

# **SAFETY CULTURE AS A PILLAR OF DID IMPLEMENTATION AT THE EFEI BATAN INDONESIA**



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# INTRODUCTION



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# INTRODUCTION



## ➤ **The objectives of Defence in Depth (DID):**

1. To compensate for potential human and component failures;
2. To maintain the effectiveness of the barriers by averting damage to the plant and to the barriers themselves;
3. To protect the public and the environment from harm in the event that these barriers are not fully effective.

## ➤ **The Strategy of DID:**

1. To prevent accidents
2. To limit their potential consequences and prevent any evolution to more serious conditions.



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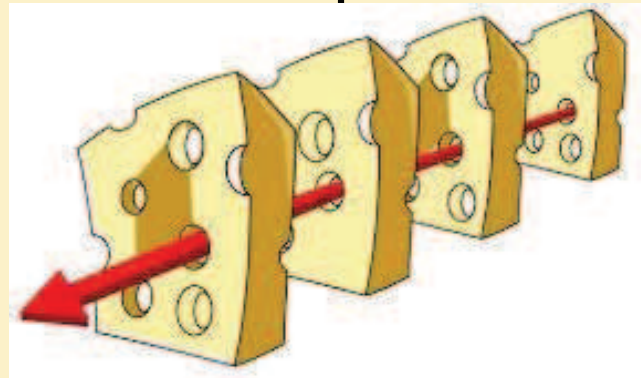


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# INTRODUCTION



- ❖ The objective of the first level of protection is the prevention of abnormal operation and system failures. (*Defence in Depth in nuclear safety, Insag – 10,*).
- ❖ One of the safety provisions at level one is **comprehensive training of appropriately selected operating personnel whose behavior is consistent with a sound safety culture.**
- ❖ Qualified personnel which has good safety behavior is needed to achieve reliable and safe operation of the installation.



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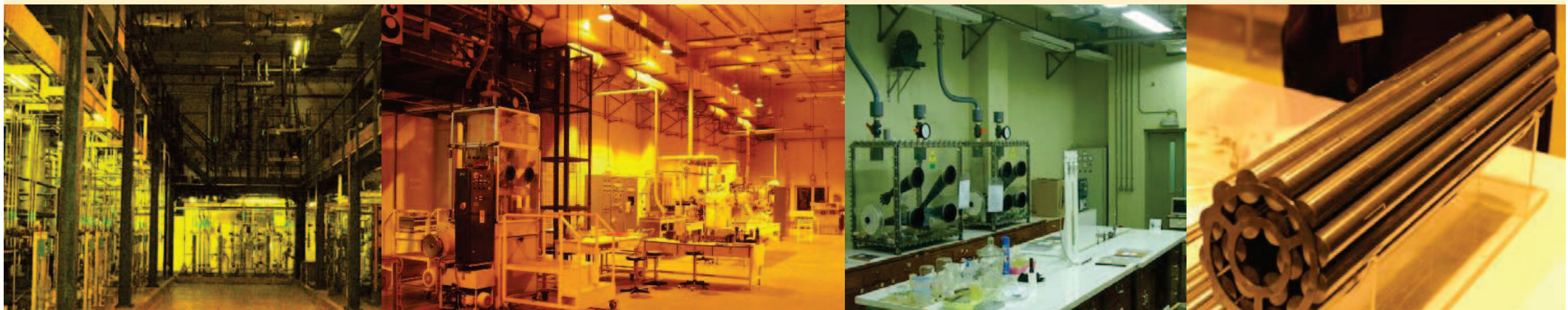


# Experimental Fuel Element Installation (EFEI)



Experimental Fuel Element Installation (EFEI) is one of the nuclear installations in National Nuclear Energy Agency (BATAN) that support the research and development of production technology of nuclear fuel for power reactor . It covers :

1. Conversion Technology of Yellow Cake into  $UO_2$  nuclear grade
2. Fuel fabrication Technology that based on  $UO_2$  pellets in Zircaloy cladding, and
3. Quality Control of the production process of nuclear fuel



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## First Level of Protection DID in EFEI



- ❖ The prevention of abnormal operation and failures that is done through conservative design and high quality in construction and operation.

Regarding high-quality operation, the EFEI conducts the following administrative measures:

- Access control to the laboratories,
- All instruments are operated below their safe operating conditions and following valid procedures,
- Maintenance programs are conducted on schedule,
- Operation and maintenance activities are done only by able and trained personnel,
- Safety based classification of systems, structures, and components, implementation of quality management system , and
- Implementation and improvement of safety culture.

