SCU1 Integration into Sector 1:
A Project Management Perspective

Project #2253

John Grimmer
System Manager, Insertion Devices
Accelerator Systems Division/Magnetic Devices Group

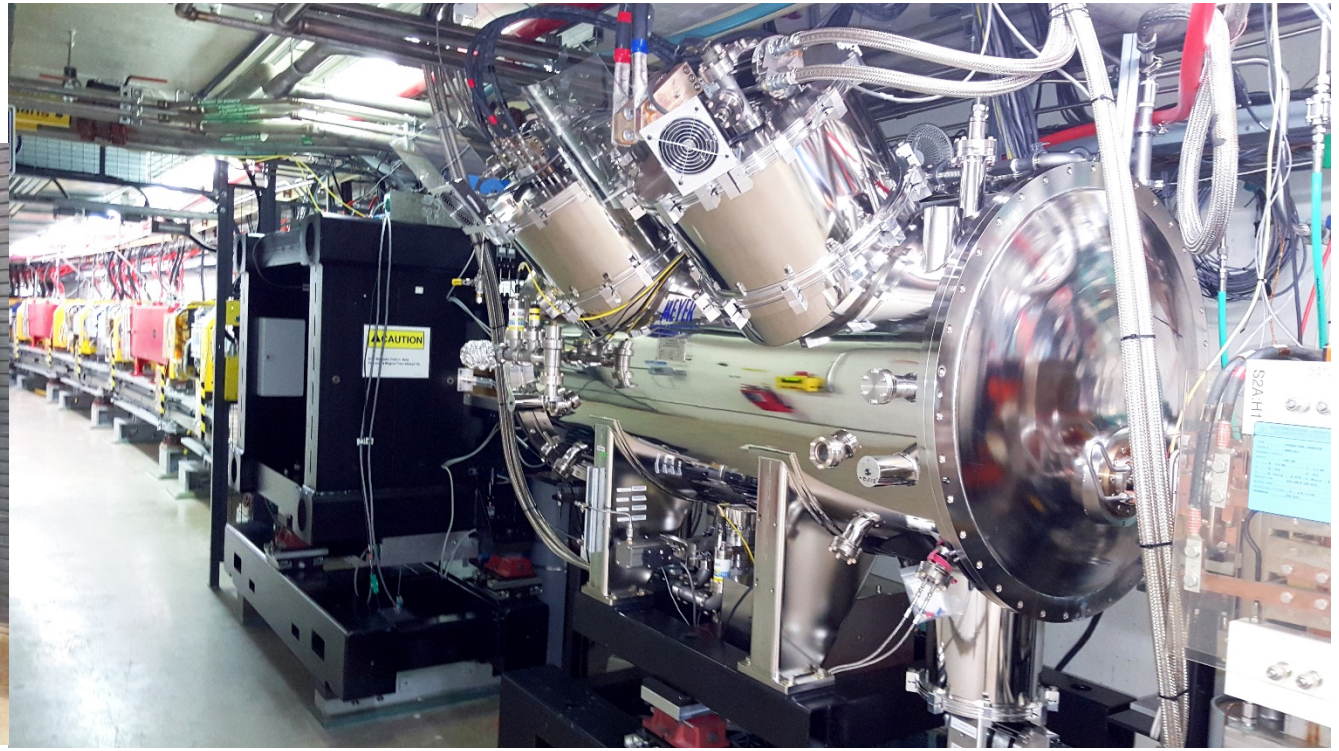
U.S. DEPARTMENT OF ENERGY | Office of Science

Outline:

- Recap of the SCU1 project; “project within a project”
- Recap of the SCU1 project; gory details of effort expended
- What’s a project? Follow-up question: What is management?
- Suggestions for Project Manager success.
- Challenges from the SCU1 project
- Reviews; fallback plan
- Initial installation attempt; recovery to original Sector 1 configuration
- Lessons learned; checklist/traveler -> successful installation!
- Recommendations
- Summary

Recap of the Project:

SCU1 ready for transport to Sector 1.



SCU1 and U33 PM undulator installed in Sector 1.

- SCU1 was successfully installed in Sector 1 in April/May of 2015 and has operated as designed since then; a new benchmark for superconducting undulator length (1.1 m) has been established; a full-length conventional undulator can now share a straight section with an SCU.
- Several obstacles were overcome in facilitating the original installation, in restoring the Sector 1 configuration when a vacuum leak developed in January, and in reworking/reinstalling SCU1 in April.
- Several “lessons learned” have provided a better recipe for building/installing future SCUs.

Recap of the Project: Project within a Project

Cryocooler chillers (4) and vacuum roughing pump in utility corridor.

SCU1 awaits its upstream neighbor.

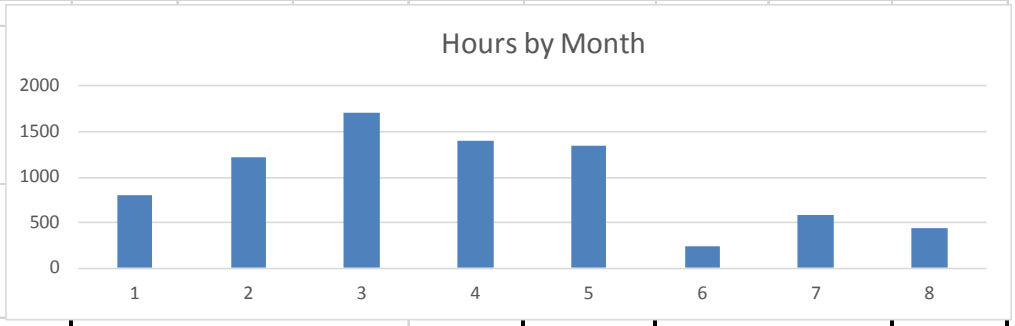
- The scope of project #2253 was to redesign/reconfigure the straight section in Sector 1 from two conventional undulators and a full-length ID vacuum chamber (IDVC), to one conventional undulator over a half-length IDVC (upstream half), and an SCU (downstream half), inclusive of the vacuum system external to the SCU cryostat, and utilities modifications in the storage ring and utility corridor.
- The SCU itself was built on another project, #1153. Both were approved ~ April of 2014, but some work had been in progress on both before that date, like many other APS projects.
- Efforts from all groups were exemplary as was efficient coordination and cooperation between groups and divisions.

