付　属　資　料

１．協議議事録（ミニッツ）・PDM・評価報告書

２．円卓会議プレゼンテーション資料・議事録

３．評価グリット

４．インタビュー用質問票

MINUTES OF MEETINGS
BETWEEN
JAPANESE MID-TERM EVALUATION TEAM
AND
AUTHORITIES CONCERNED OF THE GOVERNMENT OF
THE SOCIALIST REPUBLIC OF VIET NAM
ON
JAPANESE TECHNICAL COOPERATION PROJECT
FOR
STRENGTHENING CAPACITY
FOR MEASLES VACCINE PRODUCTION
IN VIET NAM

The Japanese Mid-term Evaluation Team (hereinafter referred to as "the Team") organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA"), headed by Mr. Hiroaki NAKAGAWA, conducted the study from 6 December to 19 December, 2007, for the purpose of the mid-term evaluation of the project for strengthening capacity for measles vaccine production in Viet Nam (hereinafter referred to as "the Project").

During the study, the Team had series of discussions with the authorities concerned of the Vietnamese government, jointly evaluated the achievement of the Project, and exchanged views for further improvement of the Project.

As a result of the study and discussions, both sides agreed upon the matters in the documents attached hereto.

Hanoi, 19 December, 2007

Mr. Hiroaki NAKAGAWA
Resident Representative
Viet Nam Office
Japan International Cooperation Agency
Japan

Dr. Nguyen Dang Hien
Director
Center for Research and Production of Vaccines and Biologicals (POLYVAC)
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The Socialist Republic of Viet Nam

for Dr. Tran Trong Hai
Director General
International Cooperation Department
Ministry of Health
The Socialist Republic of Viet Nam

THE ATTACHED DOCUMENT

I INTRODUCTION

The Project started on 24 March. 2006 with the cooperation period of four (4) years. The purpose of the Project is that "POLYVAC will be capable to produce necessary amount of measles vaccine for use of measles control activities in the Socialist Republic of Viet Nam complying with Vietnam-GMP which has met WHO-GMP standard."

II REVISION OF PDM

The Vietnamese and Japanese sides agreed to modify the Project Design Matrix (PDM) (version 1) which had been authorized on 24 March, 2006 by the Minutes of the Meeting as attached as Appendix 1 to the PDM (version 2) as attached as Appendix 2.

III MID-TERM EVALUATION

The mid-term evaluation was carried out in accordance with the PDM (version 2) as attached as Appendix 2. Both Vietnamese and Japanese sides reviewed the achievement of the activities and the outputs of the Project based on the result of the interviews with the personnel concerned with the Project and the Project records.

The result of the evaluation was described in the Joint Mid-term Evaluation Report as shown in Appendix 3.

IV CONCLUSIONS

Technical transfer on production had mostly been conducted according to the specified schedule and in time. Overall, satisfactory progress had been made in constructing a GMP system in the POLYVAC measles vaccine production facility due to effective technical transfer of experts despite the fact that the facility is the first one to comply with GMP (both domestic and WHO) in Viet Nam.

In the remaining period of the Project, it is required to maintain the skills already transferred from Japanese experts and to extend the skills acquisition from the staff that had already attained sufficient skill level to the others. It is also important for QA Department to continue training all the staff on GMP with consistent assistance by the Japanese experts in order to have the GMP system function well. Toward mass production of the measles vaccine management capacity of managers needs to be further strengthened in planning, processing, and document and inventory control according to their job descriptions that are under development.

IV RECOMMENDATIONS

Based on the review on the achievement of the activities and the outputs of the Project, both sides confirmed the following recommendations;

1. It is required for POLYVAC staff to maintain the skills already transferred from Japanese experts and to extend the skills acquisition from the staff that had already attained sufficient skill level to the others through an internal technical transfer system.
2. Further capacity building on risk/deviation management would be needed in order to cope with unexpected events, accidents or claims.
3. It is suggested that Quality Assurance (QA) Department to continue training all the staff on Good Manufacturing Practice (GMP) with assistance of the Japanese experts in order to disseminate the basic concept of GMP and to have the GMP system function well.
4. Toward the future mass production of the measles vaccine POLYVAC needs to further strengthen management capacity of managers in planning, costing, financing, processing, and document and inventory control with their own initiative.
5. Budget for procurement of raw materials and maintenance including calibration and spare parts supply needs to be secured.
6. In order to secure Specific Pathogen Free (SPF) eggs it is recommended that the MOH continues to convince the Ministry of Agriculture and Rural Development to approve importing the SPF eggs even when the exporting countries report Highly Pathogenic Avian Influenza (HPAI) infection among poultries, because SPF eggs are assured pathogen-free. In addition, POLYVAC needs to look for alternative sources of import. Domestic production is considered to be a potential but uneasy option because it requires much cost, time and technical expertise.
7. It is highly essential that the GMP inspection, clinical trial and licensing regarding the POLYVAC measles vaccine will be done appropriately and in time.
8. The technical capacity of the National Regulatory Authority (NRA) should be strengthened in its six functions so that the NRA can be WHO-accredited as soon as possible.

