Introduction of Physical Protection Corrective Action Program in JAEA

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Abstract

In the nuclear security are, JAEA investigated a corrective action program for physical protection called "PPCAP", and newly introduced it for relevant sites and headquarters since September 2019.

The PPCAP activity is conducted as a responsibility of PP manager of each site in accordance with the regulation (periodically reviewed). Those activities are confirmed by the state authority during the periodical inspection. JAEA conducts the PPCAP as following steps. 1) Manager collects observation/assessment report with any noticing with nonconformity, improvement, good practice, inspection result and internal assessment result. Those reports are commonly used with Safety and Safeguards in a part of sites at the viewpoint of 3S engagement. 2) Distinguish whether emergency or not, if so, countermeasure applies against any degradation of the performance as soon as possible. 3) Assessing organization reviews each report with a specified timeframe, and decides the grade by importance, comments, and countermeasures, and the action plan. 4) Manager resolves the issues based on the review result. To use each PPCAP result for resolving own issues as a reference, each report is allowed us to use the records in centralized server under information control.

After the introduction of PPCAP, more than 3500 reports were submitted and resolved, and they contribute to keep the high-performance level of physical protection of each facility. Thus, it is thought that this PPCAP activity is not only noticing or mitigating the risk of sabotage and unauthorized removal, but also the viewpoint of nuclear security culture promotion to understand and share the risks and good practices of nuclear security.

1 Introduction

In the safety area, JAEA has already introduced an improvement activity called "Corrective Action Program (CAP)" to utilize the process of the feedback and improvement of safety function within the quality management system. The U.S. DOE also publishes a guide to conduct corrective action program [1]. In addition, since new inspection scheme was introduced by NRA for safety and security area since 2020, we had to establish a such kind of CAP system against the Physical Protection (PP) area. JAEA has 6 nuclear fuel cycles sites, reactor, reprocessing, fuel fabrication and enrichment, applied physical protection (Category I, II and III). Continued improvements is very important to keep the security performance level and to mitigate the vulnerability of itself as well as safety. Since the safety CAP activity could be extended to the area of physical protection, JAEA investigated the corrective action program for physical protection called "PPCAP" which

was customized for the PP, and newly introduced each site and headquarters as a new internal regulation since September 2019. We believe that this activity could help to keep the expected performance on safety for entire organization and to ensure resolution and prevention of the same or similar problems.

