Regional Class Research Vessels

Do's and Don'ts of Project Management for NSF

Presented by Demian Bailey and Richard Grubb
Research Infrastructure Workshop 2023

3 Vessel Build under NSF MREFC Funding

R/V *Taani*

R/V *Narragansett Dawn*

R/V *Gilbert R Mason*

Oregon State University

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For those just starting out

- Don't underestimate the depth of project management requirements that NSF will want to see. As the project becomes more real, oversite and expectations grow for reporting and documentation.
  - If you are an academic or used to being on a tight budget, think bigger. Don't try to do everything yourself. i.e, Hire a risk manager and contract out aspects of the project for which you don't have the expertise. Do it right. From my experience, that is NSF's expectation. These are LARGE PROJECTS. With lots of scrutiny and oversite. Many of those people come from a DoD or DOE background and are used to projects with high overhead.

Don’t take any offramps

- Bring a project controls expert on first thing.
- Build your project by following the 32 EIA 748 Guidelines in order.
- A project that has great science but poor project management will fail.

Do organize your project around the RIG

- Now that the ~~LFM~~, ~~MFG~~, RIG seems pretty firm, read and follow it closely. Recommend structuring the entire project around it. Make choices based on what's best for the project in the long run... not what's easy or convenient in the short term.
- All project documents live somewhere in the PEP. All of them.
  - For annual reviews, you can map your deliverables to NSF's charge easily if everything has a home

Do’s and Don’ts

- DON’T ask for direction. Use your team and propose solutions; don't bring NSF problems that you can fix.
- DO Keep the RIG printed and within arm's reach on your desk. Don't try to build a program from scratch.
- DON’T underestimate the importance of quality budget formulations and contingency development and use. These are the most import aspects of building a program that can withstand scrutiny.
- DO Keep a "beginner's mind". Avoid preconceived ideas and assume you have all the answers.

