

RP-monitoring in decommissioning:

1. Decom at OKG, Oskarshamn
2. RP background
3. RP monitoring in decom
4. Q/A



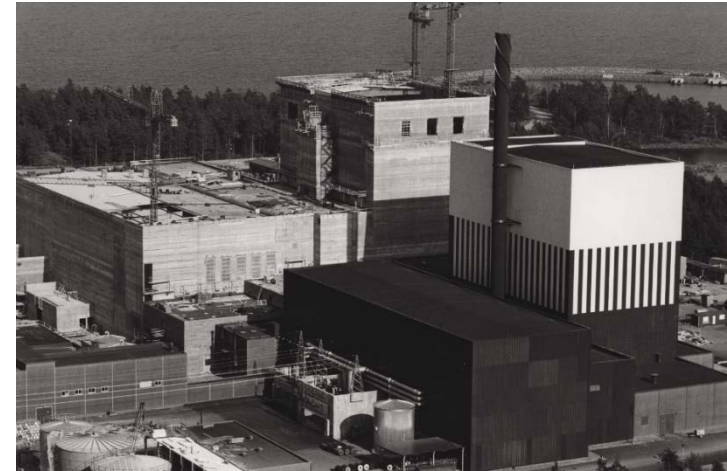
RP-monitoring in decommissioning:

Decommissioning at OKG

100 employees dep A unit 1-2

Section AS, RP:

- 2 RP analysts
- 3 RP-engineers
- RP-foreman
- 11 RP-techs



RP-monitoring in decommissioning:

Status unit 1

- Spent fuel handling
- Handling of failed spent fuel done
- Categorization and characterization
- 2019, segmentation internal part.

Status unit 2

- Segmentation internal part.
- Categorization and characterizations
- 2019, System decontamination

General

- Basic data for bids is being assembled



C/C-process

Authority approval

Scope of work (Work package, WP)

Historical report

- Historical operation management
- Process limitations
- First assessment, ELR mm
- Systems and objects
- Theoretical nuclide vector

Measurements and testing plan

- Inventory of materials
- Statistics
- Method of measuring
- Contamination
- Ways of spreading, into materials
- Hard to measure nuclides, material testing

Physical measurements, inventory

Characterization report

- Materials
- Risk category, SKB R-16-13
- Hotspots
- Contamination
- RP
- Updated nuclide vector

RP per WP

- ALARA-plan
- Dose budget/result collective/individual
- Prevent external, internal and skin dose
- Optimizing RP, radiological PJB
- BAT
- Reducing radiological sources
- Decontamination
- Low/highdose zones
- Loose contamination
- Identifying activity concentrations
- Type of radiation source alpha, beta, gamma
- Work environmental plan
- Experience log
- Final report to DMA
- Radiological PJB

Free release

- Extremely low risk, **can** not be contaminated
- Low risk, **should** not be contaminated
- Risk – up to 0,1Bq/g and 0 mSv/h

Environmentally hazardous

Radioactive waste, over free release

- LLW 1 - 0,1-1 Bq/g and < 0,1 mSv/h
- LLW 2 - 1-20 Bq/g and < 0,5 mSv/h
- LLW 3 - 20-100 Bq/g and < 2 mSv/h
- LLW 4 - 100-1000 Bq/g and < 2 mSv/h
- LLW 5 - >1000 Bq/g and > 2 mSv/h

Categorization report

- Waste track
- Waste logistics
- Plan for backend
- Categorization, ELR mm
- Volumes for backend
- Evaluation analysis, approving
- PJD for next WP

D&D

Generically documents

- Initial assessment
- Strategy for C and C
 - Historical report
 - Characterization plan
 - Categorizing plan, waste track
 - Evaluation, analysis and estimation
- Mapping plan
- Inventory of materials
- Scope list WP
- Information handling, IT-support, Database,
- Methods for measuring
- Method for categorizing

Quick reference guide

- What documents to bring
- List of systems
- Instruments
- Deviations handling
- PJB

