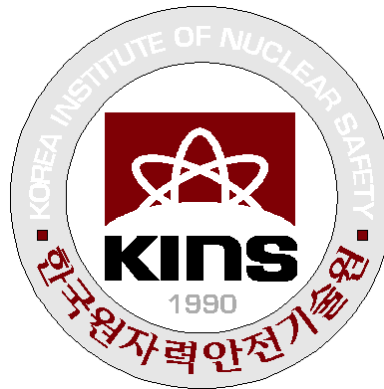


# Operational Safety with OEF



Do Sam KIM

**Korea Institute of Nuclear Safety**

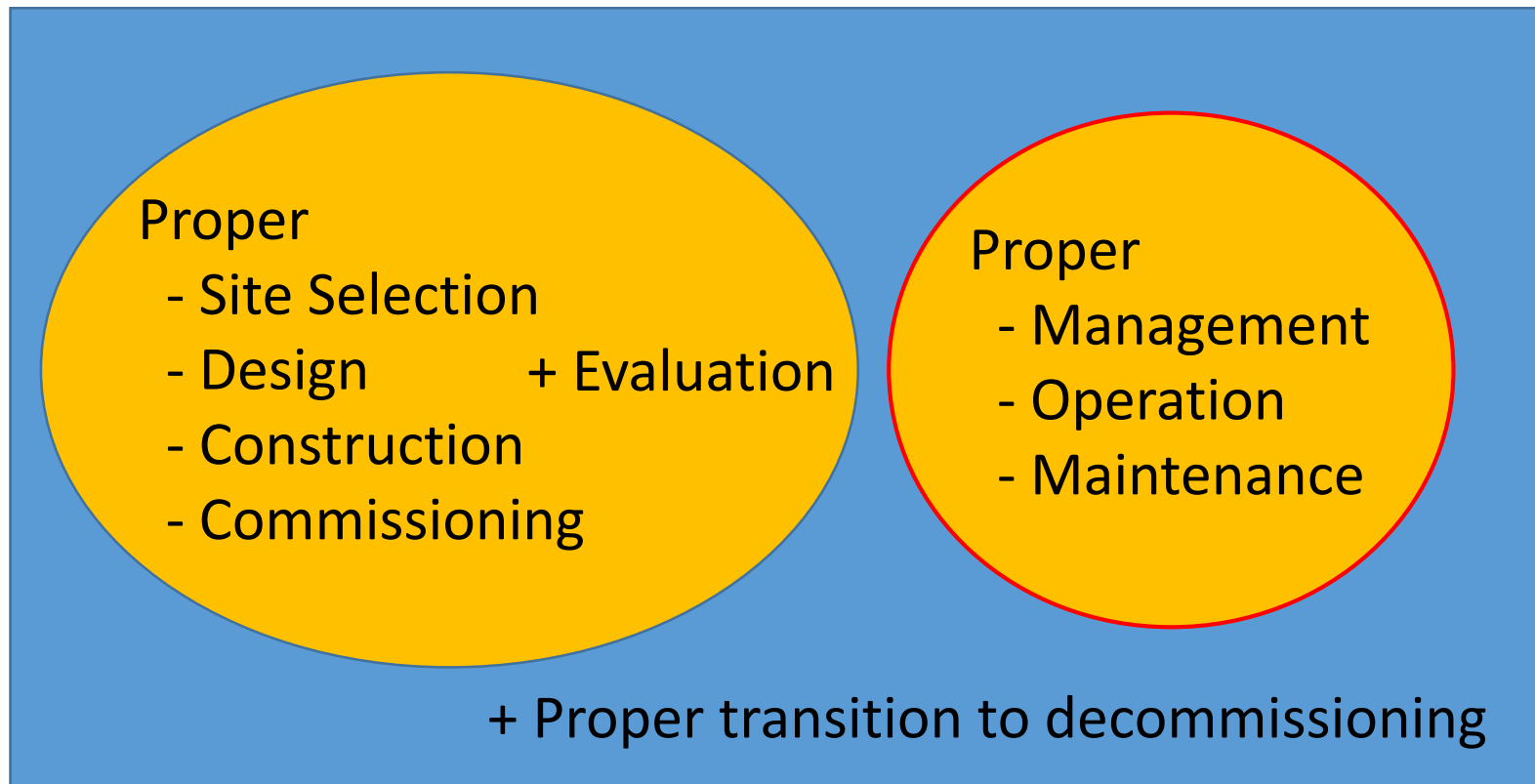
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- II. OEF Requirements for NPPs
- III. Reporting, Investigation and Evaluation of NPP Events in Korea
- IV. The National OEF Program in Korea

# I. Introduction



# ❖ Safety of Nuclear Power Plants (NPPs)



# < Contents of IAEA SSR-2/2 Safety of Nuclear Power Plants : Commissioning and Operation >

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## II. OEF Requirements for NPPs



# II.1 IAEA requirements

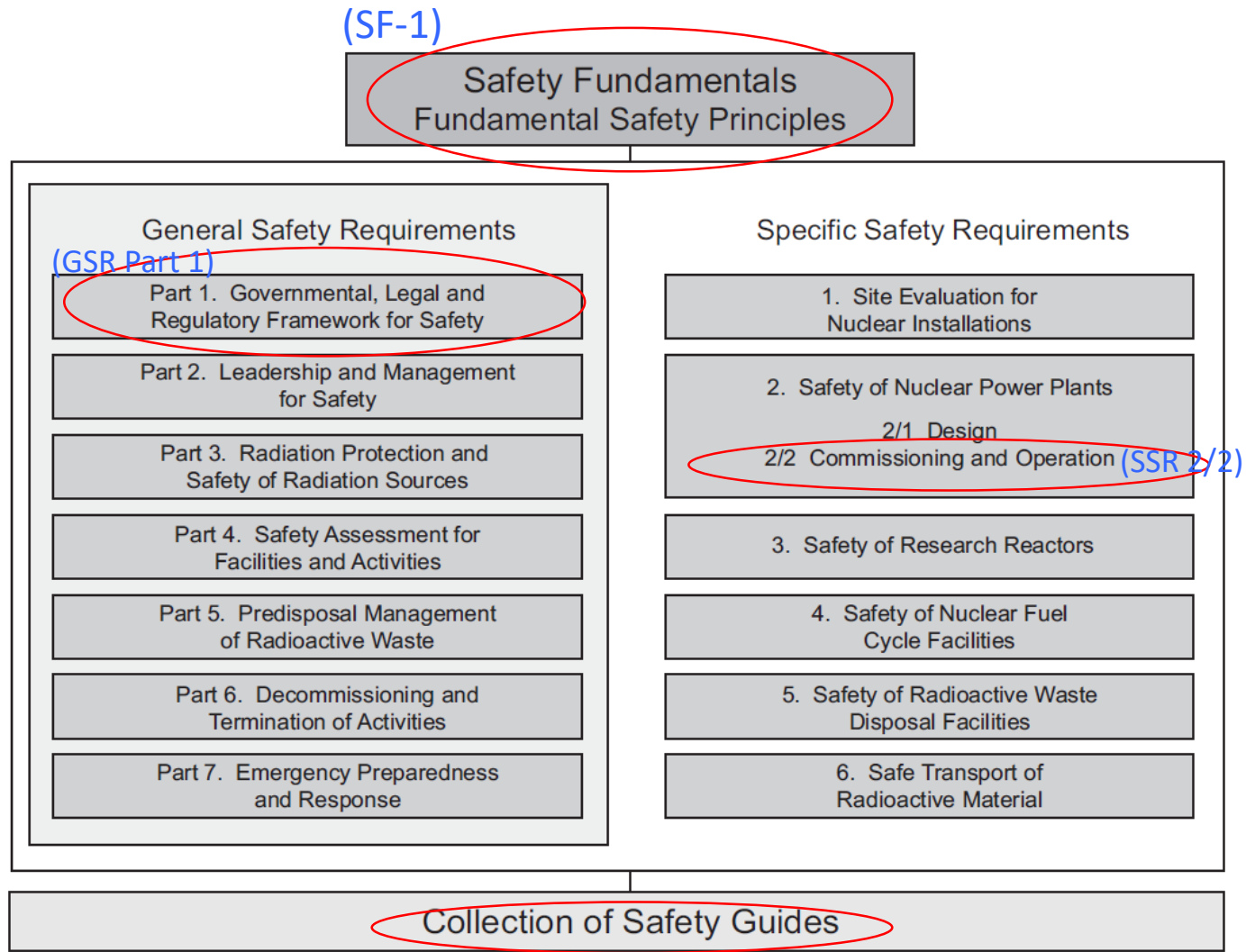


FIG. 1. The long term structure of the IAEA Safety Standards Series.



International Atomic Energy Agency  
INFORMATION CIRCULAR

INF

IAEA - INFCIRC/449  
5 July 1994

GENERAL Distr.  
Original: ARABIC, CHINESE,  
ENGLISH, FRENCH, RUSSIAN,  
SPANISH

CONVENTION ON NUCLEAR SAFETY

# 1. IAEA-INFCIRC/449 Convention on Nuclear Safety (1994.6.17)

## - Article 19. Operation

Each Contracting Party shall take the appropriate steps to ensure that:

- (vii) programmes to collect and analyse operating experience are established, the results obtained and the conclusions drawn are acted upon and that existing mechanisms are used to share important experience with international bodies and with other operating organizations and regulatory bodies;

1. The Convention on Nuclear Safety was adopted on 17 June 1994 by a Diplomatic Conference convened by the International Atomic Energy Agency at its Headquarters from 14 to 17 June 1994. The Convention will be opened for signature on 20 September 1994 during the thirty-eighth regular session of the Agency's General Conference and will enter into force on the ninetieth day after the date of deposit with the Depositary (the Agency's Director General) of the twenty-second instrument of ratification, acceptance or approval, including the instruments of seventeen States, having each at least one nuclear installation which has achieved criticality in a reactor core.

2. The text of the Convention as adopted is reproduced in the Annex hereto for the information of all Member States.

Fundamental  
Safety Principles

## Safety Fundamentals

## No. SF-1

## 2. SF-1 Fundamental Safety Principles

- Principle 3 : Leadership and management for safety

3.17 Despite all measures taken, accidents may occur. The precursors to accidents have to be identified and analysed, and measures have to be taken to prevent the recurrence of accidents. The feedback of operating experience from facilities and activities — and, where relevant, from elsewhere — is a key means of enhancing safety. Processes must be put in place for the feedback and analysis of operating experience, including initiating events, accident precursors, near misses, accidents and unauthorized acts, so that lessons may be learned, shared and acted upon.

