



INTRODUCTION AND IMPLEMENTATION OF PHYSICAL PROTECTION MEASURES INCLUDING TRUSTWORTHINESS PROGRAM AT TOKAI REPROCESSING FACILITIES

16th November, 2017

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1. Introduction

After the Great East Japan Earthquake followed by the accident of Fukushima Daiichi Nuclear Power Station in 2011, Japan learned a lesson that the blackout could cause the event of severe accident.

To develop effective security measures based on the lesson learned from such crisis and to meet the IAEA Nuclear Security Recommendations (INFCIRC/225/Rev.5), Nuclear Regulation Authority (NRA) in Japan made **a partial amendment of the regulations concerning the reprocessing activity in 2012 and 2016**, respectively.

1. Strengthening of security measures (2012 (enforced by March 2014))

Following additional security measures were mainly introduced and implemented.

- Promoting Nuclear Security culture
- Introduction of limited access area (LAA) and secondary central alarm station (SAS)
- Strengthening of the information control and cyber security measures
- Introduction of a new definition of vital area against explosion risk when blackout
- Introduction of 2 person rule

2. Introduction of trustworthiness program (2016 (enforced in November 2017))

Items with underline include measures for Insider Threat.

2. Strengthening of security measures

JAEA Tokai reprocessing facilities that have more than 20 facilities including several facilities classified as Category I, II and III implemented all of those security measures except for trustworthiness program by the end of March 2014.

Improvement of physical protection
information control procedure



Establishment of cyber security
measures and introduction of
security control plan



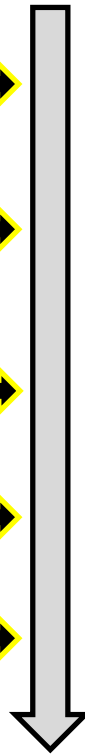
Improvement of emergency
response procedure



Improvement of education and
training



Implementation of the activity
of nuclear security culture



JAEA Tokai Reprocessing Facility

By engaging the hardware and software of security measures, our security level could be dramatically improved and enhanced.

What material is stored in Tokai reprocessing facility

Since our Tokai reprocessing facility has a large amount of nuclear material (Pu, U) and fission product (FP), through the frequent security assessment, high level of security should be maintained against sabotage and unauthorized removal (UR) for the viewpoint of outsider and insider threat.

Storage Facilities (): Category	Storage Area	Physical/ Chemical form	Sabotage / Unauthorized Removal (UR)
Main Plant (I)	SF Pond	Spent Fuel Assemblies	Sabotage
	Tanks	Pu nitrate Solution	Sabotage / UR
	Tanks	U nitrate Solution	UR
High Active Liquid Waste Storage (I)	Tanks	High Active Liquid Waste (FP, Pu and U)	Sabotage
U product storage facilities (III)	Room	Uranium Trioxide Powder (UO ₃)	UR
Plutonium Conversion Development Facility (I)	Tanks	Pu, U nitrate Solution	Sabotage / UR
	Gloveboxes, Canisters	MOX powder (PuO ₂ -UO ₂)	UR