Physical measurements

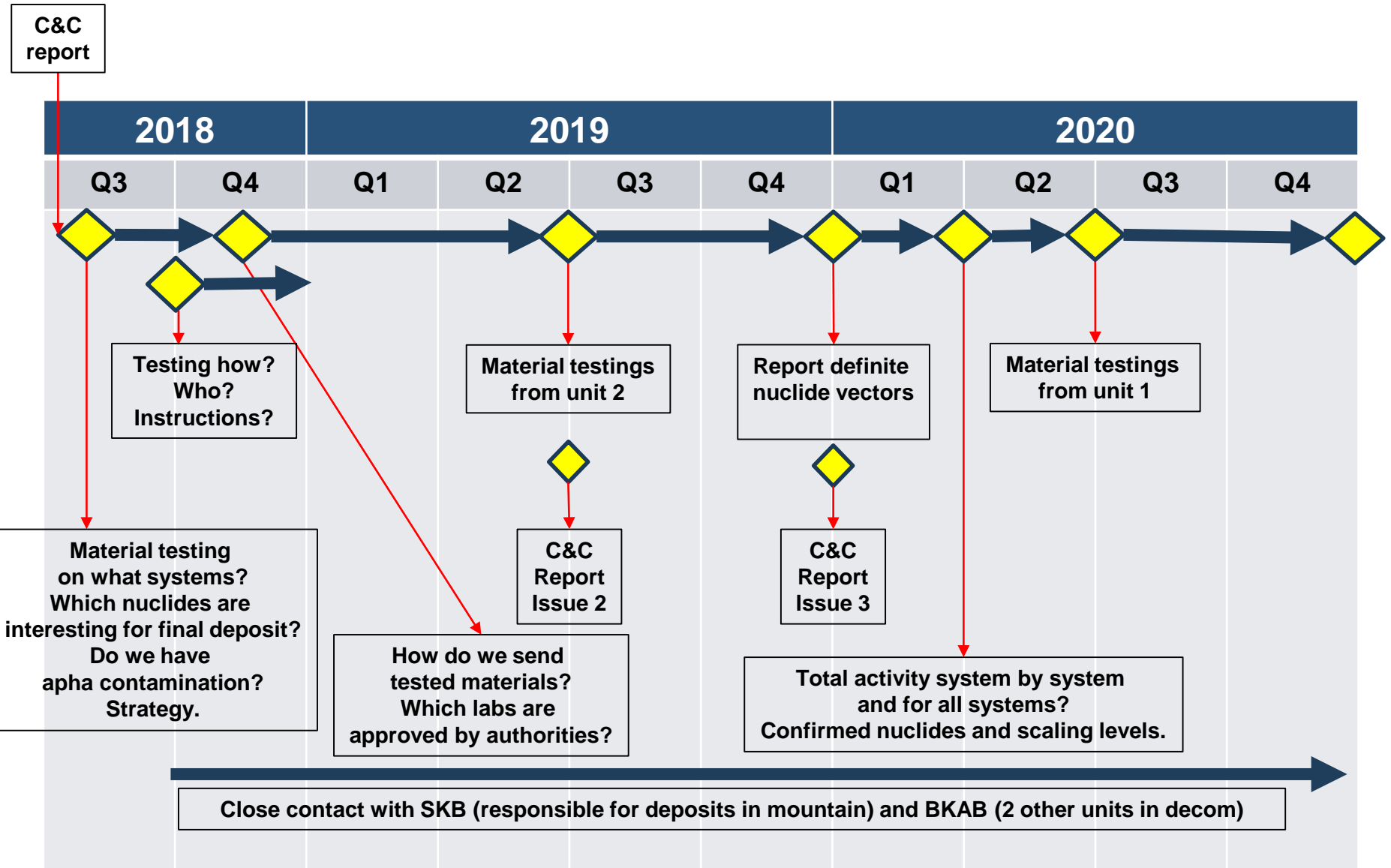
- Risk management
- Radiological PJB
- Verifying
- Complementing

