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NEWSLETTER



7th issue, December in 2014

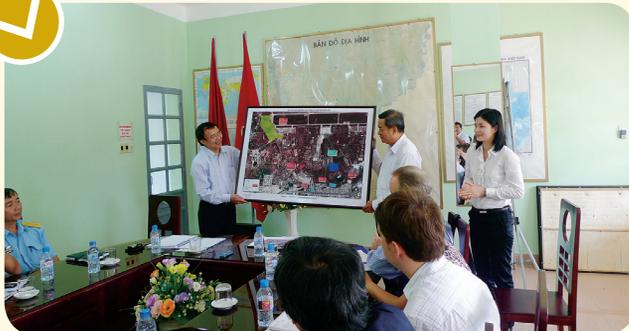
"ENVIRONMENTAL REMEDIATION OF DIOXIN CONTAMINATED HOTSPOTS IN VIET NAM" PROJECT

THE OFFICIAL LAUNCH OF THE PROJECT WAS ANNOUNCED IN THE INCEPTION WORKSHOP ON DECEMBER 15TH, 2010. THIS WORKSHOP ATTRACTED THE PARTICIPATION OF CENTRAL AND LOCAL STAKEHOLDERS, AS WELL AS INTERNATIONAL PARTNERS WHO HAVE INVOLVEMENT OR ARE INTERESTED IN THIS AGENT ORANGE/DIOXIN ISSUE IN VIETNAM. WITHIN 4 YEARS FROM 2010 – 2014, THE PROJECT HAS BEEN THROUGH A LONG WAY WITH SIGNIFICANT ACHIEVEMENTS, WHICH ACTIVELY CONTRIBUTE TO THE OVERALL FOUNDATION OF OVERCOMING CONSEQUENCES CAUSED BY AGENT ORANGE/DIOXIN IN VIETNAM. IN THIS LAST ISSUE OF THE PROJECT'S NEWSLETTER, MAIN ACTIVITIES ARE HIGHLIGHTED THROUGH THE FOLLOWING IMAGES.

4 MEMORABLE YEARS GEF/UNDP FUNDED DIOXIN PROJECT

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Meeting with local authorities in Bien Hoa (Photo by PMU, 2011)

In early 2011, a field trip at 3 hotspots (Da Nang, Phu Cat, Bien Hoa Airbases) was organized. During this trip, dioxin contamination maps were handed over to local stakeholders.



Meeting with partners in the end of 2011 (Photo by PMU, 2011)

Over 4 years of implementation, the Dioxin Project has periodically organized meeting with partners involving in Agent Orange/ Dioxin issue in Vietnam.



Research team was drilling to get core samples in Bien Hoa Airbase (Photo by PMU, 2011)

Under the GEF/ UNDP Dioxin project, investigation on contamination status was carried out in Bien Hoa and Phu Cat Airbases in 2011.

**GEF/UNDP FUNDED
 DIOXIN PROJECT**
**MEMORABLE
 YEARS**



Technical workshop on dioxin remediation options in Phu Cat Airbase (Photo by PMU, 2011)



The Landfill in Phu Cat Airbase (Photo by PMU, 2012)

In 2012, a landfill to isolate dioxin contaminated soil was constructed and completed at Phu Cat Airbase. The design of landfill is compliant with national and international regulations. This construction contains 7,500 m³ of contaminated soil, prevents further spreading of dioxin into the surrounding environment, and ensures the safety for airbase officials, soldiers and residents living in this area. The completion of the landfill was recognised as one of Vietnam's top ten environment events in 2012 by prestigious environment journalists.



Site investigation in Thua Thien Hue Province (Photo by PMU, 2011)



Site investigation in Lam Dong Province (Photo by PMU, 2012)

In the period of 2011 – 2013, investigations on sites suspected to be contaminated with dioxins, excluding three hotspots. Surveyed provinces include Thua Thien Hue, Lam Dong, Gia Lai, Kontum, Can Tho and Long Xuyen.



MCD pilot system was set up in Bien Hoa Airbase (Photo by PMU, 2012)

In 2012, MCD technology by EDL was demonstrated to remediate dioxin contaminated soil in Bien Hoa Airbase. Its results were presented in related workshop in January 2013.

**GEF/UNDP FUNDED
DIOXIN PROJECT**

**MEMORABLE
YEARS**



Interim measure facility in Pacer Ivy area (Photo by PMU, 2013)

During the year 2013 – 2014, interim measures to prevent dioxin migration into surrounding areas was implemented in Bien Hoa Airbase. Those measures were applied in Pacer Ivy, North Western, Western and North-western areas and in Mr. Binh Lake.



Short training course on MCD technology (Photo by PMU, 2012)

Training courses were organized under the GEF/UNDP funded project, with the aim of strengthening capacity of officials currently working in Agent Orange/Dioxin area or other related issues.



Participants of the MCD technology training course visiting Bien Hoa Airbase (Photo by PMU, 2012)



Training course for local communication collaborators in Bien Hoa, October 2013 (Photo by PMU, 2013)

Beside technical activities, communications are also a part of the GEF/ UNDP funded project to improve awareness on dioxin, including organization of workshops and communication campaign. In 2013, communication programmes on dioxin issue were organized in Bien Hoa Airbase, receiving positive responses from local authorities as well as local communities.



International workshop: «Sharing Lessons - Learned: Dioxin/POPs Pollution Assessment and Remediation in Vietnam» (Photo by PMU, 2013)

EVALUATION ON EFFECTIVENESS OF COMMUNICATION ACTIVITIES CARRIED OUT IN BIEN HOA BY THE PROJECT “ENVIRONMENTAL REMEDIATION OF DIOXIN CONTAMINATION HOTSPOTS IN VIETNAM”

**Nguyen Thi An,
National Consultant**

During the Vietnam War, the US Army used 95,112,688 kg of herbicides were sprayed on 2.63 million ha, accounting for 15.2% total area of the South of Vietnam, and seriously destroyed the ecosystem, the environment and the health of millions of local people . The three military airbases, specifically Bien Hoa, Da Nang and Phu Cat airbases have been identified as the key dioxin “hotspots” where dioxin contaminations exceed national and international thresholds.

