



# Magnetic Field Mitigation Schedule Options

Alan Grant

# Overview

- Option 1
  - Step IV base line schedule - NO PRY (*Partial Return Yoke*)
  
- Option 2
  - Step IV schedule – Spectrometer Solenoids Installed BEFORE PRY



# Option 1 - Step IV base line schedule - NO PRY

## Critical Path

WBS	% Complete	Name	Critical	Finish Date	Risks Level	Risk Impact	Delayed Finish due to Risk Impact	Delay Duration (days)	Fixed Cost
5.1.3.3.3	0.00	Off-Site Manufacture	Yes	08/11/13			08/11/13	0	0
5.1.3.3.4	0.00	Contractor Start Date	Yes	20/12/13			20/12/13	0	0
5.1.3.3.5	0.00	Installation (Incl. Snagging)	Yes	31/01/14			31/01/14	0	0
5.1.3.3	0.35	West Mezz Build & Associated	Yes	04/02/14			04/02/14	0	0
5.1.3.3.6	0.00	Load Test? Inspection	Yes	04/02/14			04/02/14	0	0
5.1.3.3.7	0.00	Sign Off / Complete - milestone	Yes	04/02/14	(RISK)-(R2)	Contractors late completing build of West Mezz	16/03/14	40	0
5.1.3.5.6	0.00	Ground Floor Compressor & Vac Installation	Yes	09/06/14			19/07/14	40	0
5.1.3.5.9	0.00	Compressor water services (incl trench?)	Yes	30/06/14	(RISK)-(R2)	Contractors late completing compressor services	18/09/14	80	0
5.1.3.6.5	0.00	Install Compressor Supports	Yes	07/07/14			25/09/14	80	0
5.1.3.6	0.00	Compressor & Services (feed) Support	Yes	21/07/14			09/10/14	80	0
5.1.3.6.6	0.00	Wire Up Isolators in Stands	Yes	21/07/14			09/10/14	80	0
5.1.3.6.7	0.00	Sign Off / Complete	Yes	21/07/14	(RISK)-(R4)	Contractors late completing compressor services	19/10/14	90	0
5.1.7.5.3.8	0.00	West wall Mezzanine extension finished	Yes	21/07/14			19/10/14	90	0
5.1.3.7.3	0.00	Install Compressors	Yes	04/08/14			02/11/14	90	0
5.1.7.5.3.9	0.00	Install Compressors	Yes	04/08/14			02/11/14	90	0
5.1.7.5.3.1	0.00	Install and terminate local cabling to 3 phase outlets	Yes	18/08/14			16/11/14	90	0
5.1.7.5.3.1	0.00	Install and terminate local controls cabling	Yes	25/08/14			23/11/14	90	0
5.1.7.5.3.1	0.00	Electrical / control commissioning of compressors/vac	Yes	27/08/14			25/11/14	90	0
5.1.7.5.3.1	0.00	Install cable management to Cold heads	Yes	01/09/14			30/11/14	90	0
5.1.7.5.3	0.00	Hall installation	Yes	04/09/14			03/12/14	90	10000
5.1.7.5.3.1	0.00	Install / terminate cold head cables	Yes	04/09/14			03/12/14	90	0
5.1.7.5.3.1	0.00	Compressors ready for Cooling channels tests	Yes	04/09/14	(RISK)-(R2)	Additional design & build of shields	12/01/15	130	0
5.4.7.4	0.00	Cool down spectrometer	Yes	12/09/14			20/01/15	130	0
5.4.8	0.00	Re-install TOF2, KL & EMR	Yes	19/09/14	(RISK)-(R3)	Delays in installation - delay training & stepIV	16/02/15	150	0
5.4.9	0.00	Upstream SS magnet training - (5wks training)	Yes	24/10/14	(RISK)-(R2)	Items found to be non operational in field rampin	02/05/15	190	10000
5.4.10	0.00	Downstream SS magnet training - (5wks training)	Yes	28/11/14	(RISK)-(R2)	Items found to be non operational in field rampin	16/07/15	230	10000
5.4.11	0.00	Combined magnet operation	Yes	02/01/15			20/08/15	230	0
5.4.12	0.00	Combined magnet operational tests complete - milestone	Yes	02/01/15	(RISK)-(R2)	Extended period for training all magnets together	29/09/15	270	20000
5.4.13	0.00	<b>MICE step IV installation complete</b>	Yes	02/01/15			29/09/15	270	0