Appendix: 1. PDM (version 1 dated 24 March, 2006)
2. Revised PDM (version 2 dated 19 December, 2007)
3. Joint Mid-Term Evaluation Report

Appendix 1 Project Design Matrix (PDM) (Version 1) **Date: March 24, 2006**

Project title: Technical Cooperation Project for Strengthening Capacity for Measles Vaccine Production **Project Duration: 4 years, from March 24, 2006**

Target Area: The Socialist Republic of Vietnam **Target group: Children in the Socialist Republic of Vietnam (focus on those under 5 years old)**

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Super Goal			
The health status of the children in the Socialist Republic of Vietnam is improved.	・Infant mortality rate in the Socialist Republic of Vietnam	Ministry of Health	
Overall Goal	・Rate of children infected with measles in the Socialist Republic of Vietnam. ・Number of children immunized with measles vaccine in the Socialist Republic of Vietnam.	Ministry of Health	・Public Health activities in the Socialist Republic of Vetnam is strengthened. ・The vaccine is licensed by NRA.
Measles Infection Rate in the Socialist Republic of Vietnam will be decreased from the current level.			
Project Purpose	・Number of measles vaccine doses produced in POLIOVAC ・Clearrance of Produced Measles vaccine complying with WHO-GMP standard.	Ministry of Health, NRA(CENCOBI) POLIOVAC WHO	・EPI activities will be sustained and enhanced.
POLIOVAC will be capable to produce necessary amount of measles vaccine for use of measles control activities in the Socialist Republic of Vietnam complying with Vietnam-GMP which has met WHO-GMP standard.			
Outputs			
1 **Staff of POLIOVAC acquires appropriate technical skill to produce quality measles vaccine.**	・Number of Staff in POLIOVAC who get technical training for measles vaccine production.	Ministry of Health POLIOVAC	・Trained Staff will not leave POLIOVAC
2 **Production and quality management meet Vietnam-GMP which has met WHO-GMP standard.**	・Clearance on the Prodcution and quality management by NRA which has met WHO-GMP	WHO Ministry of Health, NRA(CENCOBI)	

Activities	Inputs		
	Japan	**Vietnam**	
1 Staff of POLIOVAC acquires appropriate technical skill to produce quality measles vaccine. 1-1 Conduct technical transfer on bulk, filling, freeze-dry through the process of producing vaccine from the imported bulk. 1-2 Conduct technical transfer on production of bulk vaccine through the processing of producing bulk vaccine from the seed virus. 1-3 Conduct technical transfer on proper operation of mass production (7.5 million doses/year) of the measles vaccine. 1-4 Conduct technical transfer on quality control of the products. **2 Production and quality management meet Vietnam-GMP which has met WHO-GMP standard.** 2-1 Conduct PQ/PV for vaccine production from bulk vaccine. 2-2 Conduct PQ/PV for vaccine production from seed virus. 2-3 Establish validation system for the production and strengthen the validation skill of the staff. 2-4 Establish and implement quality assurance functions complying with Vietnam-GMP which has met WHO-GMP standard. 2-5 Prepare and implement necessary SOP for the process of production, storage, carrying in/out of the products, etc. 2-6 Conduct technical transfer on preparation of documents that need to meet Vietnam-GMP which has met WHO-GMP standard and to be approved by NRA in the Socialist Republic	***Experts*** (1) Chief Advisor / Vaccine Production (2) Bulk Production (3) Medium Preparation (4) Final Production (5) Quality Control (6) Management of Experimental Animals (7) Quality Assurance (8) GMP (9) Validation (10) Facility Management ***Other necessary fields.*** ***Full-time project staff*** (1)Secretary (2)Interpreter ***Training in Japan*** (1)Production management (2)Quality management ***Equipment and materials*** (1)Equipment for Validation (2)Equipment for Technical Activities on Vaccine Production and Quality Assurance (3)Other equipment mutually agreed upon as necessary. * *The equipment to be provided will be subjected to change due to the budgetary conditions of the Japanese side.* ***Local cost*** (1)Training textbooks, and materials (2)General expenses of the project office	***Counterpart officers*** (1) Director (2) Vice Director (Production Management) (3) Vice Director (Quality Management) (4) Chief of WHO-GMP license ***Full-time project staff*** (1)Production Unit Staff (2)Quality Management Unit staff (3)Engineering Staff ***Equipment and materials*** (1)Project Office facilities (2)Stationary (3)Cosumables for Vaccine Production ***Local cost*** (1) Vaccine Bulk (2) Maintenance for equipment	**Pre-conditions** NRA of Vietnam including CENCOBI will be functioning according to WHO recommendation. The policy of promotion on measles elimination programme will be sastained.

