European Organization for Nuclear Research - Organisation européenne pour la recherche nucléaire

EN Engineering Department

Update on the PSB Heating system removal

Risks and intervention proposal

21.11.2017

Gabor Petrika EN-CV

Scope:

- Heating system removal

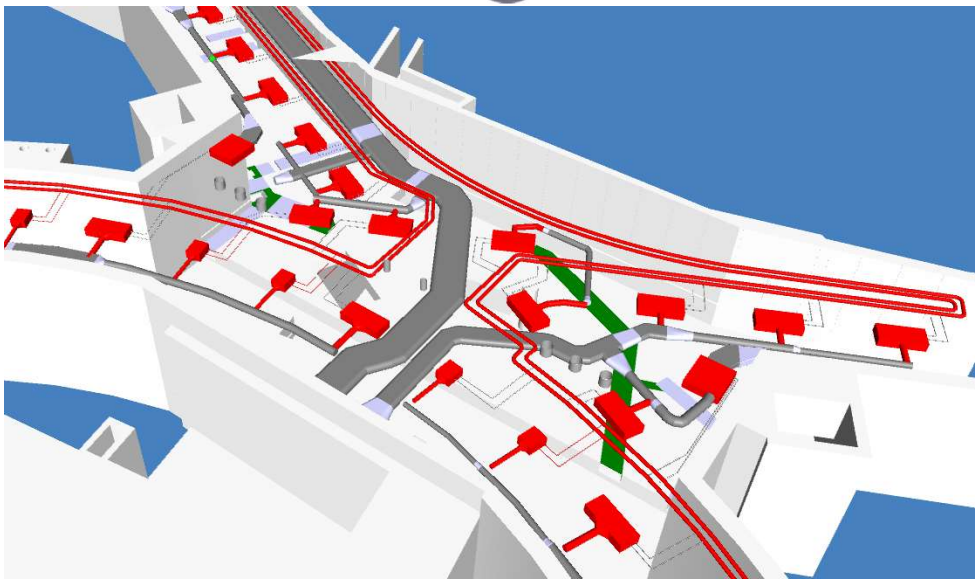
(terminal units, pipes, valves)

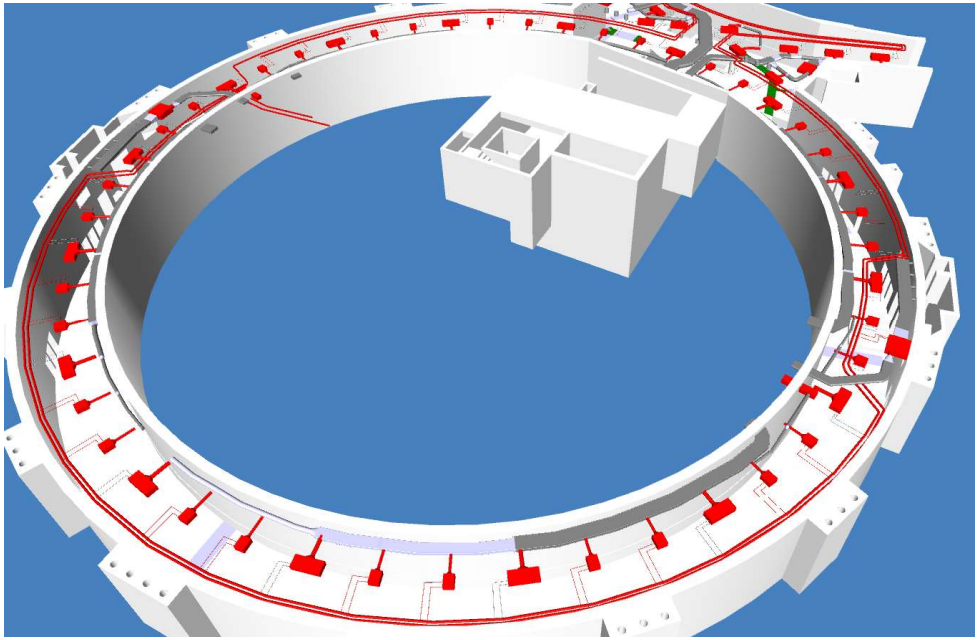
Progress report:

- Pre-VIC ☑
- 3D integration ☑
- Risk analysis ☑
- Access / Machine protection

  → **11.2017**

- WDP → **11.2017**





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PSB Heating system removal

- Overview
- Risks - Dust
- Risks - Water
- Risks – Radiation and asbestos
- Risks – Access and machine protection
- Areas and Workload
- Proposed intervention

Risk analysis - Heater Unit removal in the PSB (YETS 2017-18)

Nr	Risk description	Preventive countermeasures	Protective countermeasures	Probability	IMPACT and RISK LEVEL (with properly implemented countermeasures)		
					HSE - General safety	HSE - RP	Impact on the machine & auxiliary
1.1	**Spread of dust;** accumulated on the surfaces of objects to be manipulated and removed. (Possibly activated dust)	· Cleaning the surfaces prior the intervention. (cleaning)Using vacuum cleaners and tissues provided by RP · Prior the works dust sampling and RP test	· PPE / FFP2 · Covering the machine with plastic foil/sheets.	Likely	**Moderate ACCEPTABLE**	**Moderate ACCEPTABLE**	**Moderate ACCEPTABLE**
1.2	**Spread of dust;** caused by the manipulation of pipe insulations.	· Minimise the amount of insulation removed on-site. · During the insulation removal using vacuum cleaners provided by RP.	· PPE / FFP2 · Covering the machine with plastic foil/sheets.	Likely	**Moderate ACCEPTABLE**	**Moderate ACCEPTABLE**	**Moderate ACCEPTABLE**

Impacts:

- Pre-intervention cleaning
- RP sampling/test
- Post-intervention cleaning
- Machine protection
- Dedicated team to waste handling and insulation removal

Risk analysis - Heater Unit removal in the PSB (YETS 2017-18)

Nr	Risk description	Preventive countermeasures	Protective countermeasures	Probability	IMPACT and RISK LEVEL (with properly implemented countermeasures)		
					HSE - General safety	HSE - RP	Impact on the machine & auxiliary
2.1	**Water dripping;** remained in the hydraulic network. (contaminated water)	· Emptying the network carefully. (With compressed air.) · Collecting the water properly.	· Covering the machine with plastic foil/sheets. · PPE · Using vacuum cleaners approved to remove water provided by RP.	Very likely	**Insignificant ACCEPTABLE**	**Low ACCEPTABLE**	**Low ACCEPTABLE**
2.2	**Water spill;** remained in the hydraulic network. (> 0.1 lit.) (contaminated water)	· Closing pipes, immediately after disconnection. · Using trays for cutting pipes and disconnecting the units. · Water sampling and RP test.	· Collecting the water properly. · Using vacuum cleaners approved to remove water provided by RP.	Possible	**Insignificant ACCEPTABLE**	**Low ACCEPTABLE**	**Moderate ACCEPTABLE**

Impacts:

- RP sampling/test
- Waste handling (Water)
- Machine protection

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3	**Spread of asbestos;** present at the duct connections in the ventilation system.	· **N/A** The presence of the asbestos in the ventilation duct`s joints was confirmed by HSE. · Minimise the quantity of asbestos contaminated waste.	· Remove the parts containing asbestos together with the adjacent parts w/o splitting the joints. · Sealing the asbestos containing parts with tape. · Collect the waste separately.	Unlikely	**Moderate ACCEPTABLE**	**N/A**	**N/A**
6	**Radiation dose** (the intervention shall be conducted shortly after machine run)	· Reducing time in "hot" areas. · Working with multiple teams. · WDP · Work organisation, starting with less critical spots.	· Dose monitoring.		**N/A**	**Moderate ACCEPTABLE**	**N/A**

Impacts:

- Waste handling
- Sealing asbestos

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4	**Falling objects**; terminal units, pipes, etc. to be removed and tools used for the removal.	· Anchoring tools and removed parts to the platform above the critical areas.	· Human presence below the working platform not allowed. · Installing a scaffolding platform to provide access to the ceiling area and protection for the machine.	Possible	**Moderate ACCEPTABLE**	**N/A**	**N/A**
5.1	**Accidents via manipulation and transport of parts; structures, scaffolding etc. Using SCAFFOLDING**	· Scaffolding installed, manipulated and dismantled by specialists · No simultaneous works during scaffolding activities	· Respecting the instruction	Likely	**Moderate ACCEPTABLE**	**N/A**	**Moderate ACCEPTABLE**
5.2	**Accidents via manipulation and transport of parts; structures, scaffolding etc. Using MOBILE PLATFORM**	· CE marked platform · Training for platform handling	· Respecting the instruction of the platform manual	Possible	**Moderate ACCEPTABLE**	**N/A**	**Low ACCEPTABLE**