Spent Fuel Pond



U Nitration Tanks



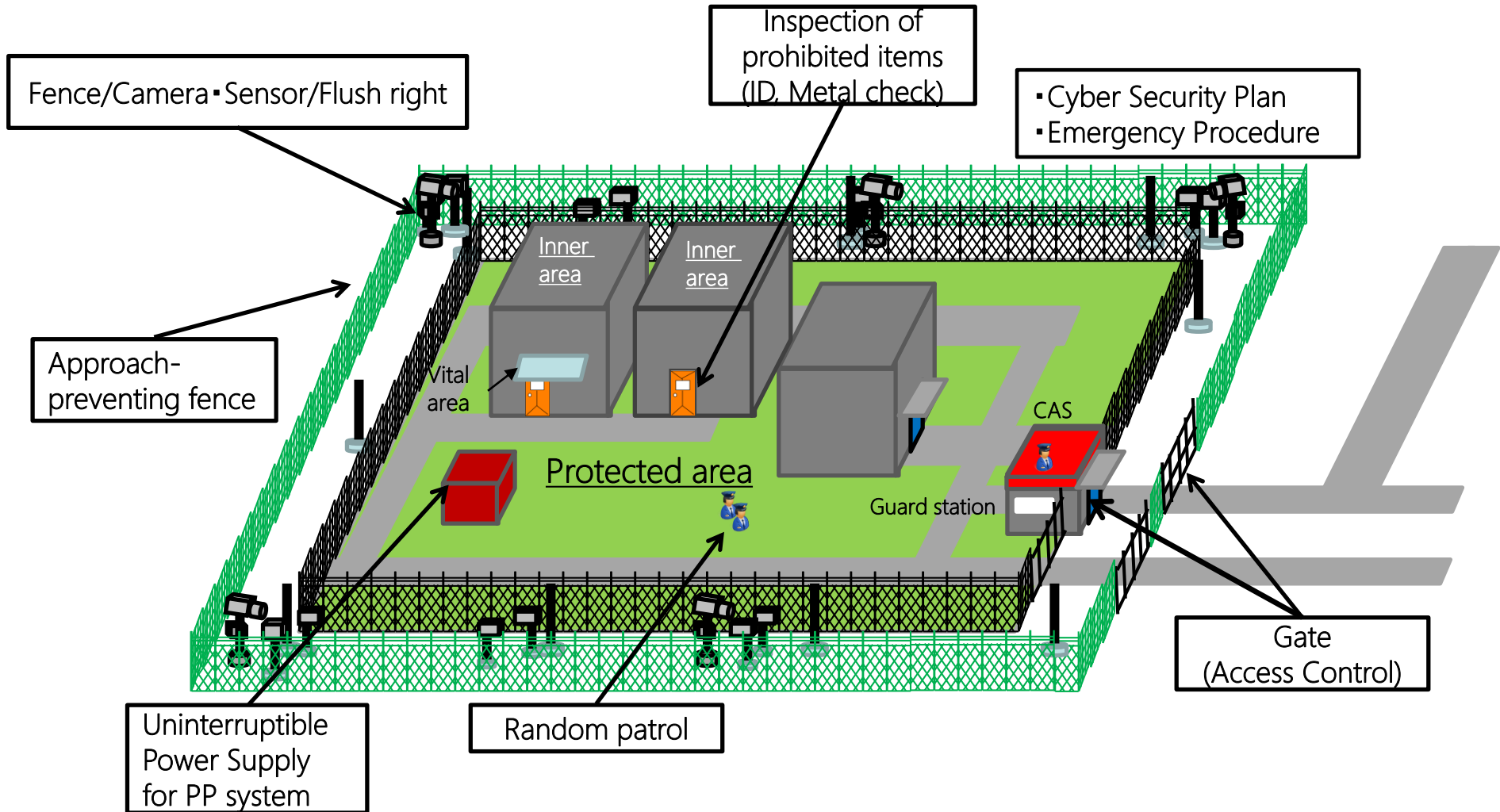
UO₃ Powder Pot



MOX Canister

Red Character: relatively high safety / security risk.