Appendix 2 Project Design Matrix (PDM) (Version 2) **Date: December 19, 2007**

Project title: Technical Cooperation Project for Strengthening Capacity for Measles Vaccine Production **Project Duration: 4 years, from March 24, 2006**

Target Area: The Socialist Republic of Viet Nam **Target group: People in the Socialist Republic of Viet Nam (particularly focusing on children)**

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Super Goal			
The health status of the children in the Socialist Republic of Viet Nam is improved.	・Infant mortality rate in the Socialist Republic of Viet Nam	Ministry of Health	
Overall Goal	・Rate of children infected with measles in the Socialist Republic of Viet Nam.	Ministry of Health	・Public Health activities in the Socialist Republic of Viet Nam is strengthened.
Measles Infection Rate in the Socialist Republic of Viet Nam will be decreased from the current level.	・Number of children immunized with measles vaccine in the Socialist Republic of Viet Nam.		・The vaccine is licensed by NRA.
Project Purpose	1.Measles vaccines are produced in POLYVAC at a rate of 300,000 doses x 25 batch (i.e. 7,500,000 doses)/year.	Ministry of Health, NRA(NICVB) POLYVAC WHO	・EPI activities will be sustained and enhanced.
POLYVAC will be capable to produce necessary amount of measles vaccine for use of measles control activities in the Socialist Republic of Viet Nam complying with Viet Nam-GMP which has met WHO-GMP standard.	2.Clearance on the Production and quality management by NRA which has met WHO-GMP		
Outputs			
1 Staff of POLYVAC acquires appropriate technical skill to produce quality measles vaccine.	1-1 Number of Staff in POLYVAC who get technical training to reach a sufficient technical level (i.e. level 4 * for staff categorized as A)for measles vaccine production. *level 4 : be able to work by themselves and could train others	Ministry of Health POLYVAC	・GMP inspection will be done by NRA.
	1-2 Standard Operating Procedure (SOP), equipment maintenance list, equipment inventory and other necessary documents for operation and maintenance of the facilities and production equipment by POLYVAC shall be prepared.		
	1-3 Details on equipment, apparatus, raw materials, spare parts and consumables are properly administrated and inventory is properly managed.		
2 Production and quality management meet Viet Nam-GMP which has met WHO-GMP standard.	2-1 Performance Qualification (PQ) and Process Validation (PV) are executed as scheduled.	WHO Ministry of Health	
	2-2 Validation complying with VN-GMP is conducted periodically by POLYVAC.	NRA(NICVB)	
	2-3 GMP documentation complying with VN-GMP is prepared.		
	2-4 SOPs complying with VN-GMP are prepared and production process is done according to the SOPs.	Records of production, quality control, validation, maintenance of equipment and facilities, and quality assurance of POLYVAC	

Activities	Inputs		
	Japan	**Viet Nam**	
1 Staff of POLYVAC acquires appropriate technical skill to produce quality measles vaccine. 1-1 Conduct technical transfer on bulk, filling, freeze-dry through the process of producing vaccine from the imported bulk. 1-2 Conduct technical transfer on production of bulk vaccine through the processing of producing bulk vaccine from the seed virus. 1-3 Conduct technical transfer on proper operation of mass production (7.5 million doses/year) of the measles vaccine. 1-4 Conduct technical transfer on quality control of the products. **2 Production and quality management meet Viet Nam-GMP which has met WHO-GMP standard.** 2-1 Conduct PQ/PV for vaccine production from bulk vaccine. 2-2 Conduct PQ/PV for vaccine production from seed virus. 2-3 Establish validation system for the production and strengthen the validation skill of the staff. 2-4 Establish and implement quality assurance functions complying with Viet Nam-GMP which has met WHO-GMP standard. 2-5 Prepare and implement necessary SOP for the process of production, storage, carrying in/out of the products, etc. 2-6 Conduct technical transfer on preparation of documents that need to meet Viet Nam-GMP which has met WHO-GMP standard and to be approved by NRA in the Socialist Republic of Viet Nam.	***Experts*** (1) Chief Advisor / Vaccine Production (2) Bulk Production (3) Medium Preparation (4) Final Production (5) Quality Control (6) Management of Experimental Animals (7) Quality Assurance (8) GMP (9) Validation (10) Facility Management ***Other necessary fields.*** ***Full-time project staff*** (1)Secretary (2)Interpreter ***Training in Japan*** (1)Production management (2)Quality management ***Equipment and materials*** (1)Equipment for Validation (2)Equipment for Technical Activities on Vaccine Production and Quality Assurance (3)Other equipment mutually agreed upon as necessary. ** The equipment to be provided will be subjected to change due to the budgetary conditions of the Japanese side.* ***Local cost*** (1)Training textbooks, and materials (2)General expenses of the project office	***Counterpart officers*** (1) Director (2) Vice Director (3) QA Manager (4) Production Manager (5) QC Manager ***Full-time project staff*** (1)Production Unit Staff (2)Quality Management Unit staff (3)Engineering Staff ***Equipment and materials*** (1)Project Office facilities (2)Stationary (3)Cosumables for Vaccine Production ***Local cost*** (1) Vaccine Bulk (2) Maintenance for equipment	・Trained Staff will not leave POLYVAC. **Pre-conditions** NRA of Viet Nam including NICVB will be functioning according to WHO recommendation. The policy of promotion on measles elimination programme will be sustained.

