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Pacific Northwest National Laboratory (PNNL)

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Organization:

PNNL is a research institution that is tackling some of the world's greatest science and technology challenges from improving America's energy resiliency to

Craig Maloney has worked in project risk management since 2009, tackling massive scale projects. Performing project risk and program risk management, Craig has dealt with 1000s of risks in his portfolio. As a guest speaker at the 2020 Safran Online User Conference, Craig spoke to us about how switching to Safran Risk for megaprojects has enabled PNNL to transform the way it approaches

project risk, and helps handle the complex risks, schedules, and insights involved.

The Situation for PNNL

There are enormous threats and opportunities when working on expensive and complicated megaprojects with lots of risks, specifically regarding saving or wasting significant amounts of time and money. Only by carefully managing risks through intelligent investment in the right handling actions can they be taken care of in the most cost-effective way.

PNNL works on megaprojects that involve thousands of activities, links, and risks and they found that a traditional risk analysis tool couldn't handle the complexity they required of it. PNNL sought to find new, innovative ways of achieving higher levels of efficiency to deal with their vast volume and frequency of risk analyses. After looking at the available tools on the market, they chose Safran Risk.

The Right Risk Analysis Tool

"[Safran Risk] helps us understand what is a handling action implication? When it's funded, how much is it going to cost? How impactful is that cost, so we can later evaluate with the results what is good 'bang-for-the-buck' for implementing handling actions."

Safran Risk has been a huge improvement in how PNNL approaches risk. Where analysis in OPRA may have taken them hours for a case with 1,000 or 2,000 iterations, Safran Risk enables them to complete a 10,000-iteration case in less than ten minutes. Safran Risk has proved itself to be what PNNL needed, having helped them complete risk analysis with record efficiency on their large, complex projects.

Safran Risk's ability to provide complete visibility from a single application has helped PNNL conduct

strengthening the national security, with specialisms in chemistry, earth sciences, and data analytics.

Goals:

Intelligently invest in the right risk mitigation actions to save time and money in the most cost effective way.

Streamline the risk analysis process and get it to manageable level that doesn't need a rework every month.

Safran Benefits for PNNL:

Safran has been a huge improvement in how PNNL approaches risk, drastically reducing analysis times and hands-on interactions. The ability to access the Safran database to identify and fix common schedule problems has enabled PNNL to simplify and streamline its own custom tools.

their analysis across the whole of their project's lifecycle. Safran Risk is able to drive timely insights while handling complex schedules and risks.

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Tackling Massive-Scale Risks

PNNL uses an external risk register to ensure the risks are assigned to the right activities. The scale here is enormous – over 6,000 activities in the example schedule alone. The goal for PNNL has been to automate a tool to streamline the risk analysis process and get it to a manageable level where they don't have to rework it every month.

In the example schedule Craig produced, the scale spanned over a decade – 11 years in fact. With over \$2bn in unescalated costs, the schedule was massive. The schedule showcased the complexity and scale of PNNL's risk analyses. When explaining the problems caused by a schedule of this size, Craig noted how difficult they become to predict.

“This is a size of schedule that doesn't lend itself well to intuitive thought, as to understanding what the interactions are going to be when an individual risk happens. You can't just predict it. There's too many potential critical paths.”

On the Safran Risk project risk register, Craig delved into a particular risk with a minimum impact of up to 1 month, with a maximum potential impact of 4 years. Regarding the cost, the minimum impact was

\$50,000 – but the maximum reached as high as \$6m, with a 40% probability of occurring.

The reality is in most projects, there's a finite amount of funding available. What an individual risk owner might think is a good idea may not be agreed to by the overall project manager. When this happens, funding may be prioritized elsewhere. A typical model then, will assume that you have both a pre- and post-mitigated case, where it's either before you've taken any actions, or you've already taken them, and they've been successful.

Craig discussed the two possibilities, where you might be performing an action that you know has a 90% success rate, compared to developing a brand-new technology where that success rate is much less likely. In the example case, PNNL believed the risk had a good chance of being funded and a strong success rate likelihood – this meant they could drop the probability, which in turn, decreased the risk impacts greatly, seeing the schedule impact decrease from 800 days to 200 days. Safran has the capability to handle these complex risks where complex logic is involved.

Parent & Child Risk Management in Megaprojects

PNNL has created an innovative way of mitigating multiple risks throughout the schedule. By implementing a handling action at the parent level of the risk, they can mitigate the entire family of risks in one go.

This handling action allows them to model where they have risks impacting different points of the schedule. Even if they aren't the same cost and schedule impact, they're risks that affect different critical paths. Thanks to this visibility, PNNL discovered that the risk itself may be able to be mitigated by a single action that applies to all the

risks at once.

Estimating uncertainty is key. PNNL applies uncertainty bands in Safran Risk to all risks, which is a feature inherently available in Safran Risk.

By using correlation within Safran Risk, PNNL can take a whole family of risks they believe are similar enough and then use a single handling action to deal with all the child risks at once. Oftentimes, the models have to be broken down to different levels to understand the implications, but it actually makes more sense to apply a single mitigation action to try and mitigate multiple risks.

The Safran Difference

Safran Risk was the perfect tool for PNNL, able to perform and handle the complex risk analysis required of it. In particular, there were several aspects of Safran Risk that really made it stand out as the ideal risk management tool for dealing with megaprojects.

Safran Risk's ability to handle scale and complexity means that smart, informed risk-mitigation decisions can be made to invest remediation funds in the best way possible to save time and money. Where PNNL is concerned, the opportunities to save time and money on megaprojects are equally massive, so being able to do so is a high priority.

Improving efficiency was a big focus for PNNL, and Safran Risk enables big risk analysis workloads to be completed with automation and integration. This improves PNNL's overall efficiency, and the value for money they deliver to their client - the US Department of Energy.

PNNL also saw the benefits of being able to work collaboratively with Safran to produce the best product possible for them. By responding quickly to client suggestions, changes and decisions can be made - now, PNNL is able to enjoy a feature they

suggested, which helps them consider the true ROI of any risk mitigation idea. Thanks to this, they make smart recommendations, and US Department of Energy projects get delivered faster and cheaper than before.

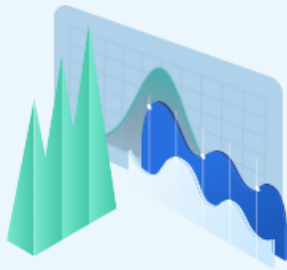
Most crucially of all however, the Safran difference is about the service - we love working with PNNL, and happily, they feel the same.

“We’ve looked at other tools and evaluated a bunch of them – Safran Risk is the way we’ve chosen to go and we’re excited and happy to have done so.”

An Introduction to Safran Risk

Sign up for a free learning session and discover the power of integrated cost and schedule risk analysis.

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