

The 6th Maintenance Seminar  
"Purposes and Approaches to the New Regulatory Inspection System in Japan"

## Towards Implementation of New Maintenance Program (An Approach to Use of IT for Maintenance)

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### Approach to Maintenance Optimization

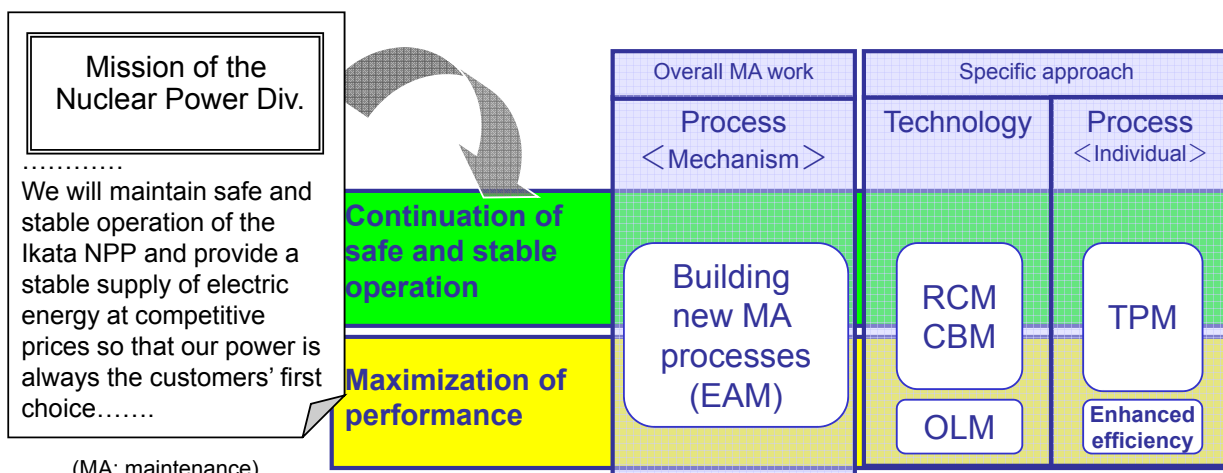
Maintenance optimization is part of the "Innovation of Maintenance Management" initiative.

Related activities include:

- To put RCM and CBM technologies on a firm footing;
- To streamline individual jobs through the TPM activity, including to shorten planned outage duration;
- To build new maintenance processes for integrally managing MA activities and introduce EAM as the tool to use.

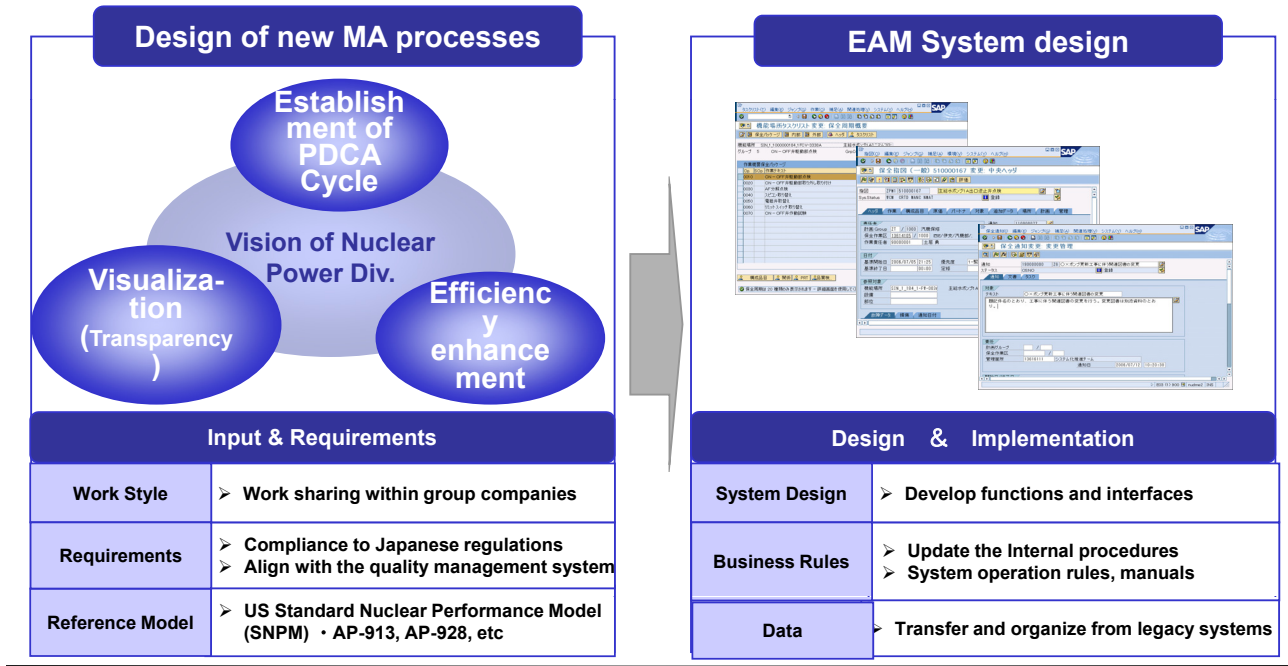
The aim is:

