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## **FIRE SAFETY REVIEW**

**Bangkok, Thailand  
November 1-6, 1993**

**Prepared for:**

**US - ASIA ENVIRONMENTAL PARTNERSHIP**



**WORLD ENVIRONMENT CENTER**

## DISCLAIMER

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## I. EXECUTIVE SUMMARY

The visit to Thailand by Mr. James M. Dewey was initiated to look at the increasing problem of fires in factories. The problem was highlighted by a fire that occurred at a doll factory in April 1993 where over 200 lives were lost. Through meetings with representatives of the government and private sector, information was developed on the existing regulations and practices regarding fire protection for industry. In addition, ideas for improving the current level of fire protection were discussed.

An important part of the information exchange was to provide suggestions to interested parties based on practices in the U.S. and elsewhere regarding life safety from fire. Emphasis during this exchange was placed on the fact that there is not one single answer or system that can be applied to meet all the objectives of both industry and government.

Government interests and objectives include those that promote the goals of the society, particularly the safety of workers and the general public. They also include strengthening the national economy through a reduction of conflagrations (fires involving a large number of buildings).

The private sector insurance interest is centered around a means to differentiate between risks. The desire is to develop a reliable basis to initially select the property for insurance and then to have the means for effectively pricing the insurance.

Thailand's existing regulations relating to fire safety are spread among many groups within the government. The scope and purpose of the various regulations are not generally understood, and the adequacy of the existing regulations and their implementation has not been assessed. Until the existing regulations are systematically evaluated against internationally accepted fire protection practices and the social/economic goals of Thailand, an inspection program aimed at upgrading the level of fire protection to improve worker safety will be inconsistent, at best.

Mr. Dewey believes that there is no single resource to draw upon which will provide an effective program for Thailand. Any program must draw upon the features of applicable programs from around the world, modified to meet the needs of Thai society at this point in time.

## II. INTRODUCTION

In response to building disasters involving loss of life from fire in 1993, concerned government officials in Thailand contacted Mr. R.J. Gurley, Business Advisor, USAID/Thailand, to request help in identifying businesses in the U.S. involved in the field of fire protection. Mr. Gurley recommended The Hartford Steam Boiler Inspection and Insurance Co., Professional Loss Control (HSB PLC) as a possible candidate. HSB PLC has maintained a presence in Asia for the last 5 years, although not specifically in Thailand.

Mr. Gurley contacted James M. Dewey, P.E., Vice President of International Operations for HSB PLC. Mr. Dewey met with Mr. Gurley, Dr. Vichit, President, Safety, Environmental, and Energy Conservation Company, and Dr. Bhichit, Director, Anti Air Pollution & Environmental Protection Foundation, in early October. At this meeting, it was decided that a visit to Thailand was necessary to allow for a more complete exchange of information on the existing conditions in Thailand and current practices existing in the United States. It was determined that a visit in early November was most desirable. Mr. Dewey visited Bangkok, Thailand, under the auspices of the United States-Asia Environmental Partnership (US-AEP), through a Cooperative Agreement with the World Environment Center (WEC), from November 1 through 6, 1993. This report presents the Mr. Dewey's finding and recommendations resulting from his visit.

The purpose of the trip was to gather information on fire safety aspects of a possible inspection and certification program for environment, fire safety, industrial hygiene, and structural safety.

### **III. DISCUSSIONS AND FINDINGS**

The issue that is at the basis of this visit to Thailand is the safety of life from fire in buildings, principally industrial and manufacturing buildings. Safety of life from fire is more a societal initiative than an economically motivated initiative. There is an immediate need to address the reasons for the large loss of life experienced in factory fires in recent times. The Thailand insurance industry also sees a long term need regarding the impact of continued large losses at industrial properties. These two needs require two different types of actions.

#### **A. Introduction**

An initial meeting was held on Monday morning November 1, with Mr. Chalot Sripicharn and Ms. Wanida Srichai of the World Environment Center, Thailand Office. WEC in Thailand has four initiatives underway. These are in the areas of worker safety, air pollution, water pollution and community awareness and response in emergencies. It was indicated that as many as 28 different organizations and government groups in Thailand had been identified with an involvement in fire safety issues. A three day basic fire prevention course for industry was being sponsored by WEC during the first week of November. In early December another program is being sponsored by WEC to emphasize worker training programs and fire emergency response plans for industrial facilities. Mr. Chalot suggested that there were four steps involved in the fire safety issues facing Thailand. These are adequate legislation, review of existing buildings, development of an implementation program and an ongoing worker training program.