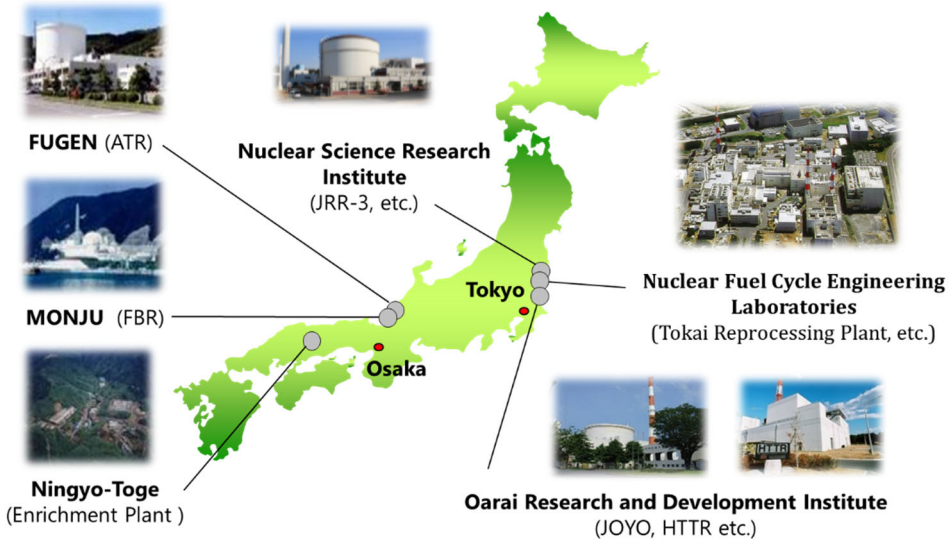

Figure 1 Nuclear Fuel Cycle Sites that PP is applied in JAEA/Japan

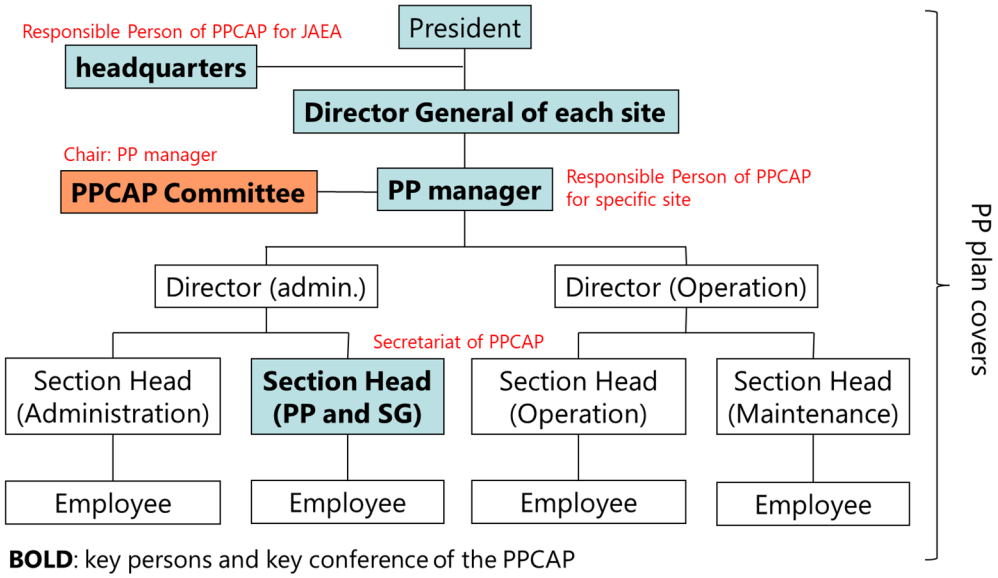

Figure 2 Organization Chart of PP plan (Representative Only)

2 Organization of Physical Protection

Figure 2 shows the image of organization chart described in the PP plan and it is extracted representative organization in terms of PPCAP. The PP plan is approved by our president, and it is authorized by Nuclear Regulation Authority (NRA) in accordance with the Japanese law. The

section in charge of PP is established the different organization from the operation and maintenance section due to the independent administration perspective. The section also directs, supports, and makes arrangement for the PP activities in the sites. In general, PP manager is responsible person for the entire PP activity in specific sites, and assistant of director general of the site. To discuss the security measures, security culture promotion activities and evaluation of PPCAP results, we have a PPCAP committee in each site, and PP manger is the chair of the committee.

The person and committee who indicates “Bold” are the key to conduct PPCAP activity. In order to perform PPCAP activity appropriately, it is very important to attend all organization described in Figure 2, report condition report (CR) without stress, discuss systematically and conduct improvement and/or correction as planned.

3 PPCAP Concept and Basic Policy

JAEA established the PPCAP according to the following 5 concepts and 3 basic policies. The procedure and classification of importance, etc. were customized to meet PP requirements.

<PPCAP Concept>

- PPCAP activity is conducted based on the requirement of the evaluation and improvement activity in the PP plan, we only referred the methodology of QMS to conduct the program systematically.
- Based on the INPUT (Condition Report), Corrective actions, Improvements and collecting good practices, and the horizontal expansion are basically implemented, and graded approach in the classification of importance are introduced for the countermeasures in the PPCAP.
- PPCAP is different from the one of safety CAP because we must respond to security specific issues such as prompt action and information control, etc.
- The design of classifications of importance is conducted to determine both viewpoints of the impact of the protecting measure on performance (no defects) and the compliance perspective (rule compliance).
- Corrective action implements the management of progress, and the result will be reviewed systematically. Those systems (PPCAP procedure) will be checked and improved periodically in the viewpoints of the effectiveness and efficiency.

<Basic Policy>

- **Report at low thresholds**

  "Reporting at low thresholds, such as conditions different from those that should be in place." is emphasized, and the system that employee could report aggressively will be maintained. Therefore, employee could convey report to the information management officer or the section head of PP with free-format, e-mail, orally or by memo etc., not stick

to the format on the "Information collection manual for awareness".

- **Identification of improvement based on various reports**

  Wide range of improvement will be conducted from the collected various reports to identify comprehensive vulnerabilities even if the improvement is not directly affected physical protection measures.

- **Classification of importance is considered for risk and seriousness**

  The classification should be set considering the impact on physical protection measures, the risk and compliance of the cases, and measures are taken according to the seriousness.