- "To maximize plant performance" , while
- "Ensuring continued safe and stable operation of the Ikata Power Station"



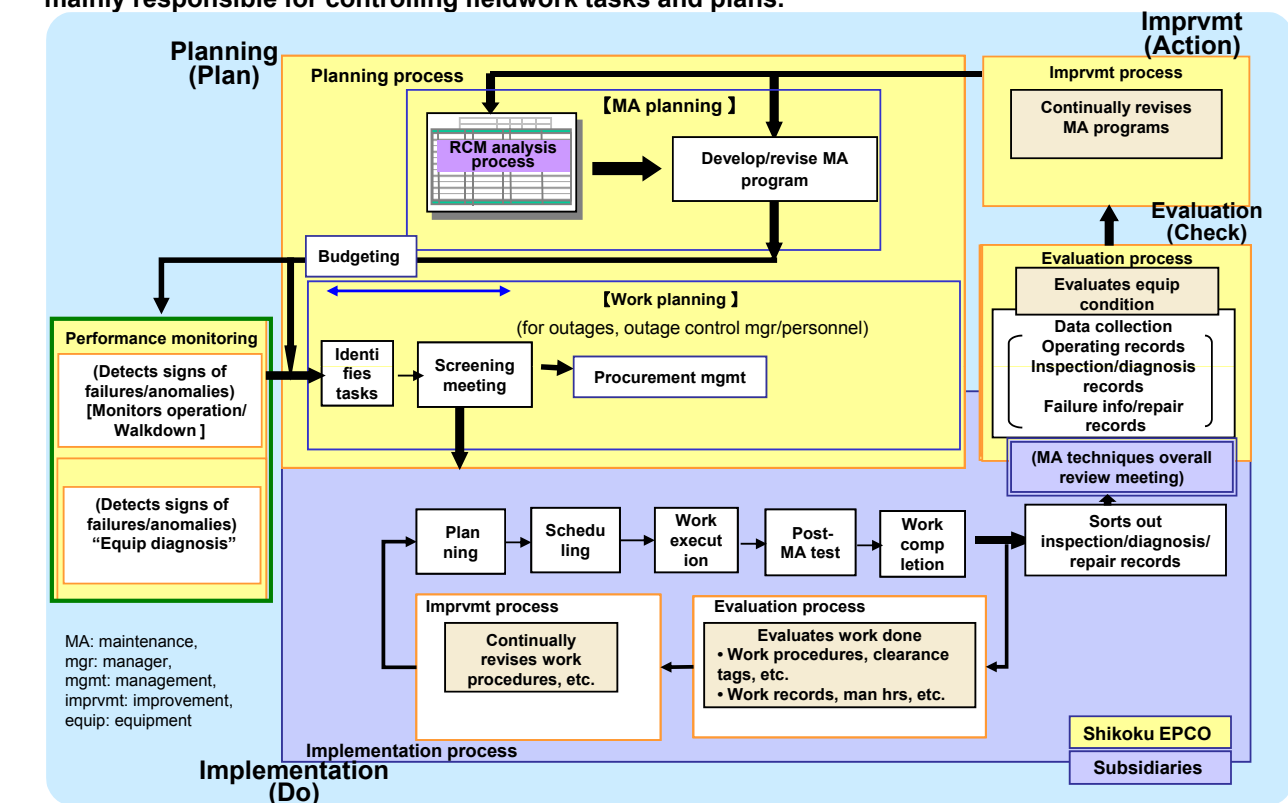
# Construction of New Maintenance Processes