Tagging

- Presorting
- Materials
- Building structure
- Areas

sksklass intern

Time schedule material testing and nuclides

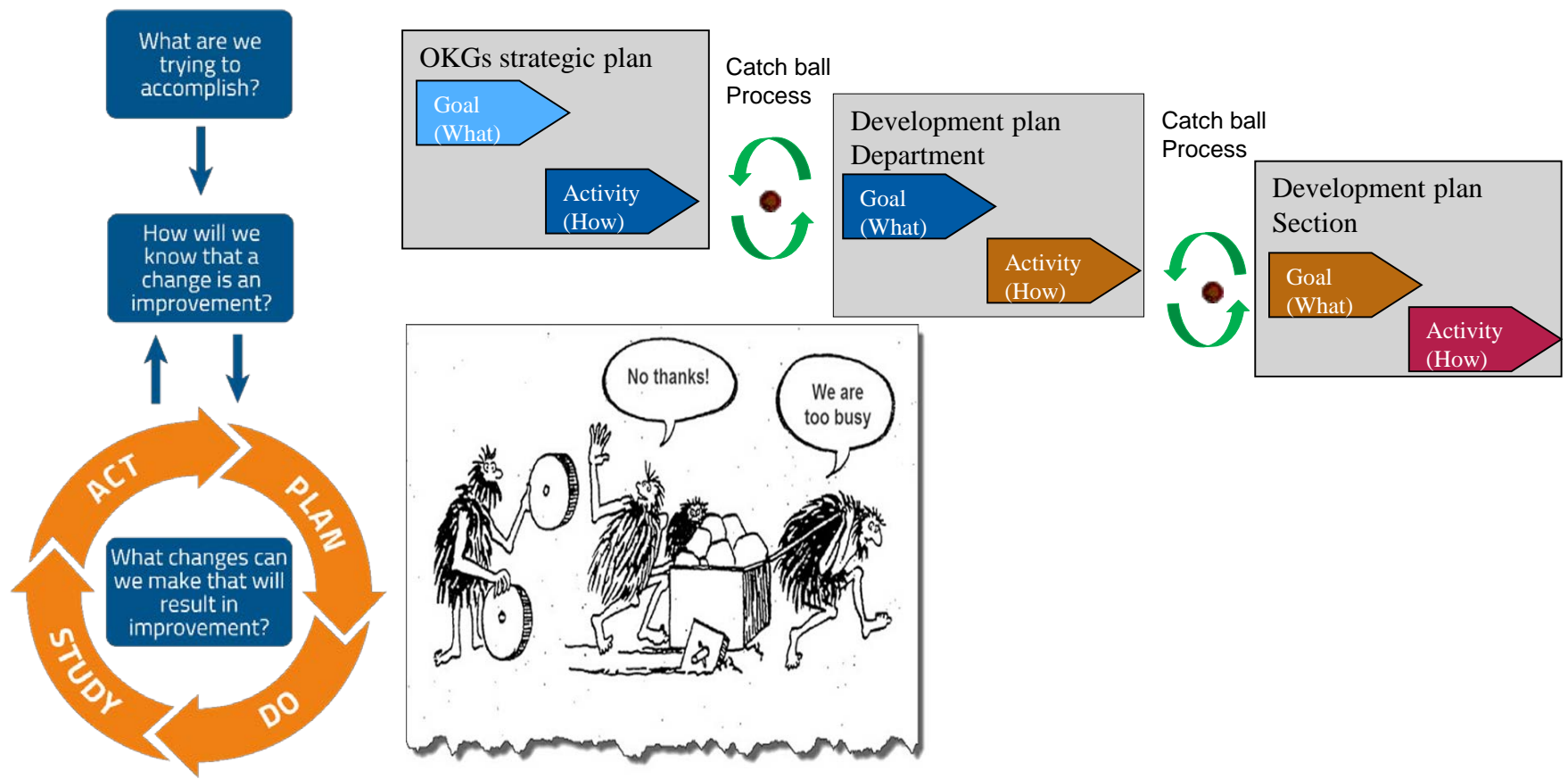


The OKG expectations on Radiation protection performance



Development at OKG:

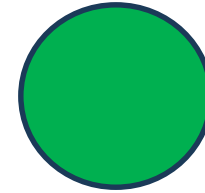
- Cost efficient and flexible business
- Continuous improvement within HSSE
- Continuous improvement of Nuclear Safety
- Responsible and cost efficient decommissioning
- Safe and competitive production



Outcome and effects:

DLM V38

- Contamination alarms. 6 p, 1,2 %.
- Passages PCM: 505 p
- Man hours O1: 232 h
- Man hours O2: 372 h
- Full body measurements: None.
- RP rounds done: 100%.
- Highest individual dose year: 3,8 mSv.
- Highest individual dose week: 0,13 mSv.
- Collective dose week O1: 0,69 mmanSv.
- Highest dose/permit: 0,15 mmanSv.
- Collective dose week O2: 1,01 mmanSv.
- Highest dose/permit : 0,73 mmanSv



Activities:

- Work in reactor pool unit 2
- No transports of spent fuel at the moment

Benefits:

- No spread of contamination.
- No dose above OKG-limit.

Concerns:

Do next:

- Cutting of control rods.
- Segmentation of internal parts unit 2.