Note: GMP: Good Manufacturing Practice, NRA: National Regulatory Authority, SOP: Standard Operating Procedure
PQ: Performance Qualification, PV: Process Validation

Appendix 3

JOINT MID-TERM EVALUATION REPORT
ON JAPANESE TECHNICAL COOPERATION PROJECT
FOR
STRENGTHENING CAPACITY FOR
MEASLES VACCINE PRODUCTION
IN VIET NAM

19 December 2007

CENTER FOR RESEARCH AND PRODUCTION OF VACCINES AND BIOLOGICALS (POLYVAC), VIET NAM

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA), JAPAN

CONTENTS

ANNEXES

ABBREVIATIONS

BPR	Batch Processing Record
C/P	Counterpart personnel
EPI	Expanded Program for Immunization
GMP	Good Manufacturing Practice
HEPA filter	Highly-efficiency Particle Air filter
JICA	Japan International Cooperation Agency
JPY	Japanese Yen
MFT	Media Fill Test
MMR	Measles, Mumps and Rubella
MOH	Ministry of Health
MVPF	Measles Vaccine Production Facility
NICVB	National Institute for Control of Vaccine and Biologicals, Viet Nam
NIHE	National Institute of Hygiene and Epidemiology, Viet Nam
NRA	National Regulatory Authority
OJT	On the Job Training
PDM	Project Design Matrix
PO	Plan of Operation
POLYVAC	Center for Research and Production of Vaccines and Biologicals
PQ	Performance Qualification
PV	Process Validation
QA	Quality Assurance
QC	Quality Control
RD	Record of Discussions
SOP	Standard Operating Procedure
SPF	Specific Pathogen Free
UNICEF	United Nations Children's Fund
VND	Vietnamese Dong
WFI	Water for Injection
WHO	World Health Organization
WPRO	Western Pacific Regional Office, WHO

1. Introduction

1.1 Background and Summary of the Project

The Vietnamese government has implemented the Expanded Program for Immunization since 1981 as effective measures to decrease infant mortality rate and to control infectious diseases. The government has promoted domestic production of EPI vaccines and resulted in producing domestically EPI vaccines other than measles vaccine.

In the Western Pacific Region, morbidity rate of measles is high especially for children and measles is one of the major causes of child death. In Viet Nam, despite sustained measles immunization coverage surpassing 93% since 1993 with a one-dose schedule, measles outbreaks occurred every seven to eight years, clearly illustrating the limitation of the single-dose approach in interrupting the domestic circulation of the measles virus. The Vietnamese government has started provision of two doses of measles vaccine per child according to the WHO/WPRO's strategy. Therefore, it is estimated that the domestic demand for the vaccine will increase. On the other hand, multinational vaccine manufacturers are anticipated to withdraw from measles vaccine production to more profitable vaccines production (e.g. MMR), so there is a concern on stable supply of monovalent measles vaccine with a reasonable price. Under these circumstances, domestic production of measles vaccine to secure stable supply is also an important issue to ensure financial sustainability of the national immunization program that is already relying more than 50% of its budget on domestic government expenditure.

The Vietnamese government requested the Japanese government for grant aid on measles vaccine production facility and technical cooperation to produce measles vaccine which complies with WHO-GMP standard. In response to this, the Japanese government made decision on construction of measles vaccine production facility as a part of POLIOVAC (currently POLYVAC) by grant assistance and on technical cooperation project for strengthening capacity for measles vaccine production (hereinafter referred to as "the Project").

The facility had been constructed since September 2004 and completed March 2006. In parallel with this, the preliminary study was conducted in July 2005 to design the Project. Based on the result of the study the Project has started for the purpose of making POLYVAC to be capable of producing measles vaccine complying with Viet Nam-GMP which has met WHO-GMP standard since 24 March 2006 for four years.

With the support of Kitasato Institute technical transfer has been conducted since July 2006. Up to now technical transfer on the process of producing vaccine from imported bulk has been almost completed and technical transfer on production of vaccine bulk from seed virus has been started.

This mid-term evaluation aims to review the current progress of the Project, identify its outstanding challenges and confirm the direction and plan of activities during the latter half of the Project.