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# **EFEI SAFETY CULTURE DEVELOPMENT STRATEGIES**



- **To formulate Vision and Mission, Cores Values, and Basic Principles of Safety**
- **To implement [step by step] Strong Safety Culture Characteristics that is listed in the IAEA Safety Guide No. GS-G-3.5**
- **To develop tools to evaluate progress on the implementation safety culture.**



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# DEVELOPMENT STRATEGIS



## **The basic principles developed at EFEI:**

- Incidents or accidents can be prevented, and there is no tolerance towards an incident or accident
- There is no job that is so important or urgent when it cannot be executed safely. It is better to postpone or terminate a job when issues of safety are known.
- Safety is an integral part of the working process so every hazard must be identified and its risks controlled.
- Safety is the responsibility of every person. Assuring the safety of the person and the partner is a duty and obligation of each and every EFEI personnel.
- Safety performance must be sustainably improved and safety performance must be accountable.

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# DEVELOPMENT STRATEGIES



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# DEVELOPMENT STRATEGIES



## Safety is Clearly Recognized Value

The main activity are: communication of safety values through socialization, safety culture training and workshops, pre-jobs briefing, coffee morning, safety posters or banners, and others.

## Leadership for Safety is Clear.

The main activity are: increasing the frequency of senior leaders visits to the workplace (work-floor), leadership training to personnel especially supervisors, personnel qualification through the work permit from regulatory agency (Bapeten), engagement personnel in occupational health and safety inspection, establish open two-way communication, and others.



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# DEVELOPMENT STRATEGIES



## **Accountability for Safety is Clear.**

The main activities are: regularly report to the regulatory agency (BAPETEN) of the EFEI operating activities, the development of Safety Performance Indicators, definition and documentation of roles and responsibilities of each personnel, open reporting of safety problems, etc.

## **Safety is integrated into all Activities.**

The main activities are: the implementation of the HIRADC (Hazard Identification Risk and Determining Controls and Workplace Hazard Assessment), the internalization of the concept of STAR in the works, strengthening of competence through training, development of behavior based safety, morning briefing before works, housekeeping through voluntary work cleaning and tidying up the work place (5S), strengthening teamwork, etc



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# DEVELOPMENT STRATEGIES



## Safety is Learning Driven.

The main activities are: safety self-assessment, OHS inspection by personnel and management, open reporting of safety problems (near miss, incident, accident), participation in the IAEA-FINAS (Fuel Incident Notification and Analysis System), safety discussions in the coffee morning, exchange experiences and information related implementation of safety culture among the work units in BATAN, requalification training of personnel, facilitation of learning activities, etc.



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- Safety Performance Indicators (SPI).
- Management System Inspection Tool (MSIT).
- Occupational Safety and Health Inspection. (OSH inspection)
- Questionnaire on Safety Culture.
- Check list on Behavior Based Safety - BBS.



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# DEVELOPMENT STRATEGIES



## Expected outcomes are increasing:

- The involvement and active participation of the personnel in enhancing safety culture activities;
- The personnel motivation and safe behavior;
- The controlled potential dangers (hazards) and safety risks;
- The internal and external communications; and
- The safety commitment of individual in all levels



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# IMPLEMENTATION OF STRATEGIES

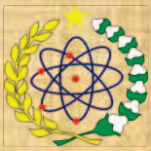


## Increasing work motivation through walk time of senior management

The visits by senior management is important because management develop and influence cultures by their actions (and inactions) and by the values and assumptions that they communicate.



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# IMPLEMENTATION OF STRATEGIES



## Workshop on Safety Leadership



- Leadership exists in everybody.
- Safety leadership constitutes all activities to influence, to move, to direct, and to empower working partners to work together to achieve zero accident and injury free workplace.

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# IMPLEMENTATION OF STRATEGIES



## Hazard Identification Risk and Determining Control (HIRADC) Dan Workplace Hazard Assessment (WHA)

- HIRADC is an analysis of potential hazards, risk assessment, prevention and ways to reduce a hazard in a job.
- WHA is an analysis of potential hazard caused by tools or materials that are stored in the workplace, including ways to cope when the incident occurred, and how eliminating and reducing the danger



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# IMPLEMENTATION OF STRATEGIES



## Applying Standard Operation Procedure laboratory in EFEI

SOP of working safely at EFEI in general, i.e. provisions for every personnel before they work: Tasks/activities that will be done; Hazards and risks of the danger; The cause or the event that causes the risks; Controlling the event and overcoming the danger; and emergency procedures

## Housekeeping - 5 S (Sort, Set in order, Shine, Standardize, Sustain)

Through this volunteer work, it is expected that the working conditions at EFEI are kept clean and tidy. This work is also to encourage team work and involvement of personnel ownership on the safety program.