Outcome/effects:

Follow up, accidents and near misses dep A

1. **Accident/near miss to be reported to managers within hours after the event.**
2. **Handling in CAP-system within 30 days.**

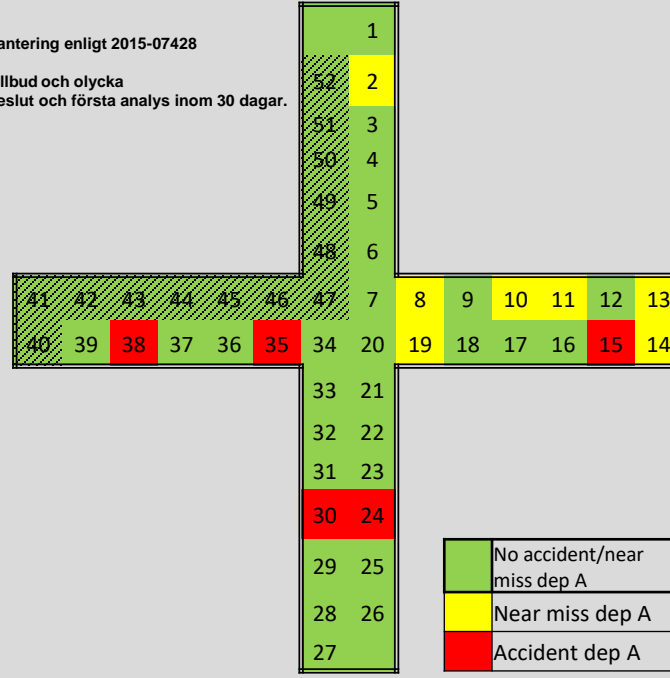
Olycka Aj!
Inträffad händelse under arbetstid som resulterat i personskada eller ohälsa.

Tillbud Oj!
Inträffad händelse under arbetstid som kunde lett till en olycka men tack vare rådigt ingripande eller lyckliga omständigheter inte gjorde det.

Riskobservation Vänta nul!
En observerad situation/omständighet/förhållande/beteende som skulle kunna resultera i en olycka.

Vidtagna åtgärder: **Q4**

Hantering enligt 2015-07428
Tillbud och olycka
Beslut och första analys inom 30 dagar.



Vidtagna åtgärder:

Olycka. Slog i huvudet i ett ställningsrör OAVF. 62366 AS
Olycka V35, ojämn beläggning östra snugggrund 63168. G/IT.
Olycka V35. Slog huvudet i hjältmhylla omkl rum. 63446, THB
Olycka klingbyte SERIN. 63595 AG
Olycka skärskada, 64788, AS

Q3

Q1 Vidtagna åtgärder:

Tillbud 2018-01-09. Fel ventil avgränsades, SAFE 53951. ADU
Tillbud 2018-02-21. Mat/dryck på kontrollerad sida. SAFE 55968.
Tillbud 2018-03-09. Backventil acetylen. SAFE 57460. ADU.
Tillbud 2018-03-15. Avlopps rör, rivning ställning. SAFE 57872.
Tillbud 2018-03-28. Skanning utan SKYD/ABT Wetwell . SAFE 58488.

Vidtagna åtgärder:

Tillbud 2018-04-06. Lossning motorblock SERIN. 58991.
Olycka 2018-04-10. Blånagel Urflästning SERIN . SAFE 5896.
Tillbud V19. SAFE 59899. Flaga lastbärare TB. 2018-05643.
Olycka SAFE 61312. Snubblat skoskydd/ställning TB. AS.

Q2

Activities:

- Overall expectations for a safe work environment is communicated within dep A.
- Safety coaching is being done i segmentation of internal parts.

Benefits:

- Continuous follow up of work environment and risks.
- Work in progress to be ready for D&D.
- At least 2 managers on every security check. Good!

Concerns:

- How to find out about every accident and near miss within hours?

Do next:

- Reporting of accidents and near misses within hours is under formation.
- Handling of accidents and near misses in CAP is OK.
- Information to all managers about how to do after an accident/near miss.

Outcome/effects:

Categorization of radiological event:

- Instruction for radiological event try outs.
- Event in yellow are categorized as near miss and red are accidents.