#### **B. Insurance Industry**

The Thai insurance interests were discussed at a meeting with Mr. Surachai Sirivallop, President of the Thai Reinsurance Co., Ltd. and Mr. Arnon Opaspimoltum, Business Development Manager of the Thai Reinsurance Co., Ltd. Mr. Surachai is also head of the General Insurance Association of Thailand. The insurance industry is involved in the property aspects of a facility. This includes fire and machinery breakdown. The insurance companies do not provide coverage for workman's compensation; it is funded by the government. The present insurance tariff law has a simple, straight forward rating system. Credits are applied to a basic rate for safety equipment items such as hydrants, fire extinguishers, and fire sprinkler systems that are available in the building. However, the present system does not have a mechanism to assure the adequacy of the equipment for which credit is being applied. The only type of inspection program that exists is for very large risks where an international reinsurer is

involved. It was indicated that a sprinkler system with only one sprinkler in a facility could receive a credit.

Since Thailand's insurance industry has become very competitive, individual company underwriters are eager to lower prices as much as possible. The insurance association sees a need to have a more sophisticated rating system which distinguishes between risks of different magnitude. Mr. Surachai indicated that there may possibly be some existing standards which could be applied initially. Improvements to the existing standards could be made over time. It was indicated that the General Insurance Association would like to have a third party inspection program underway as soon as possible. However, practically it is understood that it may be sometime before such a program could be adequately implemented.

### **C. Inspection Program**

It is estimated that 3,000 to 5,000 facilities will require inspection. The insurance association has estimated that there are 2,000 facilities valued at 2,000,000 to 4,000,000 U.S. Dollars (USD), and that there is an additional 800 facilities valued in excess of 4,000,000 USD. The resources required to develop an inspection standard and provide inspections for as many as 1,000 facilities in the first year were discussed. The scope of the fire safety inspection will significantly effect the resources required. The certification process would involve evaluating existing conditions against an identified standard. For example, in the United States, the Occupational Safety and Health Act (OSHA) establishes the requirements to be met in the areas of fire safety and industrial hygiene. Building codes adopted at the local or state level establish standards for structural safety.

Business opportunities were discussed with representatives of the Safety, Environmental, and Energy Conservation Company. These representatives included Dr. Vichit Punyahotra, President; Mr. Surasak Yongwatananun, Business Manager; and Mr. Yuthachai Bunterngrchit, Technical Director. Several opportunities are presented by an inspection program directed towards improving worker safety. A separate company could be set up as a joint venture between HSB PLC and SEECCO with the sole purpose of providing inspections. HSB PLC could establish a branch office in Thailand to work jointly with SEECCO, and could also provide technical expertise for an extended period of time to support an inspection program. HSB PLC could provide technical expertise to a government department on a contract basis. The available options will be evaluated with consideration of the need for Thai nationals to actually conduct inspections, the economic influence on program costs with expatriots involved, and the required staffing levels to accomplish the expected activity.

## **D. Facility Visits**

This exchange included visits to two industrial facilities located in Bangkok, for the purpose of identifying fire safety practices found in Thai industries. A brief summary of each tour is provided below. There was no indications that the two industrial plants visited were representative of industry in general. Neither plant is comparable to the reported conditions at the plant where the major loss of life occurred during 1993.

### **1. Textile Facility**

The first visit was to a privately owned textile operation. The plant employs approximately 80 people per shift, and operates two shifts per day. It is a one story building of noncombustible construction, approximately 2,000 square meters in area. The older portion of the building was 15 years old. It contains about 50 Jacquard looms used for weaving labels for clothing. There is no fixed fire protection in the building, but portable fire protection appliances (fire extinguishers) are available. Small quantities of raw materials are stored on a mezzanine along one wall. Jacquard patterns (heavy cardboard punch cards) are stored in a small adjacent building.

The facility has no fire safety training program for its employees. Emergency exiting arrangements are not well identified. However, housekeeping throughout the facility is excellent, with no significant buildup of lint around the looms or on the floor (lint accumulation is a typical hazard for this type of occupancy). Looms are well maintained without excessive grease accumulation. This plant has not experienced a fire in its operating history. This plant would be considered a low value (< USD 2,000,000) and low risk facility.