Impacts:

- Scaffolding installation – only in the transfer area possible
- Mobile platform – available during LS2
- Nacelle – very limited area

During YETS: only transfer zones

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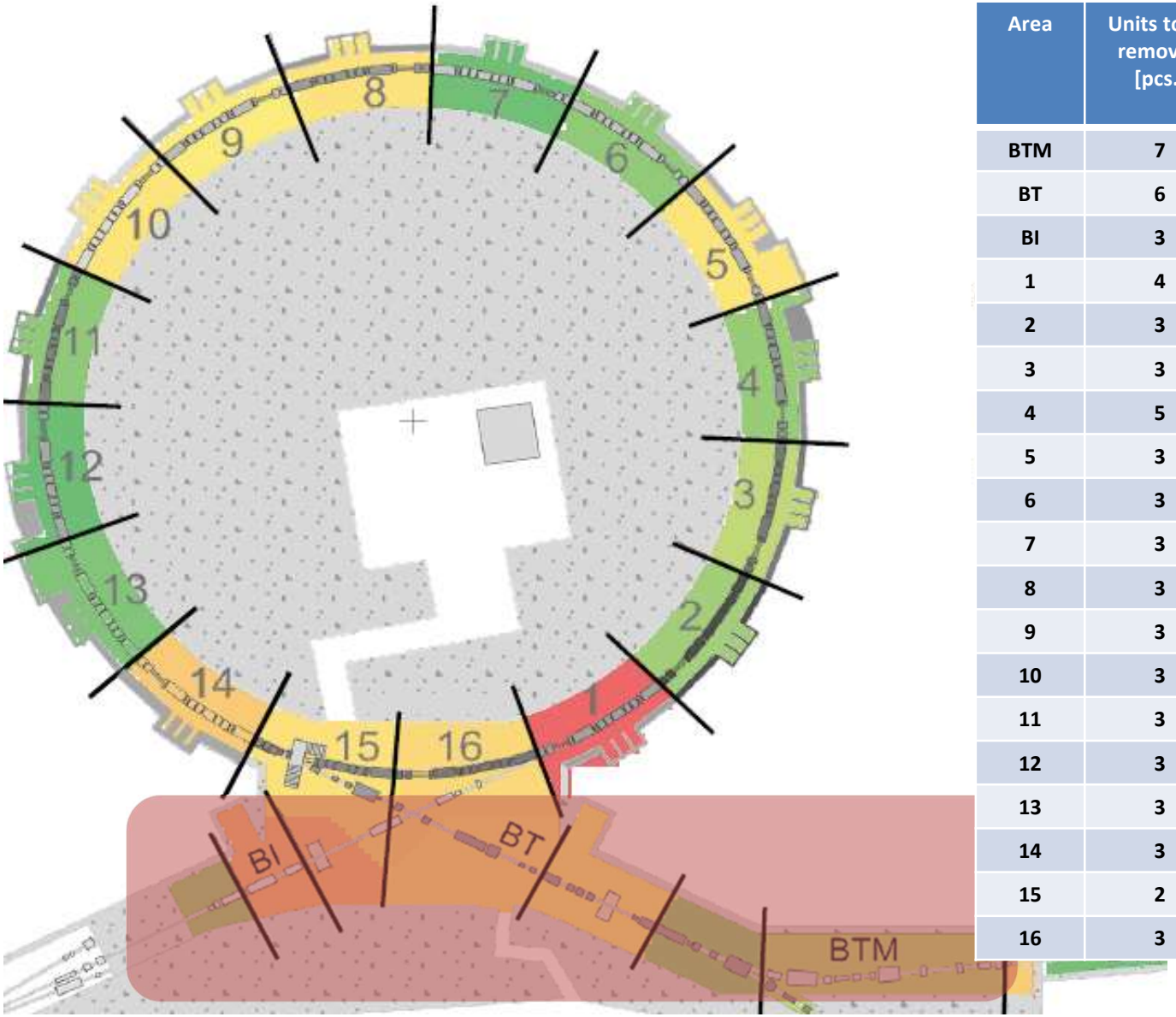