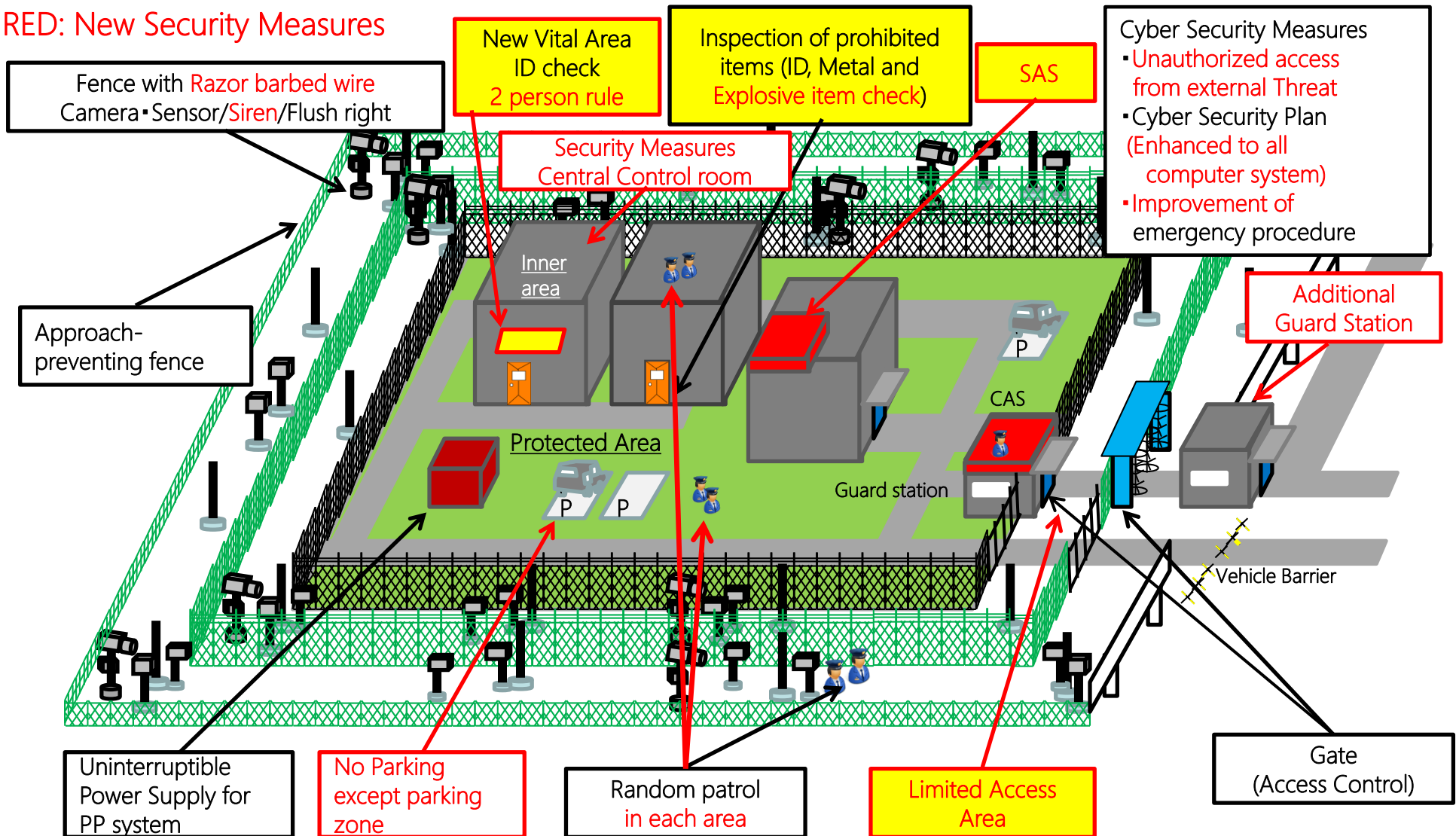
The representative security measures before the March 2014



There is no limited access area and secondary central alarm station.

The representative security measures after the March 2014 (After introduction the security measures based on IAEA INFCIRC 225 / Rev.5)

RED: New Security Measures



: Effective for the facility operator and security force through our security experience.



3. Overview of Trustworthiness program in Japan

In addition to the general security measures, **as one of countermeasures for insider threat**, trustworthiness program was newly introduced* in 2016, and enforced in 1st November, 2017 for the following facilities.

The screening is basically implemented by business (facility) operator.