- Designed new maintenance processes for the maintenance management at the Ikata NPS, using the SNPM (Standard Nuclear Performance Model used in the U.S.) as a guide.
- Performed Fit & Gap analysis comparing the new maintenance processes with the standard functions of the EAM package software, to determine the scope of functions to be developed (system design).



## New Maintenance Processes and the Role of Shikoku EPCO and Its Subsidiaries

Shikoku EPCO mainly manages company's maintenance programs, while the subsidiaries are mainly responsible for controlling fieldwork tasks and plans.



# The Aim of EAM Systems and the Activities Covered

## [EAM and Its Peripheral Systems Complementing the EAM]

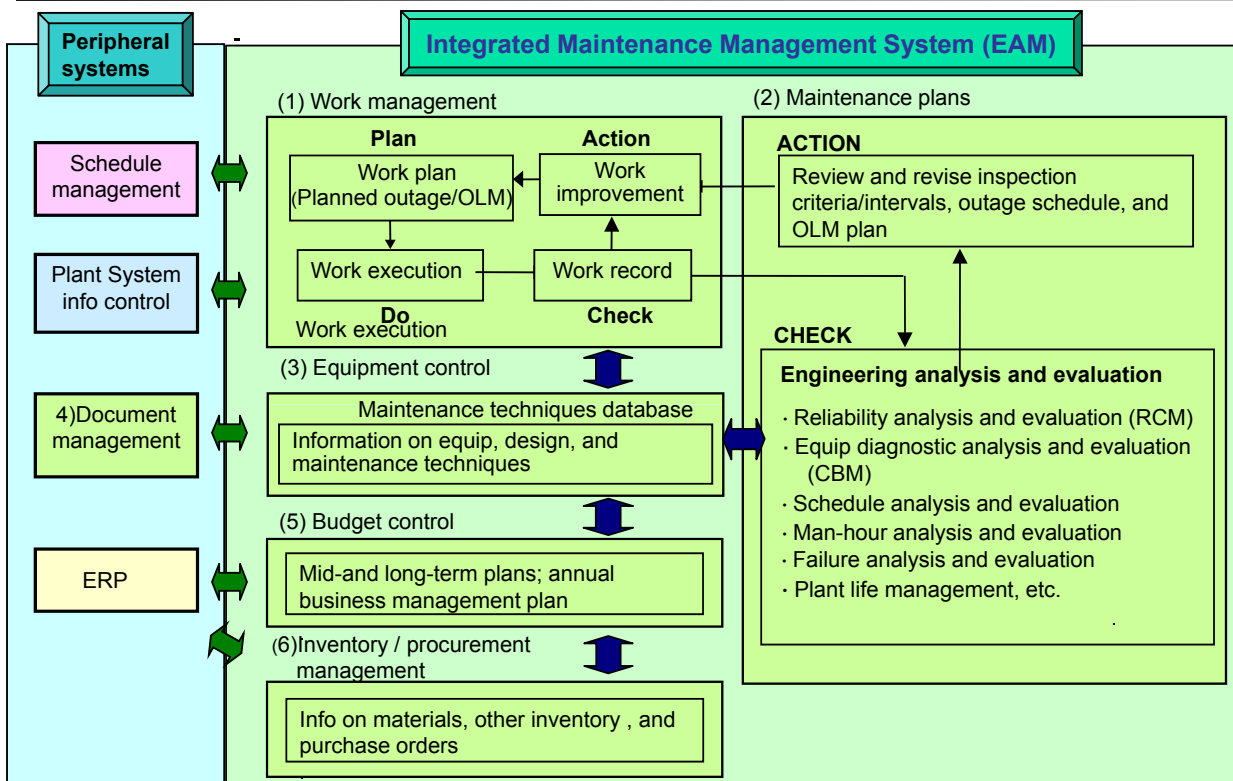
Tools that help make decisions on MA and introduce promptness and transparency into MA activities through integration of information on plant equipment control and maintenance management; the goal is to successfully putting the new business processes into practice.