Recap of the Project: Effort Totals

	Total Hrs. Planned	Actual Hours Provided to Date	Prep Hours Needed	Installation Hrs. Needed	Actual as % of Plan	Main factors in overrun
Designer	240	746.3	240		310.96%	Changed IDVC; Raytracing
MED Eng	104	448.8	104		431.54%	Redesign transitions; chamber fab
MED SA Eng	16	672.0		16	4200.00%	Preshutdown work not scoped
MOM-Eng	192	337.5	192		175.78%	Chamber fab/rework
MOM-Tech	600	1039.5	460	140	173.25%	Chamber fab/rework
ASD MD Physicist	40	537.0	40		1342.50%	Prep and rework of SCU1 not scoped
ASD MD Eng	72	3157.0		72	4384.72%	Prep and rework of SCU1 not scoped
ASD MD Tech	100	1095.5	80	20	1095.50%	Prep and rework of SCU1 not scoped
ASD PS Tech	80	0.0		80	0.00%	Some work not charged
		296.3				Forensic work not scoped
Totals	1444	8329.9	1,116	328	576.86%	

- A “half-length” ID vacuum chamber from inventory was used; this forced redesign of the transition assembly and meant that the raytracing from SCU0 did not directly apply.
- Numerous issues were encountered in fabricating the vacuum chamber internal to SCU1 prior to the original installation; even the original work was not within this project scope. (Preinstallation)
- There was a project to build the prototype SCU and cryostat used for SCU1 and there was not a clear dividing line between that project and #2253. (Project #1153; ended in September/October 2014)
- Work on preparing and testing SCU1 and a considerable amount of rework within the ASD-MD group itself was not scoped, but the rework could not have been foreseen .
- The removal, SCU vacuum chamber rework, all prep/testing prior to reinstallation was not scoped.
- No project replan was done until the reinstallation work (441 actual vs. 380 planned; 16% overrun).

Recap of the Project: by Project Phase.



	ORIGINAL DESIGN/BUILD				INSTALL	REWORK OF CHAMBER		REINSTALL
Month/Year	Sep-14	Oct-14	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15
Cumulative Hours	803	2022	3728	5130	6485	6730	7323	7764
Hours by Month	803	1219	1706	1402	1355	245	593	441
Cum. % of Estimate	55.61%	140.03%	258.17%	355.26%	449.10%	466.07%	507.13%	537.67%
Monthly % of Estimate	55.61%	84.42%	118.14%	97.09%	93.84%	16.97%	41.07%	30.54%

- Project #1153 has ended by September- only 40 more hours charged in October.
- The monthly burn rate on Project #2253 is close to the total estimated for the whole project for 4 months, spanning completion/certification of SCU1, installation and removal.
- I regarded accurately capturing the effort on this project as a priority, but did not regard replanning effort as a priority, partly because effort wasn't a scarce resource, but primarily because:
- The day-to-day management of this project: technical, schedule, M&S budget (FY14 vs. FY 15, in particular) issues, technical reviews, definition of acceptable criteria for technical analysis and review, approval of the installation, definition of the criteria for approval, etc. was already taking considerably more time than I had available due to other projects (1.72-cm period IDs, revolver undulator).

What's a Project?

Our activities span a continuum from individual efforts, to scaled individual efforts within a discipline, to interdisciplinary collaborations, to "projects," which themselves can vary in scope by orders of magnitude. What distinguishes a project from these smaller efforts (in my view)?

A project is a collective effort large enough that progress, even completion, is not dependent on any one person.

OK. So What's Management?

I like to view management (or leadership) through this lens:

Management is the art of making firm decisions on incomplete information, communicating those decisions, owning the outcomes, and adapting as information becomes more complete.

So What's a Project Manager?

A project manager is a non-vital participant, attempting to spur decisive action despite possible cluelessness.

Suggestions for Project Managers

A project manager directs the activities of others, balancing schedule, budget and technical goals.

Time, money and human endeavor are going to be turned into something. The project manager is attempting to make that something greater than the sum of the parts, in particular, to meet technical performance goals within the scope of the project, on time and on budget. With that in mind:

- Define the scope as early as possible and as tightly as possible including any reporting, replanning or tracking demands; identify milestones, design reviews, installation reviews, etc.; minimize scope creep, maximize buy-in and consensus, limit changes to contingencies, (i.e. schedule, budget, technical tradeoffs) and opportunities presented by those contingencies

- Understand the design-> build-> test-> install process: definition of what is needed (review with stakeholders)-> translation of "what" to accomplish into "how" to accomplish it (conceptual design)-> review of design approach-> final design (also reviewed!) -> production/assembly/testing of hardware -> installation readiness review -> installation/operational testing/commissioning

- Refine a schedule with logical links between tasks, not open-ended lag times, estimate resource requirements (material and effort) especially for "key" resources that may have schedule conflicts

Suggestions for Project Managers

- Let the vertical, functionally-structured groups and divisions of the APS do what they do best: delegate activities as much as possible (vacuum, fabrication, design, analysis, etc.) to the groups that own the work processes you need, be clear about expectations and get buy-in before an activity starts; discuss any new safety issues

- Stage a kick-off meeting (or a catch-up meeting if work has begun); meet weekly; prioritize, compartmentalize, check status of last week's tasks but always stimulate discussion of the new challenges (known knowns, known unknowns, unknown unknowns!)

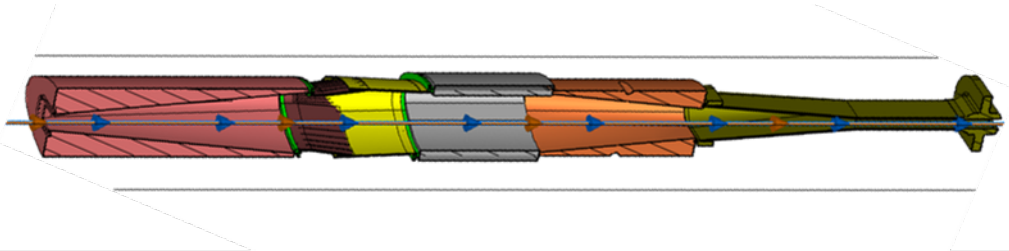
- Understand that everyone's perspective on a project is different. This is good and desirable. But- you want everyone working on the same project, not their own interpretation of it!

- Especially if you don't have a contingency for a problem, help "bad news" travel up faster; be open to hearing it from your project team, be ready to pass it upward and ask for help in time to have a positive effect!

