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MICE Oversight Committee

October 4th 2016

Project Manager's Report

Hall Infrastructure

Air Conditioning

- Repair of 2 air conditioning units in MICE Hall.
- Installation of fifth air-conditioning unit.
- Repair of RR2 air conditioning units

Cooling Water

- Commissioning of additional external chiller in MICE 'loading bay' to provide fail-over safety.
- Shutdown, re-configuration, and re-commissioning of roof based cooling system.
- Separation of cooling systems for superconducting and warm magnet systems.
- Commissioning of new warm magnet water system
  - controls and monitoring - integration to Epics system
  - shakedown in progress, requires fine tuning.

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Controls & Monitoring

- increased protection to operator error in both the spectrometer solenoid and focus coil systems.
- operating procedures have been written for FC magnet and are near completion for SS magnets.
- improved quench protection for the spectrometer solenoids including compensation for voltages induced by the ramping of the FC magnet.
    - allows time correlation of all superconducting magnet current excursions in the Epics controls and monitoring system for quench propagation determination after a trip event.
- Addition of a 'spike catcher' feature to the quench logging to allow the capture and study of events below the Qd trip threshold – this to aid diagnosis of signals seen on the SS voltage tap connections during running.
- improved quench logging for FC magnet system.

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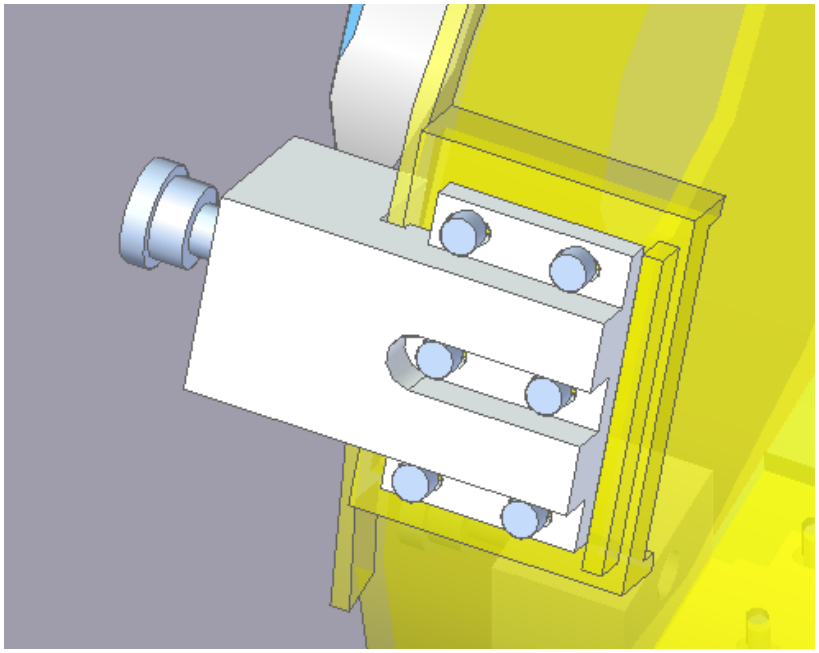
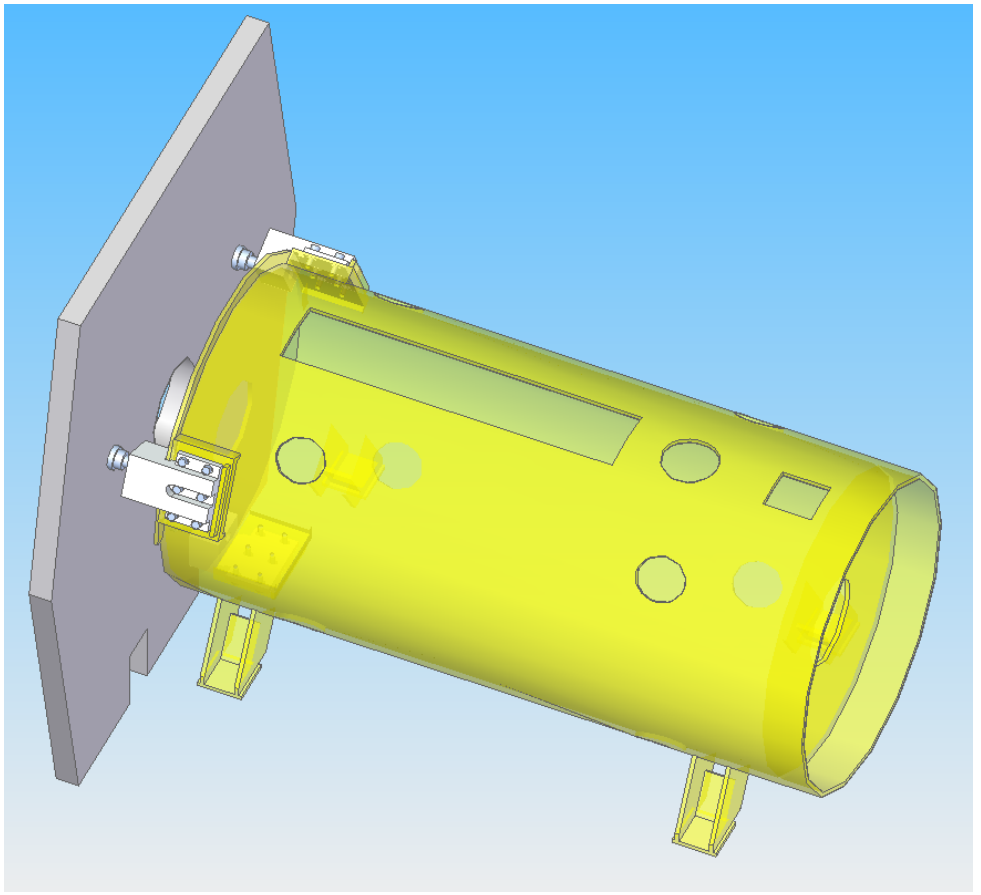
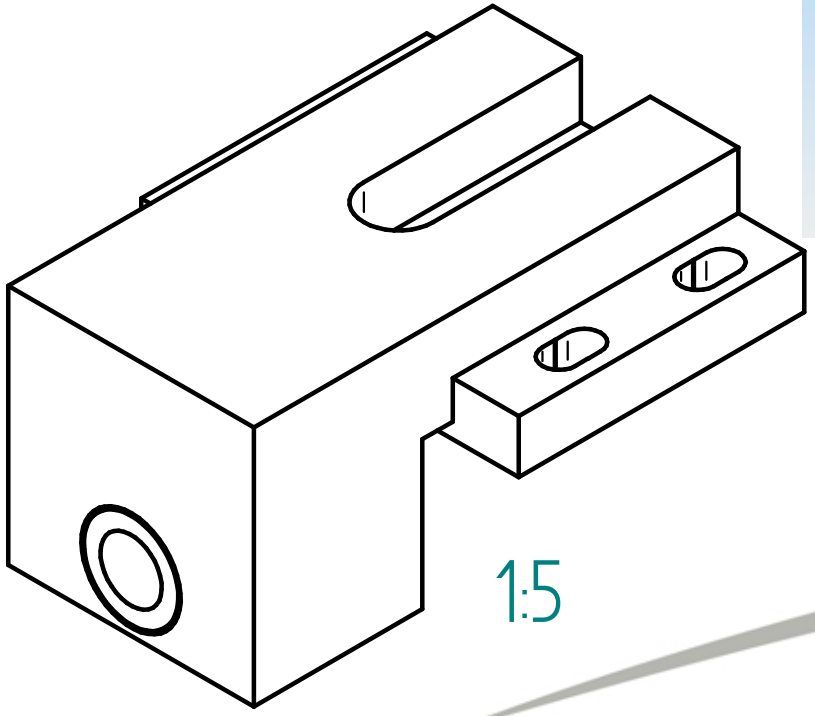
Spectrometer Solenoids

- Magnet string successfully operated at 3T nominal inter-magnet forces up to 9T
  - FC performing well – no issues
  - SSU performing well – QD upgraded
  - SSD – Intermittent noise source on SSD QD system
    - currently OK – easily monitored
  - Trim power supplies currently not in use – controls issues under active investigation. Considering internal change to supplies or change of supply for fully floating output.

- PRY/magnet movement
  - Verified by 'survey' at field
  - Working to design OVC – PRY brace – J Tarrant.







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Decay Solenoid

- Annual refrigeration plant service
- Annual compressor service
    - New 'air-end' – Concerns over rising operating temperature
    - Persistent leak after service
      - Traced to intermittent leak at shaft seal of 'air-end' – only leaks when compressor is running and even then not all the time – hard to leak check.
    - HPC (service agents) agreed to replace seal – now completed.
      - We required consultant Jorge Jungst on site to assist
    - Now leak tight and cooling down.
    - HPC to pursue Kaeser re their supply of 'new' air end with leak

- Decay solenoid requires 10 days + leak check/cleaning time before restart of operations – expect Ready date 12th October 2016.