(Risk)-(R2) 40day delay

(Risk)-(R3) 20day delay

(Risk)-(R4) 10day delay

24th September 2013

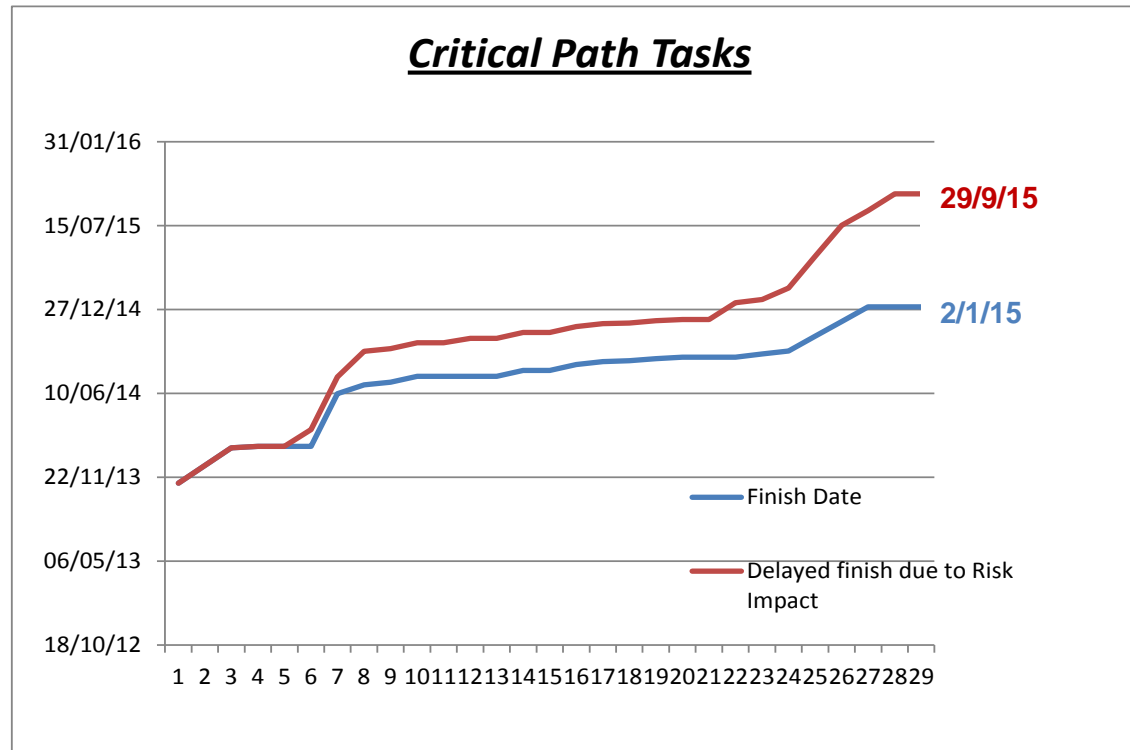
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# Option 1 - Step IV base line schedule - NO PRY

## Critical Path



- Assumes we can engineer solutions to known localised shielding issues
- More risky – may have overlooked some components
- Critical path driven by West Mezzanine Wall and compressor installation
- Magnets cooled in September 14
- If channel does not work may have to install PRY – risk of delay for stepIV completion

## Option 2 - Step IV schedule – Spectrometer Solenoids Installed BEFORE PRY

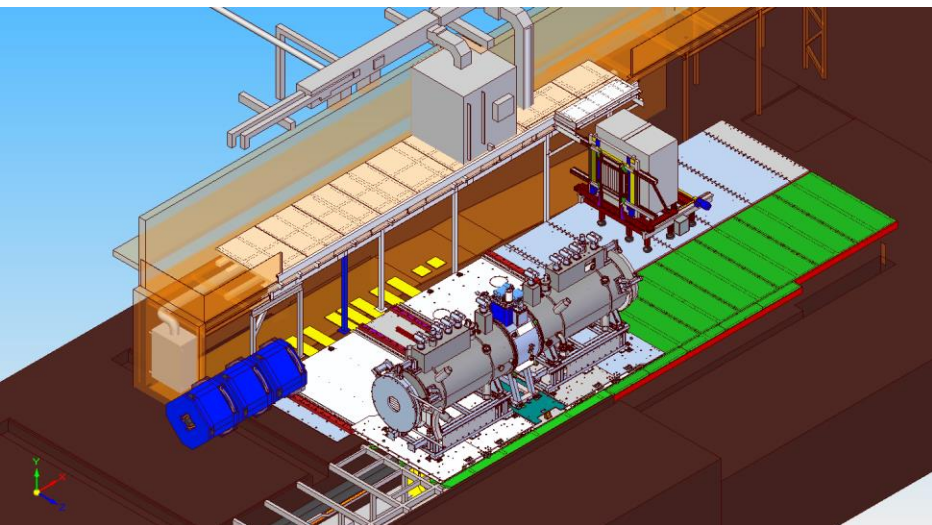


Fig 1. Devices installed online initially.

