the effectiveness, efficiency, and timeliness of project execution; highlight issues requiring decisions and actions; and present initial lessons learned on project design, execution and management. Findings of this review will be incorporated as recommendations for enhanced execution during the second half of the project's term. The organization, terms of reference and timing of the mid-term evaluation will be decided upon consultation with the key project stakeholders. The Terms of Reference for this mid-term evaluation will be prepared by UNIDO in accordance with the generic TORs developed by the GEF Evaluation Office.

- Perform terminal external evaluation

198. An independent Final Evaluation will take place within 6 months after the completion of the project implementation, and will focus on the same issues as the mid-term evaluation. The final evaluation will also review impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental goals. The Final Evaluation should also provide recommendations for follow-up activities. The Terms of Reference for this evaluation will be prepared by UNIDO in accordance with the generic TORs developed by the GEF Evaluation Office.

199. Legal Context

200. " The Government of the former Yugoslav Republic of Macedonia agrees to apply to the present project, mutatis mutandis, the provisions of the Standard Basic Assistance Agreement between the United Nations Development Programme and the Government, signed and entered into force on 30 October 1995.

201. According to the Monitoring and Evaluation policy of the GEF and UNIDO, follow-up studies including Country Portfolio Evaluations and Thematic Evaluations can be initiated and conducted. All project partners and contractors are obliged to (i) make available studies, reports and other documentation related to the project and (ii) facilitate interviews with staff involved in the project activities.

PART III: APPROVAL/ENDORSEMENT BY GEF OPERATIONAL FOCAL POINT(S) AND GEF AGENCY(IES)

A. RECORD OF ENDORSEMENT OF GEF OPERATIONAL FOCAL POINT(S) ON BEHALF OF THE GOVERNMENT(S):): (Please attach the Operational Focal Point endorsement letter(s) with this form. For SGP, use this OFP endorsement letter).

NAME	POSITION	MINISTRY	DATE *(MM/dd/yyyy)*
Daniela Rendevska	GEF Operational Focal Point	MINISTRY OF ENVIRONMENT AND PHYSICAL PLANNING	03/26/2013

B. GEF AGENCY(IES) CERTIFICATION

This request has been prepared in accordance with GEF/LDCF/SCCF/NPIF policies and procedures and meets the GEF/LDCF/SCCF/NPIF criteria for CEO endorsement/approval of project.

Agency Coordinator, Agency Name	Signature	Date *(Month, day, year)*	Project Contact Person	Telephone	Email Address
Philippe R. Scholtès, Managing Director, Programme Development and Technical Cooperation Division - PTC, UNIDO GEF Focal Point		12/08/2014	Fukuya IINO 	+43-1-26026-5218	f.iino@unido.org