Actions:

Q4

Q1 Actions:

Actions:

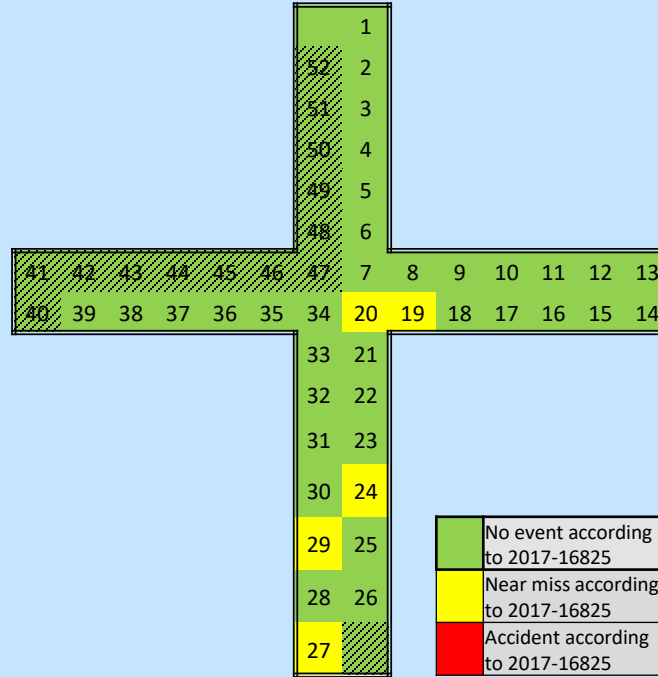
V27 kontaminationslarm över 3 %
V29 SAFE 62546.
Kontaminerade durkplåtar från 244 till CSV

Actions:

Tillbud V19. SAFE 59899.
Flaga lastbärare TB. 2018-05643.
V20 kontaminationslarm 3,2%.
Över OKG:s målvärde för larm.
V24 kontaminationslarm över 3 %

Q3

Q2



Green	No event according to 2017-16825
Yellow	Near miss according to 2017-16825
Red	Accident according to 2017-16825

Activities:

- Segmentation of internal part unit 2.
- Develop awareness on risks in D&D.

Benefits:

- Collective dose during period is under budget unit 1 and unit 2.
- Risk handling process is being implemented.

Bekymmer/Risker:

- Shiftwork at reactor hall unit 2.
- Fuel handling unit 1.

Do next:

- Continuous work in decreasing PCM-alarms. Dialog with the groups with the most alarms

Tabell 5.3.2: Riktlinjer för rapportering samt INES-värdering i kategori 3

		Klass	SC/SSF cGS/cAS cGS3	VD/cS/cG/ VHI/CHK	SSM/andra myndigheter	Uniper/ TH	INES- värdering	WANO- rapportering
1	Kategori	3A	Skyndsamt	Skyndsamt	Skyndsamt	Inom 1 vecka	Ja	Ja
		3B	Skyndsamt	Nästa arbetsdag	Nästa arbetsdag	Nästa ERF-möte	-	Ja
2	Kategori	3C	Nästa arbetsdag	-	Årsrapport (persondos)	-	-	-
		3D	Nästa arbetsdag	Inom 1 vecka	Inom 1 vecka	Nästa ERF-möte	Överväg	Ja
3	Kategori	3E	Nästa arbetsdag	Inom 1 vecka	Inom 1 vecka	Nästa ERF-möte	Överväg	-
		3F	Inom 1 vecka	-	Årsrapport (ALARA)	-	Överväg	-
4	Kategori	3G	Inom 1 vecka	-	-	-	Överväg	-
		3H	Nästa arbetsdag	Inom 1 vecka	Inom 1 vecka	Nästa ERF-möte	-	Ja
5	Kategori	3I	-	-	-	-	-	-
		3J	-	-	-	-	-	-
6	Kategori	kontaminationszon						
		funktionskontroll för instrument för strålningsövervakning						
7	Kategori	Annan signifikant strålskyddshändelse						



Outcome/effects:

Individual dose

- Follow up every month dep A

Individual dose year top 10 dep A.