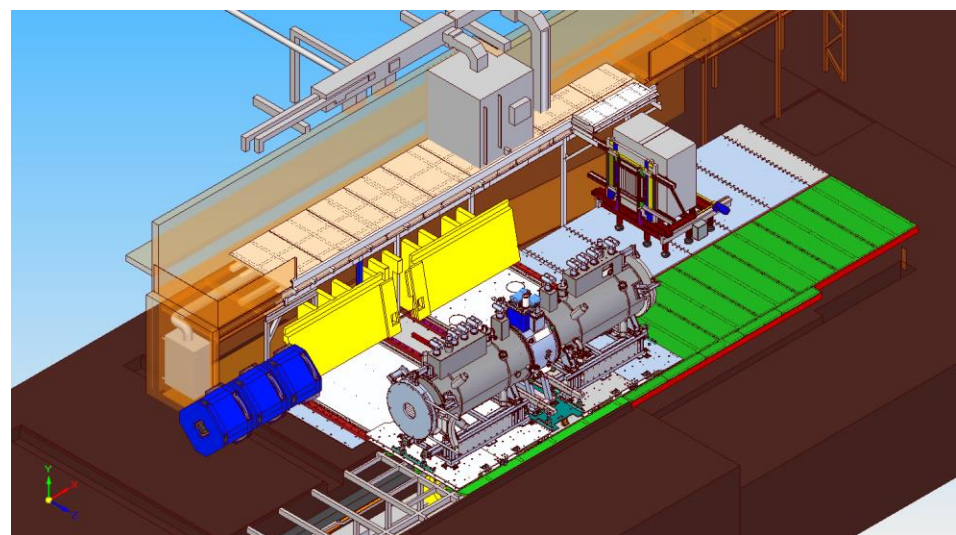


Fig 2. Devices moved offline. South PRY lower installed

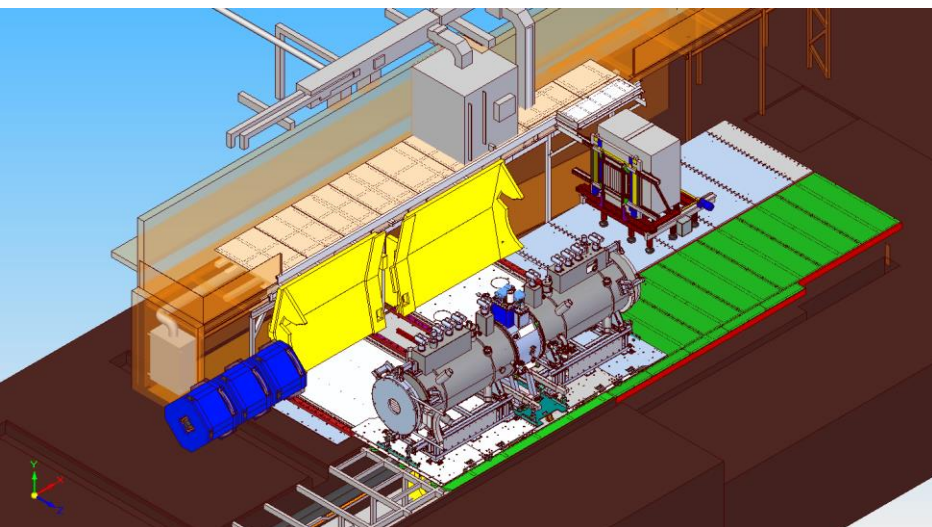
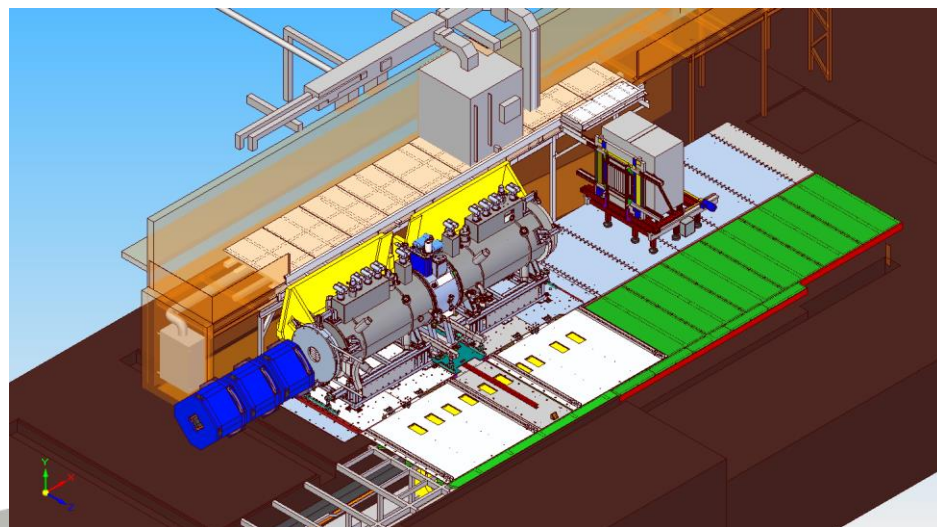