### 3. GSR Part 1 Governmental, Legal and Regulatory Framework for Safety

- Requirement 15 : Sharing of operating experience and regulatory experience

The regulatory body shall make arrangements for analysis to be carried out to identify lessons to be learned from operating experience and regulatory experience, including experience in other States, and for the dissemination of the lessons learned and for their use by authorized parties, the regulatory body and other relevant authorities.

Related items : 3.3~3.5

IAEA Safety Standards  
for protecting people and the environment

Governmental, Legal  
and Regulatory  
Framework for Safety

General Safety Requirements Part 1  
No. GSR Part 1



## 4. SSR-2/2 Safety of Nuclear Power Plants : Commissioning and Operation

### - Requirement 24: Feedback of operating experience

The operating organization shall establish an operating experience programme to learn from events at the plant and events in the nuclear industry and other industries worldwide.

Related items : 5.27~5.33

IAEA Safety Standards  
for protecting people and the environment

Safety of  
Nuclear Power Plants:  
Commissioning and  
Operation

Specific Safety Requirements  
No. SSR-2/2



## 5. SSG NS-G-2.10 PSR of NPPs (2003)

- Use of experience from other plants and research findings

Objective (4.39) : The objective of the review of experience from other plants and research findings is to determine whether there is adequate feedback of safety experience from other nuclear power plants and of the findings of research.

Description (4.40)



Periodic Safety Review  
of Nuclear Power Plants

SAFETY GUIDE

No. NS-G-2.10



## 6. SSG No. SSG-25 PSR for NPPs (2013)

- Safety factor 9 : Use of experience from other plants and research findings

5.103. Experience from other nuclear power plants, and sometimes from non-nuclear facilities, together with research findings, can reveal previously unknown safety weaknesses or can help in solving existing problems. Reference [2] requires the operating organization to obtain and evaluate information on operating experience at other plants and to derive lessons for its own operations. ...

Objective (5.104) , Scope and Tasks (5.105~106),

Methodology (5.107~5.110)

## 6. SSG No. SSG-50 OEF for Nuclear Installations

This publication has been superseded by SSG-50

### IAEA Safety Standards

for protecting people and the environment

A System for the  
Feedback of Experience  
from Events  
in Nuclear Installations

Safety Guide  
No. NS-G-2.11



### IAEA Safety Standards

for protecting people and the environment

Operating Experience  
Feedback for Nuclear  
Installations

Specific Safety Guide  
No. SSG-50



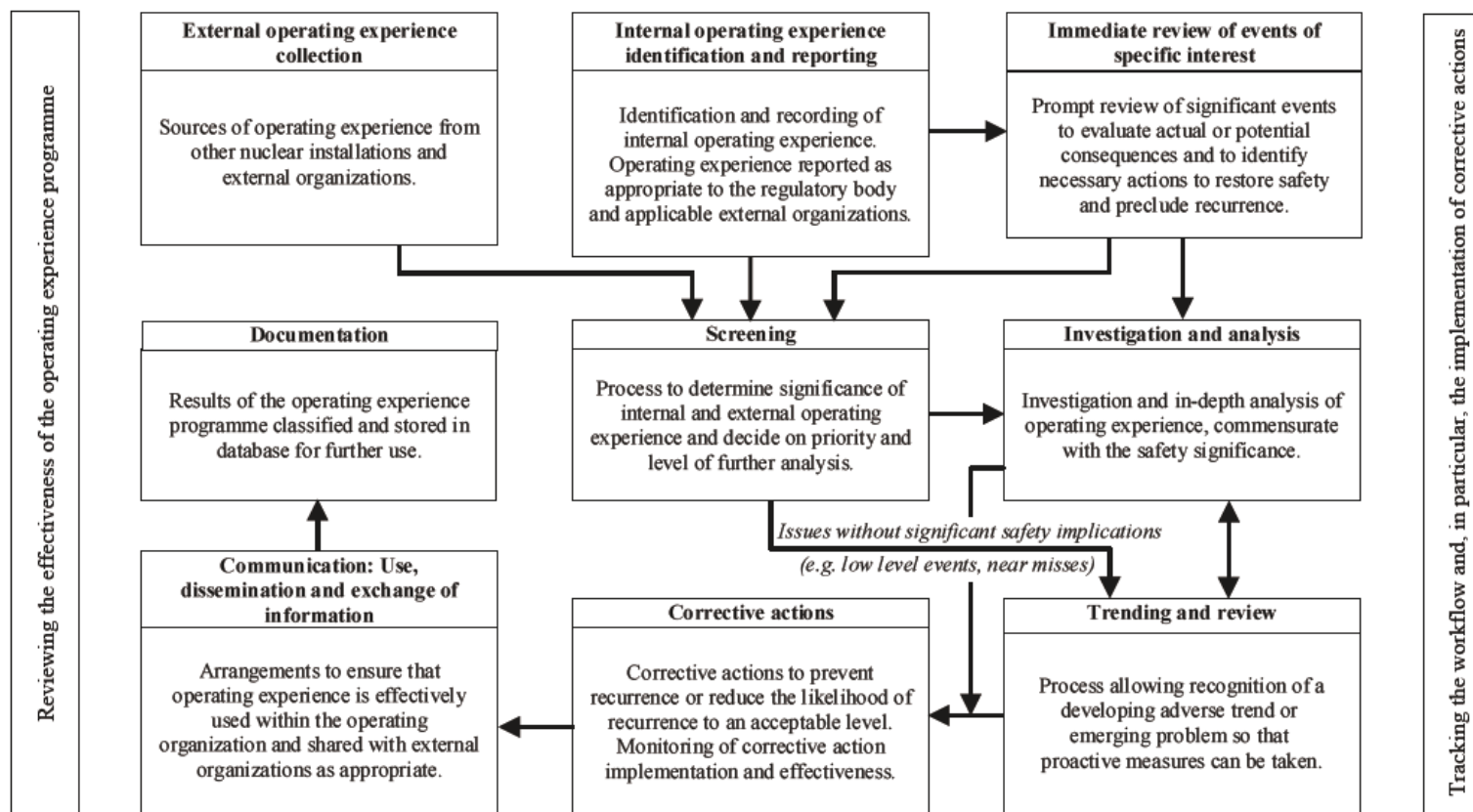


FIG. 1. Typical operating experience programme.



# Structure of IAEA OEF requirements

- IAEA-INFCIRC/449 Convention on Nuclear Safety (Article 19,(vii))  
: OEF Programmes
  - SF-1 Fundamental Safety Principles (Principle 3, 3.17)  
: OEF is a key means of enhancing safety.
    - General Safety Requirements Part 1 (Requirement 15, 3.3~3.5)  
: Sharing of OE and Regulatory experience
    - Specific Safety Requirements 2/2 (Requirement 24, 5.27~5.33)  
: Feedback of OE
  - Safety guides
    - NS-G-2.10 (PSR, 2003) (Safety factors, 4.39~4.40)  
: Use of experience from other plants and research findings
    - SSG-25 (PSR, 2013) (Safety factors, 5.103~5.110)  
: Use of experience from other plants and research findings
    - SSG-50  
: Operating Experience Feedback for Nuclear Installations

## II.2 OEF requirements in Korea

### *1. Nuclear Safety Act*

- Article 11(Standards for construction permit)
  - 1. Technical capability necessary for construction of a nuclear power reactor and related facilities...
  - ...
- Article 21(Standards for operating license)
  - 1. Technical capability necessary for the operation of the nuclear power reactor and related facilities...
  - ...

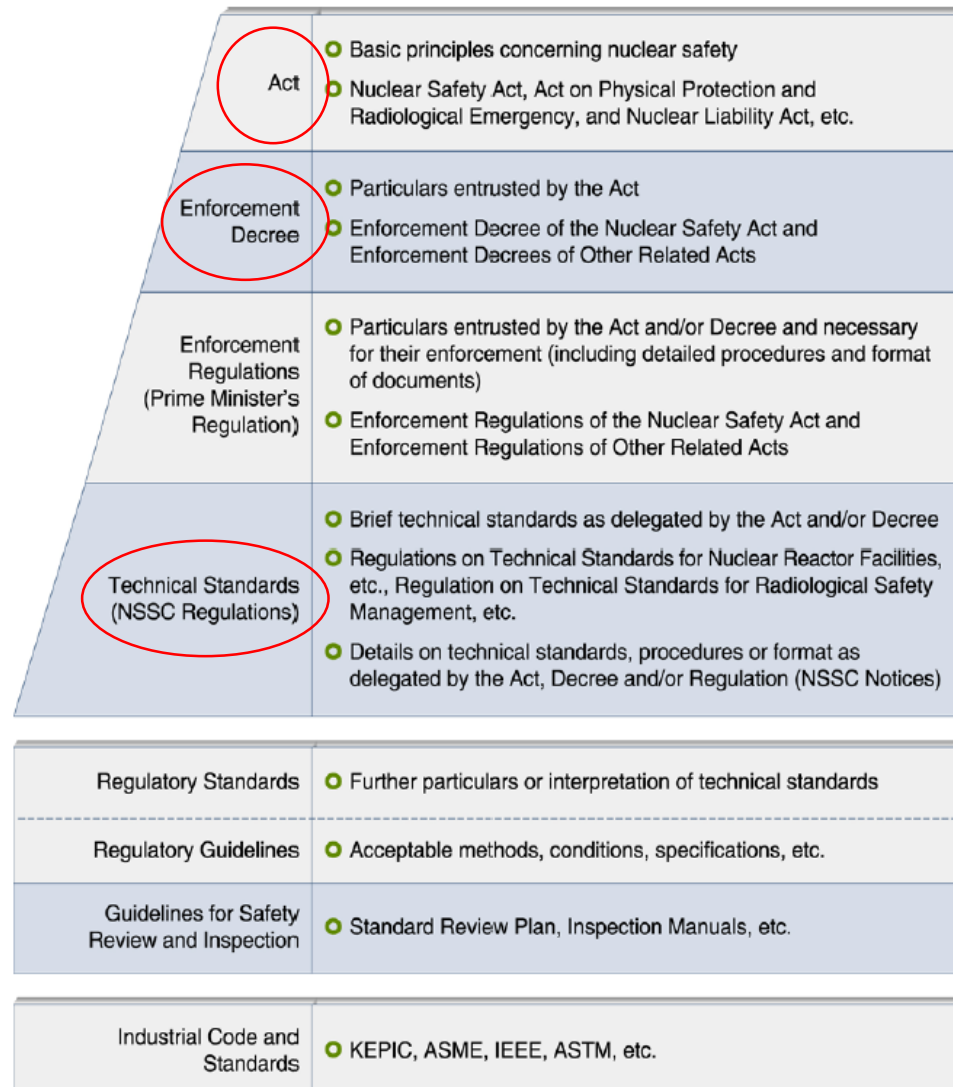


Fig. Legal Framework for Nuclear Safety Regulation in Korea

## *2. Enforcement regulations for the Nuclear Safety Act*

- Article 8 (Technical capability necessary for construction)
  1. Organization for the construction ...
  2. Engineering and technical support organization ...
  3. Qualification and experience of the personnel...
  4. ... a system whereby the construction cases of reactor facilities can be analyzed for reflection in design and construction ...
  5. Test and inspection plan for the SSCs ...