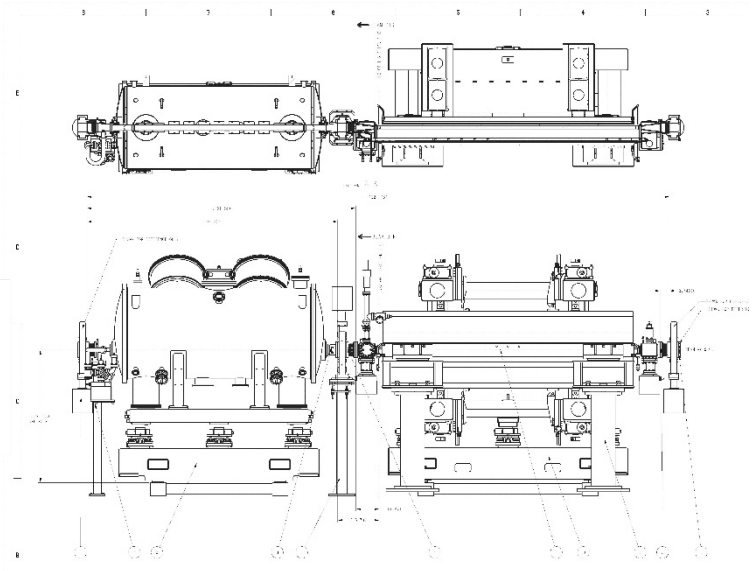
First Challenge: All the parts don't fit

The project began with a short-hand scope of "clone Sector 6" (SCU0). But there were unique aspects to Sector 1 and the timing of the project, that prevented simply cloning Sector 6 (unique-length IDVC, slightly shortened conventional undulator):

- Overhead piping interference unique to odd-numbered sectors of the storage ring
- We were experiencing delays and rework in fabricating the RIXS IDVC, so modifying an existing IDVC (such as the SPX0 one) was unattractive from a schedule or technical standpoints
- So, we investigated using an existing, unmodified IDVC, with the downside that the transition length between the IDVC and SCU would be shorter (and require new analysis and approval), but with the upside that an unmodified conventional undulator would fit (I would call that exploiting an opportunity, not scope creep!)



Aperture transitions at the upstream end of SCU1, L to R: IDVC cone, RF fingers/sleeve inside bellows, valve, external transition (orange) and internal transition (olive)



Second Challenge: Tax Increase!

- M&S got scarce at just the wrong time (July 2014) due to a retroactive overhead increase

Shops/Scheck labor will also be costed				
FY 2014 is assumed; 2015 noted if possible				
* possibly avoidable cost				
Avoidable costs:				
New half-length chamber as a spare	*	$24,000	2015	1) Spare would use existing endboxes; 2) SCU0 does not have a spare IDVC- a full-length IDVC would replace the IDVC and SCU in the event of a vacuum issue
Replace special process spare SR valve	*	$32,000	2015	1) Cost reflects price for SPX0 valve purchased in quantity of 3 in 2012
Spare B2/B4 bellows	*	$2,600	2015	1) May have sufficient stock on-hand
New cooling clamps quantity 5	*	$8,000	2015	1) May not be needed at all, or possibly fewer required.
New "Boot" Absorber	*	$3,500	2015	1) Would only be required to restore SPX0 IDVC to original configuration
Need to design/build:				
New valve stand (for SR valve upstream of SCU)		$2,500	2015	1) Roll-On slides are already in-house
New upstream water-cooled copper transition		$3,500		1) Hi-Tech BPA currently on hold
New "Test Downstream Transition Chamber"		$4,600		1) 4101010601-700390 2) Parts TBD 8/25 3) Needs to be cleaned, welded, leak-checked and certified at ANL
New Downstream Transition Support Stand		$2,300	2015	1) Parts TBD 8/18
Shops effort for above		$6,000	2015	
Other material & Misc.		$2,500	2015	
Vacuum parts:				
Catalog items		$12,000		1) Most is encumbered; some is delivered
Controls (non-SCU)		$5,000		
Material & Misc.		$3,000		
Electrical system				
Scheck SRO (in place)		$33,200		1) About 45% complete 2) Work is ongoing as of 7/30/2014 3) Would need to be postponed to save $$ in 2014
Water system				
Scheck SRO for relocating DI water lines (not in place)		$21,600		1) Cost reflects descoping after MOM Group consultation 2) Must be done in FY14
Material & Misc.		$2,000		
Scheck SRO for water for cryocoolers (in place)		$7,000		1) Cost reflects descoping after MOM Group consultation 2) Could be started in FY15
Rigging				
Cost for transporting SCU from 314 to SR		$13,000	2015	
Other rigging costs		$8,000	2015	
	Worst case total:	$196,300		Total cost (worst case)
	FY 2014 total:	$91,900		Minimum needed to be encumbered this FY, 40-45% already is
	FY 2015 total:	$104,400		Remainder for FY 2015
	Avoidable total:	$70,100		Possibly avoidable costs, all FY 2015
	Best case total:	$126,200		Total cost (best case)

Design and Analysis are Done: Time for the Review

Physics Readiness Review for SCU1

November 12, 2014, 8:0513:00
C4200

Committee Members

Aimin Xiao (Chair)	ASDAOP
Jonathan Almer	XSDMPE
Michael Borland	ASD ADD
Glenn Decker	APSU APM
John Grimmer	ASDMD
Sarvjit Shastri	XSDMPE
Alexander Zholents	ASD DD

Agenda

8:05	Welcome and charge	M. Borland
8:10	Status of SCU1 and schedule	Y. Ivanyushenkov
8:30	Physics requirements document overview	K. Harkay
8:55	Wakefield heating	X. Sun
9:20	Instabilities and single bunch limit	R. Lindberg
9:40	Break	
9:50	Steering limits, alignment tolerances, and field quality requirements	V. Sajaev
10:10	Ray tracing	K. Harkay
10:35	Commissioning and fallback plans	K. Harkay
11:00	Break for ASD Seminar	
12:00	Executive session	Committee
12:40	Closeout	All
13:00	Adjourn	

Build and Test are “Done”: Installation Readiness Review

Installation Readiness Review for SCU1

December 12, 2014, 13:00-17:00
Location: B4100

Committee

	L. Morrison (AES-MOM, Chair)	
M. Abliz (ASD-MD)	J. Almer (XSD-MPE)	L. Emery (ASD-AOP)
R. Farnsworth (AES-CTL)	J. Gagliano (AES-MOM)	W. Jansma (AES-SA)
M. Jaski (ASD-MD)	J. Lang (ASD-ADM)	S. Shastri (XSD-MPE)
A. Xiao (ASD-AOP)		