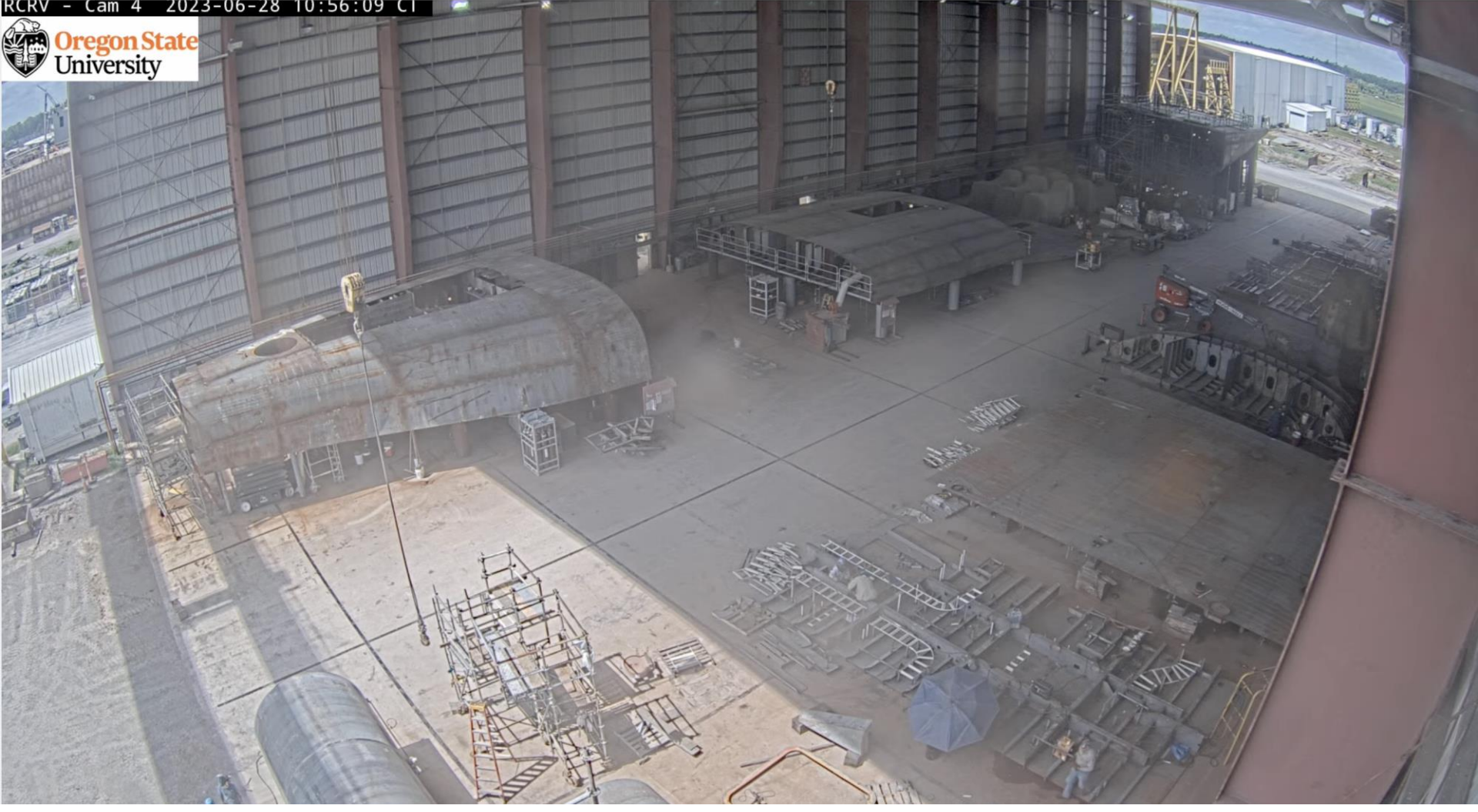
Do aim for a “1” on the DRC

Design Ready for Construction index (DRC, also known as the "Dork")
DRC = weight of paper generated/displacement of vessel

<1=You need to do your homework	0= "You Just Don't Get it" DRC < 0.25 = "We are disappointed" 0.25 < DRC < 0.5 = "We are not confident that you understand the requirements" 0.5 < DRC < 0.75 = "You have some homework to do" 0.75 < DRC < 0.9 = "You just need to take another turn"
	0.9 < DRC < 1.1 = "You just need to find the sweet spot"