Limit at OKG 10 mSv
Action plan to be set 6 mSv
Internal goal dep A 4mSv

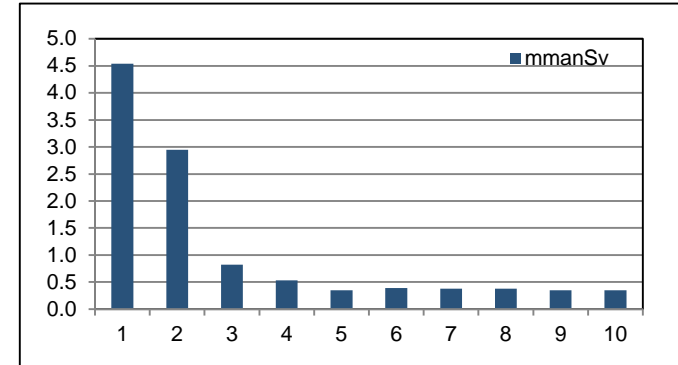
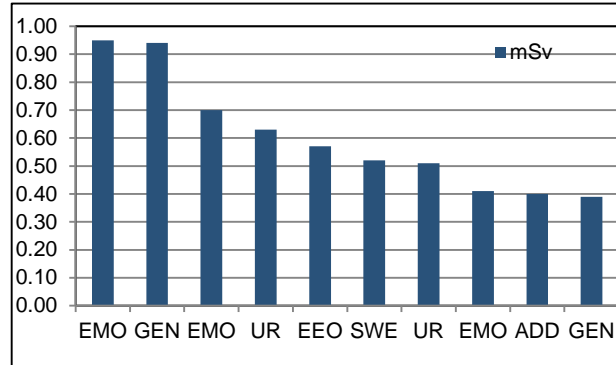
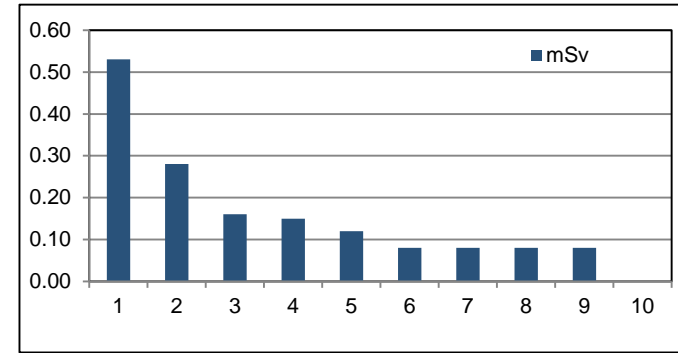
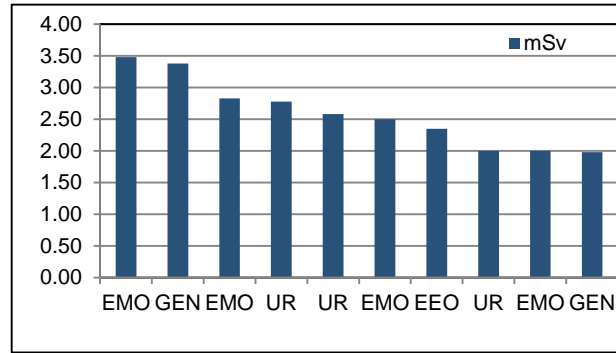
Daily individual dose top 10 dep A.

Limit at OKG 1.0 mSv.
Planning value: 3.0 mSv
Action plan at 2,4 mSv

Monthly individual dose top 10 dep A.

Planning value 6,0 mSv
Action plan at 4 mSv

Top 10 permit doses per month dep A



Activities:

- Individual dose under OKG limits.
- Persons with the highest dose are working with segmentation of internal parts. All planned.

Benefits:

- Good ALARA-work in segmentation to reduce dose.

Concerns:

- Follow segmentation when they handle hotter objects.

Do next:

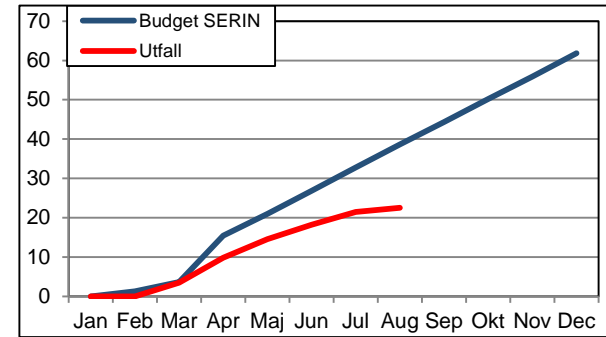
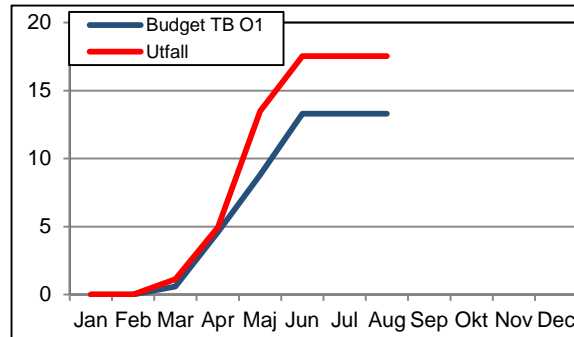
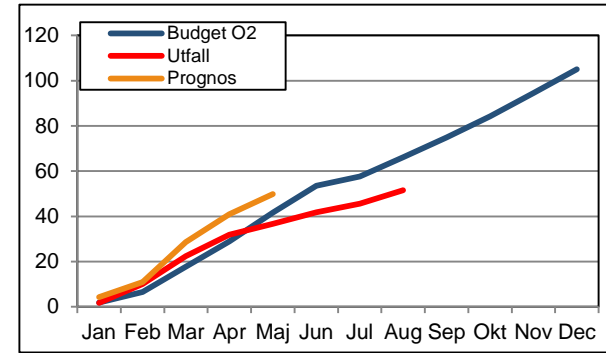
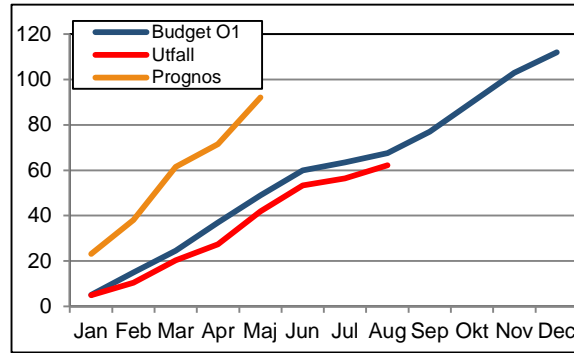
- Continuous follow up