## [Major Activities Covered by the Systems]

- (1) Work management including work planning, work execution, and reporting
- (2) Maintenance planning such as making plans for inspection and reviewing inspection intervals
- (3) Equip control including control of equip specifications and MA records
- (4) Management of documents such as design drawings, analysis reports, and job records
- (5) Budget control that controls costs, work breakdown structure, and others
- (6) Inventory/procurement management that controls data on materials and other inventory, information on vendors, purchase orders, acceptance of deliveries, etc.

(MA-maintenance; equip-equipment)

## Activities Covered by EAM (Outline)



## Expected Benefits from EAM Introduction

- Establishes the PDCA cycle for MA activities
- Visualizes MA activities (transparency)
- Enhances efficiency of MA activities

### Specific Advantages

- MA data collected and accumulated can be made “visible” in the form of KPIs (Key Performance Indicators) and properly incorporated in the planning of MA activities. This facilitates continuous improvement through the rotation of PDCA cycle.
- Information such as equipment deficiencies can be shared speedily by all the relevant parties, contributing to enhancing transparency.
- MA activities can be “visualized” by electronically implementing Plan-Do-Check-Action. This allows us to review the progress of various activities easily and reliably and realize improved maintenance processes.
- A huge amount of data related to MA can be processed with no QC-related problems, allowing for swift and reliable application of RCM, CBM, and other MA techniques.
- Procurement-related information such as that on materials and other inventory used for MA tasks, purchase orders, and acceptance of deliveries is cross-linked between the EAM and the ERP Systems, enabling integrated management of information on budgeted and actual expenditures.

## -Control of Routine Inspection- An example Screen View from EAM Operation (1) Menu Screen

The screenshot shows the SAP Easy Access interface for the '原子力EAMメニュー' (Nuclear EAM Menu). The left sidebar contains a tree view of the menu structure, with '台帳管理' (Ledger Management) selected. The main area displays a list of 17 menu items, each with a number and a description. The descriptions are as follows:

1. : **Request and Planning** for MA tasks
2. **Control of the Registry**: Control of the registry book for MA plans containing the names of equipment, tasks, etc.
3. **Maintenance Mgmt**: Planning for and control of MA orders (MA Request Sheets); control of the alert list; control of MA effectiveness evaluation
4. **Instrument Control**: Control of instruments (tools for calibration and POI\*, etc.)
5. **Clearance tags Control**: Planning for and control of clearance tags
6. **Operation Mgmt**: Planning for and control of surveillance testing
7. **Inspection Mgmt**: Planning for and mgmt of POI\*
8. **Public Affairs**: Control of notifications to off-site organizations
9. **Non-conformity/Corrective Action**: Control of non-conformities and corrective actions
10. : **Control of preventive actions**
11. : **Planning for and control** of improvement/review items
12. : **Control of Missing procedures**
13. **Change Control**: Control of changes in drawings and in EAM data
14. **Stock / Purchase Mgmt**: Control of inventory and procurement
15. : **Routine MA Control**: Routine MA and controlling routine contract work
16. **Budgeting Mgmt**: Budgeting for long-term, and annual plans
17. **Target PIs Mgmt**: Control of decision-making and oversight
18. **Control of target PIs for MA activities**
19. **Registration Mgmt**: Control of target PIs for MA activities
20. **Registration Mgmt**: Registration and inquiries about documents