>1=You Are over Thinking this	1.1 < DRC < 1.25 = "You just need to take another turn" 1.25 < DRC < 1.5 = "You just need to take another round turn" 1.5 < DRC < 1.75 = "We are not confident that you understand the requirements" 1.75 < DRC < 2.0 = "We are disappointed" 2=If we wanted it like this, we would have picked the other guys

Do take the Procurements Seriously


Designed for Science.
Designed for People.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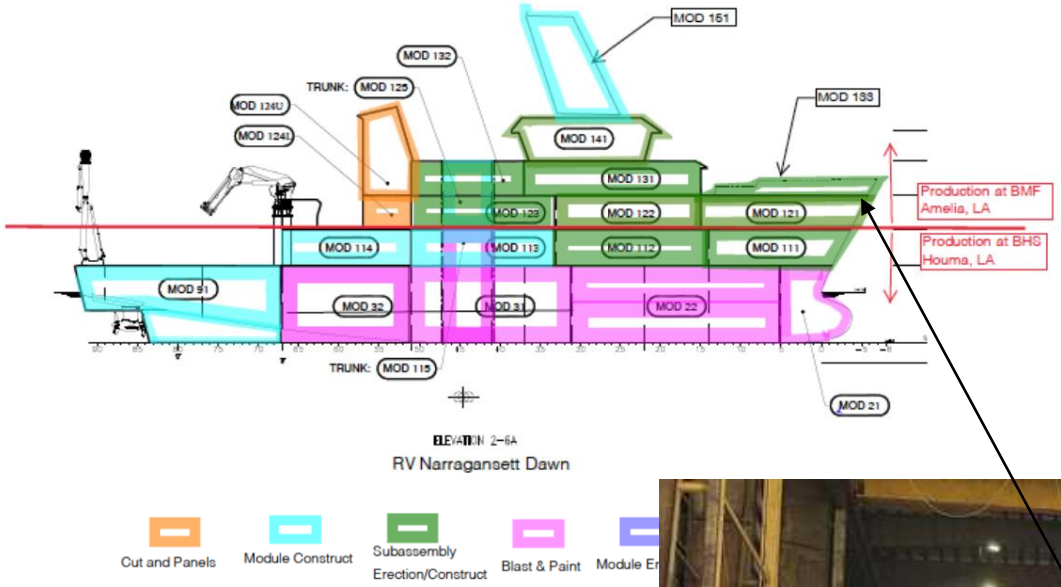
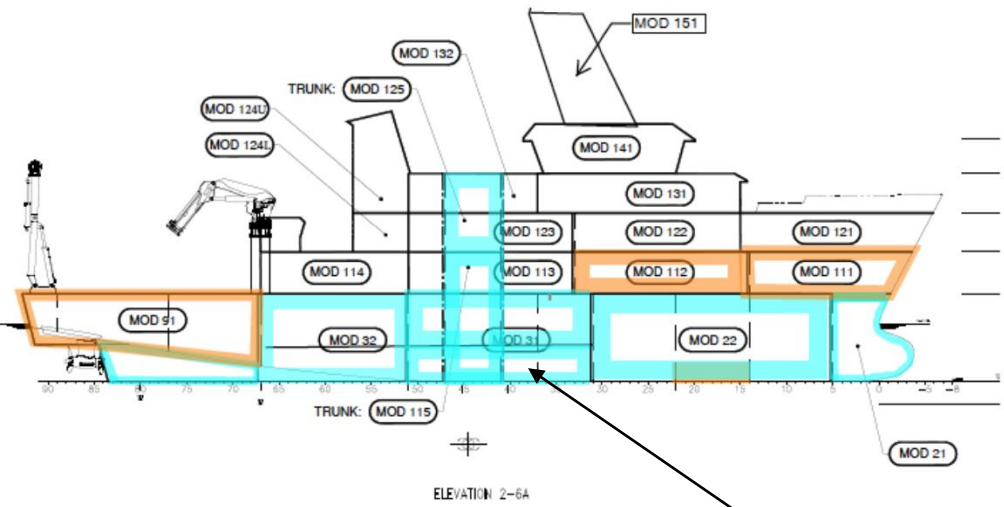