Agenda

13:00	Review goals	A. Zholents
13:05	Installation schedule and fallback plan	Y. Ivanyushenkov
13:25	Sector 1 readiness	J. Grimmer
13:40	SCU1 readiness	C. Doose
14:20	Controls readiness	M. Smith
14:30	Utilities readiness	R. Bechtold
14:40	Break	
15:00	SCU1 transport to SR tunnel	M. Merritt
15:10	SCU1 alignment in Sector 1	R. Gwekoh
15:20	Responses to physics review and commissioning plan	K. Harkay
15:50	Additional committee questions	All
16:00	Executive session	Committee
16:45	Closeout	All
17:00	Adjourn	

Charge to Committee

1. Is SCU1 ready for installation? If not, what issues or tasks remain?
2. Is Sector 1 ready to accept SCU0? If not, what issues or tasks remain?
3. Is the SCU1 control system ready? If not, what issues or tasks remain?
4. Are the SCU1 installation and fallback plans sound and complete? If not, what issues remain?
5. Is the SCU1 commissioning plan sound and complete? If not, what additions or revisions are recommended?

Fallback plans – beam commissioning

Fixed time lengths:

Machine startup length: 4 + 7 d = 11 d.

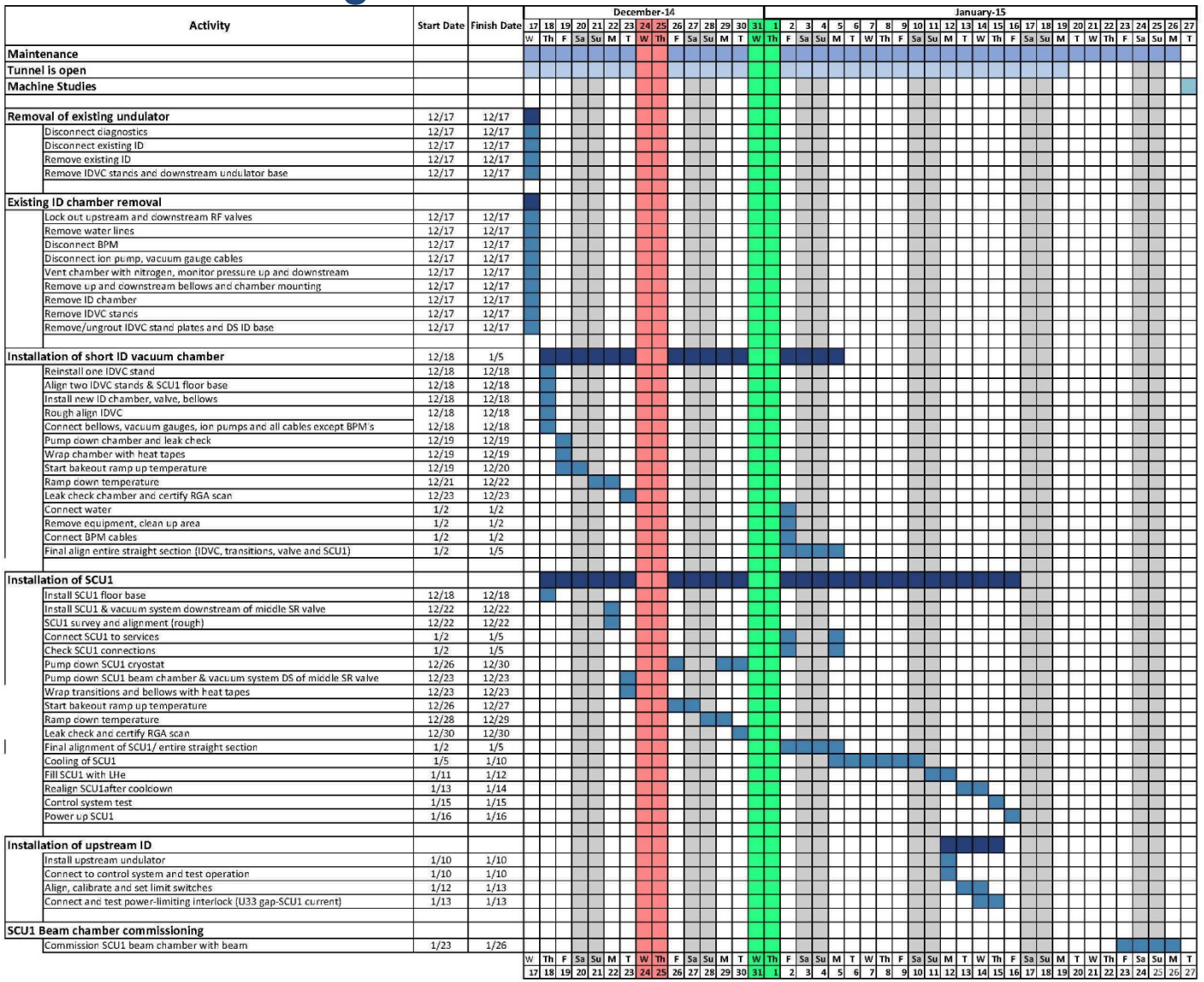
Removal of SCU1 after beam commissioning commences:

1. 4 d (warmup) + 3 d (spool piece only) + 2 d (min. startup activities) = 9 d
2. 4 d (warmup) + 5 d (ID-1 orig config) + 2 d (min startup activities) = 11 d

Failure scenario	Decision date	Operations start (ID-1 orig)	Risk to operations (ID-1 orig)	Risk to operations (spool pc.)
None		Feb 3		
Aperture	Jan 24	Feb 4	1.33 d	
Rf conditioning	Jan 25	Feb 5	2.33 d	0.33 d
Powered operation	Jan 26	Feb 6	3 d	1 d