4 Document Architecture

Figure 3 shows the document architecture of PPCAP. To proceed PPCA activity smoothly, 3 tertiary documents, awareness information collection manual, classification of importance manual, and information sharing and management manual, are made under the PPCAP procedure respectively.

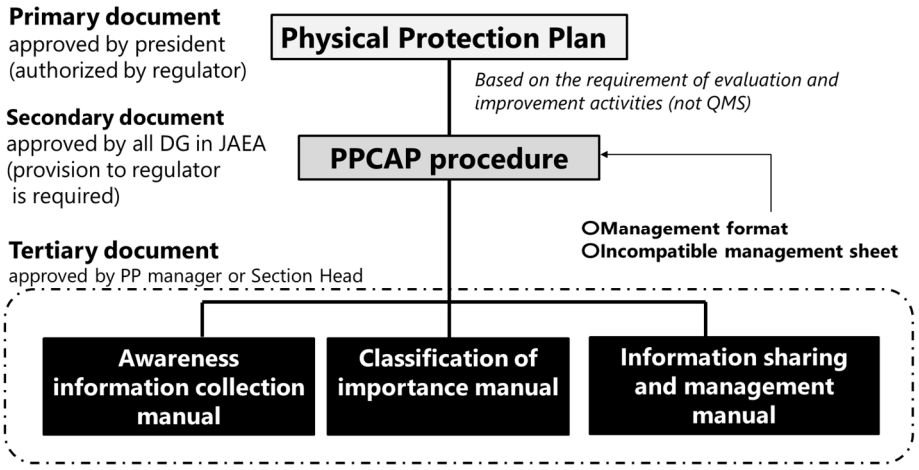

Figure 3 Document Architecture

5 Procedure of PPCAP

JAEA made a PPCAP procedure authorized by director general of each site and director of headquarters. Figure 4 shows a flow sheet to conduct PPCAP.

Though basic procedure is almost same as the one of safety CAP, we customized to meet the PP requirements as follows:

1) CR collects all employees, inspector results by NRA and assessment, etc.
2) CR related to the safety and safeguards, it is shared to another CAP or notify the relevant sections. So, only nuclear security CR is handled in this PPCAP.
3) If serious vulnerability is found, we must take countermeasures immediately. In that case, PP manger acted without following steps, and then follows up according to the procedure.
4) Since secret information and knowledge of PP is limited, and it is difficult for the high level

of manager to understand the entire PP rule and measures, preliminary classification of importance is conducted by the section head in charge of PP who is one of specialist of PP.

5) During the steps, if we noticed the significant corrections to be needed to notify the NRA or local police officer, the process is included into the procedure.

