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)

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

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

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

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

Free release
- Extremely ow 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

Physical measurements, inventory

Physical measurements
- Risk management
- Radiological PJB
- Verifying
- Complementing

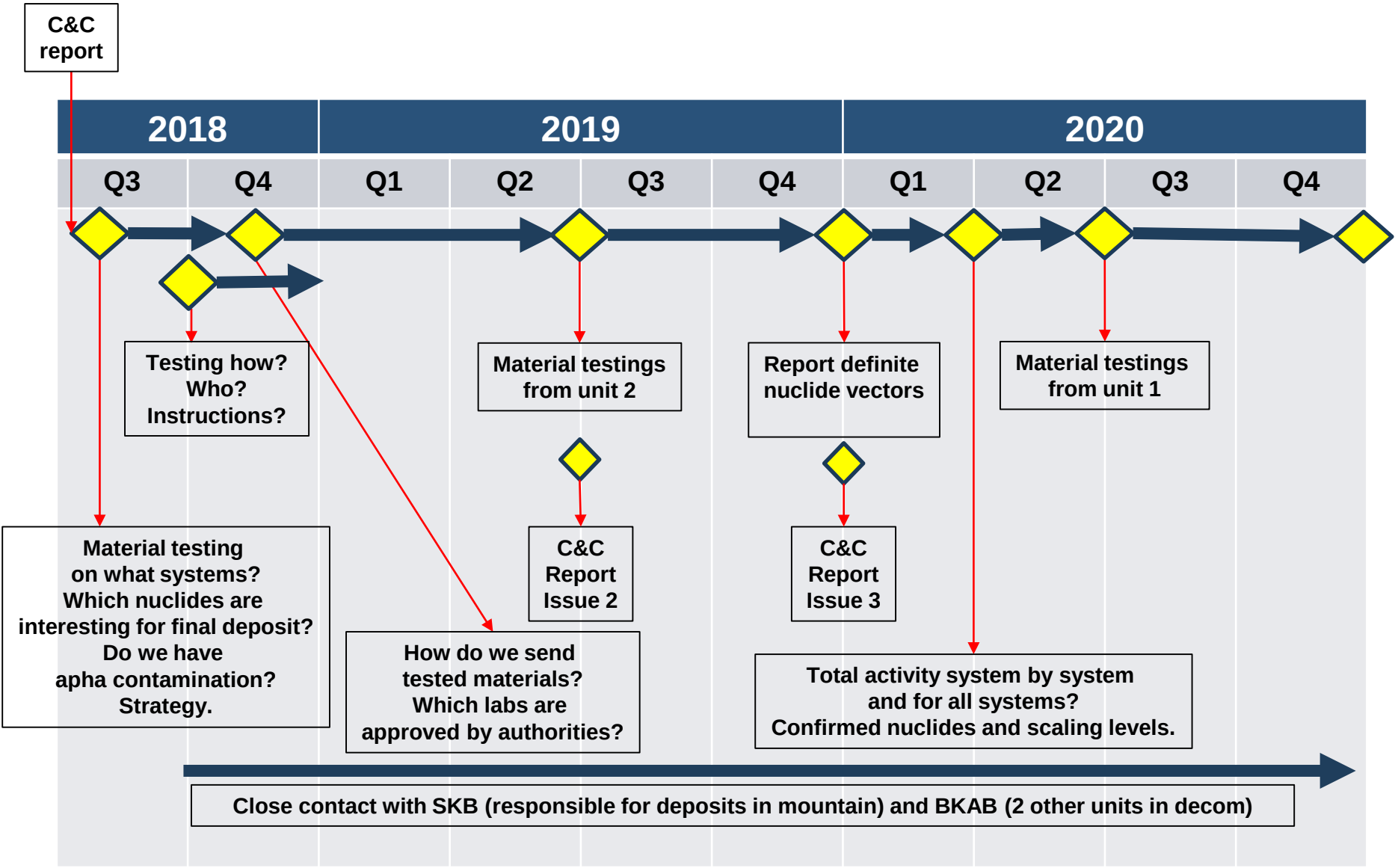
Tagging
- Presorting
- Materials
- Building structure
- Areas