### *3. Regulations on Technical Standards for Nuclear Reactor Facilities, Etc.*

- Article 58(Operational Experience Feedback)

The operator of a nuclear power reactor shall take each of the following actions in order to reflect operating experience systematically

1. OE shall be collected, analyzed, and managed...
2. ... shall be reflected in plant facilities, safety related criteria, procedures and training program.

### *4. NSSC Notice 2020-03, Regulation of Reporting and Public Announcement of Events for the Nuclear Power Utilization Facilities*

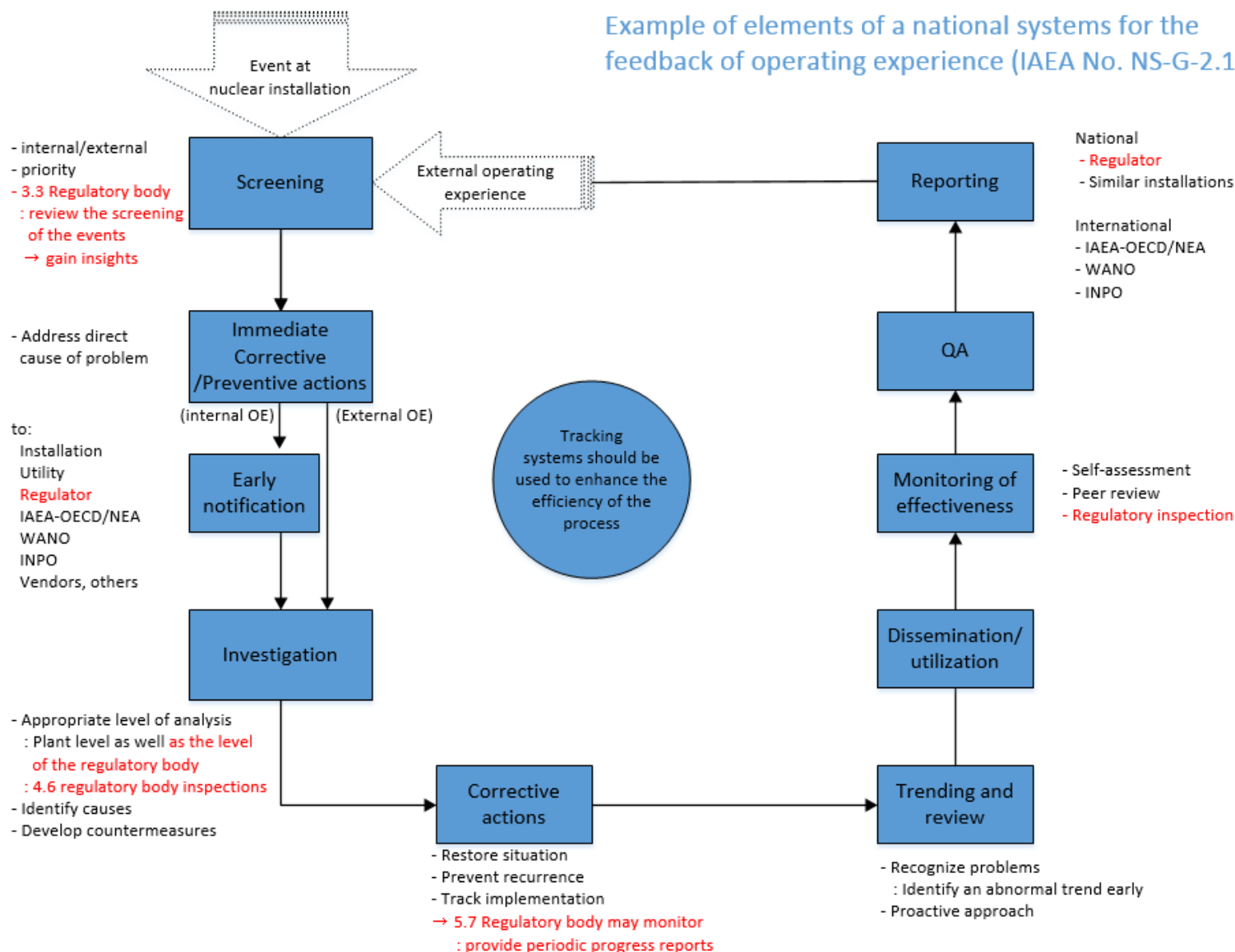
## Regulatory requirements on OEF in Korea

- Nuclear Safety Act (Article 11, 21)
  - : Technical capability for construction/operation
- One of the technical capability for construction
  - Enforcement regulations for the Nuclear Safety Act (Article 8)
    - : Reflection on the previous construction cases
- One of the technical capability for operation
  - Regulations on Technical Standards for Nuclear Facilities, Etc.(Article 58)
    - : OEF during operation

# III. Reporting, Investigation and Evaluation of NPP Events in Korea



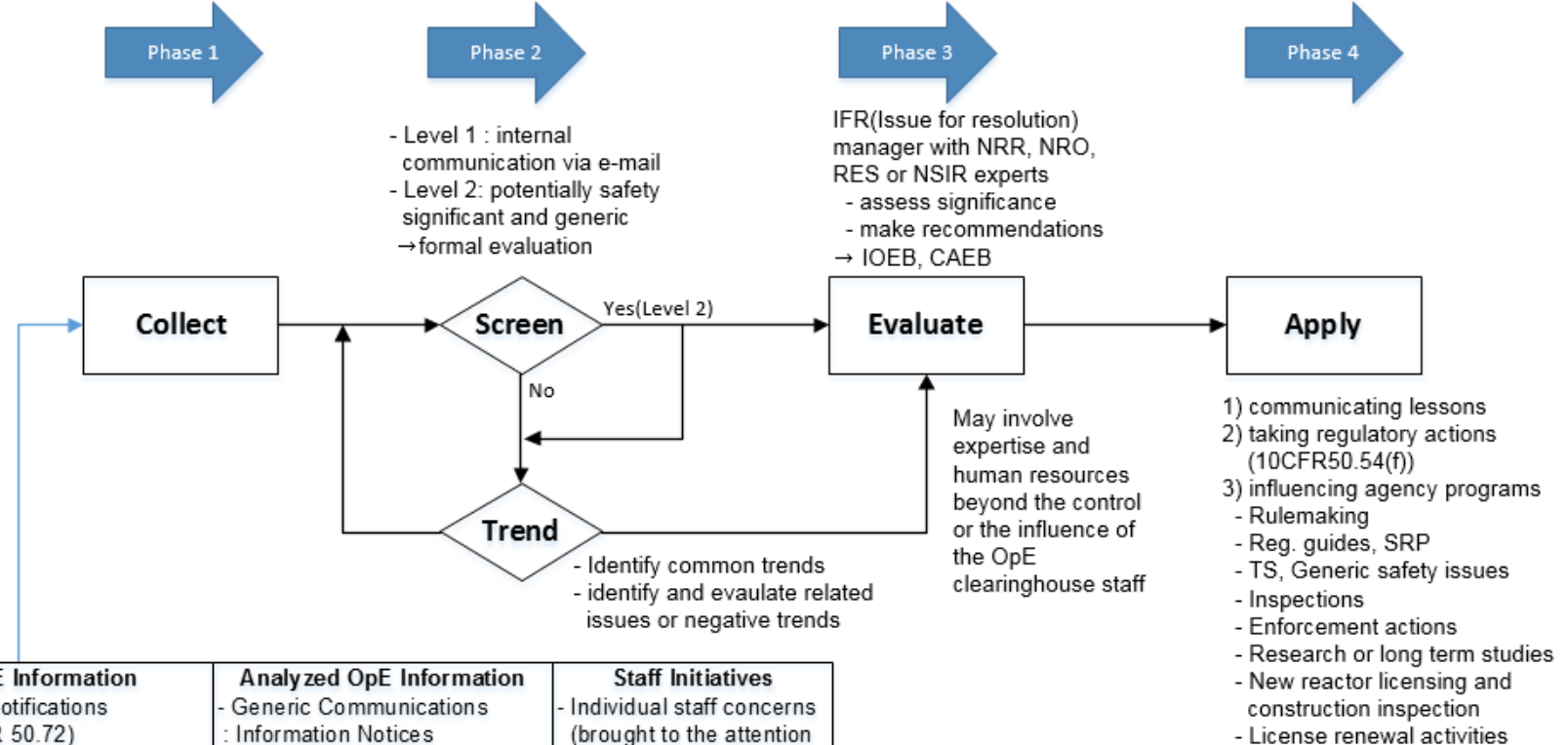
## Example of elements of a national systems for the feedback of operating experience (IAEA No. NS-G-2.11)



## Overview of NRC Reactor OpE Process(NRR-LIC-401)

COE's OpE Clearinghouse within NRR : Focal point for implementing and coordinating the elements of the OpE process

OpE Gateway : NRR intranet Web page that specializes in OpE Program topics and search tools



New OpE Information	Analyzed OpE Information	Staff Initiatives
<ul style="list-style-type: none"> <li>- Event Notifications (10 CFR 50.72)</li> <li>- Licensee Event Reports (10 CFR 50.73)</li> <li>- Preliminary Notifications</li> <li>- 10 CFR Part 21 Reports</li> <li>- HOO security reports</li> <li>- Foreign reports               <ul style="list-style-type: none"> <li>: INES events</li> <li>: IRS/ConEx reports</li> </ul> </li> <li>- Daily morning conference</li> <li>- calls with regions</li> <li>- Region II construction inspection debriefs</li> </ul>	<ul style="list-style-type: none"> <li>- Generic Communications</li> <li>: Information Notices</li> <li>: Regulatory Issue Summary</li> <li>: Generic Letters, Bulletins</li> <li>- Inspection findings</li> <li>- INPO documents</li> <li>- RES feeds</li> <li>: ASP reports</li> <li>: Component and system studies</li> <li>: Generic Safety Issues</li> <li>: Various other research studies</li> <li>: Significant non-nuclear event OpE insights</li> </ul>	<ul style="list-style-type: none"> <li>- Individual staff concerns (brought to the attention of the OpE Clearinghouse)</li> <li>- Staff concerns supported by branch chief-level or higher management</li> <li>- OpE insights from ConEx Technical Assistance Requests (TAR)</li> </ul>