- Mitigated by 'Pion' beam settings – higher rate.

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Liquid H2

Liquid H2

- All sensor and control connections verified and corrected.
  - New hermetic Fischer connector.
  - Cernox connections corrected and verified.
  - Temperature sensors verified.
- FC bolted to floor for stability.
- Improvement to thermal performance completed.
- FC end caps installed – leak found
  - waiting on correct lift gear – expected 3rd October 2016.
- H2 system leak tight.
- R9 chiller re-commissioned and cryo-coolers plumbed and operational.
- Move to hall planned Jan 2017.

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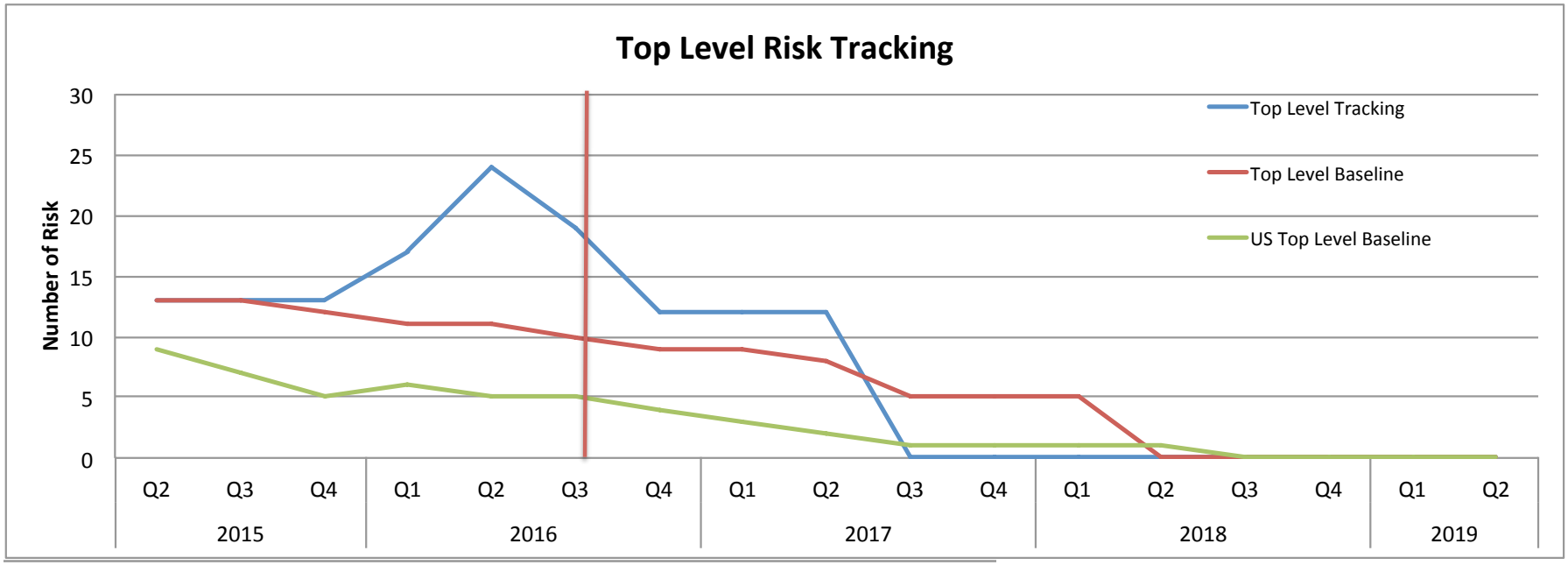
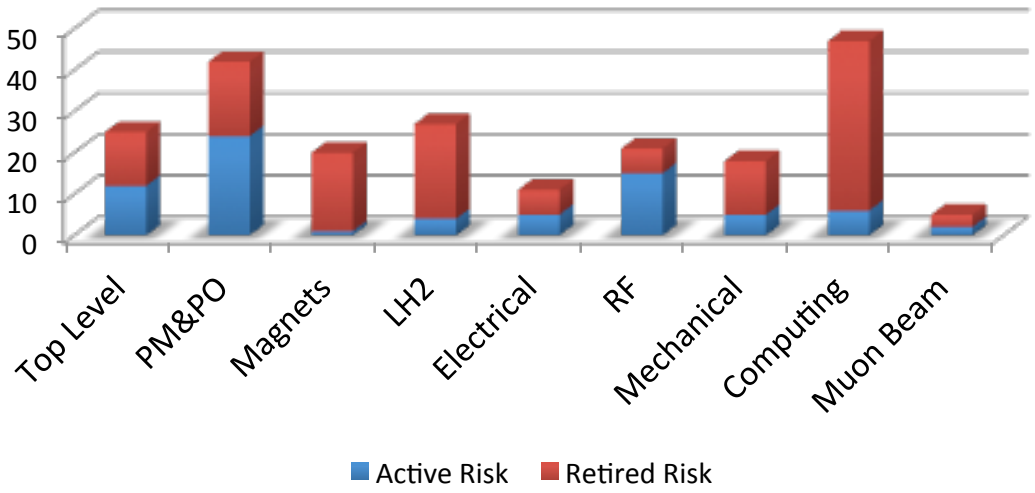
Active Risk	**12**
Retired Risk	**13**