### **2. Electronics Facility**

The second facility visited was an electronics plant located in Bangkok near the international airport. Mr. Buncha Sritanauthaikorn, Safety and Health Section Head, provided a tour of the plant. The plant is owned by Philips Company and operated by Philips Semiconductors (Thailand) Co., Ltd. The facility manufactures components for the electronics industry. Philips maintains its own standards for fire protection at its manufacturing facilities and also meets the requirements established by its international property insurer. Therefore, the facility is provided throughout with automatic sprinkler protection and a plant-wide fire alarm system. It has a private water supply specifically for fire protection.

Philips Company conducts a formal training program for new employees, with refresher training for existing employees. A formal emergency action plan is in place with exit drills conducted on a regular basis. Emergency exiting diagrams are posted throughout the facility. Plant management had identified, and is seeking solutions to, a problem presented by an adjacent unprotected woodworking plant that severely exposes the main office building. Another problem that the safety department had encountered involved exit signs which plant employees had difficulty reading due to the small size of the lettering.

It is estimated that this plant is high value (> USD 4,000,000) and high risk facility. However, it should be noted that full, automatic protection is provided; such protection was not provided at the factory where the loss of life occurred. Also, the semi conductor plant has a smaller employee population than the factory where the loss occurred.

### 3. Additional Observations

Mr. Dewey made additional observations regarding installed fire protection equipment at two buildings he was in during his visit. The 10th floor of the hotel he occupied and where his room was located, is provided with sprinklers. However, the hotel lobby and mezzanine floors are not sprinklered even though they contain extensive quantities of combustibles. This would create a situation in which a fire in the unsprinklered area could spread to the sprinklered area and overwhelm the installed sprinkler system.

An executive office where one of the meetings took place had one sprinkler provided to protect an area in excess of 40 square meters. Most tested sprinklers available in the world today are adequate to protect an area at no more than 1/2 this size. Both of these buildings were considered to be well protected.

#### IV. CONCLUSIONS AND RECOMMENDATIONS

Both the Thai government and the private sector are interested in improving life safety from fire hazards in the workplace. The various organizations that have specifically expressed an interest in improving the current conditions in Thailand's industrial environment are:

<b>Government</b>	<b>Private Sector</b>
Ministry of Industry Ministry of Labor Ministry of Interior Bangkok Metropolitan Authority	Federation of Thai Industries General Insurance Association National Safety Council National Safety Association

The objectives of these groups can be simply stated as follows:

Ministry of Industry: maintenance of profitable and desirable industrial environment; reduction of hazardous waste exposure to public and workers.

Ministry of Labor: reduction of loss of life and injury to factory workers; reduction of casualty costs in work place.

Ministry of Interior: maintenance of stable community development

Bangkok Metropolitan Authority: similar to Interior Ministry

General Insurance Association: reduction of property loss resulting from an improved selection and rating system for insured properties

Federation of Thai Industries: maintain stable and profitable industrial atmosphere which provides industry with the ability to function profitably in Thailand

National Safety groups: promote general safety to the highest reasonable level within the country.

In the United States, industry groups actively provide input to government agencies on the development of regulations, helping to ensure that regulations consider the practical impact on industry operations. This interaction can range from government regulations referencing standards developed by industry to

government developed regulations being reviewed by industry prior to issuance of the regulation.

There are a wide variety of government regulations and private industry standards that are in use around the world. These vary greatly depending on the society in which they are being used and the objectives of the user. Examples of standards are:

Private Industry:

Loss Prevention Council of Great Britain (now supplemented or replaced by British Standards)

National Fire Protection Association in the US

Private Insurance Companies:

Factory Mutual Insurance System

Industrial Risk Insurers

Insurance Inspection Bureaus

International Standards Organization

Public Sector:

US Occupational Safety and Health Act

Building Codes and Fire Prevention Codes, such as

Australian Building Code

US Model Building Codes

British Standards

The following steps are seen as necessary in developing a private sector inspection/certification program.

**Recommendation 1: Identify all existing rules and regulations and modify as needed.**

All of Thailand's existing rules and regulations pertaining the life safety in the workplace should be identified and reviewed. The rules and regulations should be modified and expanded, as necessary, to be consistent with each other and to accomplish the goals held by all concerned. It would be beneficial for a joint

working group from the government and private sectors to develop the revised regulations in order to achieve the most effective set of regulations possible.