- \* COE : NRC's Center of Expertise for operating Experiences
- \* NRR : Office of Nuclear Reactor Regulation
- \* NRO : Office of New Reactors
- \* RES : Office of Nuclear Regulatory Research
- \* IOEB : Operating Experience Branch
- \* CAEB : Construction Assessment and Enforcement Branch
- \* 10CFR50.21 : Reporting of defects and noncompliance
- \* HOO : Headquarters operations officer

# III.1 Event Reporting Criteria

# Introduction

- Legal basis of the event reporting
  - Notice of the NSSC No. 2018-03 (Regulation on reporting and public announcement of accidents and incidents for nuclear power utilization facilities)
- Contents of the notice
  - Items to report
  - Methods and Procedures of Reporting
  - Rating of the events
  - Release of the event information
  - Investigation and utilization of the results

# Items to report in NPPs

## A. Events applicable to all nuclear facilities

Events to Report	Report Deadline		Rating of Events
	Verbal report	Detailed report	
1. Incidents related to the transportation or packaging of radioactive materials,(leakage, theft or exposure,...)	<30 min	60 days	○
2. Theft, loss, fire or other accidents of radiation generating devices or radioactive materials	<30 min	60 days	○
3. Declaration of radiation emergency	-	-	○
4. Surface contamination at areas other than controlled radiation area	<30 min	60 days	○
5. Abnormal increase of radiation level	<30 min	60 days	○
6. Release of radioactive material into environment	<30 min	60 days	○
7. Occurrence of human casualties	<30 min	-	-

# Items to report in NPPs

## A. Events applicable to all nuclear facilities (continued)

Events to Report	Report Deadline		Rating of Events
	Verbal report	Detailed report	
8. Abnormal radiation exposure	<30 min	60 days	○
9. Threat to the safe operation of the facility as a result of such events as fire or toxic gas in the facility.	<30 min	60 days	-
10. Release of radioactive material which exceeds regulatory limits at the EAB	<30 min	60 days	○
11. Loss of control for radioactive material	<30 min	60 days	○
12. In case emergency measures are taken due to natural disasters (fires, storm, tsunami, etc.)	4 hours	60 days	-
13. In case emergency measures are taken due to industrial disasters	4 hours	60 days	-

# Items to report in NPPs

## B. Events applicable to power and research reactor facilities

Events to Report	Report Deadline		Rating of Events
	Verbal report	Detailed report	
1. Excess of safety limits/setpoints for safety systems	<30 min	60 days	○
2. Violations of the actions required for the LCO in TS	4 hours	60 days	○
3. Failure of the safety system actuation(RPS,ECCS,...)	4 hours	60 days	○
4. Earthquake etc. with actuation of the monitors	<30 min	60 days	-
5. Failure of the primary parameter displaying group in MCR, or functional loss of the notification system	4 hours	60 days	○
6. Functional failure of the systems related to the safe storage of spent fuels.	8 hours	60 days	○
7. Failure of safety related SCCs of the spent fuel storage cask or severe degradation of the cask.	8 hours	60 days	○

# Items to report in NPPs

## C. Events applicable to power reactor facilities

Events to Report	Report Deadline		Rating of Events
	Verbal report	Detailed report	
1. Automatic or manual reactor trips due to failures in the facilities or human errors	4 hours	60 days	○
2. Actuation of any of the Engineered Safety Features (ESF) including ECCS, CIS, AFS, EDG, etc.	4 hours	60 days	○
3. Reduction of power to satisfy the LCOs	4 hours	-	-
4. Unanticipated leakage of radioactive materials	<30 min	60 days	○
5. leakage at the pressure boundary of RCS	8 hours	60 days	○
6. Loss of shutdown cooling system or residual heat removal system	4 hours	60 days	○

# Methods and Procedures of Reporting

## □ Verbal and written reporting to NSSC

- Verbal reporting : with available means of communication
  - Written report should be submitted within next working day.
  - The report should include the material released to the press.
- Written report within the times specified in the Table.

## □ Rating of the events

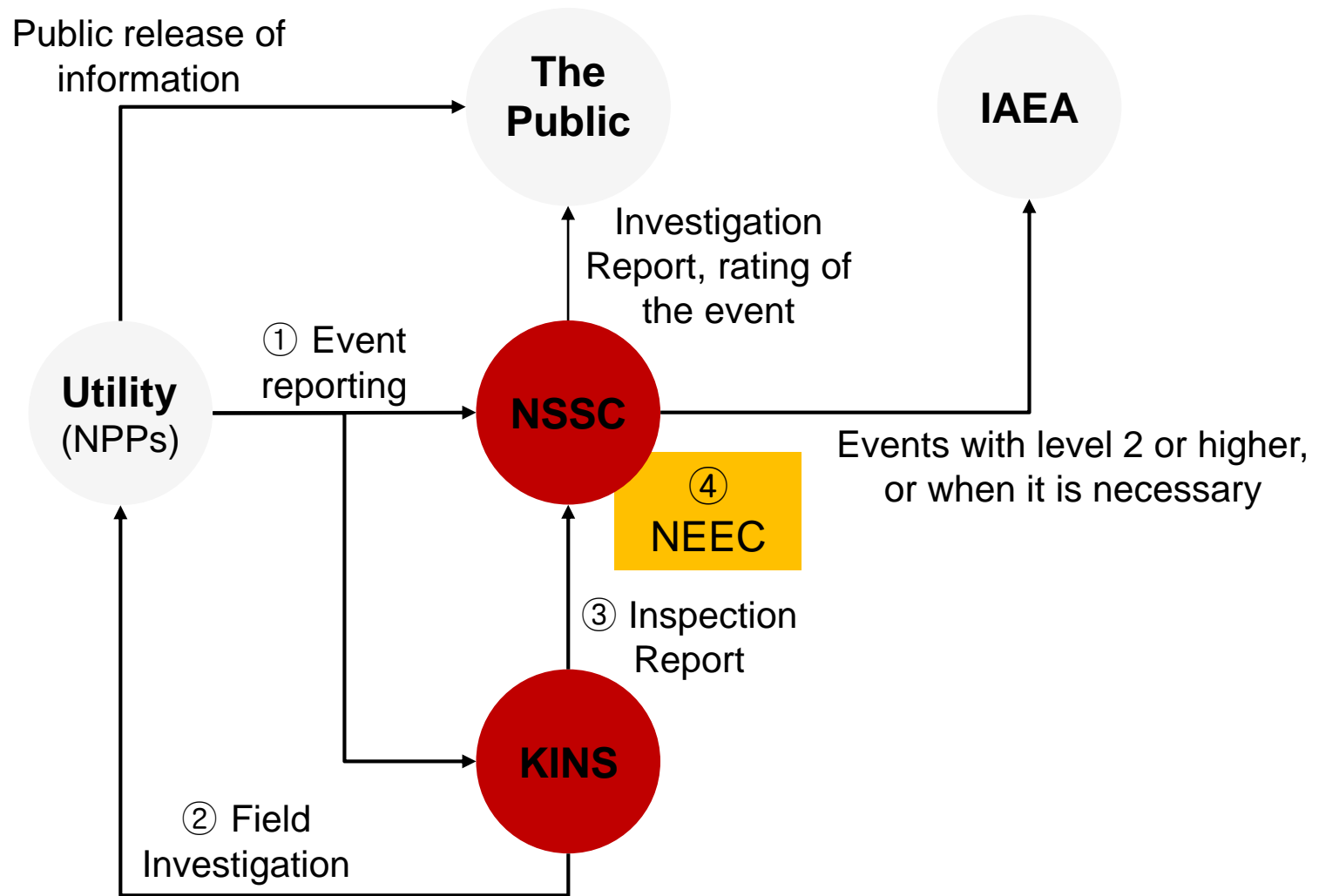
- Licensee shall make provisional rating on their initial written reporting.
- Official rating by the Nuclear Event Evaluation Committee (NEEC)

# Release of information to the public

- Information release to the public
  - Licensees shall post the information on the internet and release it to the press within 24 hours.
- Reporting to IAEA
  - NSSC shall send the results of rating and background information of the incidents for the following cases.
    - Provisional rating is level 2 or higher.
    - IAEA is interested in,
    - Dissemination of the information is necessary.

## III.2 Event Investigation

# Response to the events in NPPs



# Roles of the related organizations

1. Utility : report the events (notice of NSSC 2014-17)
2. KINS : dispatch a team to perform investigation
  - Causes and Effects
  - Operator's response
  - Response of the safety systems during the event
  - Corrective actions and measures to prevent recurrence
3. NSSC : approval of restart based on the investigation.
4. Tracking of the corrective actions
  - Utility reports the current status quarterly.
  - Periodic inspection by KINS

# Regulatory investigation

## □ Objective

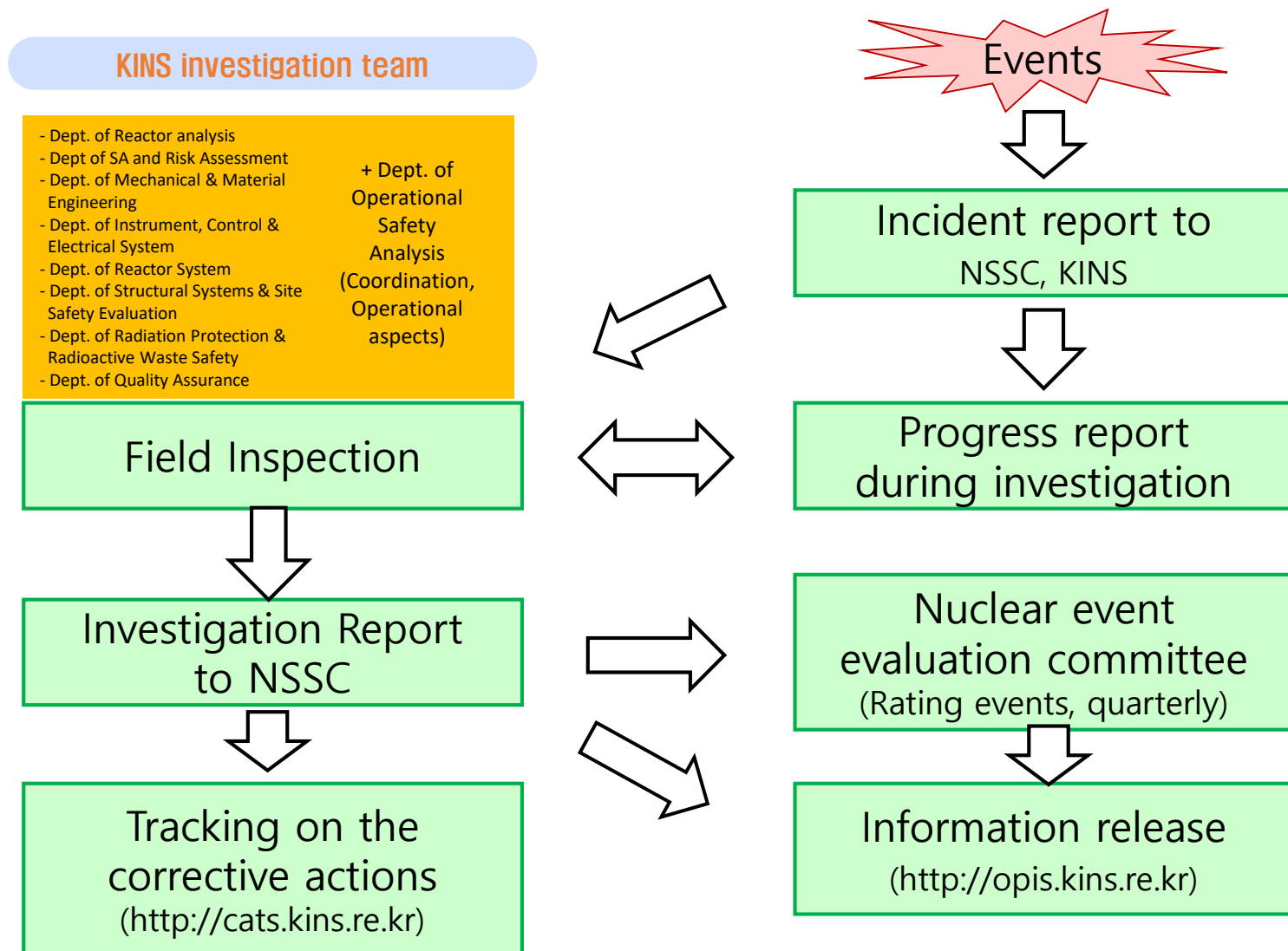
- To Check whether safety functions were maintained properly.