The Government of Vietnam, Vietnam Ministry of Defence, the Vietnam – Russia Tropical Center, Office of National Steering Committee 33 and a number of international organizations such as USAID, UNDP, and the Ford Foundation, etc. have carried out a number of researches and activities to overcome consequences due to dioxin residue. Together with technical activities to prevent dioxin spreading and reduce dioxin levels at hotspots, the communications for dioxin exposure prevention was implemented by the Dioxin Project (under the management of Office of National Steering Committee 33) funded by GEF/UNDP Vietnam in November 2013 at Bien Hoa. According to the Office of National Steering Committee 33, high population density is the reason for Bien Hoa to be considered as one of the serious contaminated areas, the area with high risk for people’s health due to dioxin contamination and should be considered as the first priority.

The communications aims at the following objectives: (i) Awareness raising for the management and communications organizations, and community regarding dioxin negative impacts and prevention methods for dioxin exposure at Bien Hoa Airbase and the surrounding areas; (ii) Behavior change, risk mitigation of dioxin exposure of the community living at the dioxin contaminated areas; and (iii) Improving communications skills for the project collaborators. Accordingly, participants include a large number of project management staff, presenters, communications experts, representatives of relevant departments and sectors, communications agencies, the airbase staff, pupils, residents living around the airbase and the project’s collaborators. Some local organizations also participated in the implementation such as Bien Hoa City People’s Committee, Dong Nai DONRE, Dong Nai Healthcare Department and the Center of Medical Preventive, The Department of Culture –

Information - Sports, Dong Nai DOLISA, Dong Nai Department of Education, Women Union, Farmer Union, Youth Union, people’s committees of Trung Dung, Buu Long, Tan Phong and Quang Vinh wards in Bien Hoa City, staff working in the airbase and representatives of mass media and communications agencies.

With the participation of the representatives of from different organizations and residential areas, various types of communications have been used depending on the participants. The model has spreading effect from those who participated directly in the communications activities. Workshops and trainings were organized for representatives of management organizations, mass media, social organizations and schools. Communications collaborators were selected from local social unions and staff of local clinics to join the communications trainings. A model communications session was carried out to provide communications skills for propagandists so as they could address well the relevant issues in terms of

¹ The Comprehensive report on the three hotspots: Bien Hoa, Da Nang and Phu Cat Airbases, Office of National Steering Committee 33, 2013
² <http://pops.org.vn/>



Communication materials issued by GEF/UNDP Dioxin Project (Photo by PMU, 2013)

communications to residential areas through group and team meetings. Besides, activities such as specialized talks, music sessions integrated with Agent Orange/dioxin prevention propaganda organized at schools with participation of a large number of pupils and teachers. The Q and A was enthusiastically participated by the pupils, contributing to the awareness raising and understanding about dioxin issues. Dioxin knowledge was planned to be integrated into extra curriculum hours as well as a number of curriculum hours with related contents.

Messages that the Dioxin Project would like to pass to local communities as well as relevant organizations and sectors include: (i) providing information about contamination status at Bien Hoa; (ii) Exposure pathways and prevention methods; and (iii) and communications skills. To transfer these contents effectively, apart from diversified communications activities, the project designed a series of communications publications, namely:

- The 50 Q and A handbook about dioxin;
- Communications handbook about dioxin and Agent Orange/Dioxin exposure prevention with the communications contents and communications skills;
- Compilation book on legal documents related to dioxin

including environment and healthcare documents;

- Large posters: Prevention methods for Agent Orange/Dioxin exposure;
- Leaflets on prevention methods for Agent Orange/Dioxin exposure delivered to households/military staff living in and around Bien Hoa Airbase;
- Leaflets on labor safety for workers working in construction work in dioxin contaminated areas at Bien Hoa Airbase;
- Time tables with illustrations and messages providing prevention methods for Agent Orange/Dioxin exposure delivered to secondary school pupils;
- Small handbooks are designed as a picture handbook with short daily stories providing prevention methods for Agent Orange/Dioxin exposure delivered to secondary school pupils;
- The radio contents providing prevention methods for Agent Orange/Dioxin exposure;
- Signage for dioxin contaminated areas;

These communications products are all simply designed, easy to understand, colorful and convenient so as to bring about fundamental messages to local people and thus, helping them to understand and apply in daily life to prevent exposure to dioxin.

Six months after the implementation of the communications campaign, an independent evaluation was carried out to identify the impacts of communications to local communities at Bien Hoa. The evaluation results show that there has been positive difference in areas with and without communication activities, before and after communications campaign. Local people understand clearly the following fundamental items: (i) accumulation levels and spreading ways of dioxin in media such as soil, sediment, water, the air and in flora and fauna, (ii) understanding about exposure pathways (through digestion, derma contact, blood and respiration, etc), (iii) prevention method to ensure minimum dioxin impact if any in daily life. As understanding dioxin issues, local people in Bien Hoa all have been aware and applied ways to prevent dioxin exposure. Although in fact, local people and local authority face a lot of difficulty regarding identifying food sources and clean water.

Communications activities implemented by Dioxin Project also provide understanding about some dioxin related illnesses for prevention. Besides, families with people exposed to Agent Orange/Dioxin have the opportunity to receive benefits from government policies that the project has compiled in



Communication workshop "Raising awareness on prevention of Agent Orange/Dioxin exposure" in Bien Hoa, October 2013 (Photo by Dioxin PMU, 2013)

THE NATIONAL REPORT ANNOUNCING DIOXIN EMISSION AND DIOXIN IN THE ENVIRONMENT

The Dioxin Project Management Unit

After surveys and studies on dioxin emission and dioxin in the environment, the Office of National Steering Committee 33 and the Project Management Unit (PMU) of the "Environmental remediation of dioxin contaminated hotspots in Vietnam" Project (Dioxin Project) have completed the national report announcing dioxin emission and dioxin levels in the environment.

The report comprises survey and study results of dioxin emission and dioxin in the environment completed by the Dioxin Project during 2013 and 2014 and the results from other researches and projects of the same field so far. The report provides overall, sufficient and up to date information regarding dioxin emission from industrial sources and dioxin in the environment in Vietnam; information about industrial activities with possibility of dioxin emission, dioxin concentration at industrial subjects such as exhaust, wastewater, solid waste samples, etc. and objective analysis, assessments in comparison with dioxin contamination levels in different areas and from different sources; referring and comparing with dioxin thresholds as regulated by other countries and international organizations; the dioxin levels in the environment are also analyzed and considered.

Nearly 200 samples for dioxin emission were collected

from the North and Center of Vietnam such as Hanoi, Nam Dinh, Thanh Hoa, Thai Nguyen, Hai Duong, Quang Ninh, Lao Cai and Nghe An provinces and from the South at Bien Hoa under close cooperation between the Dioxin Project and national experts. The key types of industries with high risk of dioxin emission were selected including the most available types such as waste incinerators, metal manufacturing and recycling, thermal power, brick production and further specifically are those areas in boilers. For each typical field, the national experts selected the production units with high risk of emission basing on their capacities and particular conditions (applications of old or new technologies, etc).