Scope of the facility to introduce trustworthiness program

- Nuclear Power Reactors (commercial including R&D stage)
- Reprocessing Facilities

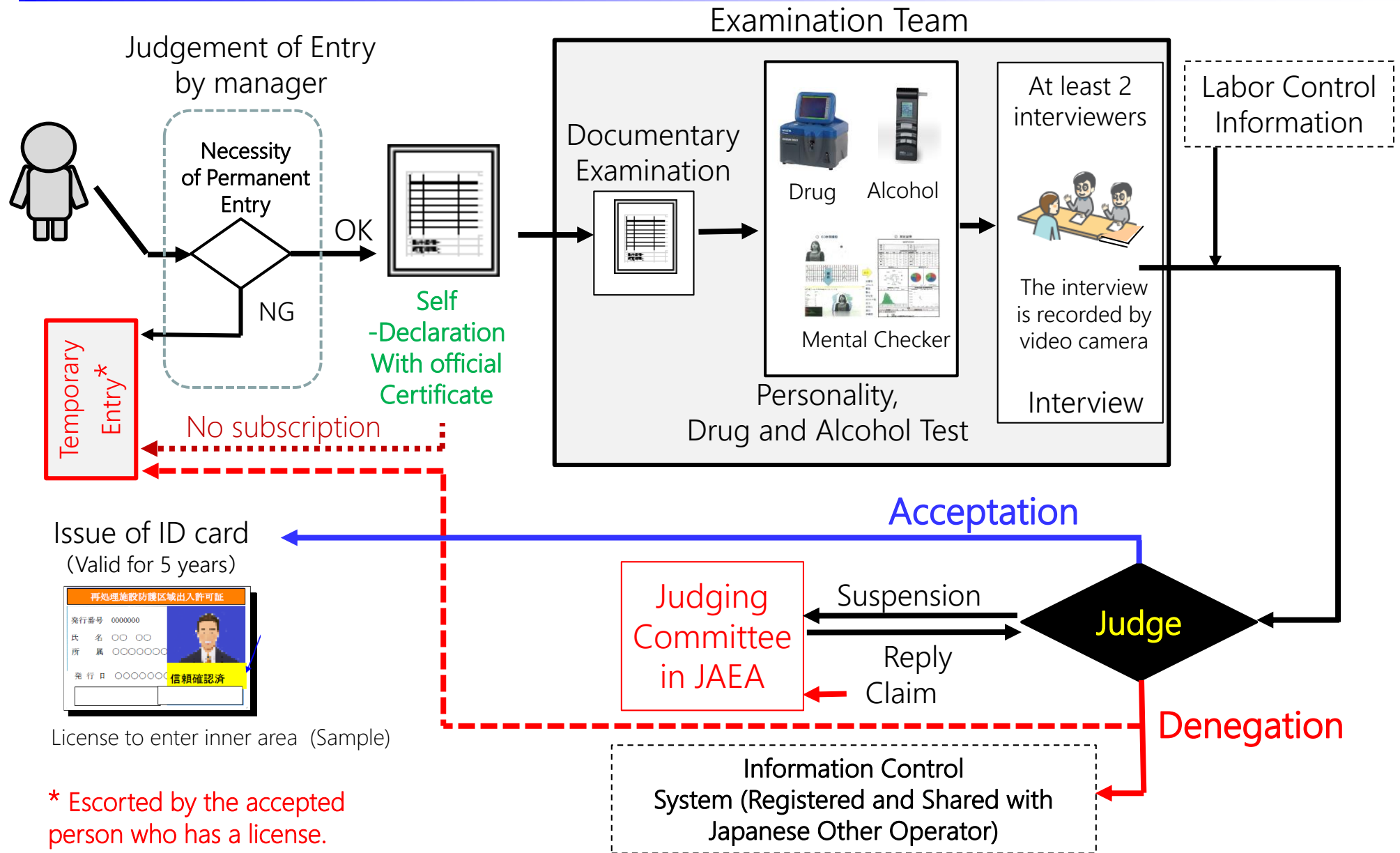
Scope of the person who enter to and/or handle with

- To enter inner area (category I and II)
- To enter CAS (Central Alarm Station) and 2nd CAS (SAS)
- To handle secret information in terms of physical protection.