## □ Contents of the investigation

- Behavior of plant safety systems during the transient
  - Any challenges to the safety functions ?
- Licensee's response activities
  - Mitigate of the adverse effects
  - investigation on the causes and corrective action items

☞ Confirm whether the safety functions were maintained properly and corrective actions were made correctly to prevent recurrence of similar events.

# Response to events in KINS



# Plant restart after a reactor trip

## □ Process

- Reactor shutdown → KINS field inspection → Report the result  
→ NSSC : Decision making after reviewing the report

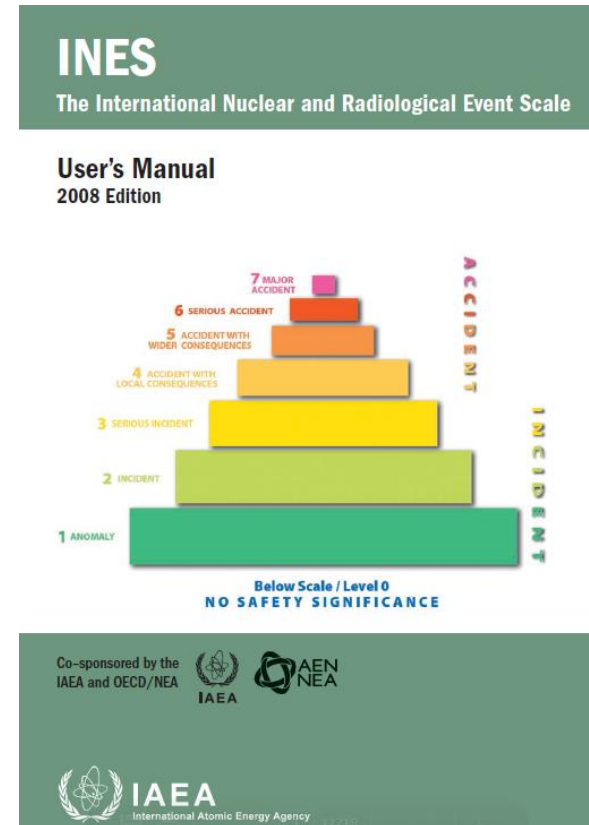
## □ Legal background

- NSSC Administrative order (2011. 5.13)
- Incident Response Manual for Nuclear Facilities(Rev.1, 2021.6)
- KINS Procedure “Procedure for the Incidents/Accidents investigation and information release”

# Corrective measures

- Items for the corrective measures
  - KINS : Review the licensee's corrective measures whether they are chosen properly based on the licensee's investigation.
- Tracking on the corrective measures of reported events
  - NSSC, "Regulations on the Technical Standards for Nuclear Reactor Facilities, Etc." Article 58 (Reflection of Operating Experience)
  - KINS performs periodic inspection on the status of the corrective measures derived after the events.

# III.3 Rating of the Event Scale



# INES

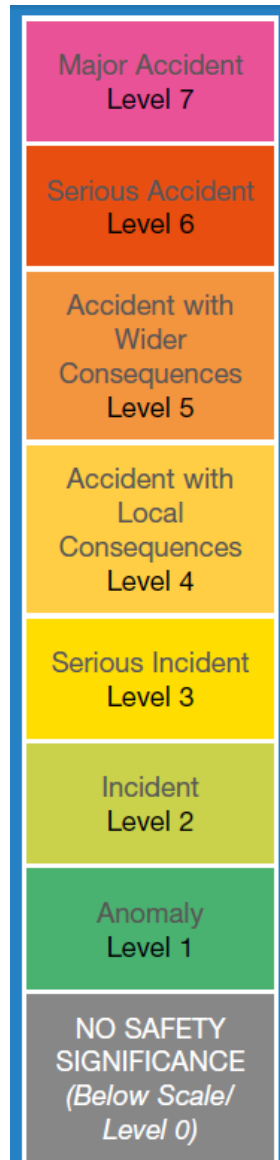
## *THE INTERNATIONAL NUCLEAR AND RADIOLOGICAL EVENT SCALE*

The INES Scale is a worldwide tool for communicating to the public in a consistent way the safety significance of nuclear and radiological events.

Just like information on earthquakes or temperature would be difficult to understand without the Richter or Celsius scales, the INES Scale explains the significance of events from a range of activities, including industrial and medical use of radiation sources, operations at nuclear facilities and transport of radioactive material.

Events are classified on the scale at seven levels: Levels 1–3 are called "incidents" and Levels 4–7 "accidents". The scale is designed so that the severity of an event is about ten times greater for each increase in level on the scale. Events without safety significance are called "deviations" and are classified Below Scale / Level 0.





**INES** classifies nuclear and radiological accidents and incidents by considering three areas of impact:

***People and the Environment*** considers the radiation doses to people close to the location of the event and the widespread, unplanned release of radioactive material from an installation.

***Radiological Barriers and Control*** covers events without any direct impact on people or the environment and only applies inside major facilities. It covers unplanned high radiation levels and spread of significant quantities of radioactive materials confined within the installation.

***Defence-in-Depth*** also covers events without any direct impact on people or the environment, but for which the range of measures put in place to prevent accidents did not function as intended.

## EXAMPLES OF EVENTS AT NUCLEAR FACILITIES

	People and Environment	Radiological Barriers and Control	Defence-in-Depth
7	<i>Chernobyl, 1986</i> — Widespread health and environmental effects. External release of a significant fraction of reactor core inventory.		
6	<i>Kyshtym, Russia, 1957</i> — Significant release of radioactive material to the environment from explosion of a high activity waste tank.		
5	<i>Windscale Pile, UK, 1957</i> — Release of radioactive material to the environment following a fire in a reactor core.		
4	<i>Tokaimura, Japan, 1999</i> — Fatal overexposures of workers following a criticality event at a nuclear facility.		
3	<i>No example available</i>	<i>Sellafield, UK, 2005</i> — Release of large quantity of radioactive material, contained within the installation.	<i>Vandelllos, Spain, 1989</i> — Near accident caused by fire resulting in loss of safety systems at the nuclear power station.
2	<i>Atucha, Argentina, 2005</i> — Overexposure of a worker at a power reactor exceeding the annual limit.	<i>Cadarache, France, 1993</i> — Spread of contamination to an area not expected by design.	<i>Forsmark, Sweden, 2006</i> — Degraded safety functions for common cause failure in the emergency power supply system at nuclear power plant.
1			Breach of operating limits at a nuclear facility.

# Event Rating System

## □ History

- Introduced IAEA INES in March, 1993
- **Nuclear Event Evaluation Committee (NEEC)**
  - held 111 times quarterly, and rated 430 events since its 1<sup>st</sup> meeting in 1993

# Event Rating System (cont.)

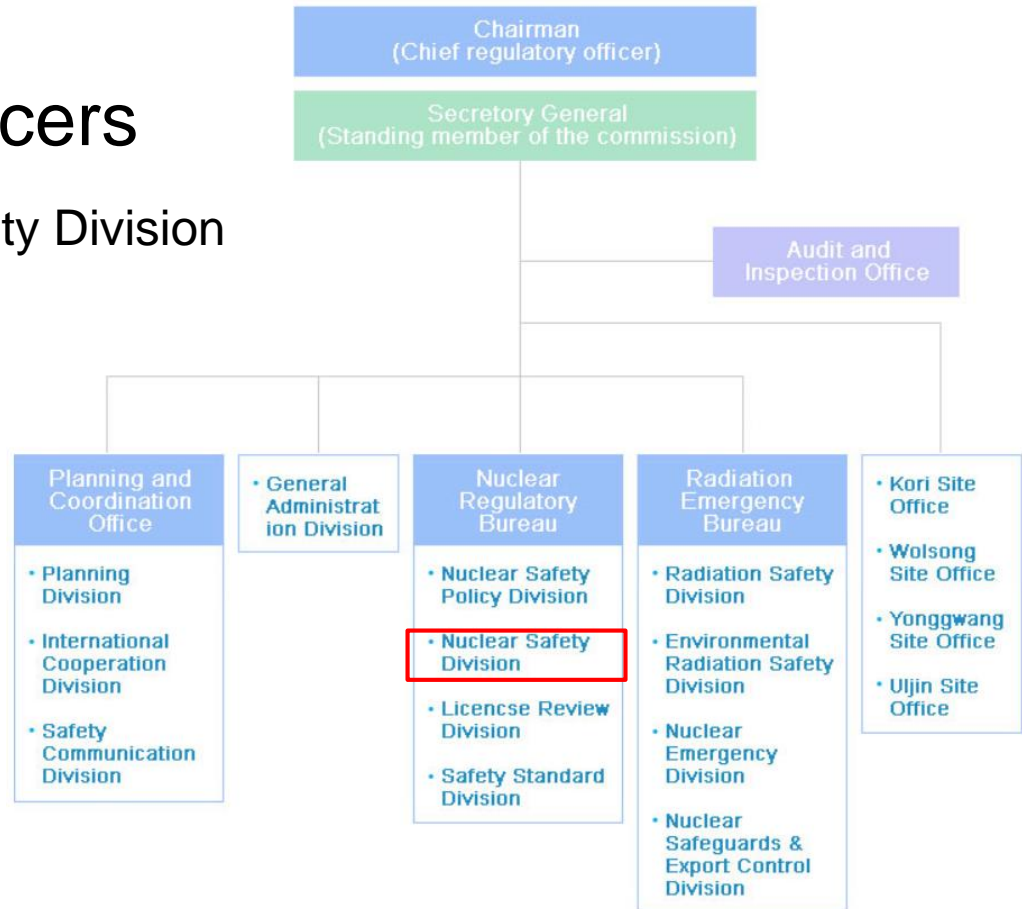
## □ Event Scale Evaluation Committee

- The NSSC(Nuclear Safety and Security Commission) was established as a government regulatory authority(Oct 26, 2011).
- Event evaluation committees have been administered by NSSC since March 2012, according to NSSC Notice 2012-85 (Currently 2018-03).
- Members of Evaluation Committees consisted of government officials and nuclear/radiation field experts including some KINS staffs with 2-year term of service.