To complete this national announcement report, the Office of National Steering Committee 33 organized a workshop to collect ideas and comments from partners, businesses under cooperation with the Project so as to obtain a more comprehensive ideas for the completion. The

report has also managed to provide a roadmap for the solution minimizing dioxin emission into the environment as well as the applications of mitigation methods for a number of industries with high risk of emission. For the first time, the baseline data of dioxin in Vietnam have been announced. This has not only reflected the current dioxin emission status but it is also an important basis to provide recommendations for the completion of national regulations on dioxin emissions, leading toward the long term objectives of controlling, mitigating emission and completely eliminating dioxin from the environment. It will also support regulations, standards on dioxin emissions for industries developed by the Ministry of Natural Resources and Environment in cooperation with other organizations to becoming effective legal and powerful instrument in environment protection and appropriate for the actual condition in Vietnam.

its Q and A handbook. Such documents are effective type of communications to help local people access to relevant legal documents and policies.

Currently, apart from information from newspapers and televisions nationwide, dioxin messages and prevention methods are still being spread out at communes and wards that the project conducted its campaign through integrated activities at different levels and through the radio system periodically by the communal people's committees. Simultaneously, propagandists and local staff remain as key people to carry out communications activities for dioxin prevention through group meetings at their

residential clusters.

The Dioxin Project together with UNDP and other partners have put their effort to contribute practical and significant support in

a long term and hard work regarding overcoming dioxin contamination consequences after the war at dioxin hotspots in Vietnam, thus helping to bring about safe and peace life for local people.



Communication programme for students of Hung Vuong Secondary School in Quang Vinh Commune, Bien Hoa City, Oct 2013 (Photo by PMU, 2013).

COMBINED CHEMICAL & MICROBIOLOGICAL TREATMENT OF DIOXINS (PCDD/F)

INTERMEDIARY RESULTS OF LABORATORY SCALE TREATMENT OF CONTAMINATED SOIL FROM BIEN HOA AIRBASE / VIET-NAM

Dr. Frank KARG: Scientific Director of HPC Group International, HPC Envirotec SA / France & HPC AG / Germany

INTRODUCTION

Poly-chloro-dibenzo-para-dioxins and furans (PCDD/F or shortly named "Dioxins") are very well known for their very toxic chronic effects, since the "Seveso" accident in Italy (2,3,7,8-TCDD in 1976) and the Dioxin contaminations from "Agent-Orange" use during the Viet-Nam War.

Samplings of contaminated soil were conducted by the Office of National Steering Committee 33, MONRE and the Vietnam-Russian Tropical Centre. After realization of Dioxin & Herbicide Analyses by the Laboratory "AsureQuality Ltd." in New Zealand, the Office 33 of MONRE (Ministry of Natural Resources and Environment of Vietnam) had sent these samples to HPC Envirotec SA in France for Combined Chemical & Microbiological (CCMT)

Treatment in a specialized laboratory, under control of HPC Envirotec / France and HPC AG / Germany.

According an Agreement with the Office 33, a Technology Demonstration was realized to show, that simplified soil treatments (in-situ and/or on-site) with bio-chemical treatment strategies concerning PCDD/F are possible for low costs. During the laboratory test, the best (combined) chemical and biological treatments for on-site and in-situ remediation are determined. The goal is also, to demonstrate that it's possible to apply those treatments "easily" by Vietnamese Governmental Services and Vietnamese Companies. In Vietnam, Dioxin Limit Value of 1,000 ng/kg I-TEq/kg would be the remediation target. In option, a better one could be

even in maximum 100 to 300 ng/kg TEQ/kg of PCDD/F.

The following descriptions are showing the intermediary CCMT-Treatment results after nearly 3 month of treatment.

MATERIALS & PROCEDURES

The Laboratory CCMT-Experiments were performed by the use of following products and procedures:

- Experiment A1 (MP-2-3): Original soil mixture, no further addition but storage under the same conditions as all other samples B1 – C3 (temperature, moisture, handling etc.) = Testimony "0-Treatment Sample".
- Experiment B1 (MP-2-1): Original soil mixture plus lactate & carbon coated zero valent iron (ZVI) with water, no further addition but storage



Fig.1: Treated Soil Layers of 10 – 15 cm (Photo by HPC, 2014)



Fig.2: Application of Treatment (Photo by HPC, 2014)



Fig.3: Raking after application of Additives (Photo by HPC, 2014)



Fig.4 a, b & c: Measuring of pH and Redox (Eh) (Photo by HPC, 2014)



under the same conditions as samples A1 & C2 (temperature, moisture, etc.).

- Experiment B2 (MP-2-2 & MPD-3-2): Original soil mixture plus persulfate ($\text{Na}_2\text{S}_2\text{O}_8$) with water (MP-2-2) and addition of ONE* and BioClean-265** (MP-3-2).

- Experiment C1 (MPD-2-5): Original soil mixture, added donators (vegetable oil emulsion) plus persulfate, and immediately neutralization to destroy persulfate and addition of ONE* and BioClean-265**.

- Experiment C2 (MPD-2-6 & MPD-3-6): Original soil mixture, added donators plus persulfate, neutralization to destroy persulfate (MP-2-6), then addition of ONE* and BioClean-265** (MPD-3-6).

- Experiment C3 (MPD-2-4): Original soil mixture, added donators* plus coated zero valent iron, no further addition but storage under the same conditions as samples A1 – C2 (temperature, moisture, etc.).

* ONE (Vegetable Oil Nutrient Emulsion)** BioClean-265. Microbe Consortium, generated from the original soil samples provided.

The CCMT-Treatment was realized on 10 – 15 cm Soil Layers (cf. Fig.1) once a week

by using the ZVI- and Sodium Persulfate, Persulfate Activators (lime or $\text{Ca}(\text{OH})_2$ or NaOH), Water and after vegetable oil emulsion (ONE) and a soil sample specific cultivated bacteria consortium mixture (cf. Fig. 2). After the soil is raked (cf. Fig. 3). The goal of the CCMT-Treatment is to use for later on-site Treatments ordinary agriculture devices on-field. For this reason the same context was simulated in the Laboratory. During the treatment pH and Redox potential (Eh) were controlled to ensure best Dioxin degradation conditions (cf. Fig. 4 a, b & c): pH for the best chemical Treatment and Eh for the microbiological treatment.