1.2 Joint Evaluation Team

<Japanese side>

Name	Job Title	Organization and Position	Period in Viet Nam
Mr.Hiroaki NAKAGAWA	Team Leader	Resident Representative, JICA Viet Nam Office	-
Dr. Hitoshi MURAKAMI	GMP	1st Expert Service Division,	2007.12.8 -2007.12.19

		Bureau of International Cooperation, International Medical Center of Japan, Ministry of Health, Labor & Welfare	
Ms. Tomomi IBI	Cooperation Planning	Staff, Infectious Disease Control, The 4th Group (Health II), Human Development Department, JICA	2007.12.8 -2007.12.19
Ms. Chiaki KIDO	Evaluation & Analysis	International Division, System Science Consultants Inc.	2007.12.5 -2007.12.19

<Vietnamese side>

Name	Project Position	POLYVAC Position
Dr. Nguyen Dang Hien	Project Director	Director
Dr. Le Thi Luan	Project Manager	Deputy Director
Ms. Nguyen Thuy Huong	Manager	QA Manager
Ms. Hoang Thu Hien	Manager	Production Manager
Ms. Nguyen Nu Anh Thu	Manager	QC Manager
Mr. Nguyen Dang Anh	Manager	Technical Department Manager

1.3 Method of Evaluation

The Mid-term evaluation was conducted in accordance with the JICA Guidelines for Project Evaluations (2004), following these steps:

1) Achievements of the Project were assessed based on the Project Design Matrix (PDM) initially agreed on 24 March, 2006 and eventually revised in December 2007 (Annex 1). The results of the Outputs and the Project Purpose were analyzed vis-à-vis the Verifiable Indicators. The Inputs and Activities were evaluated in comparison with the plan and the results of the Outputs.

2) Contributing and impeding factors to the achievement of the Project were analyzed by reviewing the project design and project implementation process.

3) The design, implementation process, and outcomes of the Project were analyzed from the viewpoints of the five evaluation criteria: relevance, effectiveness, efficiency, impact and sustainability.

4) Recommendations for the Project for the remaining period were formulated.

Both quantitative and qualitative data were collected and utilized for analysis. Data collection methods used by the Team were as follows:

- Document review;
- Key informant interviews;
- Direct observation of the Project site.

Five evaluation criteria are summarized as follows:

1) Relevance

Relevance of the Project is reviewed by the validity of the Project Purpose and the Overall Goal in connection with the policies of the Government of the Socialist Republic of Viet Nam and the needs of the country, as well as with the Japan's assistance policy to Viet Nam.

2) Effectiveness

Effectiveness is assessed by examining the extent to which the Project has achieved its Project Purpose, and clarifying how the Outputs have contributed to the achievement of the Project Purpose.

3) Efficiency

Efficiency of the Project is analyzed by looking at how the Inputs and Activities have contributed to the production of the Outputs, analyzing the quality, quantity and timing.

4) Impact

Impact of the Project is assessed through analyzing either positive or negative influences of the Project.

5) Sustainability

Sustainability of the Project is assessed in terms of organizational, financial and technical aspects by examining to what extent the outcomes of the Project to be sustained after the Project is completed.

2. Achievement and Implementation Process

2.1 Inputs

2.1.1 Inputs by the Vietnamese side

1) Counterpart personnel assigned to the Project

All staff of POLYVAC who were working for measles vaccine production are considered to be counterparts for the Project. Number of staff for measles vaccine production, which had been 43 when the Project started in March 2006, reached 59 at the time of December 2007 (Annex 10). The organization chart of POLYVAC is shown in Annex 9.

2) Provision of the project office and equipment

The Vietnamese side provided the office space to the Project firstly in the production building then in the administration building that was completed in September 2007 within the area of POLYVAC together with the equipment.

3) Operational expenses

The Vietnamese side provided VND 8,199 million (approximately JPY 57 million :1JPY=VND145) as operational expenses of the Project. The total amount of operational and investment cost provided by Vietnamese side had reached approximately VND 74,124 million (approximately JPY 511 million:1JPY=VND145) since the beginning of the grant aid for MVPF.

2.1.2 Inputs by the Japanese side

1) Experts

In 2006, in total 49.5 man-months (MM) with 55 trips was planned and implemented as scheduled. In 2007, 52.4 MM with 70 trips was planned and it is expected that it will be achieved by the end of the fiscal year 2007 (March 2008). The details are shown in Annex 5.

2) Counterpart training

A total of two POLYVAC staff participated in counterpart training at Kitasato Institute in Japan until December 2007. Two managers at QA department and QC department would participate in the training at Kitasato in February 2008. The details are shown in Annex 8.

3) Provision of equipment

Equipment directly provided by Japan to the Project would be amounted to JPY 10,167,000 (VND1,473 million :1JPY=VND145), by the end of Japanese fiscal year. The details of the equipment provided are described in Annex 6.