# Event Rating System (cont.)

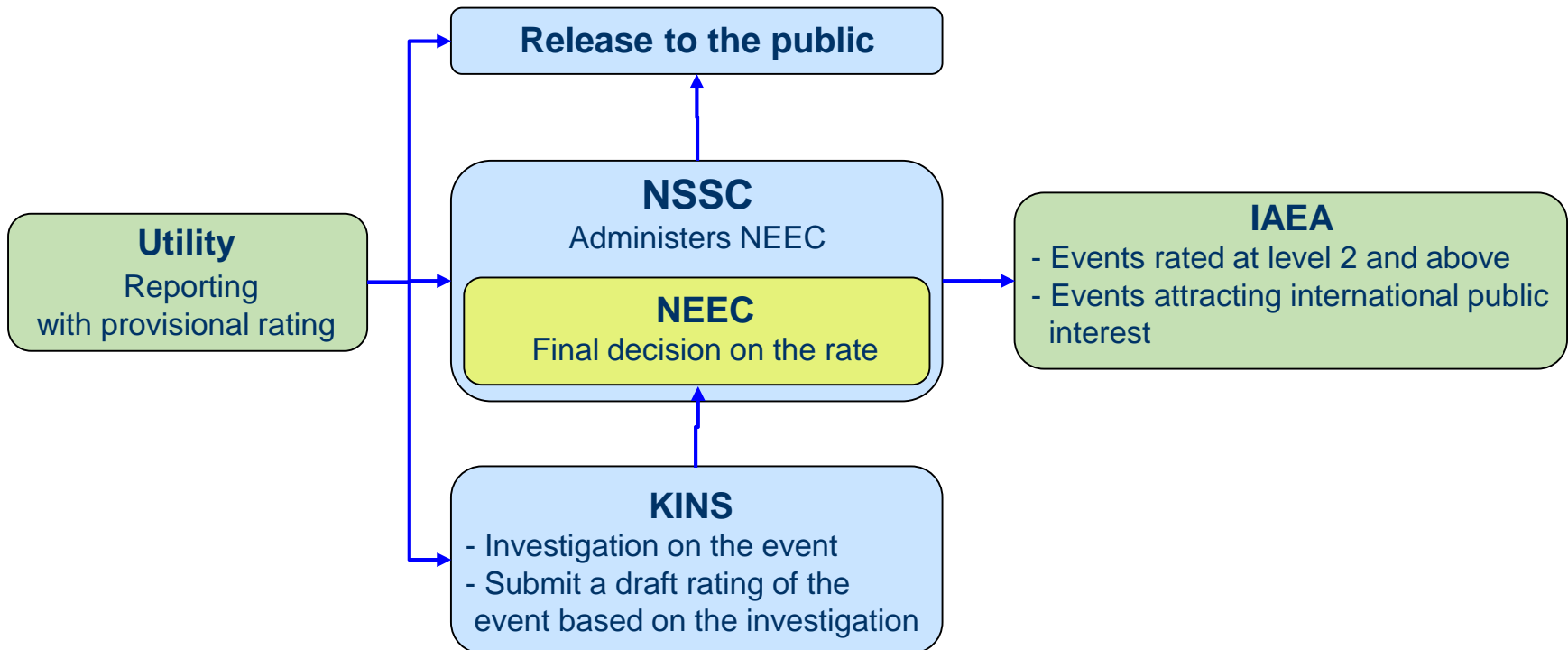
## □ INES National Officers

- Head of the Nuclear Safety Division



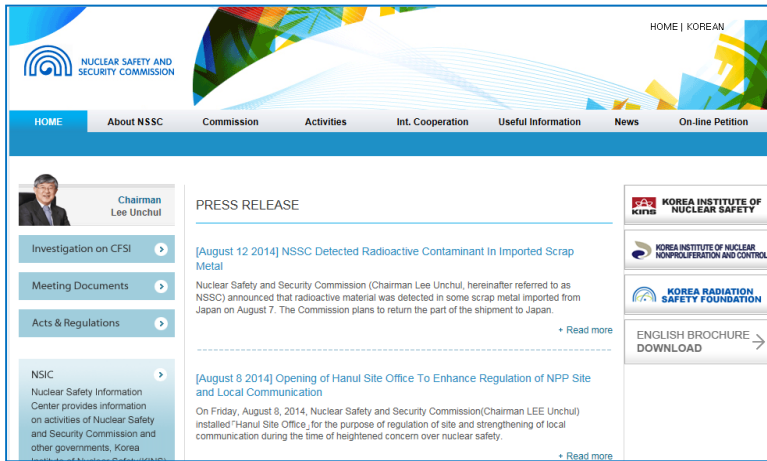
# Event Rating Process

## □ Institutions and Work Arrangements

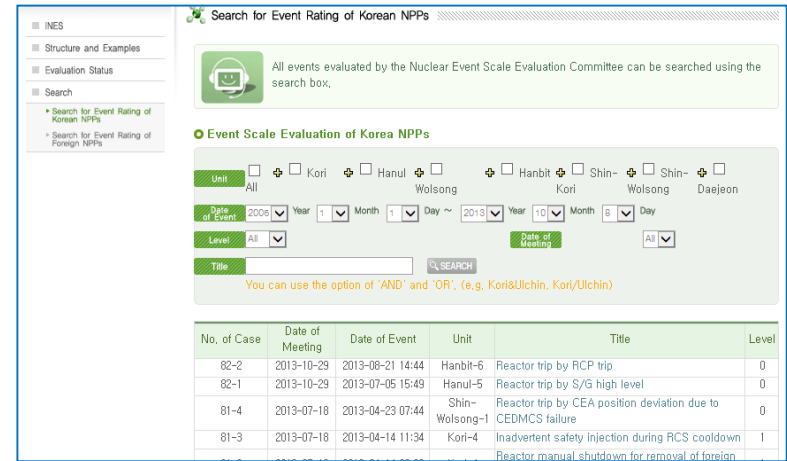


# Information Release to the Public

## ❑ Web sites for the release of information



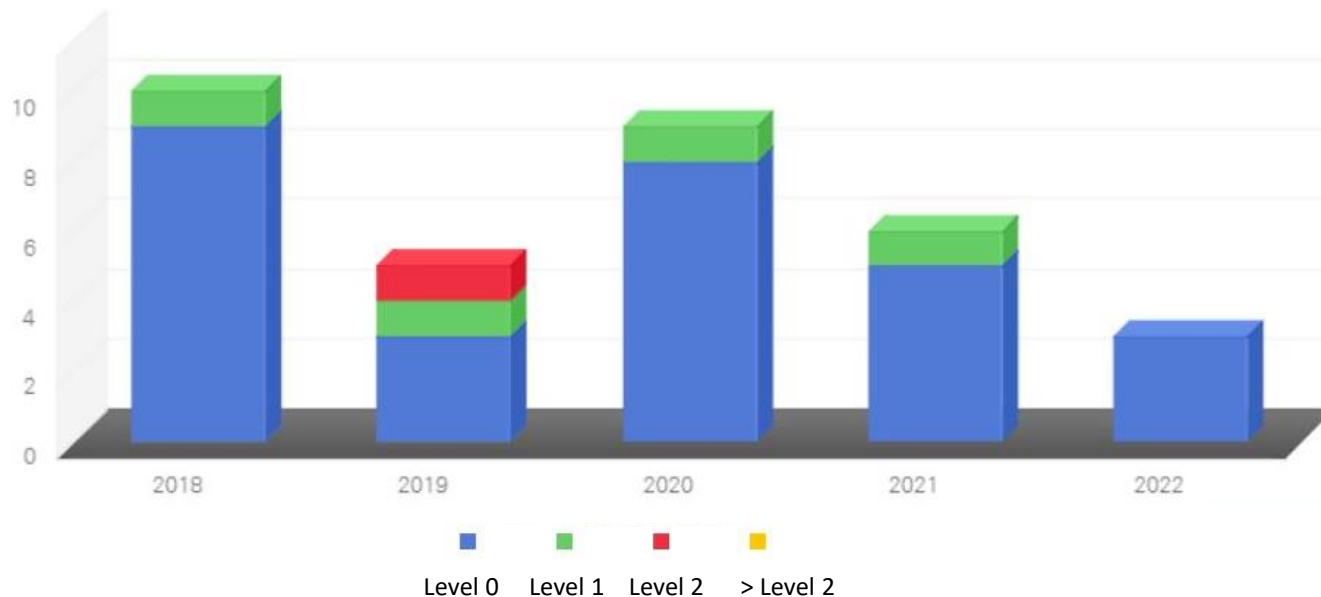
- NSSC web site (<http://www.nssc.go.kr>)



- OPIS (<http://opis.kins.re.kr>) : Operational Performance Information System for NPP

# Recent Events Rating in Korea

- Totally 430 events rated by NEEC since 1993~2022.8
  - Level 2 : 4 events
  - Level 1 : 30 events
  - Level 0 : 396 events



# Summary

- NSSC Notice No. 2020-3 defines.
  - Types of events to report, timings and methods of the reporting
  - Rating of the reported events, release of the information
  - Investigation of the events, management of the information