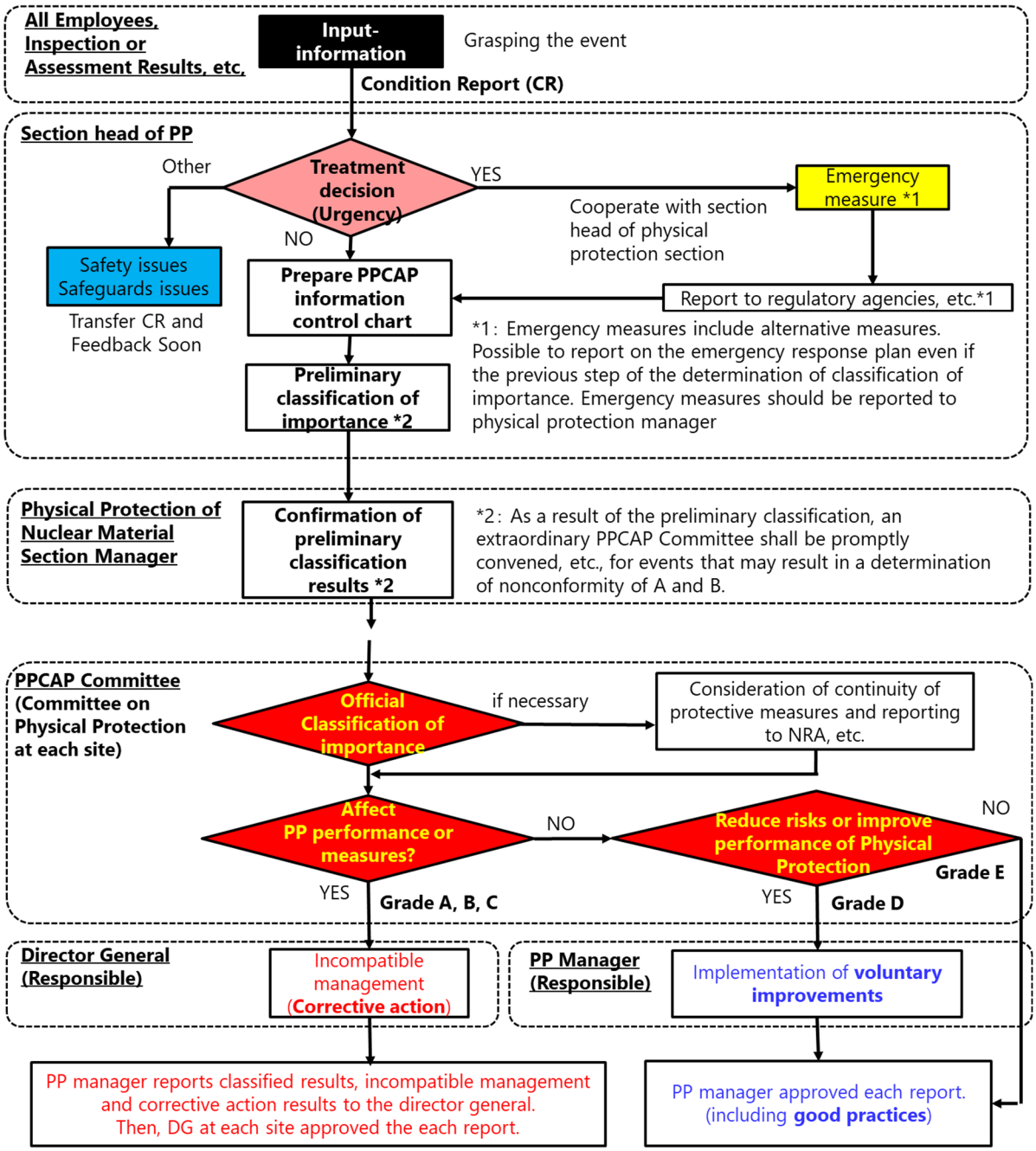

Figure 4 PPCAP Flow Sheet

6 Information Sharing and Management

In the entire JAEA, regarding the incompatible issues related to the significant vulnerability and compliance, and good practices that is found and/or noticed at each site, the horizontal expansion is very important to maintain the required security level. Figure 5 shows the image of information sharing and management system in JAEA. The database is controlled in the headquarters with access control, and HQ of PP administration, the section in charge of PP and PP manager can see the own PPCAP result. However, the section in charge of PP and PP manager cannot see the other sites results except for good practices. Those accumulated data could be used for the statistical evaluations. In addition, if there is significant concerns and good practices, HQ of PP administration conducts horizontal expansion, then correction and improvement are directed if necessary.

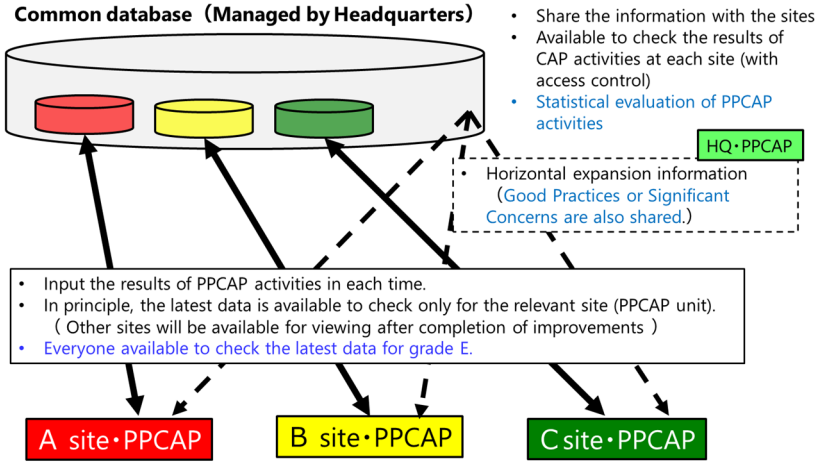

Figure 5 PPCAP information sharing and management

7 Classification of Importance of PPCAP and Examples of key findings

To conduct the graded approach, based on the criteria which is shown in the Table 1, classification for each noticing (CR) is conducted. This table is periodically reviewed and amended to keep expected performance. If it is classified “A”, “B” and “C” by the PPCAP committee, operator must conduct corrective action systematically (cause analysis, countermeasures) as soon as possible. If it is classified “D”, operator must conduct improvement action systematically as a timely manner. If it is classified “E”, it is not necessary for operator to act (Improvement could be conducted not based on the PPCAP). Since the classification A has a heavy impact to proceed the nominal work of JAEA, we seem that this classification mechanism helps us to keep compliance as much as possible.