RESULTS

After nearly 3 month of CCMT-treatments once a week (from May to July 2014) the intermediary Dioxin results showed, compared to the average “in-come” analyses results (13,300 ng/kg of Dioxin WHO-TEQ) a maximum Dioxin degradation of nearly the half (minus 47,4 %) for sample MPD-2-5: ONE & BioClean (7,013 ng/kg WHO-TEC), cf. Table 1.

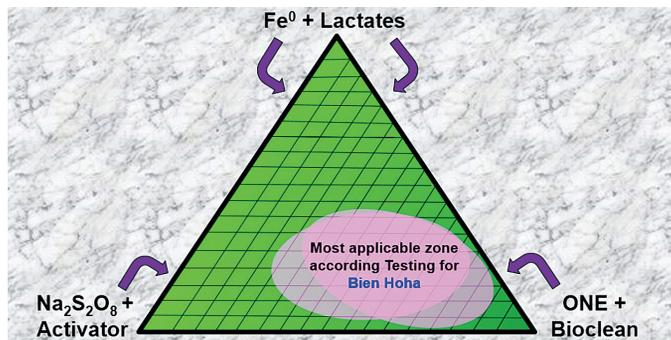
PROJECT CONTINUATION

For the project continuation it's planned to continue the 3 best soft CCMT-Treatment Procedures for further 3 – 4 months to End of November 2014 and to reach the Dioxin Remediation Goal of < 1,000 ng/kg WHO-TEQ. After this period on field applications (on-site and in-situ) at the Bien Hoa site can be also realized and even tested with Vietnamese Ingredients (as Vietnamese vegetable oil emulsions, etc.). The goal is to treat as simple as possible (for ex. with normal agriculture devices for product use, water irrigation and raking, etc.) and for lowest costs.

In every case, prior to applications on different sites a feasibility study in Laboratory has to be realized to identify the best Ingredient applications (ZVI, Persulfate, ONE and Bacteria) for each soil with its specific characteristics, as pollutants (PCDD/F, POP-Pesticides, etc.) concentrations, Carbonate and organic Carbon content, water and mineralogical constitution (cf. Fig. 4.). This will ensure the best Treatment results.

Fig. 4: Site specific CCMT applications: Example Bien Hoa Soil:

Use of ZVI (Fe^0) & Lactates, Persulfate ($\text{Na}_2\text{S}_2\text{O}_8$) & Activators, Vegetable Oil Emulsions (ONE) and site & soil extracted and cultivated specific Bacteria Consortia.



Substance	Sample ID											
	Sample name	Unit	155606-7*	155606-8*	155606-9*	Average 155606-7,8,9	140870242	140870243	140870244	140870245	140870246	140870247
PCDD/F		Office 33/ASURE	Office 33/ASURE	Office 33/ASURE	Office 33/ASURE	MP-2-1***	MP-2-2***	MP-2-3***	MPD-2-4***	MPD-2-5***	MPD-2-6***	
						HPC/SGS	HPC/SGS	HPC/SGS	HPC/SGS	HPC/SGS	HPC/SGS	HPC/SGS
2378 TCDF	ng/kg	137	140	114		100	80	110	110	78	85	
2378 TCDD	ng/kg	13.500	14.800	11.000		8.600	8.700	12.000	9.700	6.900	9.000	
12378 PeCDD	ng/kg	103	112	89,7		62	210	140	68	55	130	
123678 HxCDD	ng/kg	166	188	149		130	400	150	140	110	150	
1234678 HpCDD	ng/kg	1.360	1.480	1.350		910	830	1.200	1.100	970	980	
1234678 HpCDF	ng/kg	166	178	166		160	130	160	150	140	150	
OCDF	ng/kg	275	277	277		290	200	240	190	170	290	
OCDD	ng/kg	8.370	8.820	9.120		7.100	6.500	8.700	7.200	6.200	6.100	
Total WHO-TEQ	ng/kg	13.700	15.090	11.200	13.330	8.723	9.007	12.213	9.836	7.013	9.194	
Percentage of Reduction to aver,						-34.6%	-32.4%	-8.4%	-26.2%	-47.4%	-31.0%	

Table 1: Initial Dioxin analyses Results and Dioxin analyses results after the first 3 months of CCMT-Treatment (Bien Hoa)

ENVIRONMENT ASSESSMENT IN BIEN HOA AND 10 TO-DO THINGS



Z1 Area, Bien Hoa Airbase (Photo by PMU, 2014)

**Assoc. Prof. Dr. Le Ke Son,
National Project Director**

Dioxin remediation at Da Nang and Bien Hoa airbases can be considered as the key assignment in overcoming the Agent Orange/Dioxin consequences for the Environment in Vietnam.

Regarding the dioxin contamination status in Da Nang, according to the plan by Vietnam Ministry of Defence (MOD) and the United States Agency for International Development (USAID), by 2016, the dioxin remediation will be completed. Up to now, almost half of the work has been completed. However, there remain questions to be addressed such as the quantity of activated carbon for absorbance of dioxin from exhaust, wastewater, especially when the dioxin amount from exhaust is significantly higher than previously experienced and which technology will be used to remediate the activated carbon, the location for such treatment and also the cost?

For dioxin remediation in Bien Hoa Airbase, although a lot of questions have been addressed, further data is still required while more questions need to be answered. Addressing such additional questions and providing such answers are indeed the fundamental contents of environmental assessment for dioxin contaminated areas at Bien Hoa Airbase.

Environmental Assessment (EA) is a scientific and legal basis as regulated by the US Government for an approval

of project on environmental remediation and improvement. Such regulations are partly similar and partly different from the legal regulations by the Government of Vietnam. For Vietnam, Environment Impact Assessment or EIA is the legal basis for approving a project of environmental remediation or improvement or projects which have impacts on the environment. Although the contents of these two reports are somehow similar, the preparation timeline of these reports are at different stages. EA is prepared initially and is the prerequisite for a project to be developed. Nonetheless, only when the project is developed, the EIA will be prepared (so as to have adverse influence on the project if required) and it is the condition for the project to be finally approved. Key contents from the EA for Da Nang dioxin remediation project (issued by USAID via CDM) are used for EIA prepared by the MOD. The two environmental legal systems have been incorporated in the dioxin project for Da Nang Airport.