# IV. The National OEF Program in Korea



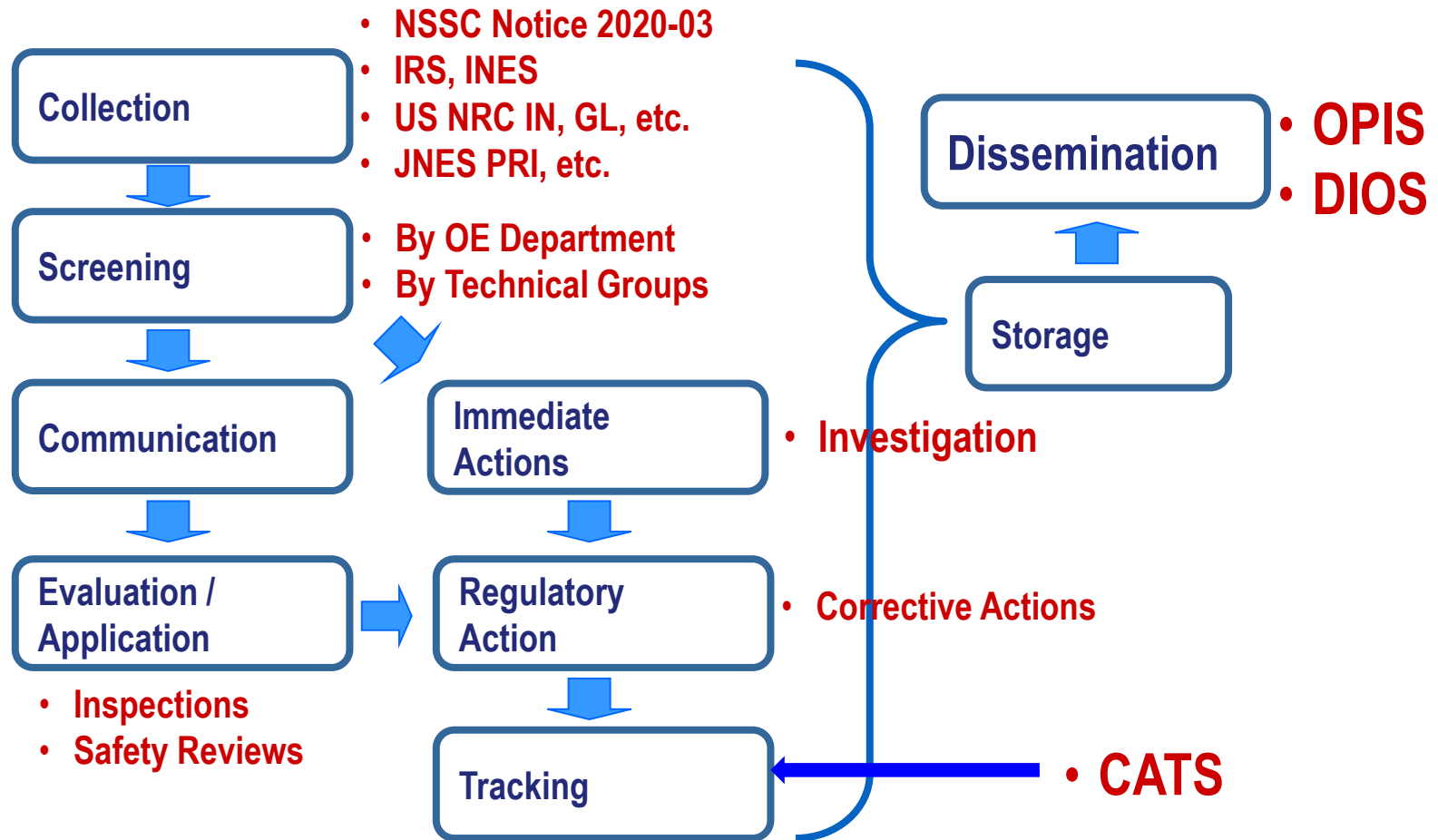
# VI.1 National OEF(NOEF) program

- Regulatory Body (NSSC and KINS)
  - Perform investigation on the reported events, issuance of the corrective actions, and information release to the public according to NSSC Notice “2020-03”
  - Collection, categorization, storage and dissemination of the OE information
  - Screening and implementation of safety issues
  - Utilization of regulatory experiences obtained through inspection and review activities

- **NPP Utility (KHNP)**

- Storage and dissemination of important domestic and foreign information (KONIS)
- Accumulation of information on incident, maintenance and routine works including surveillance test (DREAMS)

# [Overall OEF Process]



- Reference : IAEA Safety Guide No. NS-G-2.11 "A System for the Feedback of Experience from Events in Nuclear Installations"

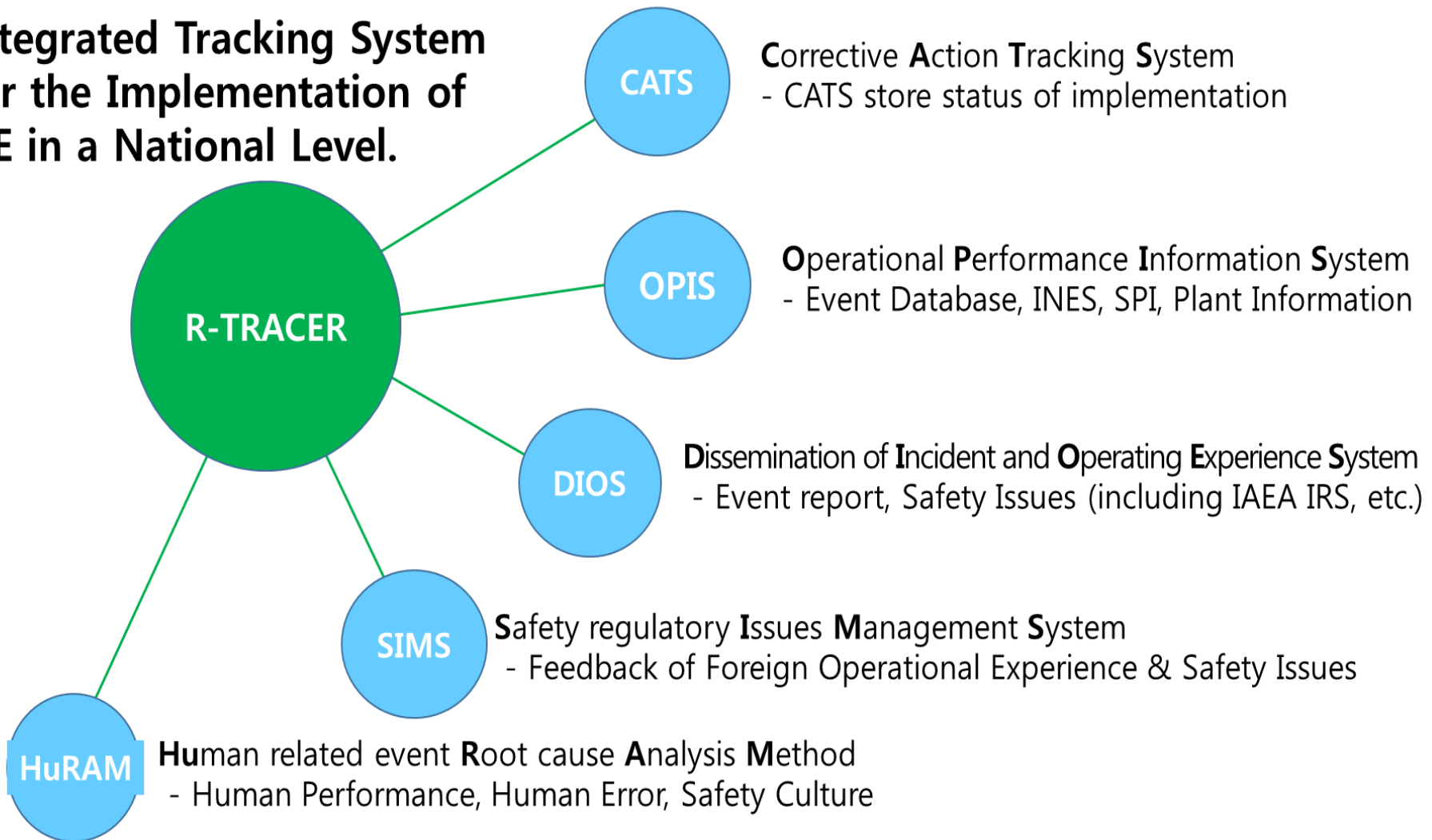
- **Backgrounds of the NOEF**
  - National concerns on the nuclear installations including NPPs
  - The Public, NGOs and Stakeholders want to know the information about incidents and failures of equipment in NPPs.
  - IT-based tools can fulfill these demands, and promote the public confidence in the nuclear safety.
  - This also implements the functions of OEF by Disseminating and Storing the related information.

- OEF Environments
  - Huge amount of OEF data
    - thus, mostly based on the computer and DB system.
    - Promote and facilitate OE activities.
- Effective and efficient implementation of OEF requires development of web-based OEF Tools
  - Web-based OEF Tools can reduce the time to collect/screen/evaluate/analyze and investigate/disseminate the OEF data, and
  - provide effective ways to satisfy both domestic and international guidelines of the OEF.

## **IV.2 Tools for the national OEF**

# R-TRACER

**Integrated Tracking System  
for the Implementation of  
OE in a National Level.**



<http://rtracer.kins.re.kr>

# CATS Corrective Actions Tracking System (1)

Browser: http://r-tracer.kins.re.kr/cats/ver3/MainVer3.do

Navigation: HOME | 비밀번호 변경 | ADMIN | LOGOUT | 김도삼님 로그인 하셨습니다

Buttons: 사건처리현황 | 시정조치완료현황 | 시설별이행현황 | 기기고장현황

Filters:

- 시설: ☐ 전체 ☒ 고리 ☒ 한울 ☒ 월성 ☒ 한빛 ☒ 신고리 ☒ 신한울 ☒ 신월성
- 발생기간: [ ] ~ [ ]
- 사건제목: [ ]
- 정지방법: 원자로 정지 [ 수동 ☐ 자동 ☐ ] 없음 ☐  인적실수 ☐ 기계결함 ☐ 전기결함 ☐ 계속결함 ☐ 외부영향 ☐
- 사건등급: 0등급 ☐ 1등급 ☐ 2등급 ☐

사건처리현황

범례: 등록 공문 본문 제출 | 등록 공문 본문 제출(나의업무) | 해당없음

누적 사건 수 (2007부터) ( 199 )

Year Filter: 2022 (8) | 2021 (10) | 2020 (10) | 2019 (9) | 2018 (14) | 2017 (7) | 2016 (23) | 2015 (6) | 2014 (15) | 2013 (8) |