**Recommendation 2: Identify agencies to be involved in the licensing process, including review of policy and procedures, areas covered, control of license maintenance, etc. Provide information on the licensing process to the public.**

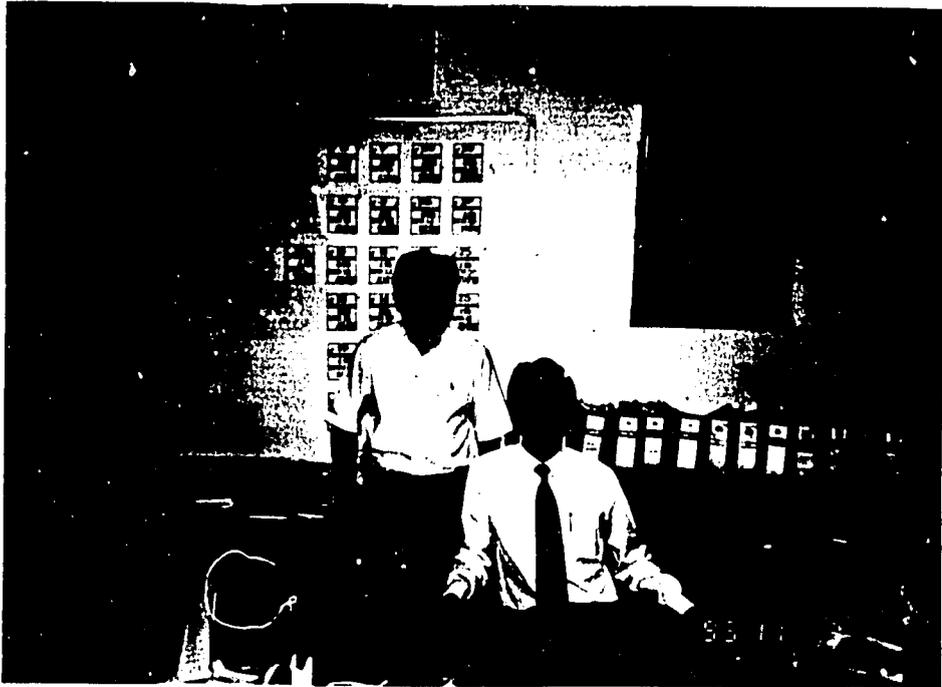
An infrastructure is needed to effectuate the licensing process. It is also important to ensure that the affected public is informed of the new licensing program and its requirements, and the logistical information needed to apply for and obtain a license.

**Recommendation 3: Implement a certification and enforcement program to ensure compliance with standards.**

Businesses should be legally required to obtain a certification of compliance with their license and applicable standards. A program of random inspections should be instituted to determine continuing compliance as well as a mechanism to require improvements, where indicated.

**Recommendation 4: Determine the requirements for individuals and companies performing the inspections based on the conditions to be inspected.**

Inspector qualifications should be established to ensure that all inspections are conducted in a capable and comprehensive manner. Inspection criteria should be developed relevant to the various types of facilities to be inspected, ensuring consistent inspection procedures for like facilities.



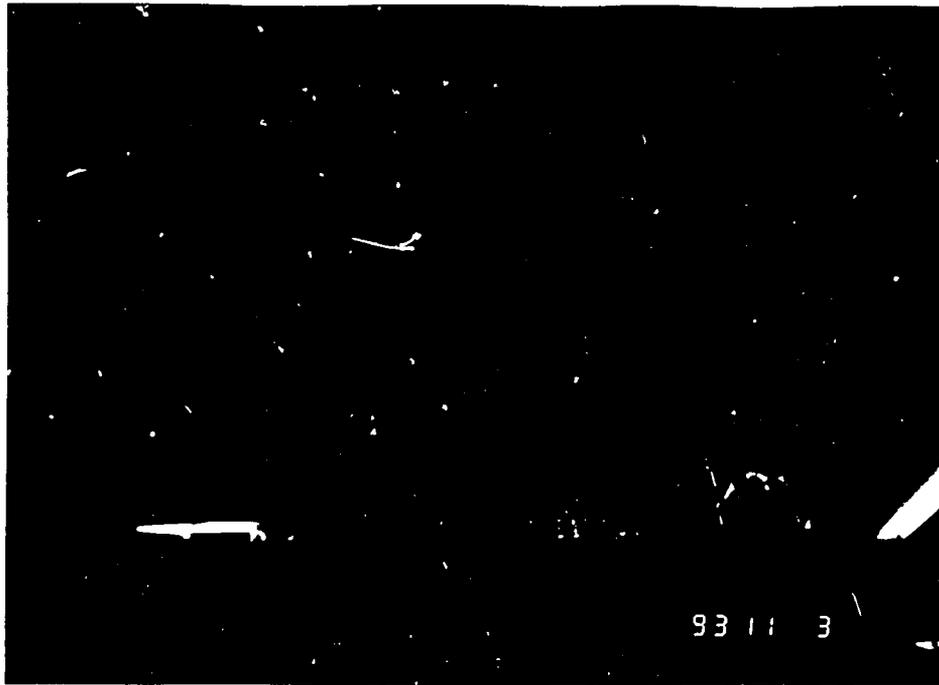
General Manager of Textile Wearing Plant, on left,  
and Mr. Surasaka, SEECCO