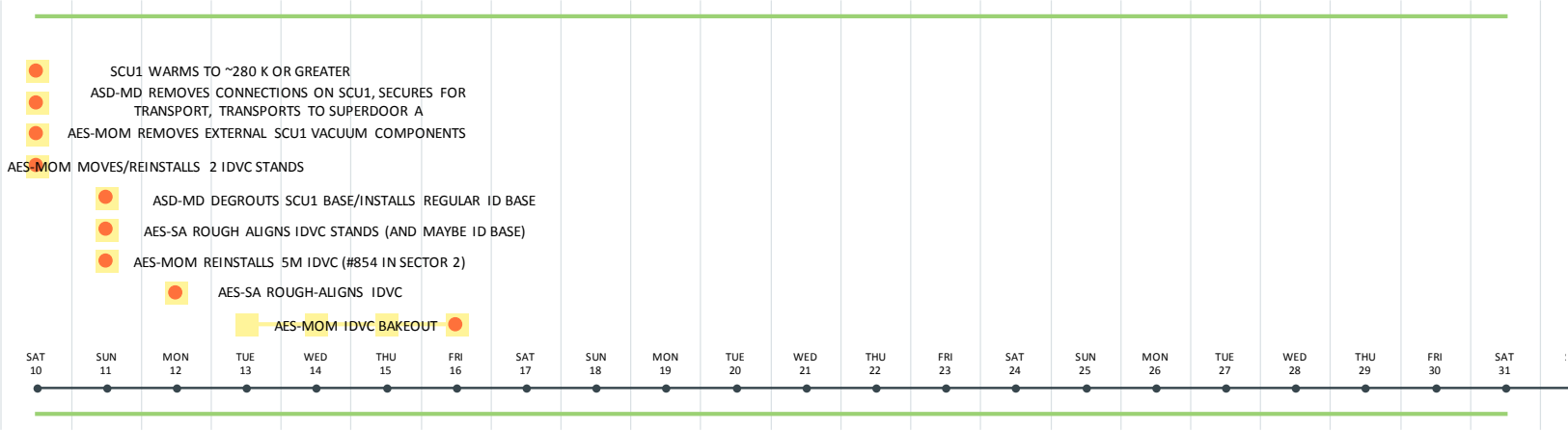
Work begins on 12-17-2014; Leak between SR vacuum and SCU1 insulating vacuum detected on 1-8-2015

Activity	Start Date	Finish Date
Maintenance		
Tunnel is open		
Machine Studies		
Removal of existing undulator	12/17	12/17
Disconnect diagnostics	12/17	12/17
Disconnect existing ID	12/17	12/17
Remove existing ID	12/17	12/17
Remove IDVC stands and downstream undulator base	12/17	12/17
Existing ID chamber removal		
Lock out upstream and downstream RF valves	12/17	12/17
Remove water lines	12/17	12/17
Disconnect BPM	12/17	12/17
Disconnect ion pump, vacuum gauge cables	12/17	12/17
Vent chamber with nitrogen, monitor pressure up and downstream	12/17	12/17
Remove up and downstream bellows and chamber mounting	12/17	12/17
Remove ID chamber	12/17	12/17
Remove IDVC stands	12/17	12/17
Remove/ungrout IDVC stand plates and DS ID base	12/17	12/17
Installation of short ID vacuum chamber	12/18	1/5
Reinstall one IDVC stand	12/18	12/18
Align two IDVC stands & SCU1 floor base	12/18	12/18
Install new ID chamber, valve, bellows	12/18	12/18
Rough align IDVC	12/18	12/18
Connect bellows, vacuum gauges, ion pumps and all cables except BPM's	12/18	12/18
Pump down chamber and leak check	12/19	12/19
Wrap chamber with heat tapes	12/19	12/19
Start bakeout ramp up temperature	12/19	12/20
Ramp down temperature	12/21	12/22
Leak check chamber and certify RGA scan	12/23	12/23
Connect water	1/2	1/2
Remove equipment, clean up area	1/2	1/2
Connect BPM cables	1/2	1/2
Final align entire straight section (IDVC, transitions, valve and SCU1)	1/2	1/5
Installation of SCU1		
Install SCU1 floor base	12/18	12/18
Install SCU1 & vacuum system downstream of middle SR valve	12/22	12/22
SCU1 survey and alignment (rough)	12/22	12/22
Connect SCU1 to services	1/2	1/5
Check SCU1 connections	1/2	1/5
Pump down SCU1 cryostat	12/26	12/30
Pump down SCU1 beam chamber & vacuum system DS of middle SR valve	12/23	12/23
Wrap transitions and bellows with heat tapes	12/23	12/23
Start bakeout ramp up temperature	12/26	12/27
Ramp down temperature	12/28	12/29
Leak check and certify RGA scan	12/30	12/30
Final alignment of SCU1/ entire straight section	1/2	1/5
Cooling of SCU1	1/5	1/10
Fill SCU1 with LHe	1/11	1/12
Realign SCU1after cooldown	1/13	1/14
Control system test	1/15	1/15
Power up SCU1	1/16	1/16
Installation of upstream ID		
Install upstream undulator	1/10	1/10
Connect to control system and test operation	1/10	1/10
Align, calibrate and set limit switches	1/12	1/13
Connect and test power-limiting interlock (U33 gap-SCU1 current)	1/13	1/13
SCU1 Beam chamber commissioning		
Commission SCU1 beam chamber with beam	1/23	1/26



Restoration of Sector 1 to original configuration begins on 1-9-2015

SCU1 Sector 1 Restoration



ENTER START DATE: 1/9/2015

ACTIVITY	START	END	NOTES
Project Start	1/9/2015		
Remove US ID	1/9/2015	1/9/2015	
AES-MOM Disconnects Water, Vents and Removes IDVC	1/9/2015	1/9/2015	Valve will be left closed and floating
SCU1 warms to ~280 K or greater	1/10/2015	1/10/2015	Quentin approves MOM-VAC removal of SCU external vacuum components
ASD-MD removes connections on SCU1, secures for transport, transports to Superdoor A	1/10/2015	1/10/2015	
AES-MOM removes external SCU1 vacuum components	1/10/2015	1/10/2015	
AES-MOM moves/reinstalls 2 IDVC stands	1/10/2015	1/10/2015	
ASD-MD degrouts SCU1 base/installs regular ID base	1/11/2015	1/11/2015	
AES-SA rough aligns IDVC stands (and maybe ID base)	1/11/2015	1/11/2015	
AES-MOM reinstalls 5m IDVC (#854 in Sector 2)	1/11/2015	1/11/2015	
AES-SA rough-aligns IDVC	1/12/2015	1/12/2015	
AES-MOM IDVC bakeout	1/13/2015	1/16/2015	
AES-MOM vacuum-certifies IDVC and reconnects water	01/16/2015	01/16/2015	
AES-SA final-aligns IDVC	01/16/2015	01/16/2015	
ASD-MD reinstalls both IDs	01/17/2015	01/18/2015	