* The amendment of reactor and reprocessing regulation was implemented.



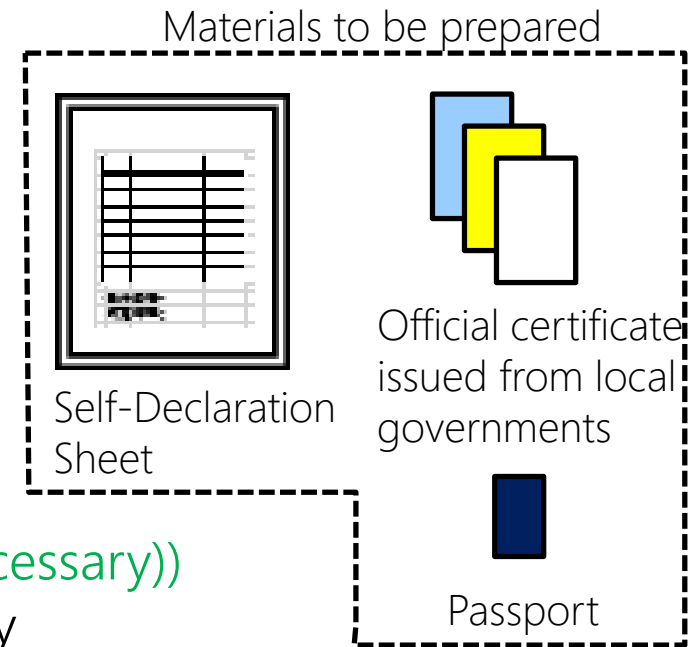
Screening flow for Trustworthiness Program





Self-Declaration with official certificate

1. Name, Birthday and Nationality (official certificate)
2. Residence (official certificate)
3. Name of company with department
4. Academic background and work experience
5. Work experience and job content at atomic facility
6. Overseas travel history (Passport)
7. Criminal and disciplinary background
8. Guardian presence or absence (official certificate)
9. Alcohol, Drug, Mental status (medical certificate (if necessary))
10. Pledge of no relation with sabotage by foreign country
11. Pledge of no relation with terrorism and a crime ring including gangsters
12. Pledge of no false declaration
13. Pledge of compliance and confidentiality



Prior to submit a self-declaration with official certificate, following subscriptions are necessary at the viewpoint of privacy protection.

- Use of personal information
- Information sharing etc.



Criteria of Judgement for screening

In case that the following points are confirmed through declarations and interview, etc.