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

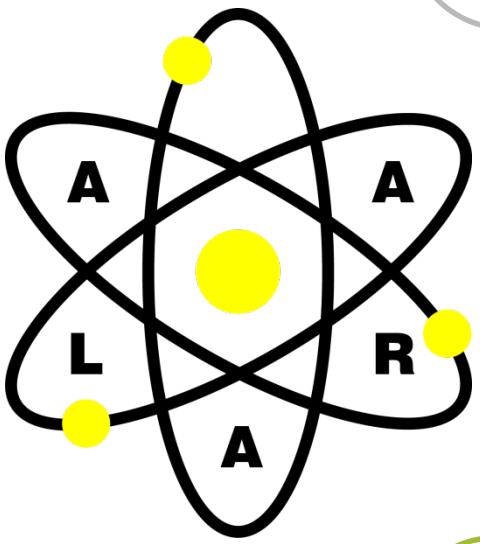
Categorization report
- Waste track
- Waste logistics
- Plan for backend
- Categorization, ELR mm
- Volumes for backend
- Evaluation analysis, approving
- PJD for next WP

D&D

Time schedule material testing and nuclides



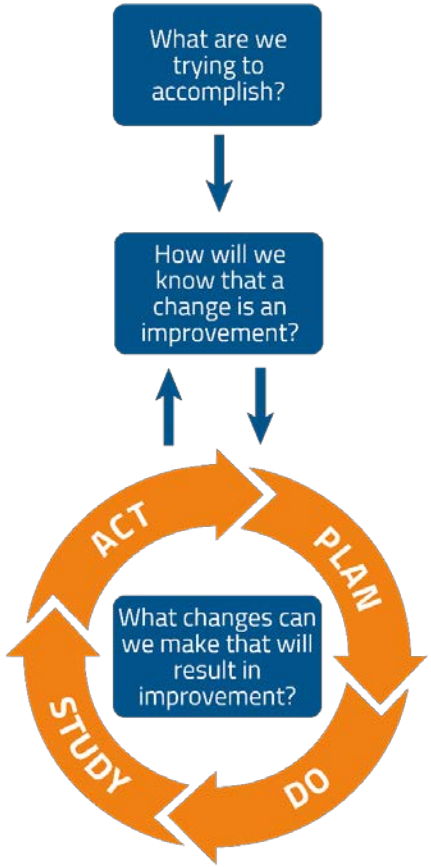
The OKG expectations on Radiation protection performance