Lessons Learned, Initial Installation

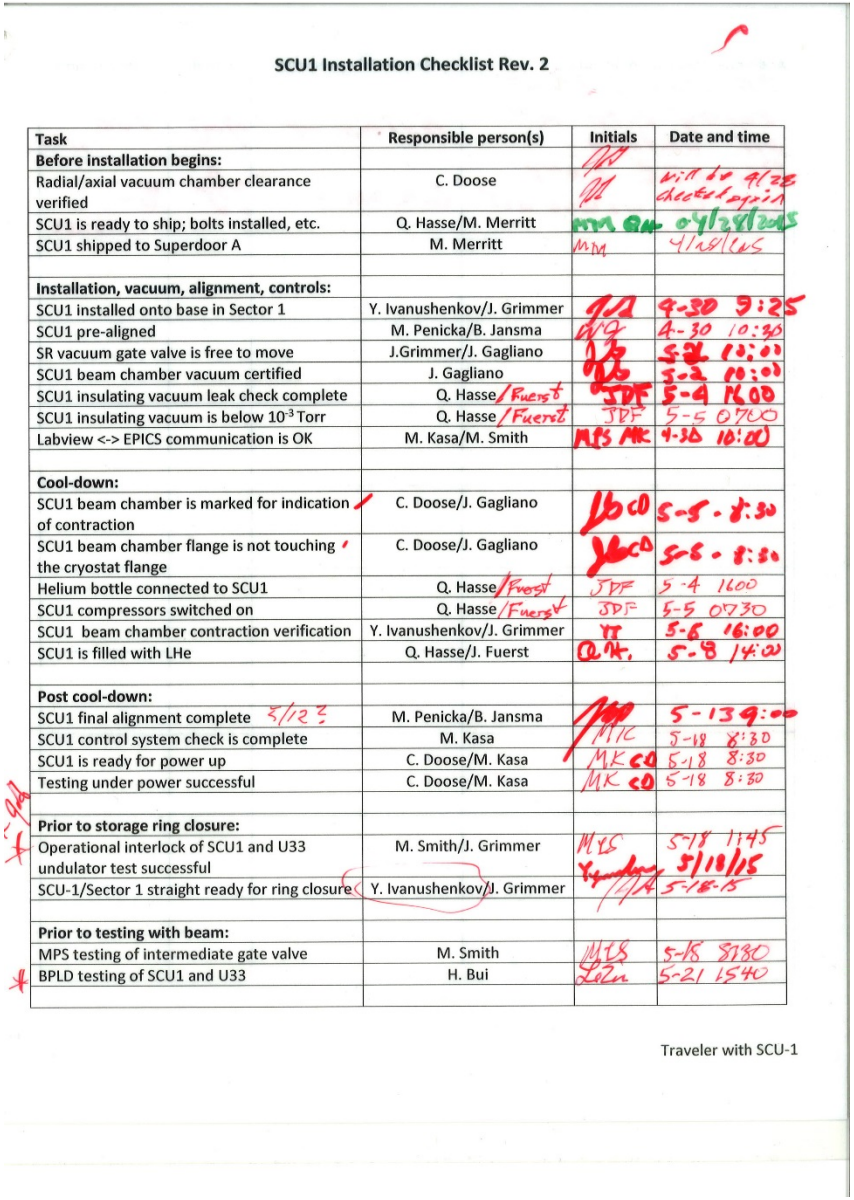
There were several technical and communication details to address:

- To replace the failed bimetallic joints on the beam chamber
- To make some other design improvements to improve the ease of installation the second time
- To provide a clearer indication of the handoff between tasks
- To provide a clear record of the sequence of events (who did what, and when) especially if we experienced another "out of design" condition!

SCU-1 Installation April/May 2015: Prior Installation Issues, Key Points and Resolutions:

1) SCU1 was transported on 12/22 and didn't fit within the envelope of the "Trojan Horse" that was used prior to SCU0 installation to verify the ability to install an SCU anywhere in the ring. Two Conflat flanges and attached assemblies were removed to allow SCU1 past the upstream undulator in Sector 2; one was known to be the insulating vacuum; the other was connected to the helium reservoir- a separate volume. I believe everyone involved in the disassembly assumed both flanges were connected to the insulating vacuum. All of the issues associated with this have been addressed.
2) The nominal location for installing the two downstream SCU1 base floor anchors interferes with "rebar" in the concrete, so those anchors could not be adequately "set," which required grouting of the base for stability. These holes will be relocated to avoid the rebar, making the z-axis position of the base fixed, but that is acceptable.
3) SCU1 was installed on the base and rough aligned without too much grief. The upstream end of the SCU1 vacuum chamber had a weld repair at an RF spring groove that made it difficult to retain the RF spring when that vacuum flange joint was assembled, so an improvised method was used. This was complicated by the design of the mating parts, which required a difficult sequence of steps to install studs to mate the flanges of the SCU1 vacuum chamber and the copper transition. The RF springs are now secured with tabs and the copper transition has been modified to allow bolts to be easily installed, and to allow better monitoring of the RF spring as the flanges are mated.
4) SCU1 insulating vacuum was leak checked and then pumped down over the Christmas holiday. When the leak check was done, it appears that no one involved was aware that the helium reservoir had been exposed to atmosphere, or that the replaced flange was leaking. A consequence of item 1; all issues have been addressed.
5) The vacuum parts external to SCU1were installed, baked and vacuum certified between Christmas and New Year's. For the bake and subsequent cool down, the slide supporting the closed valve between the IDVC and SCU1 was unbolted. The status of this "lock" and the slide position will be explicitly monitored and recorded.
6) Cooldown of SCU1 began on Friday, January 2 with a helium bottle connected to the helium reservoir, to prevent the pressure from going subatmospheric (in case of a leak). There was a significant leak to atmosphere in this passage, but it was not known at this time. The bottle was replaced on Sunday, January 4, and the leak identified and repaired (new Conflat gasket) on Monday, January 5. On Wednesday, January 7, the consequences of the leak were seen- it was impossible to fill the helium reservoir with liquid helium. Ice had sealed off the pressure gauge as well (and helium gas fill line?), so the vessel had seen pressure well below atmospheric and well below what was known. Again, a consequence of item 1; all issues have been addressed.
7) The SCU team decided that SCU1 needed to be warmed up to remove the blockage and to ensure that no ice (of any kind) was left. On Thursday, January 8, we became aware of a vacuum leak in the SCU1 beam chamber (communication from ring vacuum-to-insulating vacuum implying a massive leak). By January 10, SCU1 was sufficiently warm to allow it to be removed and to begin restoring the Sector 1 straight section to the 2 planar undulator configuration. The work was completed in time to allow ring closure on January 20. SCU1 was transported back to Bldg. 314 and the chamber was removed. There is a failure at the upstream bimetallic joint, with a visible crack on about ¾ of the joint perimeter. How much of this displacement is cause vs. effect of the vacuum failure is unclear, but the failed joint was the only leak found. The valve stand upstream of SCU1 in the storage ring was not clamped down (by design). This allowed the bellows upstream of the valve to expand/contract under differential thermal expansion. However, with the valve closed (as was the case on January 8), loss of vacuum on either side of the valve would risk damaging the bellows. It is curious that there was no displacement of the SCU1 vacuum chamber relative to the SCU1 cryostat (which was fixed in place) and no compression of the bellows. The differential vacuum force would have to have been borne by the SCU1 vacuum chamber and in turn through something internal to the SCU. The vacuum chamber has been repaired, with both bimetal joints replaced. The failed joint has flaws in the bond- a "smoking gun" for the failure was identified. The replacement joints were thermally cycled/shocked and subsequently leak checked successfully. The chamber was put into service and has undergone 2 full thermal cycles (with a third beginning) without leaking. The status of the valve slide and the amount of thermal contraction will be explicitly monitored.

