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**FINAL REPORT**

**PROJECT**

**"PROMOTION OF CLEANER INDUSTRIAL  
PRODUCTION IN THE KINGDOM OF CAMBODIA"**

**US/CMD/03/048**

**Submitted to: United Nations Industrial Development Organization(UNIDO)**

**By: Viet Nam Cleaner Production Center**

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## **ABBREVIATIONS**

CP	Cleaner Production
CPA	Cleaner Production Assessment
BAT	Best Available Technology
VNCPC	Viet Nam Cleaner Production Center

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## I INTRODUCTION

This report summarize partly results of the project named "**Promotion of Cleaner Production in the Kingdom of Cambodia**" (till the training module 3 and 3<sup>rd</sup> in-plant follow-up) that taken place in 2007.

As defined goal, the project will assist the government of Cambodia to improve the productivity and competitiveness of its growing industry base, as well as improve industry's access to international and more local markets, through the application by export-oriented enterprises of cleaner production techniques and technology. Activities will focus on building national capacity in cleaner production through awareness-raising, conduction of in-plant demonstrations at se and running of training programs. As indicated in the project document as well as confirmed in the inception report, the project consists of 2 main activities: cleaner production training for and in-plant demonstration at selected companies in food processing and textile sectors.

## **II. RESULTS FROM THE PROGRAM**

### **2.1 Training Activities**

For the purpose to sustain the CP in the participating companies after the program completed, the training modules on cleaner production assessment methodology were held for representatives from enterprises of food processing sector, demonstration companies, from provinces, related Ministries and Departments and Academic institutions, national consultants. Through the training, the program had tried to build-up a resource base of national experts on cleaner production. The four training modules were implemented which instruct all steps and specific tasks in systematic CP assessment methodology and related subjects to the trainees of the training.

The above in-depth training was done mainly by Dr. Dr. Permod Gupta, CTA of the project with the participation of Dr. Tran Van Nhan, Director of Vietnam Cleaner Production Center (VNCPC), CP expert, Mr. Le Xuan Thinh and Mr. Nguyen Hong Long, CP expert from VNCPC

Addition to the in-depth four modules- training, awareness-raising seminars were organized to introduce the CP concept to a number of enterprises and other stakeholders. In the awareness raising seminars, numbers of CP case study from India and Vietnam were presented by Dr. Permod Gupta and CP experts from VNCPC.

Content of the 4module – training covered all the essential knowledge/information to CP to the trainees. The content of the 3 training modules (that have VNCPC participatory) is presented below:

Module 1	Module 2	Module 3
<ul style="list-style-type: none"> <li>-CP introduction (concept, benefits)</li> <li>- Introduce detailed CPA methodology (theory and exercises): baseline data collection, selection of CPA focus, develop detailed flow diagram, material balance, energy balance</li> <li>-Introduce food processing (seafood processing,....)</li> <li>Work plan</li> </ul>	<ul style="list-style-type: none"> <li>-Participants present their assignment on CPA at their selected company</li> <li>-Discussion of results</li> <li>-Identify missing data</li> <li>- CPA methodology (cont.): Assign costs to waste streams; Analyze causes for waste streams; Develop CP options</li> <li>- Energy Efficiency</li> </ul>	<ul style="list-style-type: none"> <li>-Participants present their assignment on CPA at their selected company</li> <li>-Discussion of results</li> <li>- CPA methodology (cont.): Technical feasibility study; Financial feasibility study, Environmental impacts study</li> <li>-Cleaner technology in textile, food processing</li> <li>- BAT in selected sectors</li> <li>- Introduce Clean Development Mechanism and links with CP</li> </ul>

The four training modules have delivered 468 person days of training. See detailed in annex.

After every training module, trainees were asked to evaluate the training. Trainees highly appreciated the quality of the training with the evaluated results were at good level.

## **2.2 In-plant demonstration activity**

In-plant assessments at enterprises used as practical training for CPA methodology and using the results for dissemination for CP application in industry.

The in-plant assessments were implemented at 3 selected production units named:

1. Sunwan Cambodia seafood Company
2. Hagar Soya Company, Ltd
3. United Kniting Manufacturing Company, Ltd

Participants of the training were divided into 3 groups. Each group is in charge in following one demo units. After every in-class training module, an in-plant working visit was done by the assigned group and international experts.

The in-plant assessments covered baseline data collection, CPA focus selection, flow diagram preparation, material balance preparation, analyzing causes for waste streams, CP options generation, feasibility analyzing of CP options. There is a lack of baseline data due to there is no monitoring systems at demo units.

From CPA, all demo units have produced a list of CP options which consist of simple and low or no cost options as well as high cost options.

All demo units have implemented simple CP options with certain results in economic and environmental aspect. The real benefits from CP implementation would be monitored when program finished .

## **III. FINDINGS AND RECOMMENDATIONS**

### **3.1 Findings**

1. As last batch of 2005-2006, it was found that model of integration in-class training and in-plant assessment for demo units was found very useful for both trainees as consultants as well as people at enterprises.
2. The in- depth 4 training modules had been well designed, that help participants well understand a circle of CPA and how to do a CPA. In comparison with the last batch in 2006, some more related topics were added: Cleaner technology of related sectors and Clean Development Mechanism (CDM).
3. Generally, companies have less awareness on specific resource consumption losses, environmental effect of production on actual costs of production (total costing including environmental costs). Their monitoring systems of production are very weak. Most of them have no water meter, limited number of electricity meters, and monitoring of material consumption. Then it is a big obstacle for CPA.
4. There is a lack of technical resource at demo companies.

### **3.2 Recommendations**

From the CP program implemented, it is recommended that:

1. The designed model of integration 4-module in-class training with in-plant assessment demonstration should be applied for the next round of the project, for other industrial sector to promote and disseminate CP approach but at the same time the consultant fee should be collected to create CP market;
2. For make sure the good results for CPA, it should have more careful, well designed process for selection of demo units that make sure getting real commitment from them;
3. It should have real commitment from the management of the demo unit presented by install proper material and energy consumption monitoring systems.



4. National experts should have more involvement in CPA at demo units to get experiences in carrying out CPA.

## **CONCLUSIONS**

The demonstration program on cleaner production in food processing sector in Cambodia has achieved the purpose of capacity building in application of CP approach of the program.

It is a need to set up a CP expert network country-wide for broader CP application. Therefore, it is necessary to expand the number of national experts in CP in the Cambodia CP expert network.