Aluminum Superstructure bow and mast, looking aft

R/V *Narragansett Dawn*

Cut and Panels | Module Construct | Subassembly Erection/Construct | Blast & Paint | Module Erection



ELEVATION 2-6A

RV GILBERT R. MASON

Mod 31, Inverted

R/V *Gilbert R Mason*

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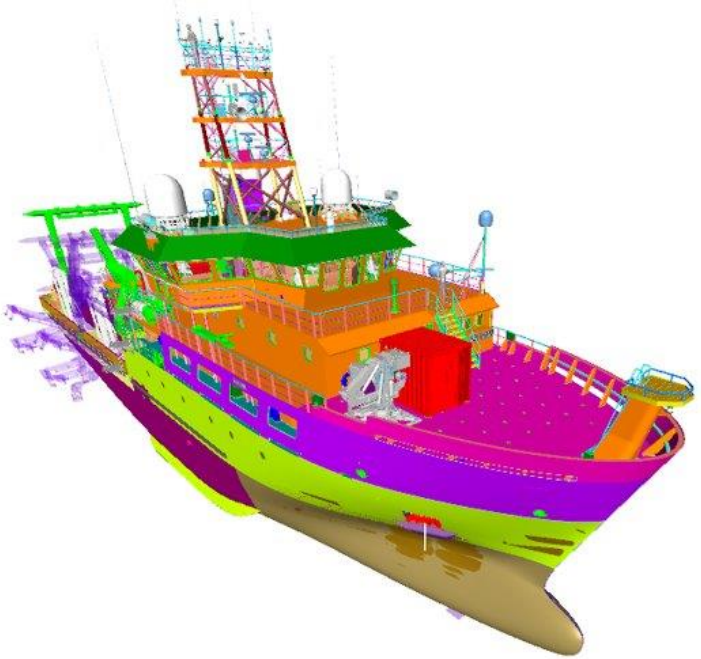
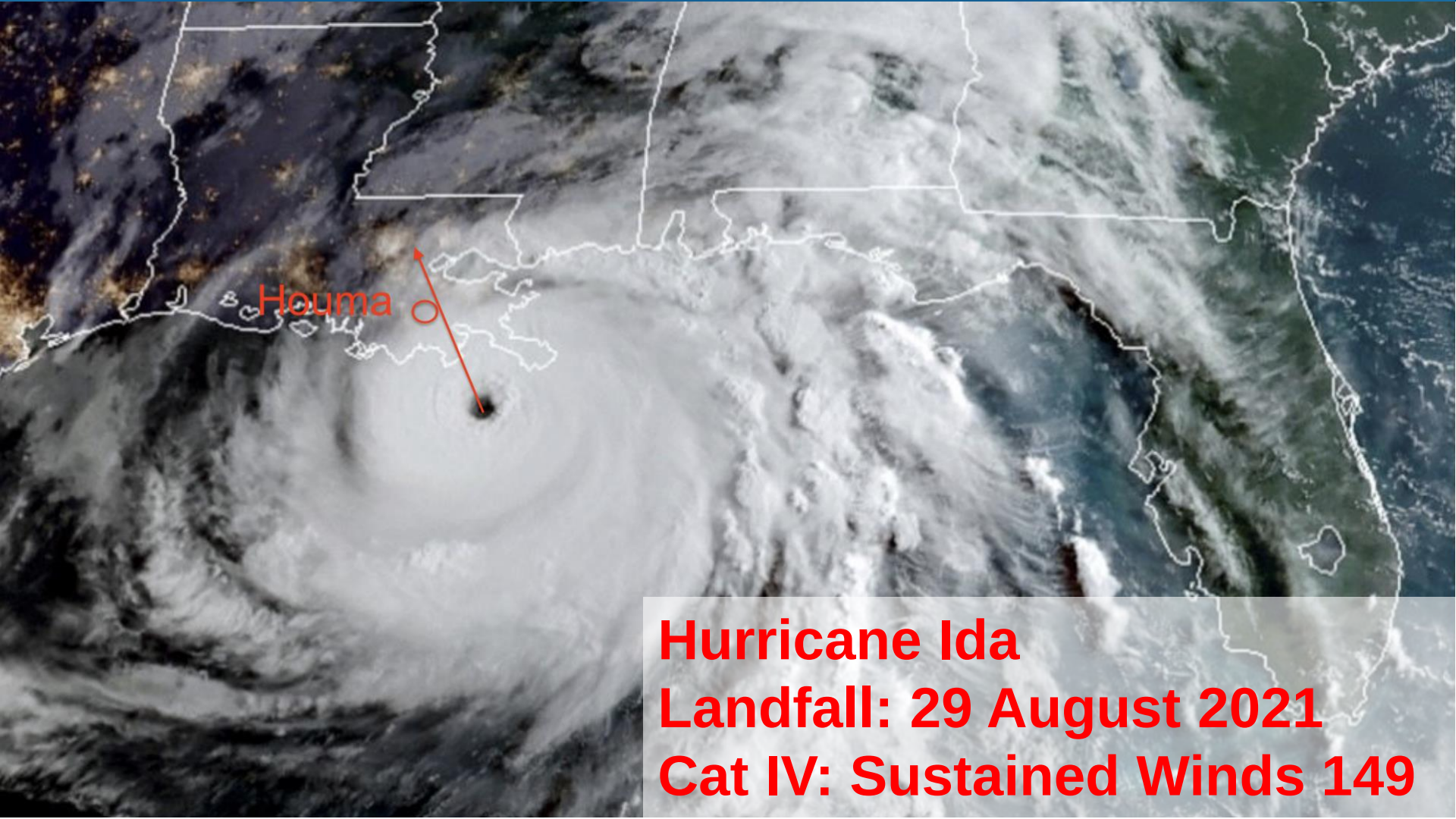
TRIPLEX
KONECRANES

Do embrace the challenge




Houma
Hurricane Ida
Landfall: 29 August 2021
Cat IV: Sustained Winds 149


NOAA | © MapTiler © OpenStreetM



Force majeure and Management Reserve

- OSU RCRV Risk Register very clear that multiple weather events like hurricanes are included but only with minor impacts of a few days of schedule extension. A major hurricane direct hit was off project.

- OSU RCRV Shipyard Contract very clear about Force Majeure events.
  - Shipyard insurance covered physical damage repair and replacement

- Hurricane Ida permanently displaced much of the workforce and NSF MR/Congressional Disaster Relief funds were added to Baseline and Contingency for:
  - Extending the Project Offices marching army
  - Shipyard Contract changes to add incentives for rebuilding the shipyard work force, adding a temporary painting enclosure, and warranty extensions.

Don’t Underestimate the value of Project Controls

1. Project Controls has a seat at the table for decisions throughout the project phases, earlier the better.
2. Major Contracts and all amendments include requirements for reporting and are reviewed for comment by all functions of the project: Procurement, Legal, Project Management, Project Controls, Science, Engineering, and Finance.
3. Reporting requirements for Major Contracts are tailored to the contractor’s processes and abilities.