ID	Risk Description	Potential impact on project	Risk score			Ownership	Proposed Action	Post-action risk score			Comment / Conclusion
			L	I	LxI			L	I	LxI	
MICE 3	Magnetic field effecting operation of electrical equipment relating to the continued operation of the cooling channel magnet systems and detectors.	Inability to operate the cooling channel	5	5	25	MICE - UK / MAP	Installation of a partial return yoke has mitigated the major risk. Movement of the control and power supply equipment to a dedicated room outside of the magnetic field.	1	4	4	Much work has been completed and provision of additional rack room has enabled the majority of the sensitive equipment to be moved away from the hall. The PRY has not yet been installed and so has not been tested, the residual risk still applies. Significant investment from UK and US to mitigate risk has been expended. Non staff risk persists in the event of additional material being required.
MICE 4	Extended period of re-training for the lattice of magnets for Step IV - SS1/AFC/SS2.	Timescales for the training period, cost of the amount of LHe required to carry out the training the availability of the Lhe. Expert personnel required to be available for magnet operations over a protracted period of time.	4	5	20	MICE-UK / MAP	Discussions with BOC (or supplier) to agree delivery timescales and availability during heavy use periods. Magnet integration task force to define commissioning method to keep schedule and cost to a minimum.	4	4	16	Each re-cool and fill of the Spectrometer Solenoid can take upto 500l LHe, AFC remebers it's training. Each full lattice quench could cost in the region of £7K. Initial investigations with BOC show that the predicted amount of LHe will be available during the commissioning period.
MICE 8	Resourcing issues from the STFC and national labs	inability to complete significant sections of work on agreed time or cost scales.	4	5	20	MICE - UK / MAP	Realised. Escalation of the issue to the STFC and DOE.	2	4	8	Project scope has changed leading to a different labour profile required to complete the project.
MICE 16	Failure of a Focus Coil Magnet	Internal cold mass or associated equipment deep within the assembly. LTS leads.	3	5	15	MICE UK	Follow all specific operational aspects as defined by the experts for the superconducting magnet	1	5	5	Transportation, dis-assembly, investigation, fix and reassembly would be extreamly costly and extensive with regard to schedule. A spare magnet would be out of the reach of the project. A repair intervention would be 12 months including testing and commissioning and manufacture of new magnet system, test and commission around 2 years.
MICE 17.1	Failure of Upstream Spectrometer Solenoid Magnet	Internal cold mass or associated equipment deep within the assembly. LTS leads.	4	5	20	MAP	New quench protection system	1	5	5	Has the same design issues as SSD, confidence improving with operation and testing with forces.
MICE 19	Failure of M2 in SSD.	Reduction in scientific output and resulting cooling effect.	3	4	12	MICE-UK / MAP	Maximise data collection before running M2.	2	4	8	Consider completing data set for one absorber.
MICE 20	Failure of Helium space feedthrough in SSD.	Reduction in scientific output and resulting cooling effect.	3	4	12	MICE-UK / MAP	Limit number of quenches	2	4	8	
MICE 23	Risk of equipment failure/breakage	Cost of repair/replacement. Time lost during recovery	3	3	9	MICE UK	Spares inventory / proper planned maintenance	3	1	3	to some degree inevitable due to age of equipment
MICE 24	Problems during magnet string commissioning	Further compromise of SSD / Delays to program	3	5	15	MICE UK	Conservative magnet settings.	3	3	9	Always recognised as a challenge - complicated and exacerbated by SSD situation
MICE 28	Inability to cool absorber to required temp	No H2 absorber / reduced science	3	5	15	H2 Group	Heat load modelling/design revision	2	5	10	improvements to heat load design.
MICE 29	Further compromise of SSD performance	Slower data-taking, more remedial action required	3	5	15	MICE-UK / MAP	Power supply improvements, feedthrough heating improvements.	3	5	15	Anomalous earth leakage and noise seen - now absent, but as yet unexplained.
MICE 30	Insufficient international manpower available.	Delay in remediation of non-UK assets and associated reduction in effort on other tasks.	4	3	12	MICE-UK / MAP	Discussion with international management to maximise staff availability.	3	3	9	Long standing issue.