In order to understand what item is being handled, though these are not real case, examples of key findings are shown below:

Table 1 Classification of importance

Classification	Criteria
A	1. Items that conflict with the standard requirements (including examples of DBT measures*) or PP Program of the text-tracing manual on the Regulations of the NRA. 2. Items that were judged to be inspection issues in the nuclear regulatory inspection for the PP, and for which additional action is required because of the classification of importance assessment based on the "Implementation Guideline for the NRA".
B	1. Items that are insufficient fulfillment of the standard requirements (including examples of DBT measures*) or Provisions for the PP of Nuclear Materials of the text-tracing manual on the Regulations of the NRA. 2. Items that were judged to be inspection issues in the nuclear regulatory inspection for the physical protection, and for which additional action is not required because of the classification of importance assessment based on the "Implementation Guideline for the Nuclear Regulatory Inspections". 3. Items that are assessed to be minor in the nuclear regulatory inspections for the physical protection, and which meet into the 1. above.
C	1. Items that cannot be considered problem-free from the standpoint of PP due to non-compliance or inadequacy of procedures and manuals under the PP program. 2. Items that judged to be minor in the nuclear regulatory inspections for the PP, which do not meet into above B judgment 1..
D	1. Items that should be improved physical protection measures based on voluntary reviews and evaluations. 2. Items that were raised as inspection findings or suggestions in the nuclear regulatory inspections for the physical protection and checked and improved by the operator itself.
E	1. Items that judged to be good practices by the nuclear regulatory inspections for the physical protections or PPCAP committee. 2. Items in which the evaluation of the input information did not result in any impact or relevance to the nuclear material protection measures

Grade A（Corrective action）

・ Unauthorized removal of SNM by insider was occurred. As a correction measure, cause and countermeasures were investigated. HQ conducted horizontal expansion not to do the same issue.

Grade B（Corrective action ）

• Regulator found that a PP boundary door was not completely locked due to aged door during the periodical inspection. So, operator corrected that door was replaced to the new one.

Grade C（Corrective action ）

• Operator noticed to forget a masking against the sensitive information (not secret), then provided it with contractor (no assessment). So, operator corrected that confirmation procedure of sensitive information with double check function is made.

Grade D（Voluntary improvements）

- Employee noticed that the case with the ID card fell to the floor due to come loose of the case holder. So, holder is improved to the new one with countermeasures.

Grade E (No action and/or Good Practice)

- Guard found and reported the areas of poor footholds where people could be stumbled and injured in patrolling. This was transferred to safety CAP and it was improved.
- PP manager found a new nuclear security poster to encourage the security culture promotion at the site. The PP manager commended the person who made a poster, and HQ conducted horizontal expansion as a good practice.

8 Activity Result

Table 2 shows the PPCAP results for entire JAEA. After the introduction of PPCAP, the classified “B” (regulator noticed issues) could be significantly reduced and improved after 2020. In addition, more than 1400 items could be corrected and improved for 4 years. Fortunately, there is no “A” classification which has a possibility to open to the public at the moment.

Table 2 PPCA results for entire JAEA

JFY	CR Total	Classification Results				
		A	B	C	D	E
2019	790	0	8	81	275	426
2020	907	0	1	34	338	534
2021	794	0	2	41	287	464
2022	1103	0	1	23	350	729
	3594	0	12	179	1250	2153

9 Conclusions

After the introduction of PPCAP, more than 3500 condition reports were submitted. Then, a lot of corrections and improvements more than 1400 were conducted. So, PPCAP contributes to keep the high-performance level of physical protection of each facility.

Thus, it is thought that this PPCAP activity is not only noticing or mitigating the risk of sabotage and unauthorized removal, but also the viewpoint of nuclear security culture promotion to understand and share the risks and good practices of nuclear security.

Finally, we hope that this effort could be helped to maintain our performance for nuclear security at a high level against the threat.

10 References

[1] Corrective Action Program Guide, DOE G 414.15 3-2-06, U.S. Department of Energy

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