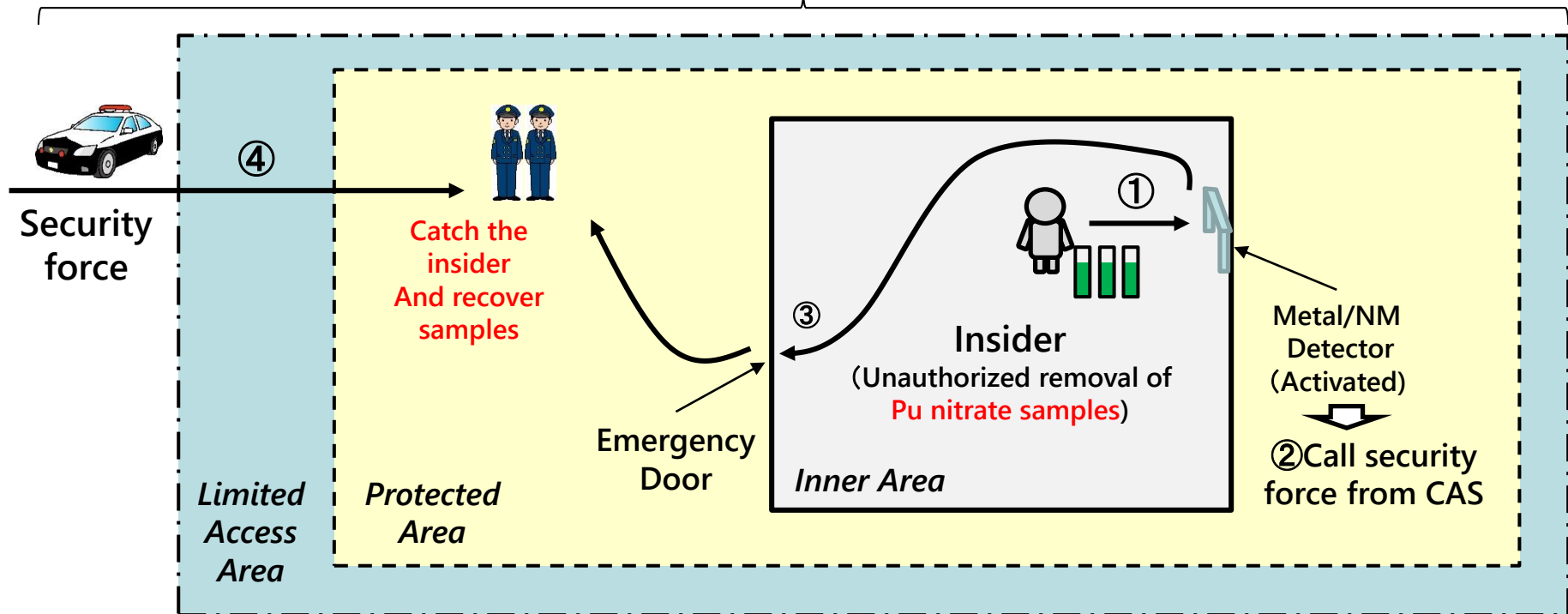
- False Declaration
- Great difficulty by **bankruptcy**, etc.
- Common relation with **terrorism and gangsters**
- A **lack of** capacity to appreciate one's situation or **self-control**
- **Legal violations** history regarding physical protection such as sabotage or information leak
- There is some **possibility for sabotage and/or information leakage** by the **comprehensive judgement**

In accordance with above criteria of judgement, final screening judgement is made based on the interview results, personality, drug and alcoholic test results, etc. by Physical Protection Manager (designated by law)

4. Exercise Training for Insider Threat

JAEA planned and implemented exercise training for insider threat (unauthorized removal of Pu nitrate samples (SFM; Special Fissionable Material)) by employee last year. The image of the training was shown in the following figure.

CAS timely provides security force with situations.



Participants for the training:

Facility Operators (all employees), Regulators (Nuclear Regulation Authority (safeguards and security)), Security Forces (local police and Japan Coast Guard)

Summary of the training exercise

In the training exercise, following abilities and capabilities were confirmed.

- ✓ **Communication** between CAS and security forces
- ✓ **Timely emergency call** when CAS detects insider threat
- ✓ Performance of **security system** (metal/SFM detector, surveillance cameras, etc.)
- ✓ **Identification of insider** (name and section) **and stolen SFM** when it is found
- ✓ **Information collections and directions** by manager of physical protection
- ✓ Procedure for **recovering stolen SFM**



- Discussion among operator, regulator and security force after the exercise is very good opportunity to review Plan-Do-Check-Action cycle.
- Operator improves physical protection measures (if necessary) in accordance with their comments* and performs training exercise several times to keep the high degree of security level.
- This kind of training is the representative approach for safety and security interface.

* Detailed comments cannot be described because of PP sensitive information.

5. Promoting Nuclear Security Culture (1)

We would introduce 2 kinds of activity for the promoting security cultures that is being implemented in JAEA Tokai Reprocessing Facility in order to keep high level of security mind.

(1) Case-Study Education

Physical protection coordinating section prepared **ten sheets of security events that actually could happen**, distributes and asks all employees in Tokai reprocessing facility to think about **what is the risk**, **what action they should take**, **what countermeasures should be taken**.