DO Learn to Love EVM

- “I was opposed to expanding our EVM footprint, but it's required. I was skeptical about the EVM Audit, but it did actually expose some useful gaps and wasn't as bad as it could have been.” –Demian Bailey 2017

DO Learn to REALLY Love EVM

- “The RCRV has built its entire project management structure around its EVMS. The system serves as a vibrant, relevant, and useful tool to provide insights into project performance. But, beyond those insights, it provides control of the baseline and provides a flexible structure for project leaders to manage their scope and, frankly, do their jobs. RCRV Control Account Managers have full buy-in into the project’s EVM policies and procedures. Under the guidance of the Project Controls Specialist, they meet regularly to review project data to discuss and better understand and contribute to what is being presented in financial reports. Project decisions are regularly informed by EVM data, and, moreover, decisions are made compiling the data and simply using the systems on a day-to-day basis.”

–Demian Bailey 2023 EVM Self Assessment

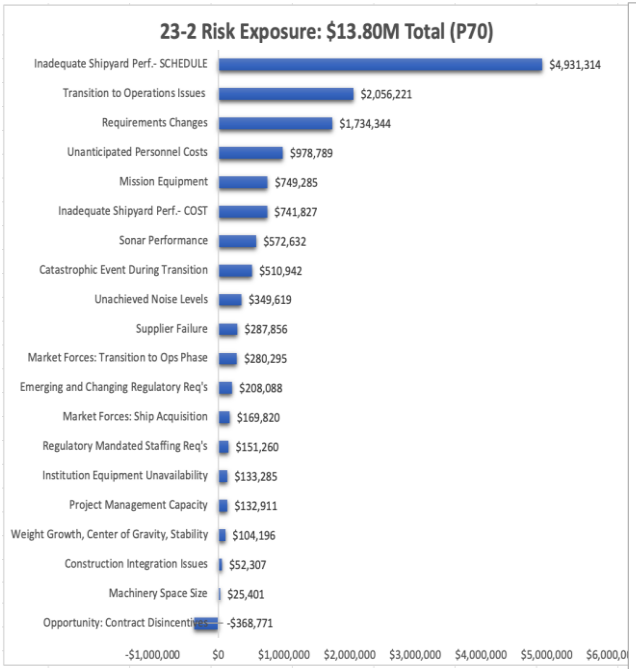
DO: Use a Project Change Request

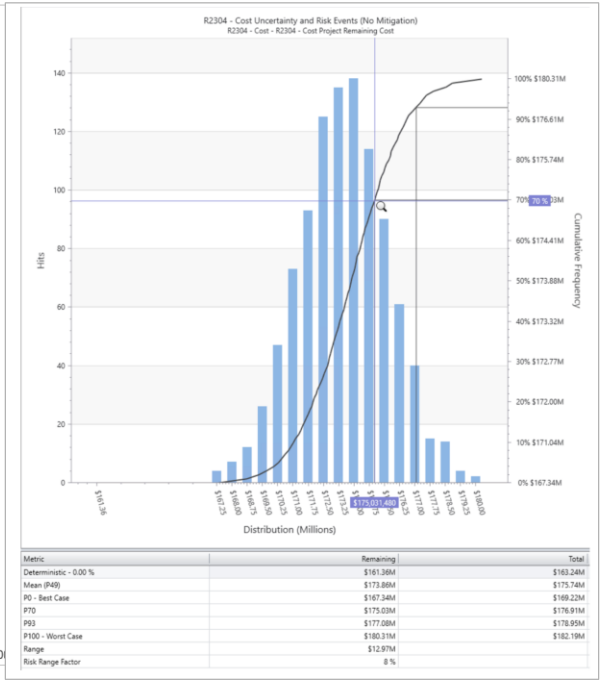
- These are the magic that bring compliance with many of the 32 EIA 748 Guidelines
- Project Change Request are the project diary.
- RCRV has implemented 141 Approved Project Change Requests into the Baseline in the past 53 months.
  - 8% required L1 NSF Approval
  - 48% required L2 PM Approval
  - 32% required L3 CAM Approval
  - 12% required L4 Project Controls Approval

  - 40% moved contingency to BAC
  - 8% moved BAC to Contingency
  - 52% did not affect contingency. These are PP to WP or replanning procurements changes.

