



RADIATION PROTECTION: AN APPROACH FOR SIMPLIFICATION

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ACCESSIBILITE : INTERNE



SUMMARY

1. CONTEXT AT EDF
2. « SIMPLIFICATION PROJECT »
3. AUTOMATIC DISTRIBUTION FOR RP EQUIPMENT
4. AUTOMATIC DISTRIBUTION FOR RADIOACTIVE SOURCES
5. OTHER EXAMPLES

1- CONTEXT AT EDF

- ✓ EDF French fleet composed of 58 PWR units.
- ✓ First unit in exploitation in 1977 (Fessenheim).
- ✓ Target : 60 years lifetime in operation.
- ✓ Maintenance program: increase of dosimetry, outages duration, activities and costs.



Need for simplification and processes improvement

2- « SIMPLIFICATION PROJECT »

- **The objective is to limit some negative consequences induced by the increase in maintenance volume.**

- **In other words ?**
 - Optimize operations
 - Optimize radiation protection management
 - Facilitate logistics and access to RP devices and personal equipment.

- **Which actions in practice ?**
 - Reference standards,
 - Performance management,
 - Guidelines for high risk works,
 - Practices standardization (ALARA committees, hot spots management, chemical decontamination, shielding, ...),
 - New equipments to facilitate activities in controlled area.

3- AUTOMATIC DISTRIBUTION FOR RP EQUIPMENT



- 62 RADIABOX on 19 NPPs (soon 81 on 20 NPPs).
- Before accessing the RCA.
- Identification with badge to access the NPP.

SIMPLIFICATION FOR USER

- Distribution 7/7 days, 24/24 hours.
- Facilitation tool for workers.
- Time queuing up at RCA store saved.
- RP devices availability increased.

3- AUTOMATIC DISTRIBUTION FOR RP EQUIPMENT

- Remote management and control.
- Centralized databases.
- Alarms.

**SIMPLIFICATION FOR ADMIN
(RP or logistics staff)**

- Traceability.
- Device management optimized.
- Ability to react increased.
- Stock shortage limited.

Radiabox

| ID Machine | ID Coordon | Site | Radiabox Ty | Petits Plates | Petits Platea | Grands Plate | Grands Plate | % Alerte Pla | Alerte Plates | Alerte Espas | Type d'actio | Etat |
|------------|------------|-----------|-------------|---------------|---------------|--------------|--------------|--------------|---------------|--------------|--------------|---------|
| 74 | 74 | TRICASTIN | RADIABOX | 236 | 57 | 92 | 0 | 80.00 | OUI | NON | ACTIVE | En état |
| 75 | 75 | TRICASTIN | RADIABOX | 237 | 91 | 93 | 0 | 80.00 | OUI | NON | ACTIVE | En état |
| 76 | 76 | TRICASTIN | RADIABOX | | 0 | | 0 | 80.00 | OUI | NON | DESACTIVE | Déconn |

Articles autorisés | Articles en stock | Modifier l'état

Articles autorisés

| ID Machine | Article | Description | Emprunt Au | Auteur de la | Date de Crs | Prog Reg | Auteur dern | Date dernier | F Off | Auteur de la | Remarque |
|------------|---------------|------------------------------|------------|--------------|---------------|----------|-------------|--------------|-------|--------------|----------|
| 76 | LOECL45LP | Lampe de poche Tricastin | S | B82873 | 08/02/2016 21 | 1 | | | N | | |
| 76 | SRCONCCTMINIB | Minirace Beta | S | J17456 | 04/02/2016 16 | 1 | | | N | | |
| 76 | SRCONCCTDOLB | Contaminamètre Dolphy Beta T | S | B82873 | 08/02/2016 21 | 1 | | | N | | |
| 76 | SRIRRDNDOM | Dosimètre neutron | S | B82873 | 08/02/2016 21 | 1 | | | N | | |
| 76 | SRIRRRCTDOLG | Radiamètre DOLG | S | J17456 | 04/02/2016 16 | 1 | | | N | | |