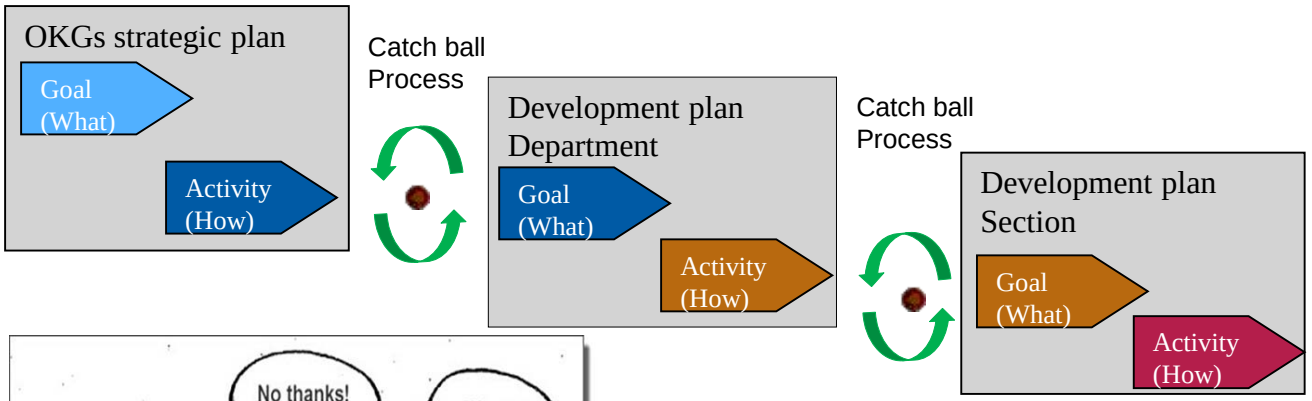


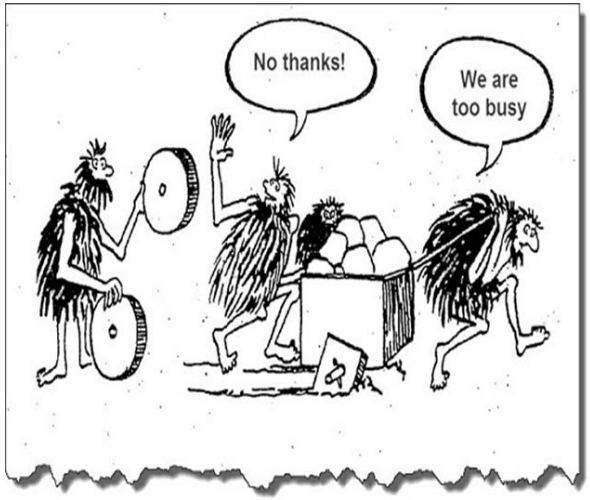
- Preparations & radiological conditions
- Time, distance, shielding
- Stop if you are unsure
- You are responsible for your own radiation protection

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







Responsible *JGV* **Period**: *V39*

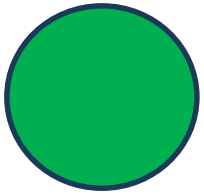
Weekly RP assessment

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.

Responsible *JGV* **Period**: *V39*

HSSE safety cross

Outcome/effects:

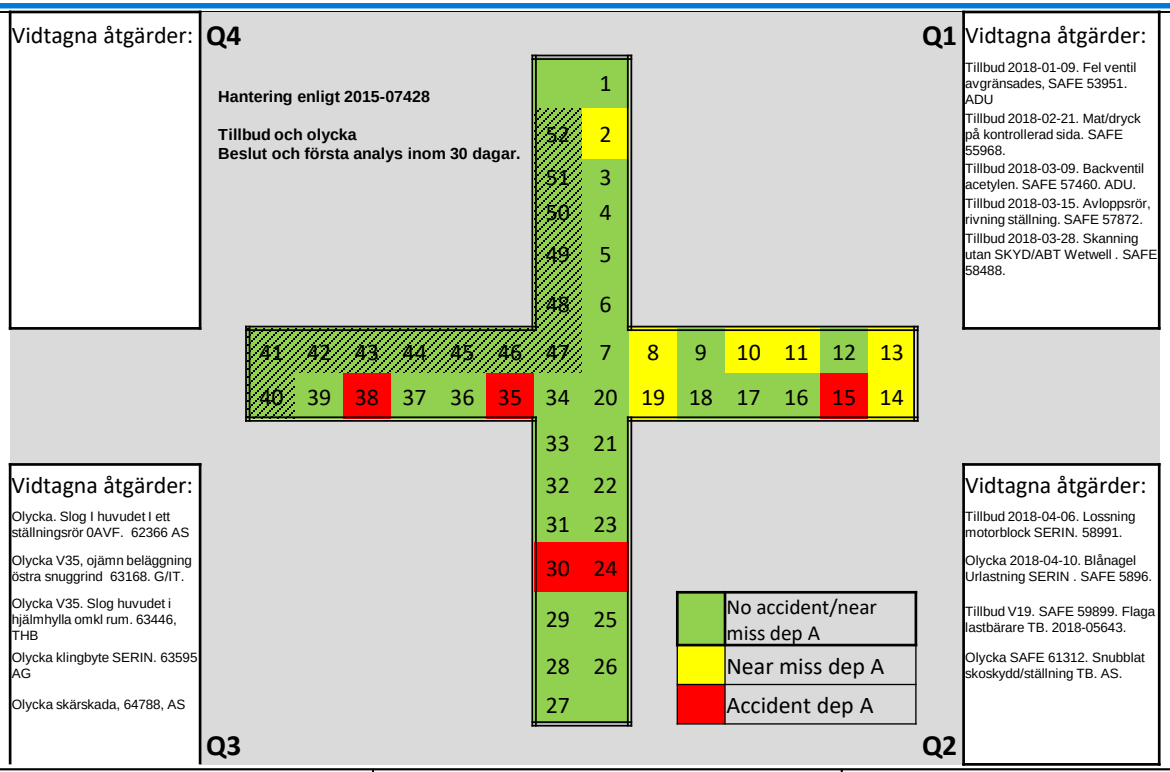
Follow up, accidents and near misses dep A

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



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.