Therefore, clarification of such fundamental items regarding the environment and dioxin contamination remediation at Bien Hoa as follows will provide key

contents for EA and EIA in compliance with the US and Vietnam's legal regulations:

1. The dioxin contamination history at Bien Hoa Airbase: Dioxin contamination at Bien Hoa Airbase is due to storage, transportation, handling and washing of aircraft after spraying missions under Operation Ranch Hand; destruction of equipment and vehicles for transportation of such substances under Operation Pacer Ivy and especially the spillage incidents as the results of herbicide tank with large capacity breakage.

2. Assessment of dioxin residue at Bien Hoa Airbase: with research results by the MOD and the Office of National Steering Committee 33 (with cooperation with researchers under the Environmental remediation of dioxin contaminated hotspots in Vietnam Project funded by the Global Environment Facility (GEF) via UNDP, the National research program on dioxin, Hatfield Consultant and Ford Foundation), it is estimated that around 200,000m³ of contaminated soil and 40,000m³ contaminated sediment requiring remediation. It should be noted that dioxin penetration and spreading at Bien Hoa Airbase

is much more complicated than it is at Da Nang Airport due to spillage incidents during the war and thus, the quantity of soil for remediation may exceed the above estimation.

3. Assessment of dioxin spreading at Bien Hoa Airbase: the pond and lake system at Bien Hoa Airbase is very complicated while runoff to the surrounding areas occurred for decades. Hence, there are still areas outside the airbase with dioxin levels exceeding the national thresholds. It is essential that the controlling and remediation of dioxin both in and outside the airbase should be mentioned in the EA and EIA.

4. The Z1 Project (the project having contained around 94,000 m³ of dioxin contaminated soil by the High Command of Chemistry in 2006-2008), the sustainability and the impacts of the project on the environment at Bien Hoa Airbase: Technical documents, the process for evaluation of the Z1 project results should be input in the EA and EIA. It is also necessary to consider the possibility for complete remediation of the contaminated soil in Z1 landfill should there be a desire for a complete remediation at the airbase.

5. The Z2 Project (the Project aims at containing dioxin contaminated soil and sediment near Z1 area which has been approved by the MOD), the scale, technology, progress, sustainability, the relation with the general plan and its impact

to the surrounding environment: this content may change the plan for Z2 project by the Ministry of Defence. Yet, there still requires consideration basing on scientific consideration and actual condition of the overall remediation of dioxin at Bien Hoa.

6. Selection of soil and sediment remediation technologies for Bien Hoa Airbase: Perhaps, containment in landfill should not be mentioned for dioxin treatment at Bien Hoa as this method is not a complete treatment and also there should not be likely three “dioxin graveyards” located at one area which is not very far from residential areas. It is possible that thermal desorption destruction method can be used as it is currently being applied for Da Nang Airport or a combination of several methods to completely solve the issue and also fit the budget restraint.

7. Environment, environmental health and community health assessments of communities living around the contaminated areas and areas receiving the project impacts: There has been relatively number of dioxin residue at surrounding areas, dioxin contents in some foods, blood and fat of those exposed to dioxin and the illness conditions in the area. Yet, there is a need for a complete compilation, additional studies and more comprehensive assessments.

8. Environmental monitoring should be developed into

midterm and long term plans and implemented during the project period and post project period. Dioxin monitoring of dioxin in the air, wastewater and underground water should be considered as the key items of the monitoring program.

9. Environmental incident and addressing: The most serious environmental incident that attracts the most attention will be the spillage carrying dioxin contaminated sediment in case of storms, floods during remediation process.

10. Land use plan and environmental recovery plan for treated soil: This content is in association with the idea whether or not this airbase will be transferred to an international airport and when it has expanded runways and taxiways. In the long run, a military airbase which is too close to a large urban area such as Bien Hoa City will not be appropriate and then, soil environment should be considered for recovery for urban and commercial use.

The above stated items are very complicated, especially in terms of scale and contamination levels, remediation for Z1 and Z2, remediation of surrounding contaminated areas, selection of suitable technologies. Yet, they require fully satisfactory answers so as EA and EIA to ensure fulfilling their scientific, practical and legal requirements./.



Interim measures in Bien Hoa Airbase (Photo by PMU, 2014)

SUPPORT TO OVERCOMING OF CONSEQUENCES OF HERBICIDES/DIOXINS IN VIETNAM – PROJECT RESULTS



Mr. Nguyen The Dong, Director of Office 33, is speaking at the closing workshop of project on October 7, 2014 (Photo by Nguyen My Hang, 2014)

Ondrej Urban, Project Manager

Project “Support to Overcoming of Consequences of Herbicides/Dioxins in Vietnam” has been implemented by DEKONTA – ALS consortium in cooperation with the Civic Association Development Worldwide and funded by the Czech Development Agency in the framework of the ODA between Czech Republic and Vietnam. Main local partner is Office of National Steering Committee.

The project focuses specifically on two hotspots, Bien Hoa and Phu Cat, where the herbicides containing dioxin admixtures were stored and handled. Therefore, the airbases still represent a serious threat to the inhabitants living in their vicinity.

The project has two specific objectives: (i) to raise the capacity of Vietnamese sampling and laboratory centers and (ii) to develop long-term monitoring plans and to construct groundwater monitoring systems for both hotspots.

The activities related to increasing the capacities and expert knowledge of Vietnamese specialists in the area of sampling and laboratory analyses of dioxins were implemented in 2013 and 2014.

The education programme for the area of sampling was divided into three specific trainings focused on ambient air sampling, surface water sampling and groundwater sampling. All three trainings included theoretical part in Hanoi and practical part at one of the hotspots. The trainings were attended by twelve representatives from

VEA, VRTC, MoD, VNA, MONRE, DONRE, VAST, Bien Hoa and Phu Cat airbases.

All trainees received training materials consisting of the presentations in English and Vietnamese (appendix No. 7) and standard operation procedures (SOP) developed for surface water and ambient air sampling at Phu Cat and Bien Hoa airbases (appendices No. 4 and 5). Handover protocol of the training materials is attached as appendix No. 2.

As a part of the trainings, the sampling equipment for surface water, groundwater and ambient air sampling was handed over to VRTC.

The education programme for laboratory specialists has been conceived with the aim of improving the expert level of analysts and competitiveness of the local dioxin laboratory through undertaking of a practical training in a specialized dioxin laboratory in the Czech Republic in 2013 and participation in inter-laboratory comparative tests jointly with Czech laboratories in 2014.

The long-term monitoring plans were developed for Bien Hoa and Phu Cat airbases in the framework of activities

related to second specific objective. These monitoring plans focus on the monitoring of potential leaks of pollutants after the implementation of remediation activities, monitoring of any emissions/leaks from residual contamination left at the locality, and the evaluation of the impact on the environment and human health of local inhabitants.