Outcome/effects:

Collective dose

- For all work packages we do a separate dose budget and ALARA-plan.
- Handled the same way as outages 4 month before and 4 weeks before start.
- Follow up every month



Activities:

- Shift work in reactor halls at the same time as outage on unit 3.

Benefits:

- Segmentation under dose budget.

Concerns:

- Collective dose outcome for fuel handling is above unit 2. Worse water quality and hotter fuel in unit 1.

Do next:

- Follow up on collective dose.



Outcome/effects:

Spread of contamination

- Follow up every month.

PCM alarms unit O1 and unit O2.

Alarms per sub section/section
 Inner PCM

PCM alarms unit O1 and unit O2.

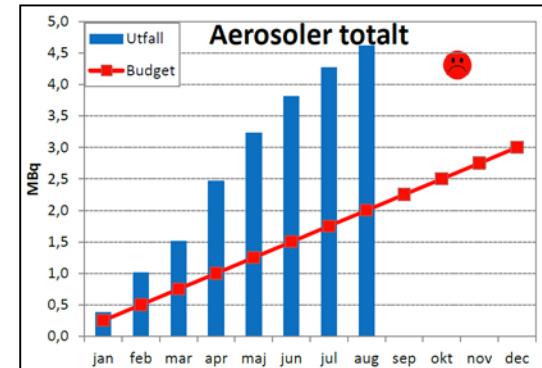
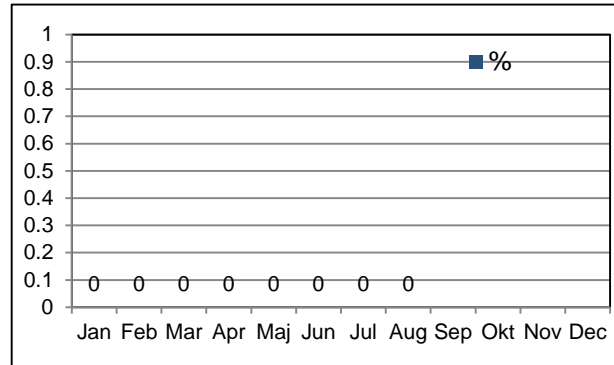
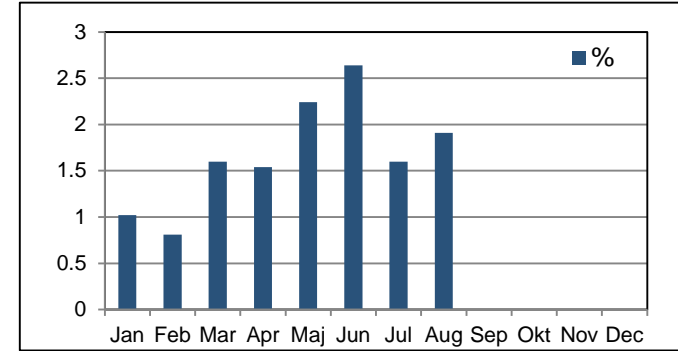
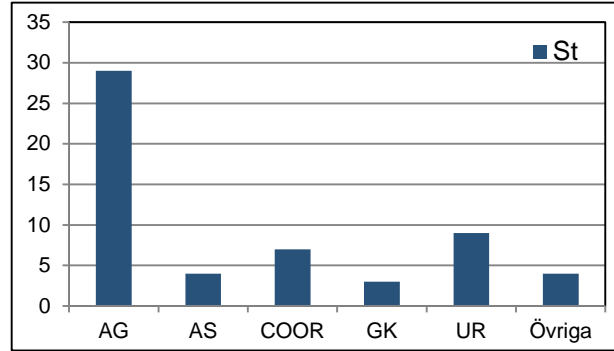
% inner PCM
 Target OKG 3% and for dep A 1%.