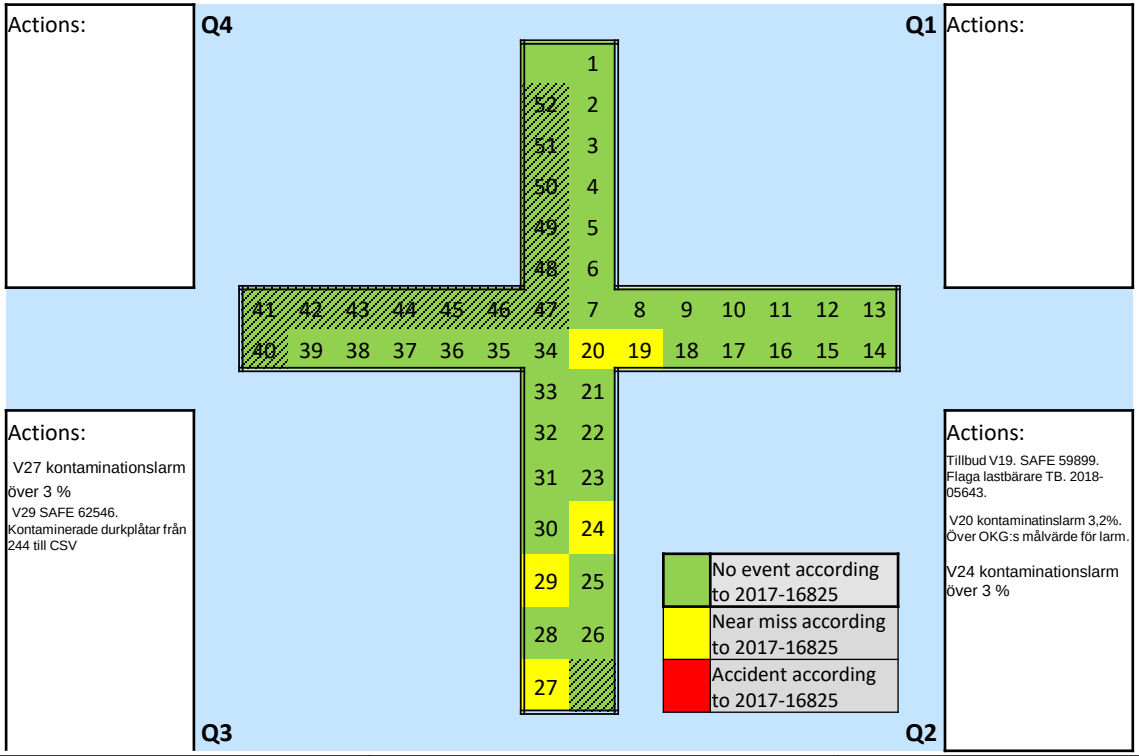
Responsible *JGV* **Period**: *V39*

Radiological event

Outcome/effects:

Categorization of radiological event:

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



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

Radiological event

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
3A	Skyndsamt	Skyndsamt	Skyndsamt	Inom 1 vecka	Ja	Ja
3B	Skyndsamt	Nästa arbetsdag	Nästa arbetsdag	Nästa ERF-möte	-	Ja
3C	Nästa arbetsdag	-	Årsrapport (persondos)	-	-	-
3D	Nästa arbetsdag	Inom 1 vecka	Inom 1 vecka	Nästa ERF-möte	Överväg	Ja
3E	Nästa arbetsdag	Inom 1 vecka	Inom 1 vecka	Nästa ERF-möte	Överväg	-
3F	Inom 1 vecka	-	Årsrapport (ALARA)	-	Överväg	-
3G	Inom 1 vecka	-	-	-	Överväg	-
3H	Nästa arbetsdag	Inom 1 vecka	Inom 1 vecka	Nästa ERF-möte	-	Ja
3I	-	-	-	-	-	-
3J	-	-	-	-	-	-

funktionskontroll för instrument för strålningsövervakning

10 Annan signifikant strålskyddshändelse

Responsible *JGV*

Period: *August 2018*

Dose

Outcome/effects:

Individual dose

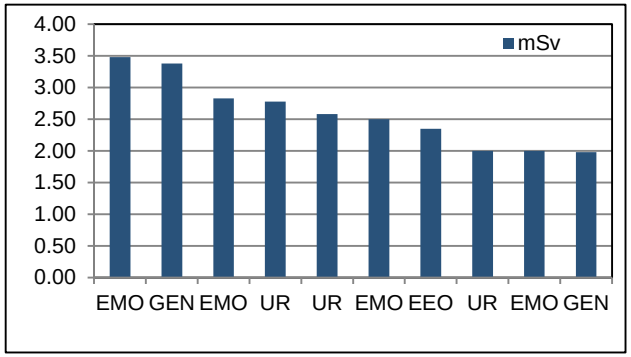
- Follow up every month dep A

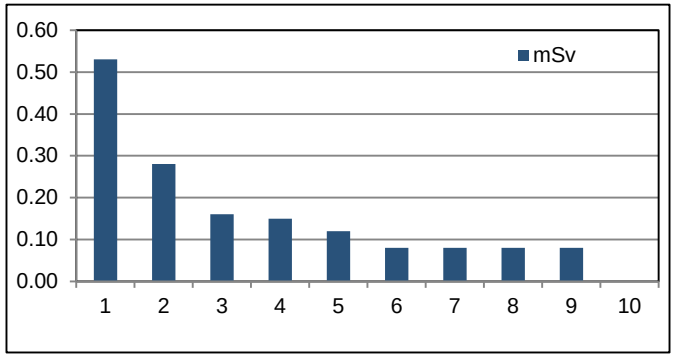
Individual dose year top 10 dep A.
Limit at OKG 10 mSv
Action plan to be set 6 mSv
Internal goal dep A 4mSv

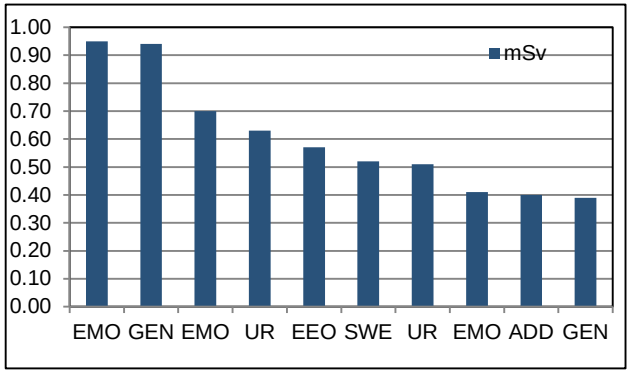
Daily individual dose top 10 dep A.
Limit at OKG 1.0 mSv.
Planning value: 3.0 mSv
Action plan at 2,4 mSv

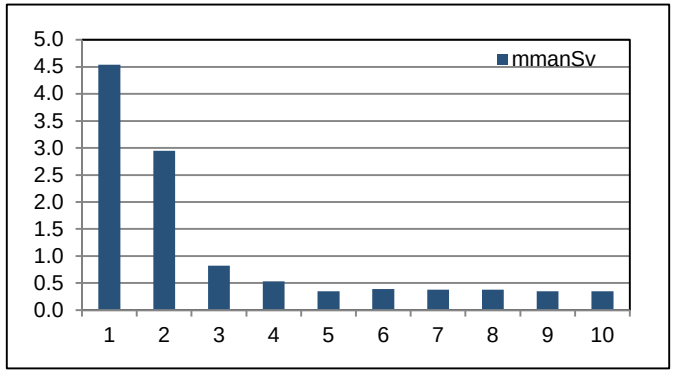
Monthly individual dose top 10 dep A.
Planning value 6,0 mSv
Action plan at 4 mSv

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

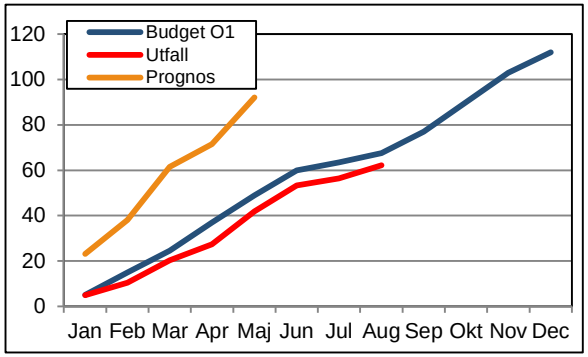
Responsible **Period**:
JGV *August 2018*