Implementation (once per year)

- Average 5 people in one group
- Choose one sheet
- 4 steps discussion
- Submission of discussion results

4 steps discussion

- Brain Storming of all risks
- Extract a few important risks
- Consider countermeasures
- Decide action target



(Example)

Leaving key
in the cabinet



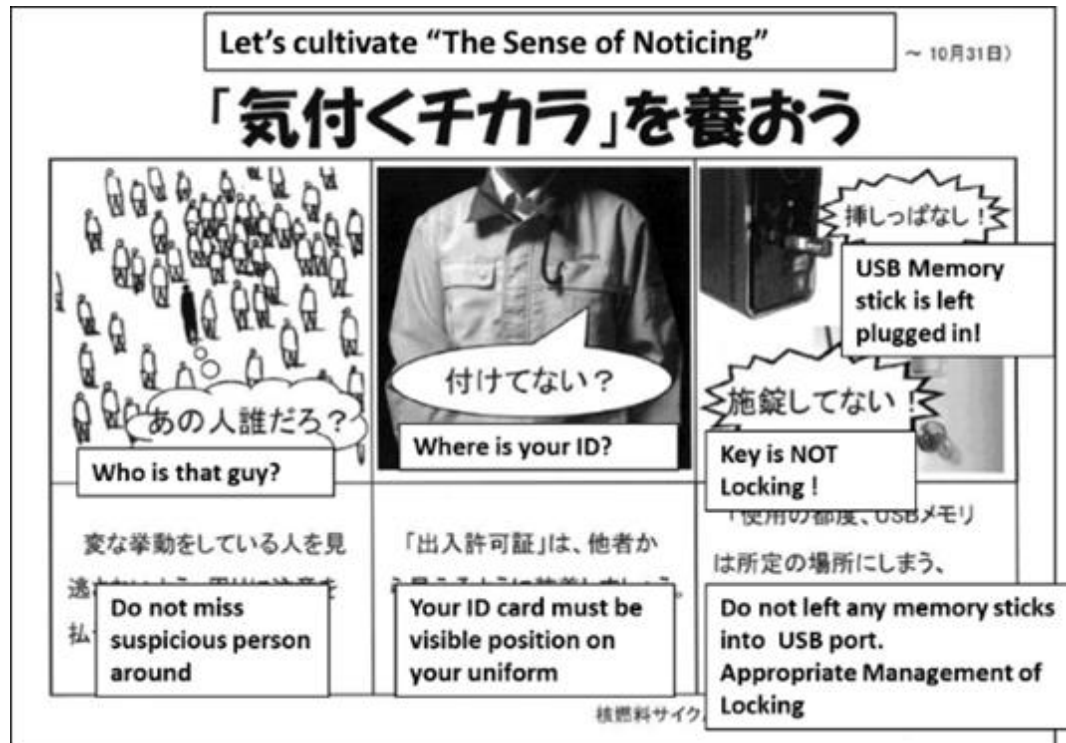
(Example)

Found drone crashes

5. Promoting Nuclear Security Culture (2)

(2) Indication of a Poster (yearly)

Important things are to cultivate the sense of noticing.



Since our goal is the reform of sense for the nuclear security through the many activities of nuclear security culture, it was concluded that this poster was **very useful and effective to conduct our security businesses.**



6. Conclusion

Tokai reprocessing facilities introduced and implemented a lot of security measures for hardware and software based on the Japanese regulation referred from IAEA INFCIRC225 Rev.5.

Against the insider and outsider, we could establish the effective and reasonable security measures from the viewpoint of unauthorized removal and sabotage comprehensively.

Trustworthiness program is enforced in 1st November 2017, it is expected that the security measures for insider would be highly strengthened.

Since we are going to promote decommissioning stage, in order to conduct the decommissioning without any security events, further improvements will be implemented continuously.

Thank you very much for kind attention.