Area	Units to be removed [pcs.]	Piping to be removed [m]
BTM	7	130 + 15
BT	6	95 + 25
BI	3	60 + 10
1	4	20 + 20
2	3	20 + 15
3	3	20 + 15
4	5	20 + 10
5	3	30 + 15
6	3	20 + 15
7	3	20 + 15
8	3	20 +15
9	3	20 +15
10	3	20 + 15
11	3	20 +15
12	3	30 + 15
13	3	30 + 15
14	3	20 + 15
15	2	30 +
16	3	20 + 15

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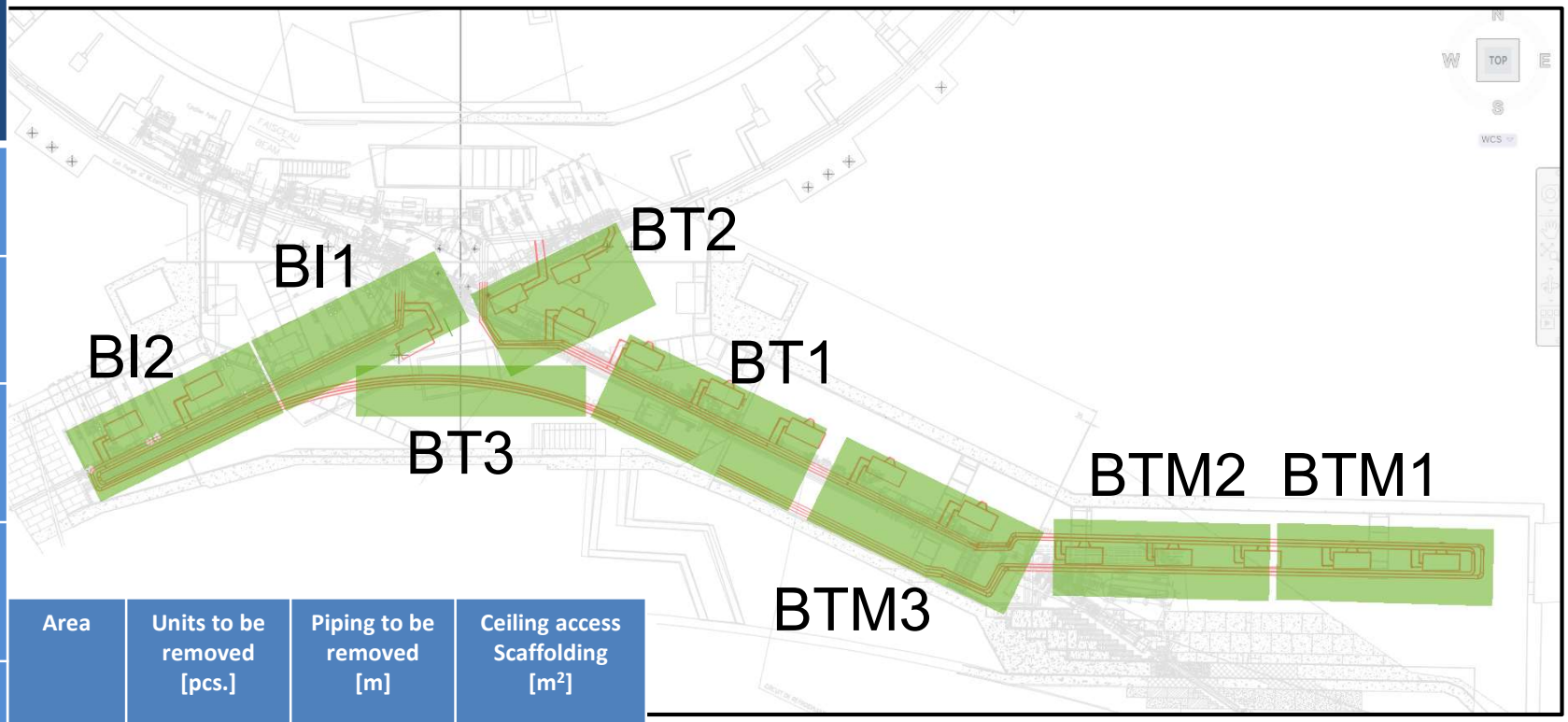
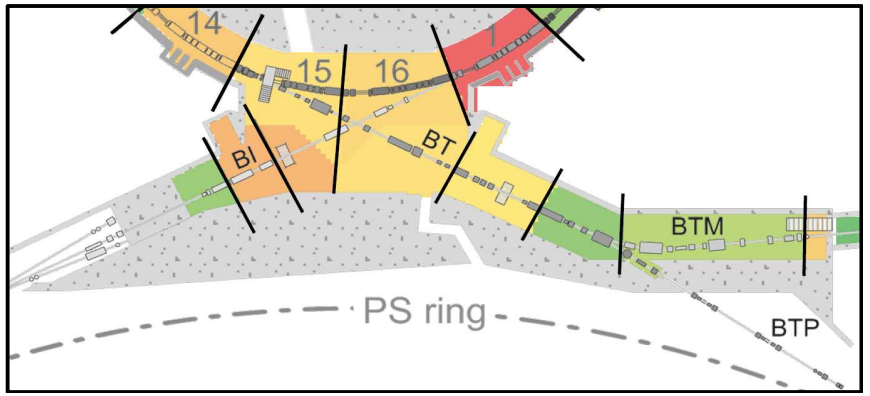