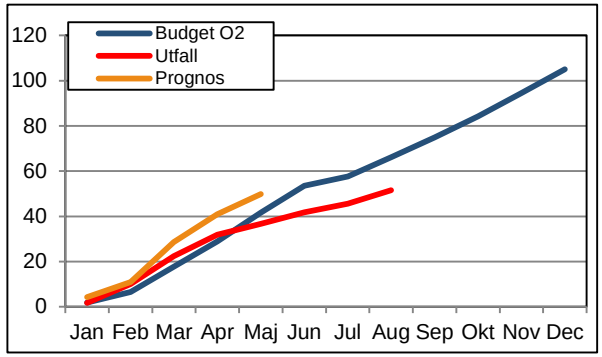
Dose

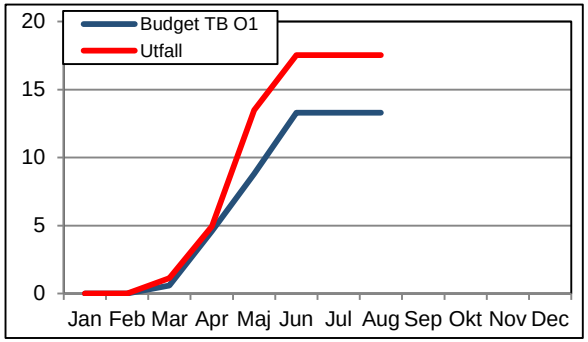
Outcome/effects:

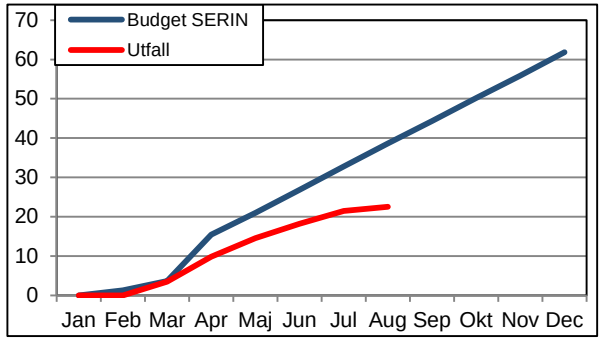
Collective dose

- 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.

Responsible *JGV* **Period**: *August 2018*

Contamination

Outcome/effects:

Spread of contamination

- Follow up every month.

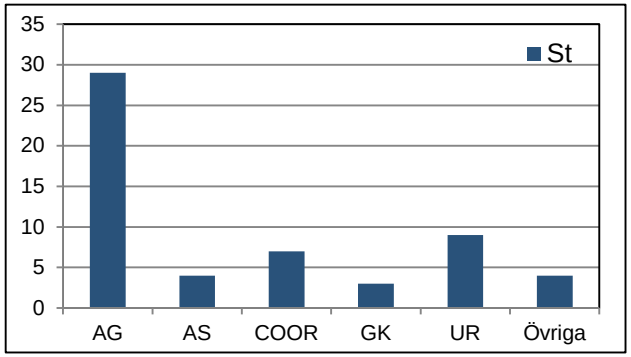
PCM alarms unit O1 and unit O2.
Alarms per sub section/section
Inner PCM

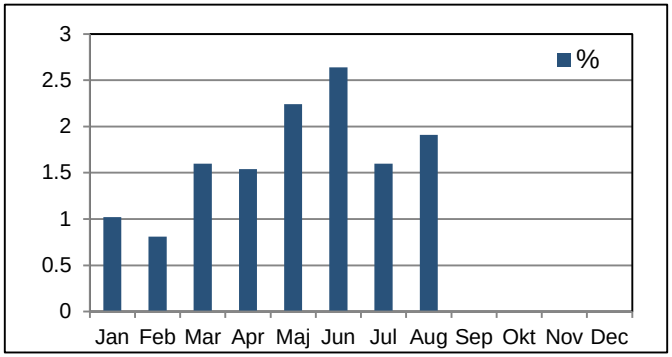
PCM alarms unit O1 and unit O2.
% inner PCM
Target OKG 3% and for dep A 1%.

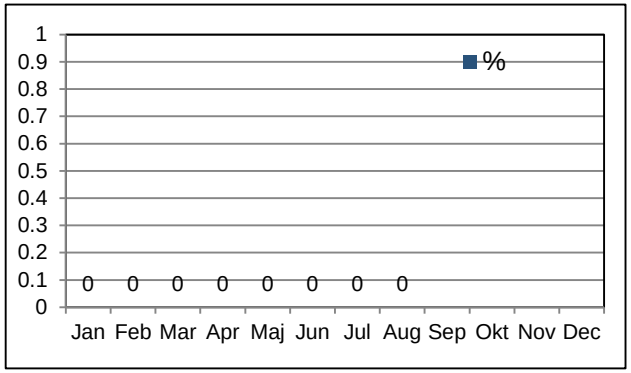
Spread of contamination blue areas
Smear tests above limit.