Items

| Id Item | Code barre | Code article | N. Séris | Site | Création | CPI | CPE | Validité | Activé | Etat | Radi |
|---------|---------------------|--------------|----------|----------------|--------------------------|-----|------------|------------|--------|-------------|------|
| 1249 | NROXYGGAE-FLA173 | NROXYGGAE | ***** | FLAMANVILLE 12 | 17/02/2016 10 12/07/2015 | | 12/07/2015 | 11/07/2016 | NON | Non calibré | |
| 1250 | SRIRRRCTDOLG-FLA072 | SRIRRRCTDOLG | ***** | FLAMANVILLE 12 | 17/02/2016 10 20/07/2015 | | 20/07/2015 | 18/07/2016 | OUI | OK | |
| 1251 | NROXYGGAE-FLA437 | NROXYGGAE | ***** | FLAMANVILLE 12 | 17/02/2016 10 11/07/2015 | | 11/07/2015 | 10/07/2016 | OUI | OK | |
| 1252 | SRIRRRCTDOLV-FLA018 | SRIRRRCTDOLV | ***** | FLAMANVILLE 12 | 17/02/2016 13 30/11/2015 | | 30/11/2015 | 29/11/2016 | NON | Changement | |
| 1253 | SRIRRRCTDOLG-FLA128 | SRIRRRCTDOLG | ***** | FLAMANVILLE 12 | 17/02/2016 13 30/11/2015 | | 30/11/2015 | 29/11/2016 | OUI | OK | |
| 1254 | SRIRRRCTDOLG-FLA031 | SRIRRRCTDOLG | ***** | FLAMANVILLE 12 | 17/02/2016 13 11/06/2015 | | 23/10/2013 | 30/09/2016 | NON | Changement | |
| 1255 | SRIRRRCTDOLV-FLA127 | SRIRRRCTDOLV | ***** | FLAMANVILLE 12 | 17/02/2016 13 20/07/2015 | | 20/07/2015 | 19/07/2016 | OUI | OK | |
| 1256 | NROXYGGAE-FLA228 | NROXYGGAE | ***** | FLAMANVILLE 12 | 17/02/2016 13 27/04/2015 | | 27/04/2015 | 26/04/2016 | NON | Non calibré | |
| 1257 | NROXYGGAE-FLA165 | NROXYGGAE | ***** | FLAMANVILLE 12 | 17/02/2016 13 27/04/2015 | | 27/04/2015 | 26/04/2016 | OUI | OK | |
| 1258 | SRIRRRCTDOLG-FLA099 | SRIRRRCTDOLG | ***** | FLAMANVILLE 12 | 17/02/2016 13 30/11/2015 | | 30/11/2015 | 29/11/2016 | OUI | OK | |
| 1259 | SRIRRRCTDOLG-FLA092 | SRIRRRCTDOLG | ***** | FLAMANVILLE 12 | 17/02/2016 13 27/07/2015 | | 01/02/2015 | 30/07/2016 | OUI | OK | |

Type Article | Mouvements

Mouvements

| Mouvements | IdMouvement | 1 - DateMou | IdArticle | Barcode | Descr.Article | Radiabox Id | Radiabox Ty | IP | Id De L'Utilis | BNU | Type De Mouvement | État |
|------------|-------------|---------------|-----------|------------|---------------|-------------|-------------|---------------|----------------|--------|--------------------------------|----------|
| 75902 | 26953 | 12/05/2016 15 | 1253 | SRIRRRCTDC | Radiamètre Di | 48 | RADIABOX | 10.164.41.205 | 249102 | 249102 | Emprunt | OK |
| 74934 | 26315 | 10/05/2016 16 | 1253 | SRIRRRCTDC | Radiamètre Di | 48 | RADIABOX | 10.164.41.205 | 0 | 0 | Rendre | OK |
| 74909 | 26299 | 10/05/2016 14 | 1253 | SRIRRRCTDC | Radiamètre Di | 48 | RADIABOX | 10.164.41.205 | 256811 | 256811 | Emprunt | OK |
| 73009 | 23943 | 02/05/2016 16 | 1253 | SRIRRRCTDC | Radiamètre Di | 48 | RADIABOX | 10.164.41.205 | 0 | 0 | Rendre | OK |
| 72975 | 20813 | 02/05/2016 15 | 1253 | SRIRRRCTDC | Radiamètre Di | 47 | RADIABOX | 10.164.46.205 | 262225 | 262225 | Emprunt | OK |
| 72504 | | 29/04/2016 16 | 1253 | SRIRRRCTDC | Radiamètre Di | | | | | | Changement d'état de l'article | OK |
| 72130 | 19513 | 28/04/2016 9 | 1253 | SRIRRRCTDC | Radiamètre Di | 47 | RADIABOX | 10.164.46.205 | 0 | 0 | Rendre | OK |
| 72127 | 19509 | 28/04/2016 9 | 1253 | SRIRRRCTDC | Radiamètre Di | 47 | RADIABOX | 10.164.46.205 | 395969 | 395969 | Retrait | Décharge |
| 69692 | 16526 | 18/04/2016 17 | 1253 | SRIRRRCTDC | Radiamètre Di | 47 | RADIABOX | 10.164.46.205 | 0 | 0 | Rendre | Décharge |

4- AUTOMATIC DISTRIBUTION FOR RADIOACTIVE SOURCES

- RFID tracking and distribution are experimented in Gravelines and Bugey since 2009.
- First gains identified:
 - Traceability.
 - Real time alarms and inventories.
 - Simplification for users.
 - Simplification for RP staff.



Positive feedback from the experimentation: generalisation for the fleet.