\*POI – (mandatory) periodic outage inspection

## An Example Screen View from EAM Operation (2) A List of MA Tasks Requested

通知変更: 通知一覧

モニタ	S	Typ	通知	テキスト	ユーザ	Sta	機能場所	機能場所の説明	PG	保全作業区	通知日
	✓	XI	110021650	【訓練用】○○設定値の変更について	承認	SIN_2	2号機	ZI	14411125	2008/03/14	
	✓	XI	110021680	【訓練用】ヘッドリン弁点検	承認	SIN_1	1号機	ZR	13615111	2008/04/15	
	✓	XI	110021681	【訓練用】冷却ファン点検	承認	SIN_1	1号機	ZE	13613111	2008/04/15	
	✓	XI	110021682	【訓練用】ラインバルブ弁点検依頼	承認	SIN_1	1号機	ZR	13615111	2008/04/15	
	✓	XI	110021683	【訓練用】パイパス弁点検依頼	承認	SIN_3	3号機	ZR	13615111	2008/04/15	
	✓	XI	110021684	【訓練用】弁グランドリーク点検依頼	承認	SIN_3	3号機	ZI	14411125	2008/04/15	
	✓	XI	110021720	【訓練用】フィルタ取替依頼	承認	SIN_2	2号機	ZR	13615101	2008/06/02	
	✓	XI	110021740	【訓練用】配管貫通部点検依頼	承認	SIN_2	2号機	ZR	13615111	2008/06/04	
	✓	XI	110021760	【訓練用】設定値の変更依頼	承認	SIN_1	1号機	ZI	14411125	2008/06/12	
	✓	XI	110021770	【訓練用】制御用Comp電磁弁漏えい	承認	SIN_2	2号機	ZI	14411131	2008/08/04	
	✓	XI	110021780	【訓練用】○○点検依頼	承認	SIN_1	1号機	ZN	10214121	2008/06/18	

Presents the names of the MA tasks for which MA Request Sheets have been issued.

## An Example Screen View from EAM Operation (3) Approval on MA Request

保全通知変更: 保修依頼

通知	110021770	XI	【訓練用】制御用Comp電磁弁漏えい	承認	後続通知登録
ステータス	NOPR ORAS OSTS			後続通知との紐付け	
指図	510021960			先行通知との紐付け	

○The status changes with time.  
Registered    Waiting approval  
Approved    Waiting completion  
Completed

参照対象  
機能場所 SIN\_2    2号機  
設備

対象  
分類 X10    X101    巡視点検中  
テキスト 【訓練用】制御用Comp電磁弁漏えい  
 保修員の巡視点検において、制御用Comp電磁弁から微量の空気漏えいが発生していることを発見したため修理を依頼する。  
 8/5 スクリーニング会議にて 作業指示

責任  
計画グループ ZI / 1000    計装保修  
保全作業区 14411131 / 1000    四計/原子力/伊事/二次計装課  
報告者 報告者名    通知日 2008/08/04 14:51:21

A finder enters information on the equipment condition and requests for a maintenance action.