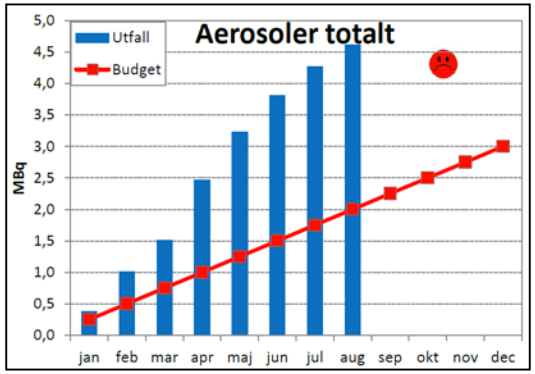
Discharge to water and air

- 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.

Responsible *JGV*

Period: *August 2018*

Dose

Outcome/effects:

Internal dose

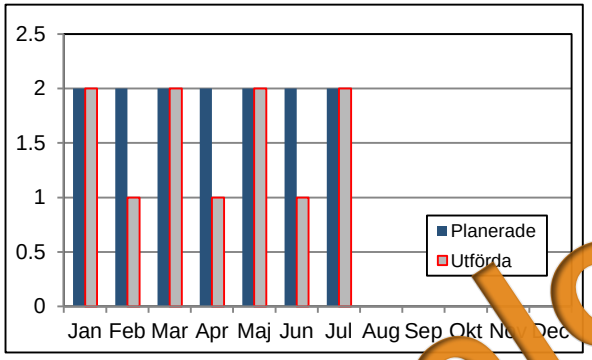
Follow-up full body measurement.

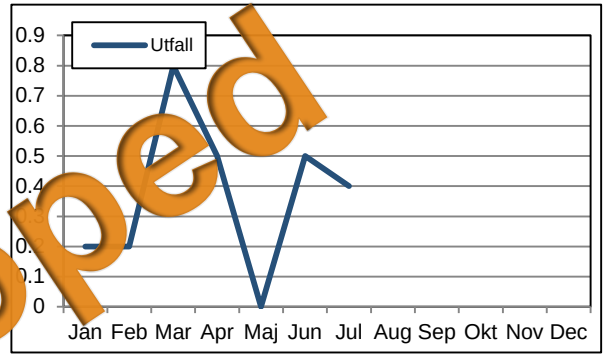
No of planned measurements
No accomplished measurements
Target 100%

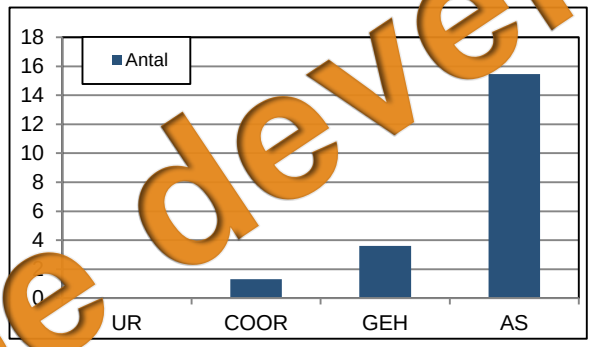
Outcome from measurements
Above limit to C-dis. 0,25 mSv?

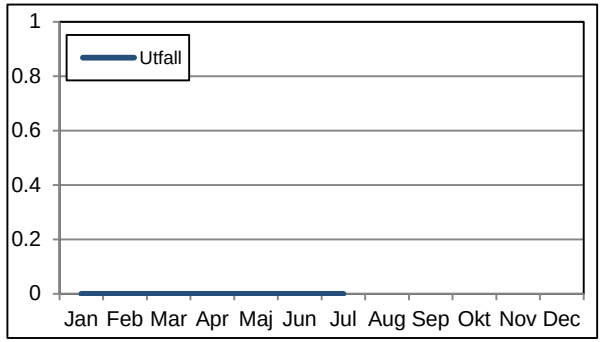
Chosen work/group

Event resulting in measurements









Activities:

- ???

Benefits:

- ???

Concerns:

- ???

Do next:

- ???

RP challenges/expectations

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

Questions?