Mr. Buncha, Philips,  
and Mr. Surasak,  
SEECCO

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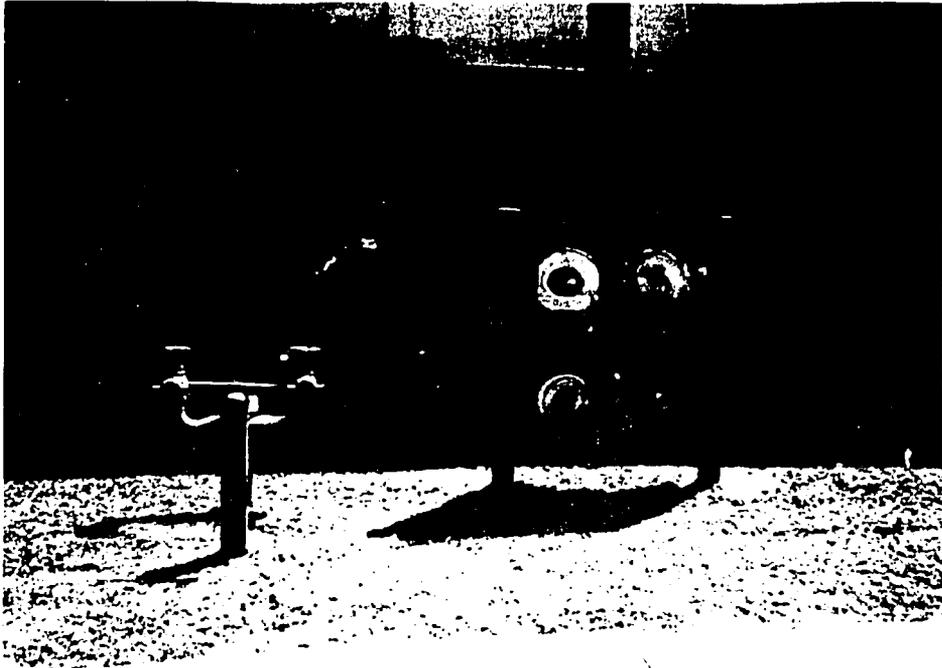


Textile Factory showing noncombustible construction  
and storage on mezzanine



Narrow aisles between weaving looms

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Outdoor hydrant and hose cabinet at Philips



Offices of Thai National Safety Association

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**APPENDIX B  
ITINERARY**

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## ITINERARY

Wednesday, November 3, 1993

Textile plant - (name unknown)  
Bangkok

Saturday, November 6, 1993

Philips Semiconductor (Thailand) Co., Ltd.  
Donmuang, Bangkok

**APPENDIX C  
PERSONS & ORGANIZATIONS VISITED**

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## **PERSONS AND ORGANIZATIONS VISITED**

Dr. Vichit Punyahotra, President, SEECCO

Mr. Yuthachai Bunternngchit, Associate Dean  
King Mongkut's Institute of Technology

Mr. Surachai Sirivallop, President, Thai Reinsurance Co.,Ltd.

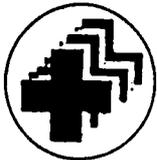
Mr. Arnon Opaspimoltum, Business Development Manager  
Thai Reinsurance Co.,Ltd.

Mr. Chalot Sripicharn, Country Director-Thailand  
World Environment Center

Mr. Chaiya Richard Holt, Managing Director, Sinobrit Group

**APPENDIX D  
BUSINESS CARDS OF PERSONS VISITED**

26



สุรศักดิ์ ยงวัฒนานนท์  
SURASAK YONGWATANANUN

484 1822 ผู้อำนวยการ

*Meeting  
Div. Vichit  
had dinner  
11/1*

ศูนย์ประกันสังคมเอกชน

(โรงพยาบาล พัทธยาโมเวียด และ เครือข่าย)

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PROF. DR. VICHIT PUNYAHOTRA

ศาสตราจารย์ นพ.ดร. วิจิตร บุญยะโทตระ

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PRESIDENT :