## An Example Screen View from EAM Operation (4) Determination of Nonconformity

安全通知変更: 保修依頼

通知 110021770 X1 【訓練用】制御用Comp電磁弁漏えい

ステータス NOPR ORAS OST5 承認

指図 510021960

後続通知登録  
後続通知との紐付け  
先通知との紐付け

通知 スクリーニング 分析 活動 評価 文書

開始日/終了日  
指定開始日 2008/08/13 14:51:21 優先度 通常

指定終了日 00:00:00  停止

保修依頼優先度詳細

劣化度合い

問題分類

優先度分類番号

不適合判断

不適合判断 10 不適合事象 不適合判断日時 2008/08/05 00:00

識別 40 関係者への周知

How urgent the work is (urgent, higher priority, ordinary, tool pouch);  
Classification of non-conformity

## An Example Screen View from EAM Operation (5) Approval on Checking/Inspection

安全指図 (一般) 510021960 変更: 中央ヘッダ

作業承認 評価 完了(業務)

指図 ZPM1 510021960 【訓練用】制御用Comp電磁弁点検

【訓練用】制御用Comp電磁弁点検  
保修員の巡視点検において、制御用Comp電磁弁から微量の空気漏えいが発生していることが確認されたため、継手の増し締め及びびりークチェックを実施する。

○ The status changes with time.  
Registered Planned Plan  
approved Scheduling Schedule  
approved Preparation  
Execution Task finished All  
Completed Waiting close-out  
Technically closed Closed-out

Sys.Status WCM VAL REL NMAT 承認

ヘッダ 作業 対象 追加データ 場所 計画 管理

責任者 通知 110021770

計画 Group Z1 / 1000 計装保修

安全作業区 14411131 1000 四計/原子力/伊華

作業管理者 10014978 従業員 0427

安全活動Ty Z04 異常兆候(不適;  
Syst 状況 E 日請(非定例)

日付

基準開始日 2008/08/13 11:37 優先度 簡易作業

基準終了日 2008/08/13 11:37 定検

参照対象

機能場所 SIN\_2 2号機

設備

Classification of work procedures (safety-related/ data output/ ordinary/ simple tasks)



## An Example Screen View from EAM Operation (6) Inspection Results

安全通知変更: 保修依頼

通知 110021770 X1 【訓練用】制御用Comp電磁弁漏えい

ステータス NOPR ORAS OSTS 承認

指図 510021960

通知 スクリーニング 分析 活動 評価 文書

定検データ  
発生定検回

故障情報  
 機能故障(F)  予防可能機能故障(MPFF)  LCO逸脱

故障データ  
発生日 00:00  停止  
復旧日 00:00 停止期間 0.00 H

明細

損傷	X10	X107	緩み
テキスト	継ぎ手が緩んでいた		
原因コード	X10	X146	経年劣化
原因テキスト	振動等の影響をうけたものと推測される		

Enter failure information (e.g., condition, cause, etc.) found as a result of checking/ inspection



## An Example Screen View from EAM Operation (7) Tasks Identified as Necessary by Inspection

安全通知変更: 保修依頼

通知 110021770 X1 【訓練用】制御用Comp電磁弁漏えい

ステータス NOPR ORAS OSTS 承認

指図 510021960

通知 スクリーニング 分析 活動 評価 文書

活動

活動	コードグル...	活動コード	活動コードテキスト	活動テキスト	LT
1	X10	X103	増締め	継ぎ手部分の増締め及びリークチェック実施	
0					
0					
0					
0					
0					
0					
0					
0					
0					

Enter the tasks identified as necessary as a result of inspection

## An Example Screen View from EAM Operation (8) Evaluation Based on the Checking/Inspection

安全通知変更: 保修依頼

通知 110021770 X1 【訓練用】制御用Comp電磁弁漏えい

ステータス NOPR ORAS OSTS 承認

指図 510021960

後続通知登録  
後続通知との紐付け  
先通知との紐付け

通知 スクリーニング 分析 活動 評価 文書

No.	コー...	タ...	タスクコードテキスト	タスクテキスト	タ...	計画開始日	終了予定日	責任者	一覧名	ステータス	ユーザステ...	完了者
1	X10	X100	全て修正不要	作業計画の改善事項なし		2008/08/11	2008/08/11	50000297	二次計装課	TSOS	登録	担当者名
2	X10	X106	是正処置要・否判断	是正処置要:継手の締め方再周知		2008/08/11	2008/08/11	50000297	二次計装課	TSOS	登録	担当者名