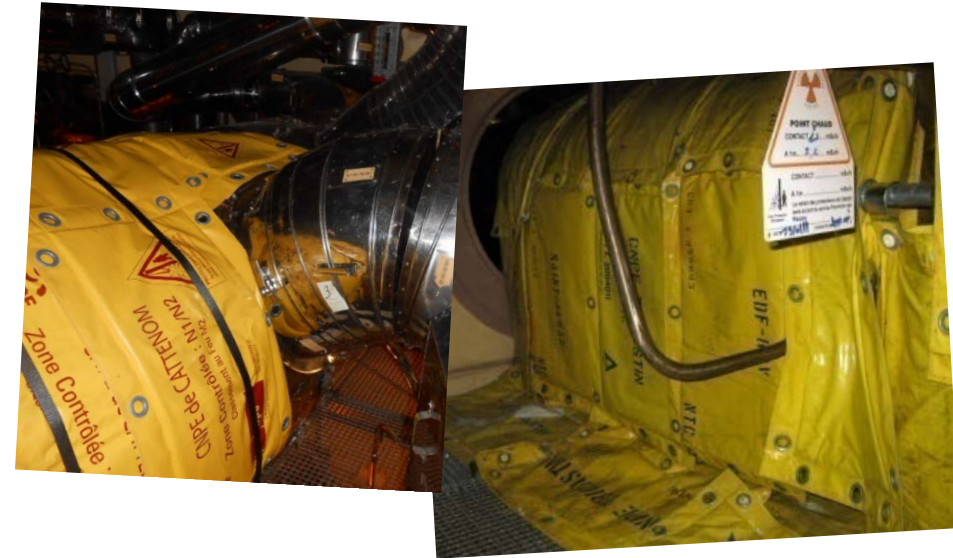
5- OTHER EXAMPLES

C1 for the exit of the RB (on going experimentation of prototype).



Simplification:

- A single threshold.
- Quick whole body control (7 sec.).
- Systematic control for all operators.



Shielding directly on pipes insulation.

Simplification for logistics staff.

- Dose saving.
- Time saving.

5- OTHER EXAMPLES



Transportation system for GAM sources.

Simplification for users:

- Safety increased for caged ladder.
- Falling risk decreased for sources.
- Shocks reduction when moving.
- Hands free.

Developed for EDF, on going tests.
Generalization: end of 2016 if successful.

5- OTHER EXAMPLES



C2 new generation for exit of the RCA without clothes.

Simplification for users:

- No systematic WBC at the arrival on the NPP.



New C2 are implemented within the fleet.

New gamma radiation beacon.

Simplification for user:

- Easy detector replacement.
- Available radiameter for complementary controls.



Generalization on the fleet.

5- OTHER EXAMPLES

Simplification Roadmaps:

Feuille de Route Simplification

REF 7- Conditions d'intervention sur les sites Everest

Objectifs et échéance finale

- Simplifier les exigences du guide associé au référentiel Everest relatives aux tenues portées sur les sites Everest en précisant les conditions d'habillage en fonction du risque de contamination

Sponsors / PS / PO

- Sponsor : B. Le Guen
- PS : S. BLond
- PO : Emmanuel ARIAL (UNIE/GPRE)

| Étapes | Jalons | Livrables clés |
|---|---------------------------------|--|
| <ul style="list-style-type: none"> • Expérimentation (orga et tenues) sur les sites Everest (CAT,CIV,GOL,FLA) • Poursuite des expé en 2016 en intégrant le site de Chooz I1. | déc 2015 T2 puis T4 2016 | <ul style="list-style-type: none"> • Note de REX sur les expé 2015 • REX à mi parcours – mi 2016 • REX fin des expé - fin des campagnes d'arrêt |
| <ul style="list-style-type: none"> • Essais en laboratoire sur l'empilement des tenues | T1 2016 | <ul style="list-style-type: none"> • Résultats essais |
| <ul style="list-style-type: none"> • Test d'une nouvelle tenue respirante | T 2-2016 | <ul style="list-style-type: none"> • Prise en compte de ce test lors des réponses à l'appel d'offres relatif aux sur-tenues non tissées de ZC |
| | T1-2017 | <ul style="list-style-type: none"> • Révision du guide associé au référentiel Everest |

Gains Attendus

- Améliorer les conditions de travail des intervenants
- Réduire les temps d'habillage et de déshabillage
- Allonger les plages de travail en lien avec l'amélioration des conditions de travail

Indicateurs de résultats

- Satisfaction des intervenants (conditions de travail vis-à-vis de la chaleur et sécurité)
- Temps métal

Acteurs et Ressources associées

UNIE/GPRE –Branches Radioprotection et Sécurité + CNPE
Filière médicale (DEM Santé et médecin du travail Blayais I2.
Prestataires (notamment Areva)

Pilotage

- MP4- Pilotage en CPR

Génération 420

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22.03.16



THANK YOU FOR YOUR ATTENTION

Questions?