- Thailand National Safety Council
- Thai Consumer Association
- Medical Social Security Center
- ICCT
- Health Group Co.
- Asian Institute of Safety-Environment & Energy Conservation (AI-SEEC)
- SEECO



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center of U.S.  
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Yuthachai BUNTERNGCHIT

Associate Dean For Special Affairs

Faculty of Engineering

Ph : 587 4336, 587 4346

*TECH DIR. for SEECO*



Pol. Col. PRAPATANA KONTRONG  
DEPUTY COMMANDER

SCIENTIFIC CRIME DETECTION DIV

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Prasit Leethathorn  
Managing Director



ANTI AIR POLLUTION & ENVIRONMENTAL  
PROTECTION FOUNDATION

DR. BHICHIT RATTAKUL

DIRECTOR

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251-8612 251-8613  
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THAI RE

*met at Thai Re office  
11/1*

Arnon Opaspimoltum  
Business Development Manager

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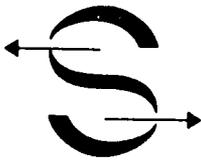
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ชัยวุฒิ ปานชี

Department Manager

**Sinobrit Group**



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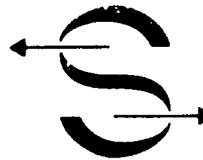
*net@  
Sinobrit office  
w/ Richard Holt  
involved in  
security*

Chaiya Richard Holt

ไชยา ริชาร์ด โฮลท์

Managing Director

**Sinobrit Group**



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*12<sup>th</sup>  
Floor*

*Met in  
11/1*



*11/6  
w/ red  
pit.*

**PHILIPS**

**Philips Semiconductors**

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Buncha Sritanauthakorn  
Safety & Health Sect. Head  
H/R. & Facilities Dept.

Philips Semiconductors  
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Fax : (662) 551-1063-64

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**APPENDIX E  
CURRICULUM VITAE OF MISSION EXPERT**

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# Professional Loss Control

Scott Plaza Two • Suite 422 • Philadelphia, PA 19113-1516 • (215) 521-8975

**JAMES M. DEWEY, P.E.**  
**VICE PRESIDENT**

## EDUCATION

B.S., Fire Protection Engineering, University of Maryland, 1968  
Course in Fire Insurance Rating, College of Insurance, New York, 1970  
Seminars on Supervisory Skills and Advanced Supervisory Skills, American Management Association, 1970-71  
Course in General Principles of Insurance, Insurance Institute of America, 1972-73  
Associate in Risk Management, Insurance Institute of America, 1981

## PROFESSIONAL AFFILIATIONS

Registered Professional Engineer, Tennessee and Pennsylvania  
Society of Fire Protection Engineers, Member  
Past President - Philadelphia-Delaware Valley Chapter  
American Society of Safety Engineers, Member  
National Fire Protection Association, Member  
Technical Committee on Airport Facilities

## PROFESSIONAL EXPERIENCE

Mr. Dewey has more than 20 years' of experience in fire protection engineering. He has specialized in industrial fire protection. He is currently responsible for the Asia/Pacific operations of Professional Loss Control. He is an NQA-1 qualified lead auditor.

Since joining PLC, he has spent one year in Africa with an electrical utility where he provided fire protection engineering support services, including fire protection program development, fire protection systems design and evaluation, and international standards review. He also spent one year in Asia managing a project providing fire protection services for an electrical utility. The project involved four engineers from PLC and four local technical support personnel. The project included risk assessment for approximately 90 electrical transmission substations, quality assurance program development, fire protection standard development, international product evaluation, fire suppression system design, and comparison of international fire protection standards.

Prior to joining PLC, Mr. Dewey worked for a major HPR Insurance organization. His responsibilities included coordinating engineering activities as engineering manager. He was responsible for a staff of 20 field engineers providing HPR inspection services for insured risks throughout the mid-Atlantic states.

## AREAS OF SPECIALIZATION

Project and Risk Management  
Fire Protection System  
Evaluation and Plan Review  
Fire Protection Program Development  
Inspection and Audits  
Industrial Fire Hazard Evaluation

Municipal Fire Protection Analysis  
Fire Brigade Evaluation  
Loss Investigation  
HPR-Type Inspection  
Quality Assurance Management  
Personnel Training

## SECURITY CLEARANCE

D.O.E. "Q" Clearance, Inactive

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*Consulting Engineers*

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