시설	발생일시	제목	사고고장보고			조사보고 안전성 평가	시정 조치 현황 완료/전제
			초기 서면	원인 및 대책보고	상세 보고		
신고리1	2022.09.08 17:00	신고리1호기 주전력계통 정비를 위한 원자로 수동정지					0/0
신월성2	2022.09.08 10:39	신월성2호기 M-G Set 출력차단기 개방에 의한 원자로 자동정지					0/0
고리2	2022.06.03 18:05	고리2호기 비안전모션 인입차단기 소손으로 인한 원자로정지					0/7
한빛2	2022.04.16 17:05	한빛2호기 터빈 윤활유 원심분리기 전열기 접속부 소손					0/0
한울1	2022.03.16 09:32	한울1호기 복수기 압력증가로 인한 보조급수펌프 자동기동					0/5
한울6	2022.03.04 14:21	한울6호기 안전모션(A계열) 저전압에 의한 비상디젤발전기 자동...					0/4
한빛6	2022.02.05 13:17	한빛6호기 터빈건물 지역냉방기 내부 팬벨트 소손					0/0
한울5	2022.01.13 01:26	한울5호기 원자로냉각재펌프(01B) 전동기 고장에 따른 원자로 ...					1/6

- Web-based Interactive system operated by regulatory body and Utility.
- Developed, especially, to trace and the Utility's implementation of the corrective actions
- CATS stores all the event related information
  - KHNP: Basic information, Preliminary and detailed reports, Planning and Implementation of CA
  - KINS: Investigation Report, Recommendation for the CA, Evaluation Report for the CA
  - NSSC: Requesting implementation of CA, Approval for the Restart, Approval of CA

# CATS Corrective Actions Tracking System (3)

## Implementation status

사건처리현황

범례 : 등록 공문 본문 제출 등록 공문 본문 제출(나의업무) 해당없음

누적 사건 수 (2007부터) ( 199 )

< 2022 (8) | 2021 (10) | 2020 (10) | 2019 (9) | 2018 (14) | 2017 (7) | 2016 (23) | 2015 (6) | 2014 (15) | 2013 (8) | >

시설	발생일시	제목	사고고장보고			조사보고	시정 조치 현황
			초기 서면	원인 및 대책보고	상세 보고	안전성 평가	완료/전체
신고리1	2022.09.08 17:00	신고리1호기 주전력계통 정비를 위한 원자로 수동정지					0/0
신월성2	2022.09.08 10:39	신월성2호기 M-G Set 출력차단기 개방에 의한 원자로 자동정지					0/0
고리2	2022.06.03 18:05	고리2호기 비안전모션 인입차단기 소손으로 인한 원자로정지					0/7

각 시행조치 상태: 진행 완료 | 시정조치배경서: 등록필요 임시저장 저장완료 | 각 발전소 비적용 현황: 등록필요 저장완료

시정조치	고리				한울						월성				한			
	1	2	3	4	1	2	3	4	5	6	1	2	3	4	1	2	3	
<a href="#">[B] 비안전모션 차단기...</a>																		
<a href="#">6.9kV 비안전모션 차단...</a>																		
<a href="#">6.9kV 비안전모션 UAT...</a>																		
<a href="#">[B] 차단기 접속부 견전...</a>																		
<a href="#">[B] 신규차단기 구매시...</a>																		
<a href="#">[B] 고압차단기반 소내...</a>																		
<a href="#">보호계전기 정정치 변...</a>																		
하반기?	2022.04.16 17:05				하반기2학기 더비 우함호 임시브리핑기 저열기 전소부 수속													

하백13 2022.09.16 17:05 하백13호기 F비 오류로 외시보리기 지연기 저속보 수조



CATS Corrective Actions Tracking System  
사고고장사정조치추적관리시스템

HOME | 비밀번호 변경 | ADMIN | LOGOUT 김도상님 로그인 하셨습니다

R-TRACER

사건처리현황

시정조치완료현황

사실별이행현황

기기고장현황

시정조치이행 정기검사 차수이력

Home > 시정조치이행 정기검사 차수이력

최종 자수정보만 보입니다.

대상발전소	대상호기	정기검사 차수	검사자	검사수행기간	사건발생기간	
고리1발	고리1호기	영구정지 2차	전상현	2022.04.01 ~ 2022.06.30	2019년 01월 ~ 2021년 12월	<a href="#">등록</a>
고리2발	고리3호기	26	전상현,윤동혁	2021.07.14 ~ 2021.12.07	2018년 04월 ~ 2021년 06월	<a href="#">등록</a>
한울1발	한울1호기	제24차(2022)	한순규	2022.04.11 ~ 2022.04.15	2019년 01월 ~ 2021년 12월	<a href="#">등록</a>
한울2발	한울3호기	15차(2019)	전상현, 임종혁	2019.11.05 ~ 2019.11.08	2016년 01월 ~ 2019년 06월	<a href="#">등록</a>
한울3발	한울6호기	제12차(2021)	한순규	2022.03.14 ~ 2022.03.18	2019년 01월 ~ 2021년 12월	<a href="#">등록</a>
월성1발	월성1호기	영구정지 제1차	김보경, 한순규	2021.04.06 ~ 2021.04.09	2018년 01월 ~ 2020년 12월	<a href="#">등록</a>
월성2발	월성3호기	제19차	김보경, 김문영	2022.10.04 ~ 2022.10.07	2019년 07월 ~ 2022년 07월	<a href="#">등록</a>
한빛1발	한빛1호기	제26차	하종태, 김문영	2022.08.28 ~ 2022.12.29	2019년 07월 ~ 2022년 07월	<a href="#">등록</a>
한빛2발	한빛3호기	제17차(2018)	유영진,한순규,정매주	2018.06.18 ~ 2018.06.22	2015년 01월 ~ 2017년 12월	<a href="#">등록</a>
한빛3발	한빛5호기	13차(2020)	조대관, 한순규	2020.06.09 ~ 2020.06.12	2017년 01월 ~ 2019년 12월	<a href="#">등록</a>
신고리1발	신고리1호기	07차(2022)	윤동혁,전상현	2022.09.14 ~ 2022.11.08	2019년 06월 ~ 2022년 08월	<a href="#">등록</a>
신고리2발	신고리4호기	02차(2022)	전상현, 윤동혁	2022.09.13 ~ 2022.09.16	2019년 06월 ~ 2022년 07월	<a href="#">등록</a>
신한울1발	-	-	-	~	~	<a href="#">등록</a>
신월성1발	신월성2호기	5차(2022)	김종갑, 김도상	2022.06.18 ~ 2022.08.12	2019년 01월 ~ 2022년 06월	<a href="#">등록</a>
한수원 본사	-	-	-	~	~	<a href="#">등록</a>
-	-	-	-	~	~	<a href="#">등록</a>

KINS 한국원자력안전기술원  
Korea Institute of Nuclear Safety

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Korea Institute of Nuclear Safety

# DIOS Dissemination of Incident and OE System (1)

## 운전경험정보관리시스템

### Dissemination of Incident & Operational experience System

국내·외의 원자력 발전소에서 발생한 운전 경험들을 수집·저장하고 분류체계에 따라 분류·저장하여 운전 경험 정보를 분석하고 활용하기 위한 시스템

## NEWS & NOTICE

더보기 +

**공지** 내, 외부망에서의 R-Tracer 모듈 분리사용 안내

[2018.11.26]

최근 검색자료 ▾

최근 등록자료 ▾

더보기 +

최근 검색된 자료가 없습니다.

## 정보현황

출처	자료	총계
한국	국내사고고장	776
	국내규제(심사)	219
미국	Generic Issue	290
	Bulletins	192
	Generic Letters	515
	Information Notices	2,005
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	Preliminary Notification	610
	Licensee Event Report	49,637
IAEA	IAEA IRS	4,600
	IAEA INES	1,074
	IAEA USIE	133
일본	Japan Press Release Information	379
기타	국제회의 운전경험 발표자료	8
	OECD/NEA WGOE 운전경험보고서	29
	FIIR,IRC 운전경험보고서	24

## 분류현황

더보기 +

계통		검사	심사	사건/규제
원자로본체	원자로용기 및 내부구조물	6	6	90
	노심 및 반응도 제어관련 기기	17	2	53
	연료집합체	7	3	136
	기타			
원자로 냉각재계통	원자로냉각재배관	5	3	242
	압력조절기기	2	2	84
	냉각재펌프	9	4	171
	증기발생기	4	3	160
정지냉각계통	원자로냉각재 압력경계	6	2	242
	기타			
	정지냉각펌프	8	1	59
	정지냉각열교환기	8	1	1
통	관련밸브 및 배관	8	2	111
	기타			
	열교환기	1	1	3

## QUICK MENU

운전경험정보 검색

정보현황

분류현황

TOP

- DIOS is an IT based archival system for the OEF system
  - manages huge amounts of OE data
  - efficiently handles the data by utilizing web-based technique
  - data is stored with categorized codes
- *Developed for the efficient storage, management and dissemination of Incidents and OE related data and Safety Issues*
  - *Events, Regulatory issues raised from the safety review and inspection*
  - *Events and Safety issues from IAEA, USNRC, NRA, etc.,*

# OPIS Operational Performance Information System

The screenshot shows a web browser window with the URL `http://opis.kins.re.kr/opis?act=OPISMAIN`. The browser's address bar and tabs are visible. The website's main navigation bar includes links for **HOME**, **SITELINK**, and **SITEMAP**. Below this, a secondary navigation bar lists categories: **원전안전운영정보시스템**, **원전운영현황**, **사고 · 고장정보**, **사고 · 고장등급**, **안전성능지표**, and **참고**.

The main content area features a large teal banner with the text **OPIS 란?** and **Operational Performance Information System for Nuclear Power Plant**. Below this, a paragraph states: "세계 원자력발전소의 개요, 설계 운영정보, 사고고장정보, 사고고장등급 평가 그리고 안전 성능지표를 관리하는 종합 데이터베이스 입니다." To the right of the text is a large white circle containing a blue nuclear symbol.

Below the banner, there are four rectangular panels with a dark background and white text:

- 원전운영현황**: 전 세계 원자력발전소에 대한 위치, 노형, 운영상태 등의 정보를 제공합니다. [바로가기 →](#)
- 사고 · 고장 정보**: 사고 · 고장 정보를 계통별, 원인별 조회
- 사고 · 고장 등급**: 각종 사고 · 고장에 대한 등급 평가 현황 및 결과 정보
- 안전성능지표**: 안전성능지표를 15개의 지표 평가로

- Major contents of OPIS
  - Nuclear Event Evaluation Database (NEED)
  - INES (International Nuclear Event Scale)
  - SPI (Safety Performance Indicator)
  - Status of World NPP
  - English Version of the OPIS

- Annual OEF workshop since 2003
  - To exchange information on events from foreign and domestic nuclear facilities
  - To discuss the event-related regulation perspectives
  - To improve the national OEF program
- International Cooperation Activities
  - Sharing and discussion on lessons learned from OE among the countries
  - Participation *on international OEF-related workshop*

Always we keep watching  
our Atomic Power



Thank You



한국원자력안전기술원  
KOREA INSTITUTE OF NUCLEAR SAFETY