Fig 3. South PRY upper installed



Images courtesy of Jason Tarrant



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# Option 2 - Step IV schedule – Spectrometer Solenoids Installed BEFORE PRY

## Critical Path

WBS	% Complete	Name	Critical	Finish Date	Risks Level	Risk Impact	Delayed Finish due to Risk Impact	Delay Duration (days)	Fixed Cost
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5.1.3.3.4	0.00	Contractor Start Date	Yes	20/12/13			20/12/13	0	0
5.1.3.3.5	0.00	Installation (Incl. Snagging)	Yes	31/01/14			31/01/14	0	0
5.1.3.3	0.35	West Mezz Build & Associated	Yes	04/02/14			04/02/14	0	0
5.1.3.3.6	0.00	Load Test? Inspection	Yes	04/02/14			04/02/14	0	0
5.1.3.3.7	0.00	Sign Off / Complete - milestone	Yes	04/02/14	(RISK)-(R2)	Contractors late completing build of West Mezz	16/03/14	40	0
5.1.3.5.6	0.00	Ground Floor Compressor & Vac Installation	Yes	09/06/14			19/07/14	40	0
5.1.3.5.9	0.00	Compressor water services (incl trench?)	Yes	30/06/14	(RISK)-(R2)	Contractors late completing compressor services	18/09/14	80	0
5.1.3.6.5	0.00	Install Compressor Supports	Yes	07/07/14			25/09/14	80	0
5.1.3.6	0.00	Compressor & Services (feed) Support	Yes	21/07/14			09/10/14	80	0
5.1.3.6.6	0.00	Wire Up Isolators in Stands	Yes	21/07/14			09/10/14	80	0
5.1.3.6.7	0.00	Sign Off / Complete	Yes	21/07/14	(RISK)-(R4)	Contractors late completing compressor services	19/10/14	90	0
5.1.7.5.3.8	0.00	West wall Mezzanine extension finished	Yes	21/07/14			19/10/14	90	0
5.1.3.7.3	0.00	Install Compressors	Yes	04/08/14			02/11/14	90	0
5.1.7.5.3.9	0.00	Install Compressors	Yes	04/08/14			02/11/14	90	0
5.1.7.5.3.1	0.00	Install and terminate local cabling to 3 phase outlets	Yes	18/08/14			16/11/14	90	0
5.1.7.5.3.1	0.00	Install and terminate local controls cabling	Yes	25/08/14			23/11/14	90	0
5.1.7.5.3.1	0.00	Electrical / control commissioning of compressors/vac	Yes	27/08/14			25/11/14	90	0
5.1.7.5.3.1	0.00	Install cable management to Cold heads	Yes	01/09/14			30/11/14	90	0
5.1.7.5.3.1	0.00	Install / terminate cold head cables	Yes	04/09/14			03/12/14	90	0
5.1.7.5.3.1	0.00	Compressors ready for Cooling channels tests	Yes	04/09/14	(RISK)-(R2)	Additional design & build of shields	12/01/15	130	0
5.4.8.4	0.00	Cool down spectrometer	Yes	12/09/14			20/01/15	130	0
5.4.9	0.00	Re-install TOF2, KL & EMR	Yes	19/09/14	(RISK)-(R3)	Delays in installation - delay training & stepIV	16/02/15	150	0
5.4.5.6	0.00	Install north side return yoke	Yes	17/10/14			24/02/15	130	0
5.4.5.7	0.00	North side return yoke installation complete	Yes	17/10/14			24/02/15	130	0
5.4.10	0.00	Upstream SS magnet training - (5wks training)	Yes	21/11/14	(RISK)-(R2)	Items found to be non operational in field rampin	30/05/15	190	10000
5.4.11	0.00	Downstream SS magnet training - (5wks training)	Yes	26/12/14	(RISK)-(R2)	Items found to be non operational in field rampin	13/08/15	230	10000
5.4.12	0.00	Combined magnet operation	Yes	30/01/15			17/09/15	230	0
5.4.13	0.00	Combined magnet operational tests complete - milestone	Yes	30/01/15	(RISK)-(R2)	Extended period for training all magnets together	27/10/15	270	20000
5.4.14	0.00	<b>MICE step IV installation complete</b>	Yes	30/01/15			27/10/15	270	0