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## First Aid Training

- ❖ Every personnel is obliged to attend the training of First Aid
- ❖ It aims to provide skills to EFEI staff members to be able to provide first aid assistance to their colleagues when an accident in the work place occurs.
- ❖ First aid training is held once a year and the speakers are physicians and nurses from the BATAN health care centre



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# IMPLEMENTATION OF STRATEGIES



## Fire Risk Assessment (FRA) and Fire Extinguisher Training



- ❖ Fire Safety aims to minimize the risks of injuries or even loss of life.
- ❖ The objectives of Fire Risk Assessment are:
  - To identify fire hazard potentials
  - To reduce the fire hazard risks

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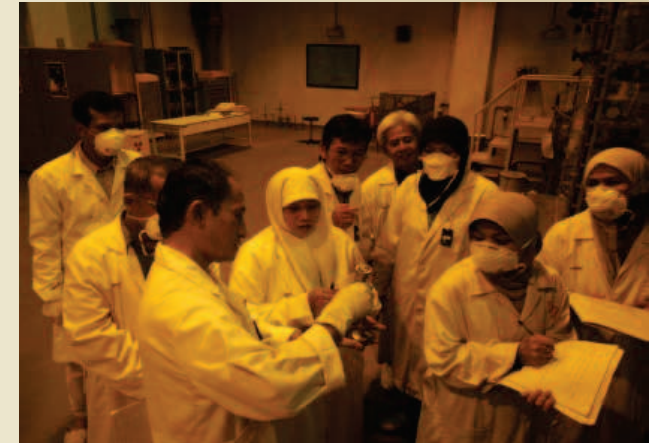
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# IMPLEMENTATION OF STRATEGIES



## Occupational Health and Safety Inspection (OHS Inspection)

- ❖ OHS Inspection is done routinely every month in turns by all members of EFEI staff in order to create a safe, secure and comfortable working condition.
- ❖ This event is also intended to increase motivation, teamwork and involvement of personnel ownership



## Coffee morning

- ❖ Coffee morning is a media to create open communication between the staff and the management.
- ❖ Each staff member could deliver any suggestion toward colleagues or supervisors
- ❖ It is also used as a time to communicate work issues and safety discussion so a solution can be reached by all members of the staff.



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# IMPLEMENTATION OF STRATEGIES



## Sharing on the implementation of safety culture



- ❖ Sharing on the implementation of safety culture is done by visiting other working units in National Nuclear Energy Agency (BATAN) and National Oil Company (PERTAMINA).
- ❖ The purpose of the sharing is to support and give inputs on the implementation of safety culture in each working unit.

## Morning briefing (Pre-Job Briefing)

- ❖ Morning briefing is done as a media of safety induction for all operators that will work in the laboratory.
- ❖ The leaders of morning briefings are supervisors scheduled routinely every morning.



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# IMPLEMENTATION OF STRATEGIES



## Participation of EFEI in IAEA- FINAS (Fuel Incident Notification and Analysis System)



- Every incident, no matter how small, is noted and reported to the management and to BAPETEN (the coordinator of FINAS Indonesia). Next, it will be evaluated and analyzed to discover the potential and the cause of the event. Solution are also found.

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# IMPLEMENTATION OF STRATEGIES

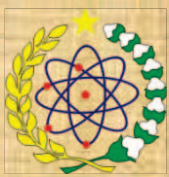


## Personnel Qualification

- ❖ Personnel qualification and training as required by Regulatory Agency (BAPETEN) has been continuously done.
- ❖ The qualification of EFEI personnel that are required to have a Working Permit from the Regulatory Agency are the NRNI Operator, NRNI Supervisor, Nuclear Material Inventory Officer, and the Officer of Radiation Protection.
- ❖ SIB (working permit) is valid for 3 years



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# Self Assessment on Safety



## **(a) Filling in SPI (Safety Performance Indicator)**

EFEI with BAPETEN has managed to develop SPI for NRNI.

The overall score of SPI EFEI 2012 is 3.82 [max score 5]. The results show that the overall condition of the safety culture at EFEI is in line with the provisions required by Regulatory Agency.

## **(b) The Result of Occupational Health and Safety Inspection (OHS Inspection)**

The findings from the routine OHS Inspection (monthly) is immediately followed-up and solved when possible. All of the findings and correction action that have been done are reported.

The small number of findings and high percentage of immediate solving are the indicators of a successful OHS.