Traveler/Checklist for Second Installation



SCU1 Installation Checklist Rev. 2

Task	Responsible person(s)	Initials	Date and time
Before installation begins:			
Radial/axial vacuum chamber clearance verified	C. Doose		will be checked again
SCU1 is ready to ship; bolts installed, etc.	Q. Hasse/M. Merritt	MM QH	04/28/2015
SCU1 shipped to Superdoor A	M. Merritt	MM	4/28/15
Installation, vacuum, alignment, controls:			
SCU1 installed onto base in Sector 1	Y. Ivanushenkov/J. Grimmer		4-30 9:25
SCU1 pre-aligned	M. Penicka/B. Jansma		4-30 10:30
SR vacuum gate valve is free to move	J.Grimmer/J. Gagliano		5-2 10:00
SCU1 beam chamber vacuum certified	J. Gagliano		5-2 10:00
SCU1 insulating vacuum leak check complete	Q. Hasse/Fuerst	JDF	5-4 1600
SCU1 insulating vacuum is below 10^{-3} Torr	Q. Hasse/Fuerst	JDF	5-5 0700
Labview <-> EPICS communication is OK	M. Kasa/M. Smith	MJS MK	4-30 10:00
Cool-down:			
SCU1 beam chamber is marked for indication of contraction	C. Doose/J. Gagliano		5-5 8:30
SCU1 beam chamber flange is not touching the cryostat flange	C. Doose/J. Gagliano		5-6 8:30
Helium bottle connected to SCU1	Q. Hasse/Fuerst	JDF	5-4 1600
SCU1 compressors switched on	Q. Hasse/Fuerst	JDF	5-5 0730
SCU1 beam chamber contraction verification	Y. Ivanushenkov/J. Grimmer		5-6 16:00
SCU1 is filled with LHe	Q. Hasse/J. Fuerst		5-8 14:00
Post cool-down:			
SCU1 final alignment complete 5/12	M. Penicka/B. Jansma		5-13 9:00
SCU1 control system check is complete	M. Kasa	MK	5-18 8:30
SCU1 is ready for power up	C. Doose/M. Kasa	MK	5-18 8:30
Testing under power successful	C. Doose/M. Kasa	MK	5-18 8:30
Prior to storage ring closure:			
Operational interlock of SCU1 and U33 undulator test successful	M. Smith/J. Grimmer	MJS	5-18 1145
SCU-1/Sector 1 straight ready for ring closure	Y. Ivanushenkov/J. Grimmer		5/18/15 5-18-15
Prior to testing with beam:			
MPS testing of intermediate gate valve	M. Smith	MJS	5-18 8:30
BPLD testing of SCU1 and U33	H. Bui		5-21 1540

Traveler with SCU-1

Recommendations for APS Projects

- Clear definition of the project scope and identification of the project manager and resources before the project begins is highly desirable.
- Recognition that project management isn't done in anyone's spare time; especially tracking, reporting, replanning, etc.