Groundwater monitoring system at Phu Cat airbase was constructed in 2013 and contains 5 monitoring wells installed in close vicinity of landfill for soil and sediment contaminated by dioxins.

The monitoring system at Bien Hoa was constructed in 2014 and focuses not only on the vicinity of the existing landfill, but also covers the areas containing residual contaminated soil and sediment such as Pacer Ivy area and Southwest area. In total 6 monitoring wells were installed and first set of groundwater samples was collected.

The concentrations of dioxins (PCDDs/PCDFs), expressed both as TEQ-Lowerbound and TEQ-Upperbound were above the screening level of 1 pg I-TEQ/l in some of the wells at Bien Hoa airbase. Besides the dioxins, the elevated concentrations of acid pesticides (2,4-D, 2,4,5-T and picloram) were identified in the groundwater samples too. According to the developed long-term monitoring plan, the resampling (second round of sampling) will be undertaken in autumn 2014 in order to confirm the groundwater contamination and/or propose further response actions.

VIETNAM-USA RELATION IN RESEARCHING AND OVERCOMING THE CONSEQUENCES OF AGENT ORANGE/DIOXIN

The International Relation Department,
Office of National Steering Committee 33



Photo 1. President Nguyen Minh Triet and President George Bush in Washington, USA, June 2007 (Source: TTXVN)

Cooperation in researching and overcoming the consequences of Agent Orange/Dioxin between Vietnam Government and the USA Government has been established since 2000 after the Vietnam visit by President Bill Clinton. It kicked off with the conference between officials of the two governments organized in Singapore in December, 2000 to discuss cooperation potential and then the Vietnam – USA scientific conference on Agent Orange/Dioxin impacts on people’s health and environment in Hanoi with the participation of over 400 Vietnamese and international scientists. After the conference, the two sides also discussed the implementation of some of the specific research activities between some scientific organizations of Vietnam and the USA.

The bilateral announcement of both Vietnam and US leaders on the occasion of the Vietnam visit of President George Bush in November 2006 mentioned the support of the US government to Vietnam in dioxin remediation in Da Nang Airport and Vietnamese disabled people. One year later, Vietnam Ministry of Defence and US department of Defence started exchanging the information of herbicide spraying missions, in which, mostly the information about Agent Orange/Dioxin during the Vietnam War. This information helped Vietnam in further identifying dioxin contaminated areas in some airbases.

In June 2007, in a meeting with President Nguyen Minh Triet in Washington, President George Bush was committed an amount of 3 million USD in the 2007 foreign affair fiscal year on remediation of dioxin contamination in Da Nang Airport and supporting local people who are exposed to Agent Orange/Dioxin. The US Agency for International Development (USAID) was designated to manage this amount of aids.

To better support information exchange and consultancy for the two governments, the Vietnam – USA bilateral joint advisory committee (JAC) was established with the members are representatives from the US Environment Protection Agency (USEPA), USAID, US Centers for Disease Control and Prevention (CDC), the US Embassy to Hanoi; and on the Vietnamese side are representatives from the leaders of Office of National Steering Committee 33, Vietnam Ministry of Defence,

Ministry of Health, Ministry of Labour – Invalids and Social Affairs, Vietnam Academy of Science and Technology. Since its establishment, JAC has organized eight annual meetings and has very well completed its assignments as providing information and consulting for both governments, persuading international organizations, governmental and nongovernmental organizations to participate in overcoming the consequences of Agent Orange/ Dioxin in Vietnam.

Together with the above activities, some activities supporting the disabled, including victims of Agent Orange/Dioxin were carried out in Da Nang, Binh Dinh and Dong Nai. Up to now, over 8,000 people have benefited from those activities. These activities provide health examinations for the disabled, specialized equipment and orthopedic surgery. Many of them received scholarships or incentive credits or participated in training courses or related activities to obtain further external interactions.



Photo 2. General Director of Office of National Steering Committee 33 and the US Ambassador to Vietnam in the press conference after the annual JAC meeting in September, 2009 (Photo by Office of National Steering Committee 33, 2009)

Photo 3. The signing ceremony of the Agent Orange/Dioxin remediation program at Da Nang Airport between the USAID and Vietnam Ministry of Defence (MND), 2010 (Source: MND)



Besides, these activities have also promoted the disabled supporting system such as providing assistance to family members of the disabled, managers of relevant centers, physical therapists, training teachers for specialised education and promulgating some relevant laws and policies locally.

In the period of 2007- 2010, the US Government spent nine millions USD on overcoming Agent Orange/Dioxin consequences in Vietnam. Around two thirds of the money was spent on the dioxin remediation activities in Da Nang. By the end of 2010, the US Government supplemented 12 millions USD for the Overcoming the consequences of Agent Orange/Dioxin program in Da Nang.

After quite a long time of discussing of the two governments' relevant organisations, on April 1st, 2011, Vietnam Minister of National Defence signed the decision approving the

"Environmental Remediation of Dioxin Contamination at Da Nang International Airport" project. The Air Defence and Air Force is designated to be the project owner and the duration for the project implementation is 2011-2016. The project includes the following components: unexploded ordnance detection; design and excavation of dioxin contaminated soil and sediment to the pile for remediation; design and application of thermal remediation of around 67,000m³ dioxin contaminated soil and sediment; and landscape reinstatement. The budget for the project comprises of 41 millions USD from nonrefundable ODA provided by the US Government and 35 billions VND as the counterpart fund from the Government of Vietnam. According to the latest information, the budget required for the project's implementation has now reached up to 83 millions

USD and may increase due to the double of the quantity of sediment and soil to be remediated as compared to the original estimate.

The Director of the US Agency for International Development and officers of US Embassy in Vietnam conducted a survey in the contaminated areas in Bien Hoa Airbase to prepare for the environmental assessment at Bien Hoa Airbase which is in progress according to the commitment by the US Government.

Apart from activities by the governmental organizations, some US nongovernmental organizations also participated in supporting Vietnam to study and overcome the consequences of Agent Orange/Dioxin, especially the activities carried out by the Ford Foundation, Bill & Melinda Gates Foundation, Atlantic Philanthropic Foundation and the Vietnam Veterans of America Foundation.