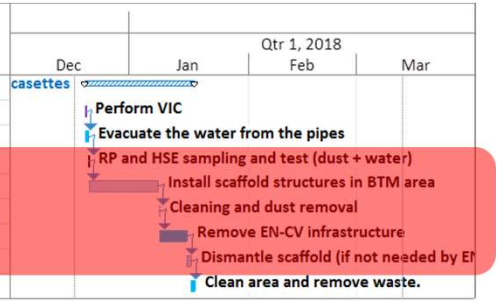
Area	Units to be removed [pcs.]	Piping to be removed [m]	Ceiling access Scaffolding [m²]
BTM1	2	40 + 4	25
BTM2	3	40 + 6	25
BTM3	2	50 + 4	30
BT1	3	40 + 6	30
BT2	3	30 + 15	25
BT3	-	25	20
BI1	1	20 + 5	25
BI2	2	40 + 4	25



		OPTION 1.	OPTION 2.	
YETS	Transfer area removal	6 / 16	16 / 16	[%]
	Ring removal	0 / 50	0 / 50	[%]
	Duration	2	6	[weeks]
	Access / Protection	Scaffolding	Scaffolding	-
	Staff	6	16	[persons]
LS2	Transfer area removal	10 /16	0 / 16	[%]
	Ring removal	50 / 50	50 /50	[%]
	Duration	**9**	**7**	[weeks]
	Access / Protection	Mobile platform	Mobile platform	-
	Staff	10	10	[persons]
Total	Total duration	11	13	[weeks]
	Total workdays	510	830	[person x day]
	Risk to the machine	Lower	Higher	-

PSB Heating system removal

ID	% Complete	Task Name	Duration	Start	Finish	Groups	Cons	Pred	Planning Contact
120	0%	**Removal of obsolete cooling pipes and heating casettes**	**10.5 days**	**20/12/201**	**17/01/201**	**EN-CV**	**No**		G. Petrika
121	0%	Perform VIC	2 hrs	20/12/201	20/12/201	EN-ACE	No		C. Bedel
122	0%	Evacuate the water from the pipes	0.5 days	20/12/201	21/12/201	EN-CV	No	121	G. Petrika
123	0%	RP and HSE sampling and test (dust + water)	2 hrs	21/12/201	21/12/201	HSE-RP	No	122	G. Dumont
124	0%	Install scaffold structures in BTM area	2 days	21/12/201	08/01/201	EN-EA	No	123	G. Canale
125	0%	Cleaning and dust removal	0.5 days	08/01/201	08/01/201	SMB-SIS	No	124	D. Chameaux
126	0%	Remove EN-CV infrastructure	5 days	09/01/201	15/01/201	EN-CV	No	125	G. Petrika
127	0%	Dismantle scaffold (if not needed by EN-EL)	1 day?	16/01/201	16/01/201	EN-EA	No	126	G. Canale
128	0%	Clean area and remove waste.	1 day?	17/01/201	17/01/201	EN-CV	No	127	G. Petrika



Schedule constrains:

- Scaffolding availability
- Co-activities