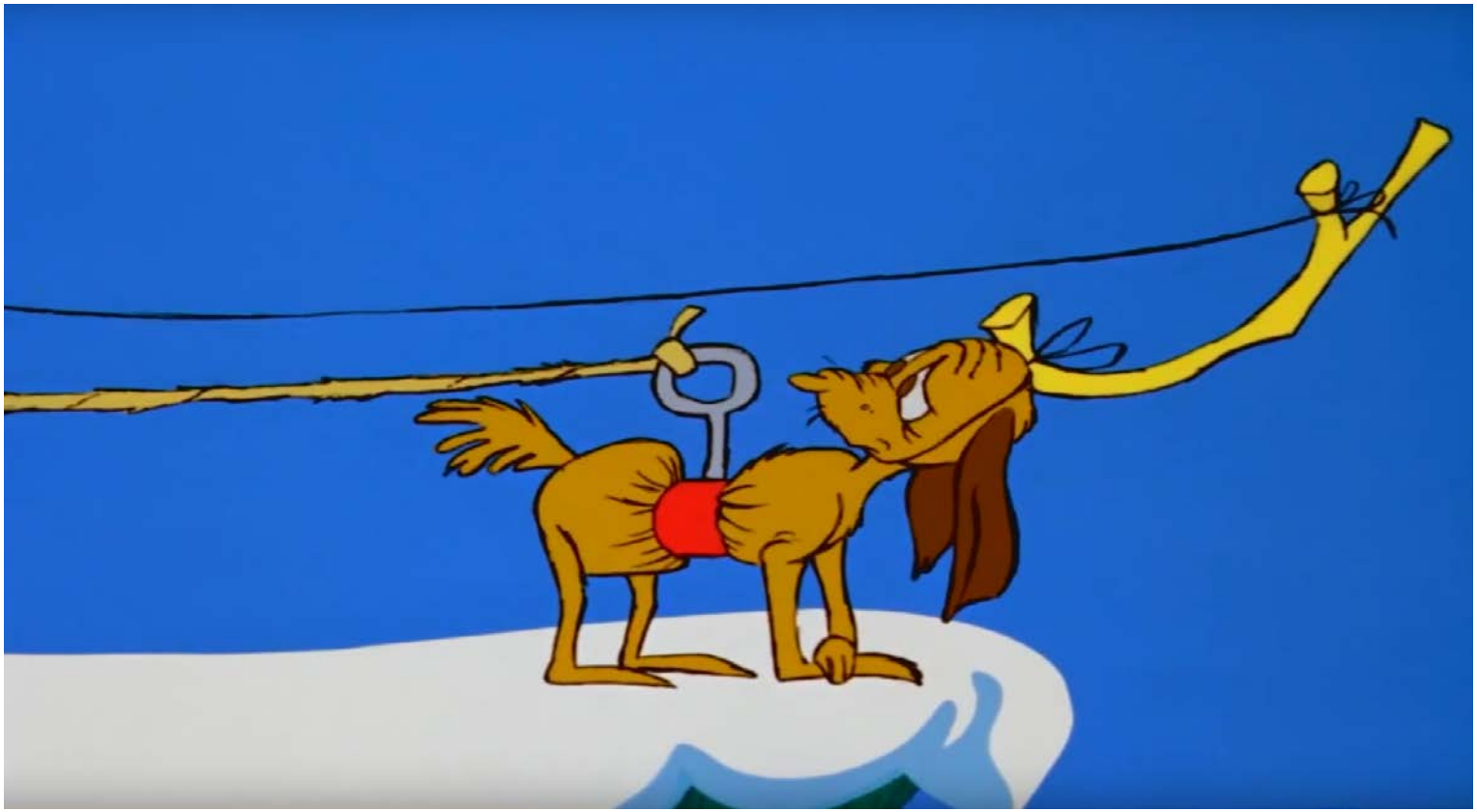
- Not every interaction at the APS can be handled as part of a freestanding project: engineering standards, the drawing release process, physics requirements, who approves what, spare parts, etc. need to be maintained/managed independently of the project apparatus.
- Agreement on what an SCB (now REG) project is, what resources to include in scope, i.e. should effort within the "sponsoring" group even be scoped/tracked; should analysis and planning from groups like ASD-AOP be scoped and charged to a project

Summary, with Inspiration from “How the Grinch Stole Christmas”

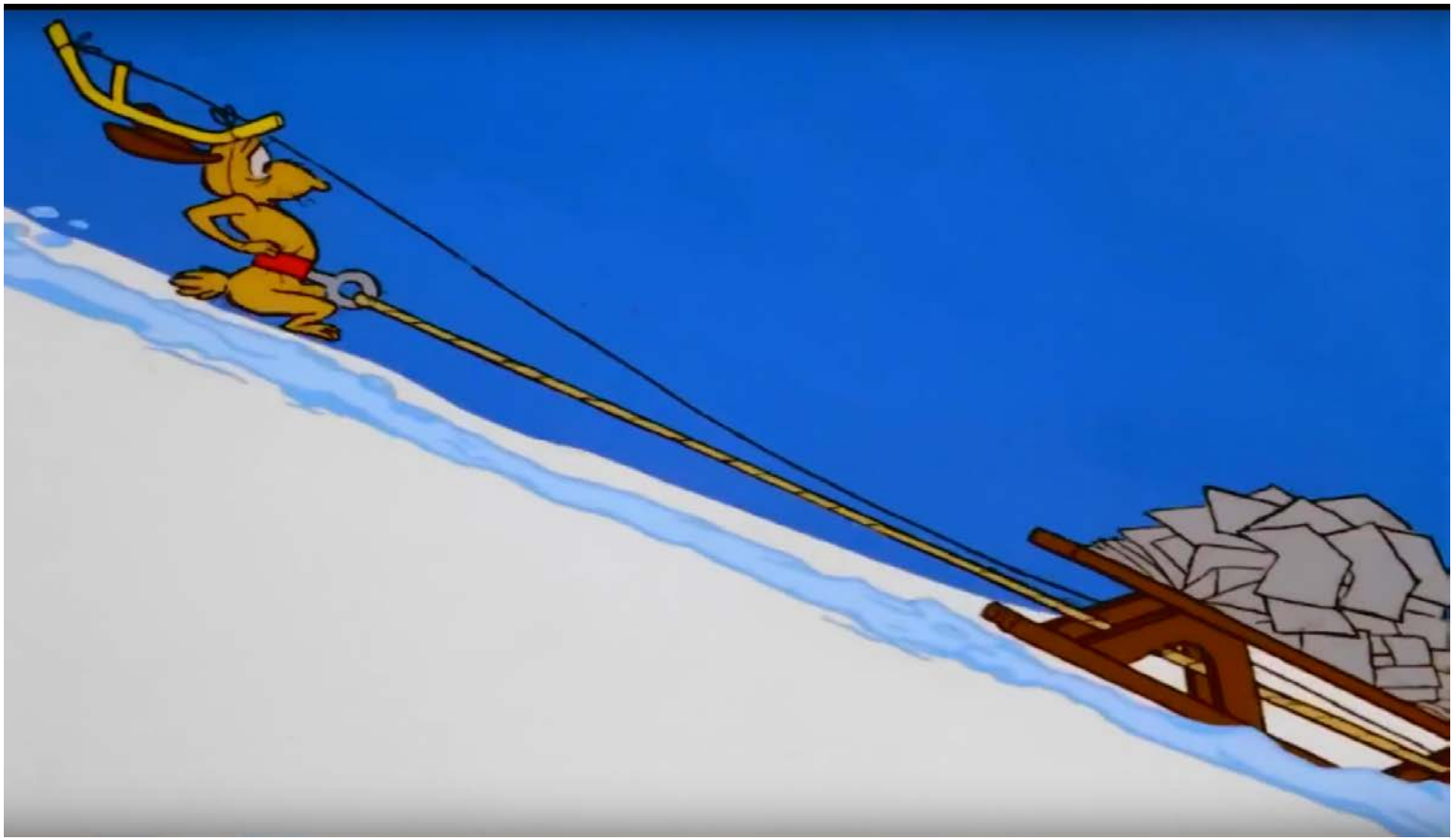
You will receive assistance fitting into your role as a Project Manager

What the PM Might Think

A More Likely Reality



An Even More Likely Reality



Embrace this Moment, You're Still Ahead of the Project!

Quick, Stage that Kick-off Meeting!

The Project has Officially Begun!

After a successful project, you will feel satisfied, and your effort will be appreciated!