4) Operational expenses

The operational expenses of the Japanese side would be amounted to JPY 8,098,000 (VND1,174 million :1JPY=VND145) since the beginning of the Project up to September 2007, the end of the second quarter of Japanese fiscal year 2007. The details of the operational expenses are shown in Annex 7.

2.2 Activities and Outputs

Achievement of Output 1 and its Activities: "Staff of POLYVAC acquires appropriate technical skill to produce quality measles vaccine."

The Activities under Output 1 have been steadily implemented towards achievement of Output 1. Technical transfer planned had mostly been conducted according to the specified schedule and in time. Even the technical skills related to the bulk production from seed had mostly been completed, ensuring POLYVAC staff to be ready for the upcoming PV of the production from seed virus planned in 2008. Staff training had been conducted constantly and their attainment level of skills objectively evaluated by a scoring system. In general, issues remaining for the last two years of the Project regarding skills acquisition by POLYVAC staff mostly focused on 1) the maintenance of the skills already transferred from Japanese experts and 2) extension of the techniques acquisition from the staff that had already attained sufficient skill level to the others.

Achievement of activities under Output 1

Activities		Achievements
1-1	Conduct technical transfer on bulk, filling, freeze-dry through the process of producing vaccine from the imported bulk.	• Basic technical transfer had been complete. • As a result, the final products were produced from the imported bulk.
1-2	Conduct technical transfer on production of bulk vaccine through the processing of producing bulk vaccine from the seed virus.	• Basic technical transfer had been nearly complete. • Only PV of the production from seed virus had still been awaited until April 2008. Technical transfer in this regard would be conducted accordingly. • Mock bulk production had been done for ten times.
1-3	Conduct technical transfer on proper operation of mass production (7.5	• Practical training on scaled-up

	million doses/year) of the measles vaccine.	production would be conducted by using a mock bulk produced from seed virus as scheduled. • Through above, technical transfer on machine operation for mass filling and mass freeze-drying as well as time and personnel management during mass production would be done.
1-4	Conduct technical transfer on quality control of the products.	• Technical transfer on almost all the necessary quality control tests had been done. • All necessary QC tests had been experienced by POLYVAC QC staff during the process of PQ/PV so far. • Further technical transfer needs included maintenance of the obtained skills and transfer of techniques from executive to non-executive, ordinary staff.

Achievement of Output 1

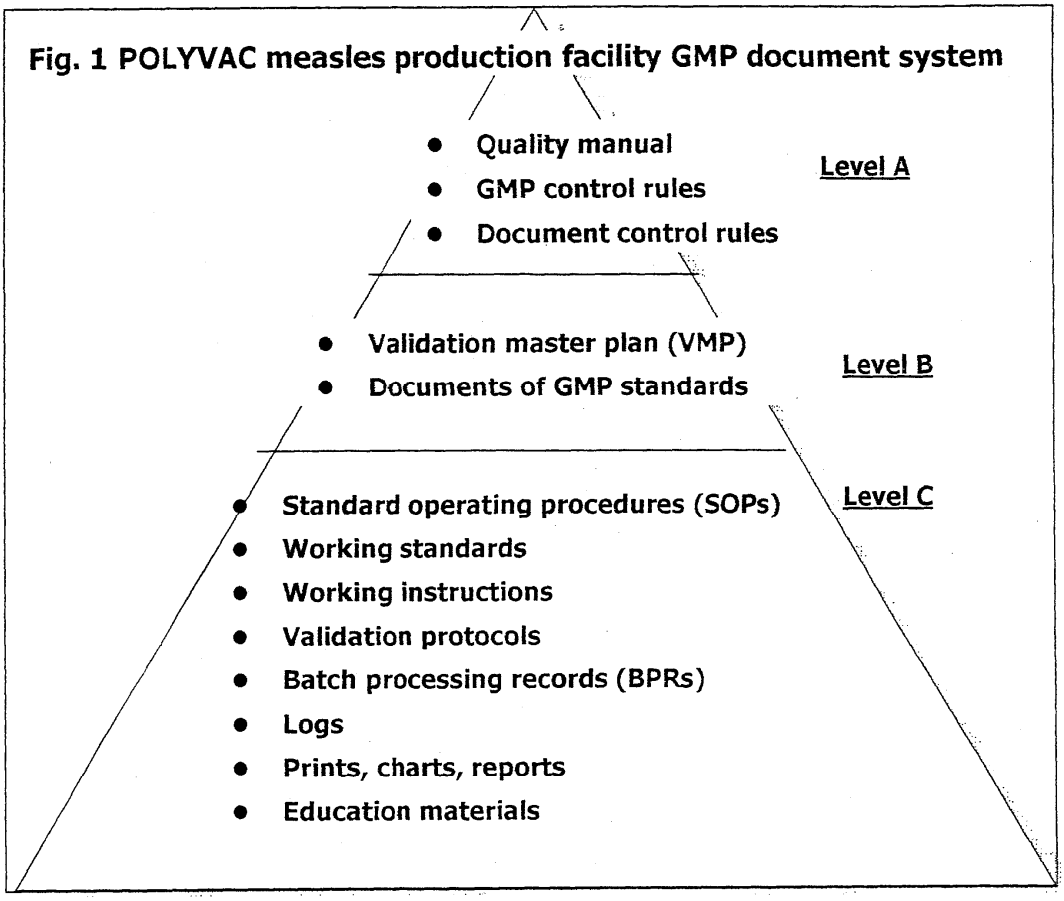
	Verifiable Indicators	Achievements
1-1	Number of Staff in POLYVAC who get technical training to reach a sufficient technical level (i.e. level 4 * for staff categorized as A) for measles vaccine production. *level 4 :be able to work by themselves and could train others	• In each department, staff training had been undertaking targeting at the status that at least one staff per each production process attains level 4 according to the internal scoring system (Annex 13). • As a result of the training, above objective had been nearly achieved. • Managers of departments were confident about their skills attained. However, their capacity for risk management needed further strengthening. • Proper GMP understanding needed to be expanded to non-executive, ordinary staff.
1-2	Standard Operating Procedure (SOP), equipment maintenance list, equipment inventory and other necessary documents for operation and maintenance of the facilities and production equipment by POLYVAC shall be prepared.	• Almost all essential SOPs were in place. • Equipment inventory listed 389 possessed items with date of updating recorded on the top page. • For facility maintenance, air-conditioning and process water supply system calibration protocols were prepared and calibration conducted. Also, maintenance validation for HEPA filter for all rooms and clean benches of the production facility had been stipulated and implemented.
1-3	Details on equipment, apparatus, raw materials, spare parts and consumables are properly administrated and	• Raw materials (SPF eggs, media, vials, rubber stoppers, sera, reagents, etc.) quality was assured by a common