Don’t be afraid of risk

- As PI/PM, I do an integrated cost/schedule monte carlo every month





Risk Adjusted EAC (RAEAC)	January Report	February Report	March Report	QMR 23-2	April Report	Notes	Key
Month of Financial Data	Jan-23	Feb-23	Mar-23	Mar-23	Apr-23		
Risk Register Update Date	Feb-23	Feb-23	Feb-23	May-23	May-23		
TPC	$391,476,851	$391,476,851	$391,476,851	$391,476,851	$391,476,851		Total Project Cost: Budget + All Contingency
BAC	$365,585,511	$368,149,116	$368,179,962	$368,179,962	$368,186,347		Budget at Completion. This is the planned budget with all changes to the PMB (not liened) incorporated (deterministic)
R/ETC	$182,393,560	$181,955,229	$178,748,938	$178,752,903	$175,031,480		Risk Adjusted ETC at P70: Generated from the Acumen Monte Carlo (Look ahead) (Attachment A1) (probablistic).
Actuals	$195,924,403	$198,422,987	$201,145,548	$201,145,548	$204,745,242		Cobra generated Actuals
R/ETC + Actuals	$378,317,963	$380,378,216	$379,894,486	$379,898,451	$379,776,722		Risk Adjusted EAC (Estimate at Completion). Expected final budget given known risk exposure (probabalistic). No leins.
(R/ETC + Actuals) - BAC	$12,732,453	$12,229,100	$11,714,524	$11,718,489	$11,590,375		This is derived risk exposure at P70
Risk Exposure (From tornado Diagram)	$14,557,000	$14,046,000	$13,797,000	$13,802,000	$13,669,000		
TPC - (R/ETC + Actuals)	$13,158,888	$11,098,635	$11,582,365	$11,578,400	$11,700,129		This equates to how much contingency is available if to finish exactly on budget given P70 risk exposure (probabalistic)
Realized and Planned Liens	$12,596,333	$10,406,309	$11,430,523	$11,430,523	$9,679,614	The cost of delay lien was recalculated more accurately, lowering exposure	All known Liens (and potential liens from risks or residual risk that that won't be retired when realized)
BAC + Liens	$378,181,844	$378,555,425	$379,610,485	$379,610,485	$377,865,961		This is is the BAC with all outstanding (approved) changes applied to the PMB
TPC - (BAC + Liens)	$13,295,007	$12,921,426	$11,866,366	$11,866,366	$13,610,890		This is hc applied t
R/EAC + Liens	**$390,914,296**	**$390,784,525**	**$391,325,009**	**$391,328,974**	**$389,456,336**		**Foreca is the k**
Known Management Adjustement	$0	$0	$0	$0	$0		This PM for the fa
Delta C	$562,555	$692,326	$151,842	$147,877	$2,020,515		This is th Estimate Liens)
R/ETC + Delta C	$182,956,115	$182,647,555	$178,900,780	$178,900,780	$177,051,995		This is th
Project Confidence Level	78%	79%	73%	73%	93%	The cost of delay lien was recalculated more accurately, lowering exposure and raising confidence.	This is th without additional mitigation. It is found by entering the Cost Histogram with R/ETC+Delta C.

R/EAC + Liens	**Forecasted final project cost P70 (probabalistic). This is the key metric required by the NSF RIG.**
Known Management Adjustement	
Delta C	This is the delta between Total Project Cost and Risk adjusted Estimate at Complete (TPC-(R/ETC+Actuals + Realized and Planned Liens)
R/ETC + Delta C	This is the R/ETC necessary to finish on budget.
Project Confidence Level	This is the % confidence that the project will finish on budget without additional mitigation. It is found by entering the Cost Histogram with R/ETC+Delta C.

A few More Do's and Don'ts

- DO Align your Business Systems section of the PEP with the BSR functional areas to facilitate the BSR. And align your Project Reporting section of your PEP with the ANSI EVM Criteria to facilitate your EVM Audit.
- DO Assume positive intent. NSF wants to see your program succeed as much or even more than you do. They have a different set of demands that trickle down. Be open to their direction... but think critically about it and push back where warranted, but do your homework.
- DON'T hide scary issues. Air your dirty laundry. Bring up sticky issues early and often. Even (or especially) those that you think NSF won't want to hear.
- DO Treat NSF as "US" rather than "THEM"


TAANI
RCRV
LAUNCH

5/18/23: Launched
Q3/25: Ready for Funded Science