(Risk)-(R2) 40day delay

(Risk)-(R3) 20day delay

(Risk)-(R4) 10day delay

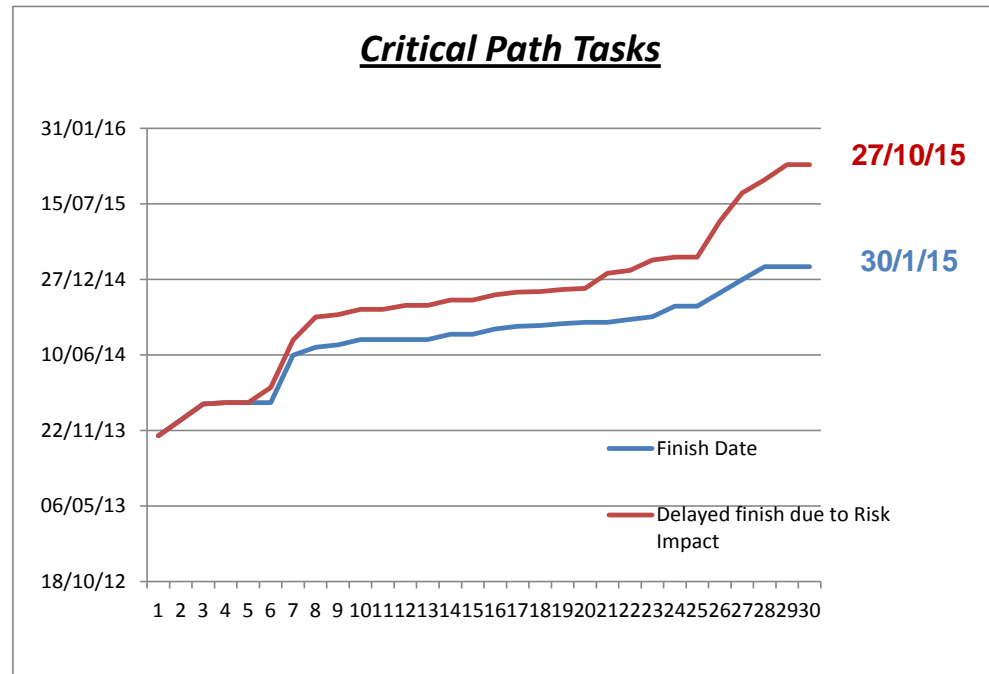
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## Option 2 - Step IV schedule – Spectrometer Solenoids Installed BEFORE PRY **Critical Path**



- Assumes South side PRY available mid April
- Assumes North side PRY available mid July – but not installed until mid September
- Critical path driven by West Mezzanine Wall and compressor installation
- Magnets cooled in September 14
- Magnet training can only take place after full PRY is installed

# Summary

	Finish Date	Delayed finish due to Risk
StepIV base line	2/1/15	29/9/15
SS before PRY	30/1/15	27/10/15

- Critical path driven by West Mezzanine Wall and compressor installation
- Further work required to identify & quantify risks.
- Estimated cost:- £500k & 5man yrs effort UK
- Assumes delivery of South PRY mid April 14 and North PRY mid July 14
- North PRY not installed until September 14
- Risk Delay – assumes we incur all identified delays
- Schedule & risks need to be monitored as these will change