	inventory is properly managed.	manual of quality assurance that stipulates color coding (green-release, red-reject and yellow-quarantine), an SOP stipulating raw materials ordering, receipt and testing, and specifications for each raw material. • Order and receipt logs for raw materials needed further streamlining. • Spare-parts lists were available, however only indicating recommended stock pile quantity, not the actual. Actual stock level was available at each department. • Consumables were managed alongside with spare-parts in the same manner described above.

Achievement of Output 2 and its Activities: "Production and quality management meet Vietnam-GMP which has met WHO-GMP standard."

The Activities under Output 2 have also been steadily implemented towards achievement of Output 2. Overall, satisfactory progress had been made in constructing a GMP system in the POLYVAC measles vaccine facility due to effective technical transfer of experts despite the fact that the facility is the first one to comply with GMP (both domestic and WHO) in Viet Nam.

The entire GMP document system was consisted of three levels of documents. Level A documents are the key GMP documents such as quality manual, GMP rules and document control rules. Level B includes validation master plan and documents of GMP standards whereas level C documents are SOPs, working standards and instructions, validation protocols, batch processing records (BPRs), reports, logs, prints, charts and education materials (Fig. 1). Documents in the level A and B were subject to annual revision and the level C biannual. The initial three batches from the imported bulk had been produced by following the relevant SOPs, and the process had been properly recorded in the BPRs, which had been signed off by the production manager, final production department manager and QA (quality assurance) manager and filed properly in the QA Department.



Achievement of Activities under Output 2

	Activities	Achievements
2-1	Conduct PQ/PV for vaccine production from bulk vaccine.	• PQ/PV for vaccine production from imported bulk had been nearly completed. • The QC tests for the three batches of the final products were ongoing. • Aside from above, all validation results for final products, MFT (media filling test) and WFI (water for injection) had been obtained. (Annex 19)
2-2	Conduct PQ/PV for vaccine production from seed virus.	• Amongst the PQ/PV for vaccine production from seed virus, PQ and a part of PV (three rounds of MFT) were anticipated to be finished by March 2008. • PV for the entire vaccine production from seed virus is planned from April 2008.

2-3	Establish validation system for the production and strengthen the validation skill of the staff.	• The main framework of validation system had been well-established. • Most of the essential validations for the production from bulk had been completed. • PV for the entire vaccine production from seed virus is planned from April 2008.
2-4	Establish and implement quality assurance functions complying with Vietnam-GMP which has met WHO-GMP standard.	• QA Department of POLYVAC had been maintaining GMP document system including quality manual, document control rules, GMP rules, SOPs and records/documents including BPRs (batch processing records). • Basic document flow system had already been established (e.g. BPR flow and sequence of signatories at Production and QA Departments, respectively.)
2-5	Prepare and implement necessary SOP for the process of production, storage, carrying in/out of the products, etc.	• Most of the necessary SOPs were prepared and implemented for the process of production, storage, carrying in/out of the products, etc. • Parts of facility and equipment maintenance SOPs were yet to be prepared and implemented.
2-6	Conduct technical transfer on preparation of documents that need to meet Vietnam-GMP which has met WHO-GMP standard and to be approved by NRA in the Socialist Republic of Vietnam.	• Technical transfer was ongoing and already core GMP documents were in place. • Some managers were capable of preparing GMP documents by themselves as a result of the technical transfer so far, though most of them still needed external assistances.