Spread of contamination blue areas

Smear tests above limit.

Discharge to water and air

- Follow up every month.
- Values above budget but well below limits.



Activities:

- Focus on number of PCM-alarms per month and group.

Benefits:

- No spread of contamination outside barriers.

Concerns:

- 3 groups need attention. Meetings are scheduled this fall.
- Discharge to air and water are over budget. Budget is very low.

Do next:

- Dialog about PCM-alarms.
- No activities on discharge to water and air.



Outcome/effects:

Internal dose

Follow-up full body measurement.

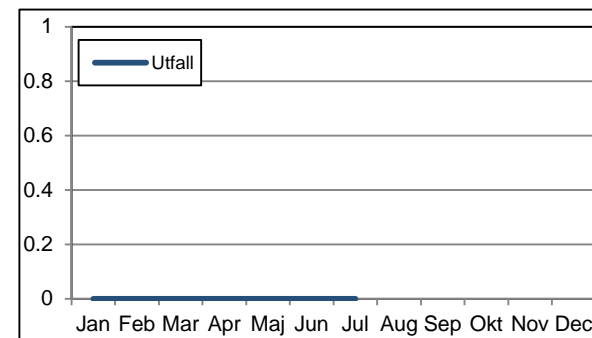
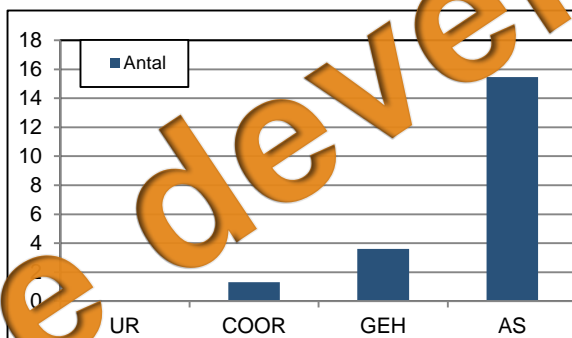
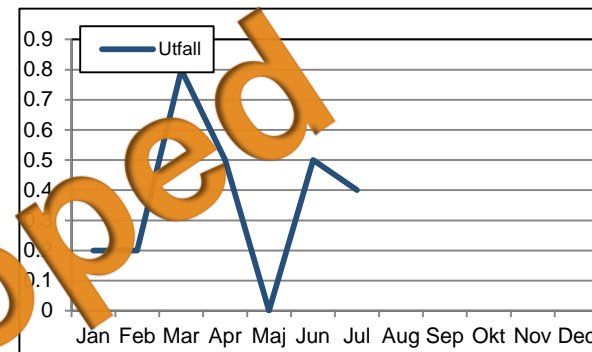
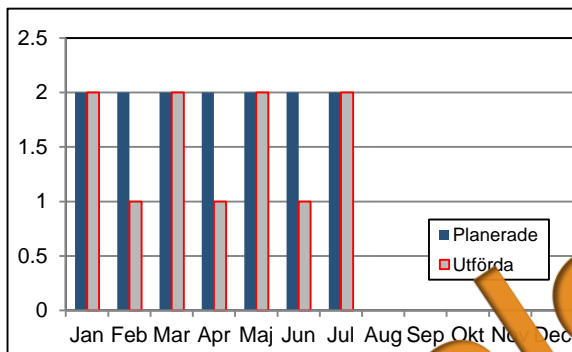
No of planned measurements
 No accomplished measurements
 Target 100%

Outcome from measurements

Above limit to C-dis. 0,25 mSv?

Chosen work/group

Event resulting in measurements



To be developed

Activities:

- ???

Benefits:

- ???

Concerns:

- ???

Do next:

- ???

To be developed

RP challenges/expectations

How do we get everybody to be aware of and take responsibility for their own RP?

Questions?