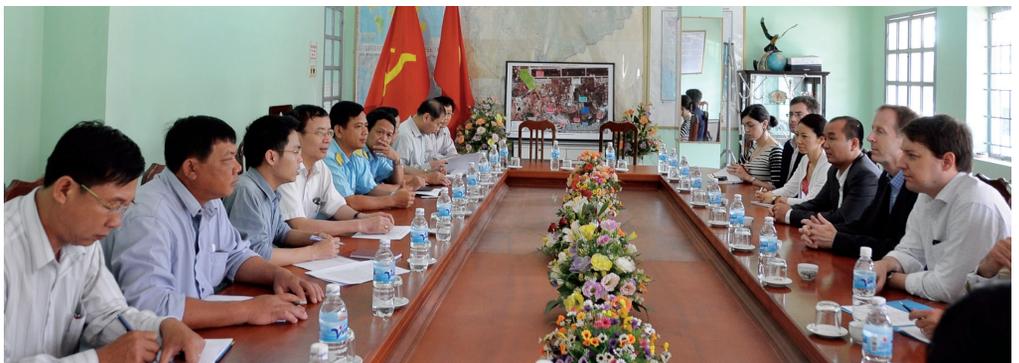
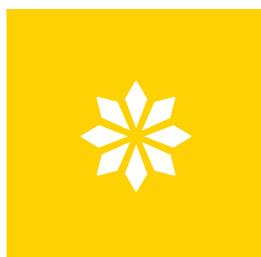


Photo 4: Office of National Steering Committee 33 and Vietnam Ministry of Defence receiving and working with the US delegation on the commencement of environment assessment at Bien Hoa Airbase (Source: Office of National Steering Committee 33)

SOME NEW CONTENTS ON THE REVISED ENVIRONMENT PROTECTION LAW

**Assoc. Prof. Dr. Le Ke Son,
National Project Director**



The revised environment protection law (herein after referred to as the Law) was approved by the National Assembly dated June 23rd, 2014 include 20 chapters and 170 articles, inheriting fundamental structures and contents of the 2005 environment protection law; surmounting shortcomings of unpractical articles; and legalizing new directions and policies regarding environment protection (EP); expanding and specifying some contents of EP; handling repetitions and contradictions against other laws to ensure consistency within the entire legal system; creating premise for the development of EP decrees and development of protection act for environment media in the future.

Environment protection planning is a completely new content of the 2014 EP law. The EP planning is to be developed suitably to the natural socio-economic conditions and thus, it should be appropriate with the overall strategy and planning of socio-economic, national defence and security as well as land use planning. Some contents of the strategic environment assessment (SEA) and Environmental impact assessment (EIA) have also been amended to ensure the necessity and practicality.

The 2005 EP law regulates EP commitment. Yet, in reality, the realization of the EP commitment is theoretical and in many cases, it leads to negative impacts in management. To overcome such shortcomings, and create more favorable conditions for project owners to fulfill their responsibility and be proactive in EP, which is also advantageous for EP regarding those who are not required to prepare EIAs, the 2014 EP law regulates six new articles in terms of EP plan.

With Chapter IV regarding handling with climate change, this is the very first time that regulations on climate change handling is legalized in close association with EP, including nine articles providing general regulations on responding to climate change; integrating the contents of climate change response into plans, planning and strategy for socio-economic development; greenhouse exhaust management; management of substances degrading the ozone layer; development of recycle energy; environmentally friendly production and consumption; energy recovery from wastes; rights and responsibility of the

community in responding to climate change; development and application of science and technology in responding to climate change and international cooperation in this field. The reduce, reuse and recycle of wastes have been stressed apart from encouraging recovering energy from wastes. These regulations should be realized in EP so as most of the wastes will be used as the key resources in the long run.

Although the law on protection of the sea's natural resources and environment is being developed, to ensure the consistency in the EP, the 2014 EP law still has its own chapter regarding sea and island's environment protection, controlling and solving sea and island's environment contamination, preventing and responding to sea and island's environment incidents. The sea EP act will specify these regulations and be consistent to the 2014 EP law.

The law regulates that discharge sources into river basins (RB) shall be managed in an appropriate way to the loading capacity of such rivers, the river water and sediment shall be monitored and assessed, water environment protection of RBs shall be in close relation with biodiversity preservation and river water exploitation and use. The contents for controlling and treating of river basin environment include providing statistics, assessment, mitigation and treatment of wastes discharged into the basin; periodically monitoring and assessing river water and sediment quality; investigating and assessing loading capacity of rivers; announcing river sections and rivers which cannot receive further wastes;

identifying sewage quota for river discharge; treating and improving river water environment; monitoring and assessing cross-border river water quality and sediment, etc; assigning clear responsibility to those relevant national management agencies.

The law regulates that any activity using soil should consider the soil environment and provide solutions for soil protection; organizations and individuals are assigned to use soil should be responsible for protecting the soil environment; those causing of soil environment pollution should be responsible for treatment, improving and recovering the soil environment. *This is also the first time, dioxin contamination from the herbicides used during the war in Vietnam has been regulated in the law to be inspected, assessed, demarcated and treated to ensure EP requirement as the same as other toxic substances.*

The law has a particular section regulating in general the air environment protection; managing the ambient air quality and controlling the air environment pollution. According to these regulations, gas emission sources into the air environment shall be evaluated and controlled; organizations and individuals having production and business activities which emit negative gas into the environment shall be responsible for mitigating and treating the air to ensure the air environment quality.

The law also defines scrap as "materials collected, classified and selected from materials and products removed from the production or consumption for use as raw materials of another production process"; eliminate

regulations such as “have to be cleaned, not mixed with materials, or goods banned from importation, hazardous wastes, and extraneous” as these are not practical. These have been replaced with the imported scraps should meet the environmental technical requirements.

According to this regulation, only scraps with environmental technical regulations that belong to the scrap list as approved by the Prime Minister; scrap is only imported for raw materials for production, a security should be paid to ensure the scrap is imported subject to regulations by the Government. The law does not regulate the sale and purchase of imported scraps. Only organizations and individuals who import scrap for production are allowed to import these scraps. Hence, with technical and legal barriers, the importation of scraps is hard to be made use of as it has been over the past time.

The abuse of the fame as having handicraft villages, application of outdated and primitive technologies while the national management proving unclear and overlapping points are main reasons leading to handicraft village pollutions. Therefore, regulations on environment protection at handicraft villages have been rewritten to clarify specific conditions on EP in which the handicraft villages and production units under such encouraged industry and other subjects living in the villages have to obey; the law also clearly regulates the responsibility of people’s committees at different levels against the handicraft village’s environment protection.