Achievement of Output 2

	Verifiable Indicators	Achievements
2-1	Performance Qualification (PQ) and Process Validation (PV) are executed as scheduled.	• PQ/PV had been executed as scheduled. • PQ/PV for vaccine production from imported bulk had been nearly completed. • The QC tests for the three batches of the final products were ongoing. • Amongst the PQ/PV for vaccine production from seed virus, PQ and a part of PV (three rounds of MFT) were anticipated to be finished by March 2008. • PV for the entire vaccine production from seed virus is planned from April 2008.

2-2	Validation complying with VN-GMP is conducted periodically by POLYVAC.	• So far the initial validation had been conducted as described above. • Periodical validation would be needed after the routine mass production starting from 2009. So far, the technology transfer on validation had been done as scheduled.
2-3	GMP documentation complying with VN-GMP is prepared.	• Basic structure of the GMP documentation system had been established (see achievement of activity 2-4, 2-5 and 2-6 indicated above, and Annex 17).
2-4	SOPs complying with VN-GMP are prepared and production process is done according to the SOPs.	• Most of the core SOPs were complete. See Annex 18. • Only some SOPs (e.g. SOPs for facility and equipment maintenance) were yet to be prepared. • The production of the first three batches from the imported bulk had been done following corresponding SOPs. Such compliance was properly recorded and traceable through the recording on BPRs. • BPRs had been properly signed-off and filed at the QA Department.

2.3 Project Purpose and Overall Goal

Technical transfer had been done on production almost as scheduled and the target production capacity of 100,000 doses /batch for the first step seemed to be attainable. Satisfactory progress had been made in constructing a GMP system in the POLYVAC measles vaccine facility. Based on these achievements, it seemed that the Project was on the track for achieving the Project Purpose.

Achievement of Project Purpose: "POLYVAC will be capable to produce necessary amount of measles vaccine for use of measles control activities in the Socialist Republic of Viet Nam complying with Viet Nam-GMP which has met WHO-GMP standard."

Verifiable Indicators	Achievement
1) Measles vaccines are produced in POLYVAC at a rate of 300,000 doses x 25 batch (i.e. 7,500,000 doses)/year.	• Technical transfer had been done on production almost as scheduled and the target production capacity of 100,000 doses /batch for the first step seemed to be attainable. • The 300,000 doses /batch mass production would follow the same freeze-drying process as the one for 100,000 doses/ batch production. • Practical training on scale-up production would be conducted from January 2008. • Increased management capacity would be required for mass production.
2) Clearance on the Production and quality management by NRA which has met WHO-GMP	• Satisfactory progress had been made in constructing a GMP system in the POLYVAC measles vaccine facility. • During the facility licensing process, NRA (NICVB) has certified that the facility outfit to be GMP-compliant, although the other aspects still needed further inspection and certification. • GMP inspection was planned during 24-27 December, 2007.

Achievement of Overall Goal: "Measles Infection Rate in the Socialist Republic of Vietnam will be decreased from the current level."

Verifiable Indicators	Achievement
• Rate of children infected with measles in the Socialist Republic of Viet Nam.	• Detailed analysis would be necessary to estimate the future trend of the rate of children infected with measles at the end of the Project.
• Number of children immunized with measles vaccine in the Socialist Republic of Viet Nam.	• Measles immunization coverage had been surpassing 93% since 1993 with a one-dose schedule. • The nationwide second dose injection as routine immunization had started since 2006. • Vaccination coverage was: -95% in 2005 (First dose) -93% in 2006 (First dose) -98% in 2006 (Second dose)

2.4 Implementation Process

a) Technical Transfer Schedule

Technical transfer on each production process had been steadily conducted according to the Master Schedule. As of December 2007, the PV of final production had been nearly completed as planned.

b) Commitment of the Vietnamese side

The number of staff was increased from 43 at the beginning of the Project to 59 currently, since POLYVAC had employed additional staff. The OJT was conducted for newly recruited staff by managers and senior staff. The GMP training had continuously been conducted to POLYVAC staff by QA Department.

The Vietnamese side had allocated the budget for project cost as stipulated in the Record of Discussions, leading to the timely implementation of the Project.

c) Long-term relationship between POLYVAC and Kitasato Institute

Twenty staff of POLYVAC had been trained on production, quality control and GMP at Kitasato Institute since 2002 through WHO and JICA schemes before the Project started. The relationship between POLYVAC and Kitasato Institute which were built through this training had been functioning as a basis of the Project implementation.