Enter information derived from checking/ inspection (e.g., corrective action required)

## An Example Screen View from EAM Operation (9) Evaluation Based on the Checking/Inspection (Cross-reference to attached drawings and others)

安全通知照会: 保修依頼

通知 110039801 X1 IAcomp-1A PS-M400A不調

ステータス ATCO NOCO NOPT ORAS 完了

指図 510039842

後続通知登録  
先通知との紐付け

通知 スクリーニング 分析 活動 評価 文書

リンク文書

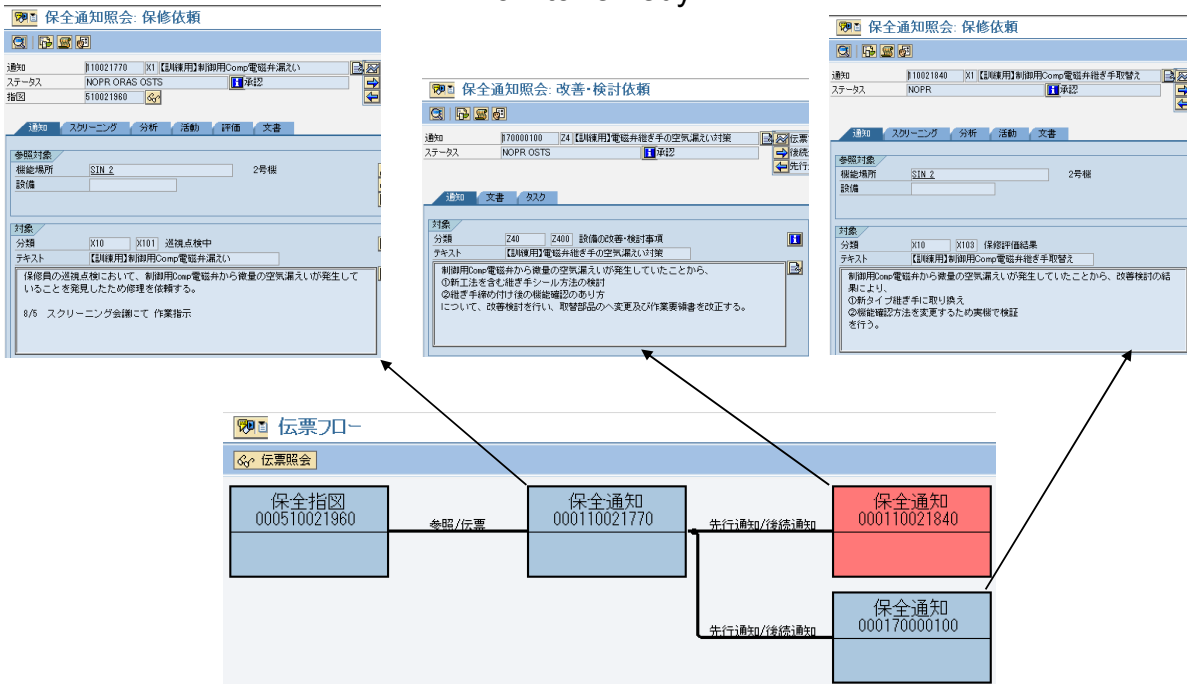
● 現行バージョン  
○ 全バージョン

Typ	文書	DPt/Vs	テキスト
320	200806-000272	000 01	IAcomp-1A PS-M400A不調

Refer to the task result (attached drawing)

# An Example Screen View from EAM Operation (10) Continuation to the Succeeding Activities

An event occurred → Discussion on how to remedy → Putting the discussion results into effect