For recalling of waste products, the law regulates the responsibility of the production unit owners, consumers and management organizations and the Prime Minister will issue more specific regulations; no specific products are regulated for recalling in the law to ensure the practicality and flexibility.

The law regulates clearer regarding the conditions of

hazardous waste treatment unit. The new point about hazardous waste management is that the Ministry of Natural Resources and Environment regulates the list of hazardous wastes and provide permits for hazardous waste treatment; further clarify the contents of hazardous waste management in EP planning developed by the Ministry of Natural Resources and Environment and submitted to the Prime Minister for approval.

With the objectives to develop a national environmental monitoring system which is unified and thorough, the law provides a separate chapter on environmental monitoring, regulating composition in the environment and wastes to be monitored, monitoring programs, organizations and activities belonging to the monitoring system; monitoring responsibility under the Ministry of Natural Resources and Environment, the provincial people’s committees, industrial parks/zones and processing zones, etc.

To stress on the national management responsibility regarding EP, the Law on EP 2014 separates the contents of national management agencies’ responsibility as a chapter, in which it regulates the content of national management in terms of EP; the Minister of Natural Resources and Environment is responsible against the Government in obtaining agreement on national management of EP, especially in chairing the development and submission to the Government and the Prime Minister the legal documents, policies, strategies, plans, programs, national researches on EP; ministers, heads of Ministerial-level agencies chair and cooperate with the Minister of Natural Resources and Environment to develop, issue circulars and joint circulars on EP in the field that such ministries and sectors manage.

The law has also widen the subjects and contents regarding the responsibility, rights of the Vietnam Fatherland Front, social and political and occupational

organizations and especially local communities as one separate chapter. These organizations and local communities have the more responsibility and right, significantly contributing to the socialization of EP and the role of people in EP will be better upheld.

The law regulates that the Minister of Natural Resources and Environment will organize, direct and examine, investigate regarding EP subject to the law nationwide; the Minister of Defence, Minister of National Security organize, direct investigation, and inspection on EP in units, projects and construction works under the national security in terms of national defence and security.

The law provides new regulations on the responsibility solution principles for individuals and organizations causing environment pollution, in which regulating clearly the responsibility of the direct manager of the organization responsible for the law breaking on EP of his or her organization.

According to the regulations, the duration for filing a lawsuit is two years, commencing from the existence of the law breaking behavior. For environment, the time for filing a lawsuit as stated is not appropriate as in many cases, the consequences of the environment pollution to human only starts after years or decades such as birth defects and cancers. Hence, at Section 3, Article 162, the Law on EP 2014, the duration for filing a lawsuit on environment will count from the time that the organization and individual affected discover their loss caused by the environment law breaking by other organizations and individuals. This means the time for filing a lawsuit is expanded to no limits.

To implement the Law, the Government of Vietnam is responsible for issuing a number of decrees providing specific guidance and these decrees should be issued in line with the effectiveness of the law./.

PRESS RELEASE

“DIOXIN CONTAMINATION IN BIEN HOA AIRBASE – STATUS AND PLAN FOR FUTURE WORK” WORKSHOP

Bien Hoa, 21 October 2014- The current status of dioxin contamination at Bien Hoa airbase, one of the three dioxin hotspots in Viet Nam, and the plan for further action were shared at a workshop in Bien Hoa today conducted by the Office of National Steering Committee 33 and the UN Development Programme (UNDP).

With the current estimated amount of dioxin contaminated soil in Bien Hoa (250,000 cubic meters with dioxin concentration levels are as high as 1,180,000 ppt), at least US\$ 250 million will be needed to complete the environmental clean up. Over the past five years, with funding from the Global Environment Facility (GEF), UNDP and the Ministry of Natural Resources and Environment (MONRE) have mapped dioxin contamination at Bien Hoa Airbase to give a better understanding of its scope, level and the unique features of the contamination. Through this project, interim measuring facilities have been set up to prevent dioxin from being released to outside the airbase. The project has also helped develop a master plan for dioxin remediation in the airbase and conducted testing of various dioxin remediation technologies inside the airbase and at the technology suppliers' laboratories using the contaminated soil from the airbase. Besides, the Ministry of Defence has completed the containment of 94,000 cubic meters of dioxin contaminated soil in Z1 and developed a plan (Z2 project) to do further containment work in areas around Z1 area.

Meanwhile, the Czech Republic has implemented a project on design and environmental monitoring and the United States Agency for International Development (USAID) has funded the environmental assessment. Mr. Bakhodir Burkhanov, UNDP Deputy Country Director, applauded development partners and non-government organizations for their engagement in dealing with dioxin contamination: “UNDP is pleased to see greater stakeholder engagement in dealing with dioxin contamination in Bien Hoa airbase, including the participation of other development partners and NGOs to support government-led efforts,” he said. “The GEF-UNDP-MONRE project has created a good foundation through capacities, knowledge and technologies to complete the clean-up works so that communities in and around the Bien Hoa airbase can once again safely enjoy this environment.” All data and information on dioxin contamination status and results of the GEF-UNDP-MONRE project were shared at the workshop and handed over to the Ministry of Defence and USAID for further action. Associate Professor Doctor Le Ke Son, national director of

the project, highlighted the need for further clarification of major issues related to dioxin remediation in Bien Hoa in environmental and environmental impact assessments before implementing the upcoming and overall dioxin remediation project at Bien Hoa airbase. The issues include the contamination history, assessment of dioxin residue, assessment of dioxin release from Bien Hoa airbase to the outside areas, evaluation of Z1 Project's outcomes, plan for the Z2 Project, technology selection; environmental assessments as well as environmental and community health assessments of those living near the airbase and being affected by dioxin; and environmental monitoring, environmental incident solving and land use planning in linking with environmental recovery planning. The workshop brought together representatives from relevant Government agencies, Bien Hoa local authorities, international organizations, national non-government organizations, media and scientists, experts working in this area of work.

Editor in Chief: Asso. Prof. Dr. Le Ke Son - National Project Director

Editorial Board: Dr. Nguyen My Hang - Project Manager

Production Editor: B.A. Nguyen Trung Kien

Address: THE PMU OFFICE OF ENVIRONMENTAL REMEDIATION OF DIOXIN CONTAMINATION HOTSPOTS IN VIET NAM

Room No. 714 - NARENCA Building (Viet Nam Publishing House of Natural Resources, Environment and Cartography)

No. 85 Nguyen Chi Thanh, Hanoi, Vietnam - Tel: +84-4-37738760 - Fax: +84-4-37738762 - Email: lesong@monre.gov.vn