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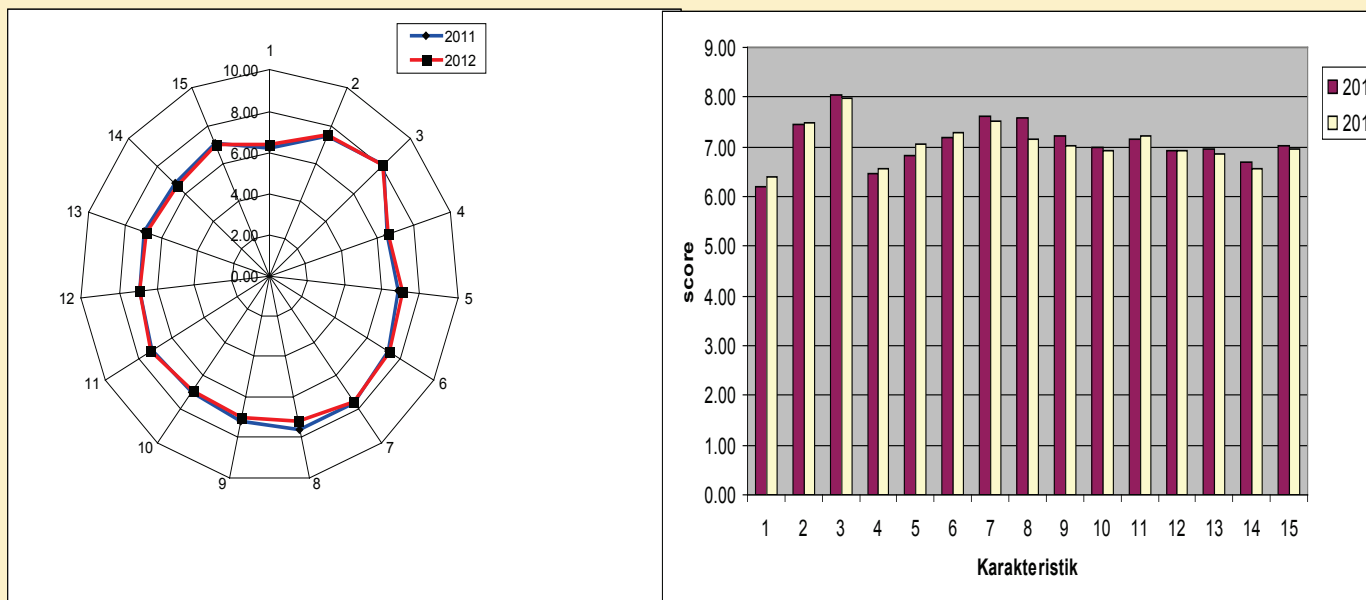
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# Self Assessment on Safety



## (c) The Result of questionnaire on safety culture

Every year, EFEI holds a survey on the perception of personnel on the implementation of safety culture at EFEI.



The average value of all characteristics surveyed in the EFEI in 2012 was 7.06. It is in the stage 2, just as the average value of 2011 (7.09). It shows that in the EFEI **“Safety becomes an organizational goal.”**

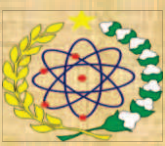
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## (d) Check list on Behavior Based Safety (BBS)

- ❖ BBS is observation done to personnel of the laboratory that are on duty.
- ❖ When under observation unsafe acts conducted by workers are identified they will be directly intervened by the officer/observer so that the unsafe acts are immediately changed to safe acts.





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# REVIEW



## Management System Inspection Tool (MSIT)

- BAPETEN (Regulatory Agency) has conducted review on the implementation of safety culture at EFEI using MSIT.
- The results of EFEI show that all components or criteria in MSIT can be fulfilled by EFEI, and MSIT is comprehensive enough as a tool for monitoring and evaluation for the implementation of safety culture in an organization.



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# RESULTS AND DISCUSSION



- The implementation of safety culture has been proven to increase the safety operation of the EFEI. The high-quality operation of the EFEI has minimized abnormalities due to system and component failures.
- Therefore the implementation of safety culture must be done continuously and in a measurable manner to achieve high quality standard of operation.

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# CONCLUSION



- In order to reach strong safety culture at EFEI, cooperation and commitment is needed from the management and all personnel.
- The five characteristics of a strong safety culture in the IAEA Safety Guide No. GS-G-3.5 were adopted as a strategy to develop safety culture in the EFEI.
- The EFEI puts a target that in 2015, its safety culture status is on Stage 3 of the **IAEA-TECDOC-1329: “Safety can always be improved.”**
- Safety is a priority and main consideration in every activity at EFEI, safety should be continuously improved. In order to reach strong safety culture at EFEI, cooperation and commitment should be intensively developed from the management and all personnel.
- The enhancement of safety culture shall result in the safe behavior of all personnel so that a high quality operation of the EFEI should be achieved and it means that the first level of Defence in Depth works well.



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תודה  
 Dankie Gracias  
 Спасибо شكرا  
 Köszönjük Merci Takk  
 Grazie Dziękujemy Terima kasih  
 Ďakujeme Vielen Dank Paldies  
 Kiitos Täname teid 谢谢  
**Thank You** Tak  
 感謝您 Obrigado Teşekkür Ederiz  
 Σας Ευχαριστούμ 감사합니다  
 Bedankt Дěkujeme vám  
 ありがとうございます  
 Tack