## Actions into the Future

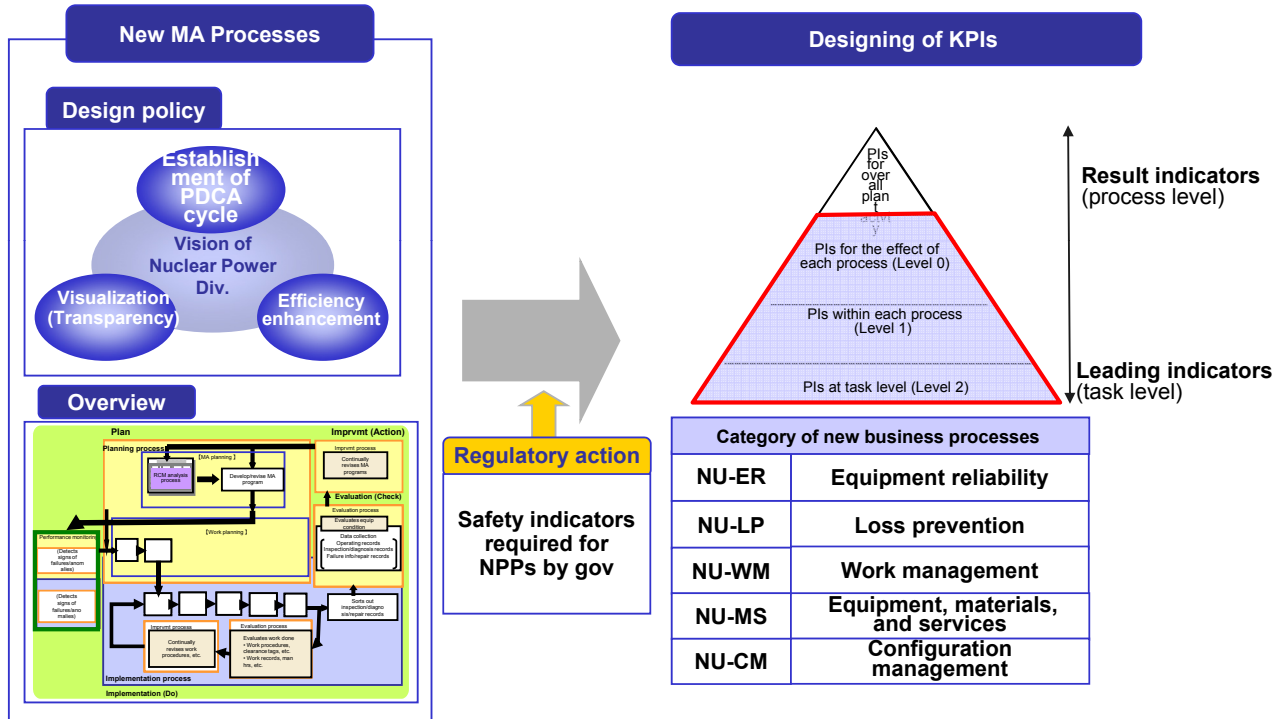
### Planned Strategy

- The EAM Systems provide a mechanism that allows for continuous improvement of MA activities through the implementation of the PDCA cycle (e.g., facilitates visualization of activities and utilization of accumulated information).  
→ By fully utilizing this mechanism, we will pursue improved and optimized MA programs, accumulate knowledge, and share it among all relevant parties, aiming at further innovation in MA.

### Specific Activities

- Make efforts at putting new MA processes on a firm footing;
- Introduce KPIs and improve MA activities;
- Continuously implement PDCA for new MA activities derived from the new MA programs.  
→ Successively apply continuous improvement efforts by rotating the PDCA cycle through the use of EAM.

# Design Concept of Key Performance Indicators (KPIs)



We plan to review our key performance indicators by, for example, studying good example cases, to achieve the vision of the Nuclear Power Division.