Risk Tracking





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Finance

Non-staff cost summary										
MICE-UK										
1	*Project management and project office*		40.00		40.45					80.45
2	*Mechanical integration*		195.50		101.99					297.49
3	*Electrical Integration*		79.50		66.84					146.34
4			35.00							35.00
5	*Hydrogn Delivery System*		20.00							20.00
6	*RF power*									
7	*Vacuum*		32.20		10.00					42.20
8	*Magnetic Mitigation*		55.00							55.00
9	*Software and computing*		15.00		15.00					30.00
10	*Operations and analysis*		150.00		46.47					196.47
	Non-staff sub-totals		*622.20*		*280.75*					*902.95*
	Non-staff totals		**622.20**		**280.75**					**902.95**
Total staff and non-staff by work package										
MICE-UK										
1	Project management and project office		492.32		268.28		26.06			786.66
2	Mechanical integration		246.72		101.99					348.71
3	Electrical Integration		211.06		66.84					277.90
4			161.89		9.52					171.41
5	Hydrogn Delivery System		51.75							51.75
6	RF power		77.47							77.47
7	Vacuum		54.49		10.00					64.49
8	Magnetic Mitigation		66.32							66.32
9	Software and computing		359.32		415.54		101.64			876.49
10	Operations and analysis		1273.94		1250.74		306.39		149.26	2980.33
	Sub-totals		***2995.29***		***2122.91***		***434.09***		***149.26***	***5701.54***
MICE-UK	**Cost of risk mitigation**		**130.00**		**20.00**					**150**
	Staff element									
	Non-staff element		130.00		20.00					150
	RG, excluded from allocation (£k)		75.32		107.97		15.83			
Income	***Common Fund***		63.00		63.00		63.00		90.00	
Income	***TIARA***		33.00							
	% above allocation		-7%		-36%		-88%		98%	
	Effect of inflation (%)				1%		3%		5%	

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Spend Sheet End August

MICE Forecast for 15/16		Including Overheads	Excluding Overheads	UK Allocation 2015/16		Including Overheads	Excluding Overheads
MICE Phase 2 (Capital)	Reqns / M&O	321.44	321.44	MICE Phase 2 (Capital)	Reqns / M&O	350.00	350.00
	Travel				Travel		
	RAL TD / Othe	350.86	350.86		RAL TD / Other	350.00	350.00
	Adj / Encum	0.00	0.00				
		672.30	672.30			700.00	700.00
MICE Phase 2 (Resource)	Reqns / M&O	284.32	284.32	MICE Phase 2 (Resource)	Reqns / M&O	155.00	155.00
	Travel				Travel		
	RAL TD / Othe	272.96	156.87		RAL TD / Other	398.46	229.00
	Adj / Encum	0.00	0.00				
		557.28	441.19			553.46	384.00
MICE Phase 2 (Ops and Analysis)	Reqns / M&O	106.81	106.81	MICE Phase 2 (Ops and Ana	Reqns / M&O	123.00	123.00
	Travel	118.09	118.09		Travel	20.00	20.00
	RAL TD / Othe	452.50	260.06		RAL TD / Other	246.00	246.00
	Adj / Encum	0.35	0.35				
		677.75	485.30			389.00	389.00
Income		-12.00	-12.00				
	Totals	1,895.32	1,586.79		Totals	1,642.46	1,473.00
	Variance	-252.86	-113.79				
		-15%	-8%				

Against budgets	ocation (ex Ov	Forecast	Varience
MICE Phase 2 (Capital)	700.00	672.30	27.70
MICE Phase 2 (Resource)	384.00	441.19	-57.19
MICE Phase 2 (Ops and Analysis)	377.00	473.30	-96.30
Common Fund income	78.00	0.00	78.00
Total	1539.00	1586.79	-47.79

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