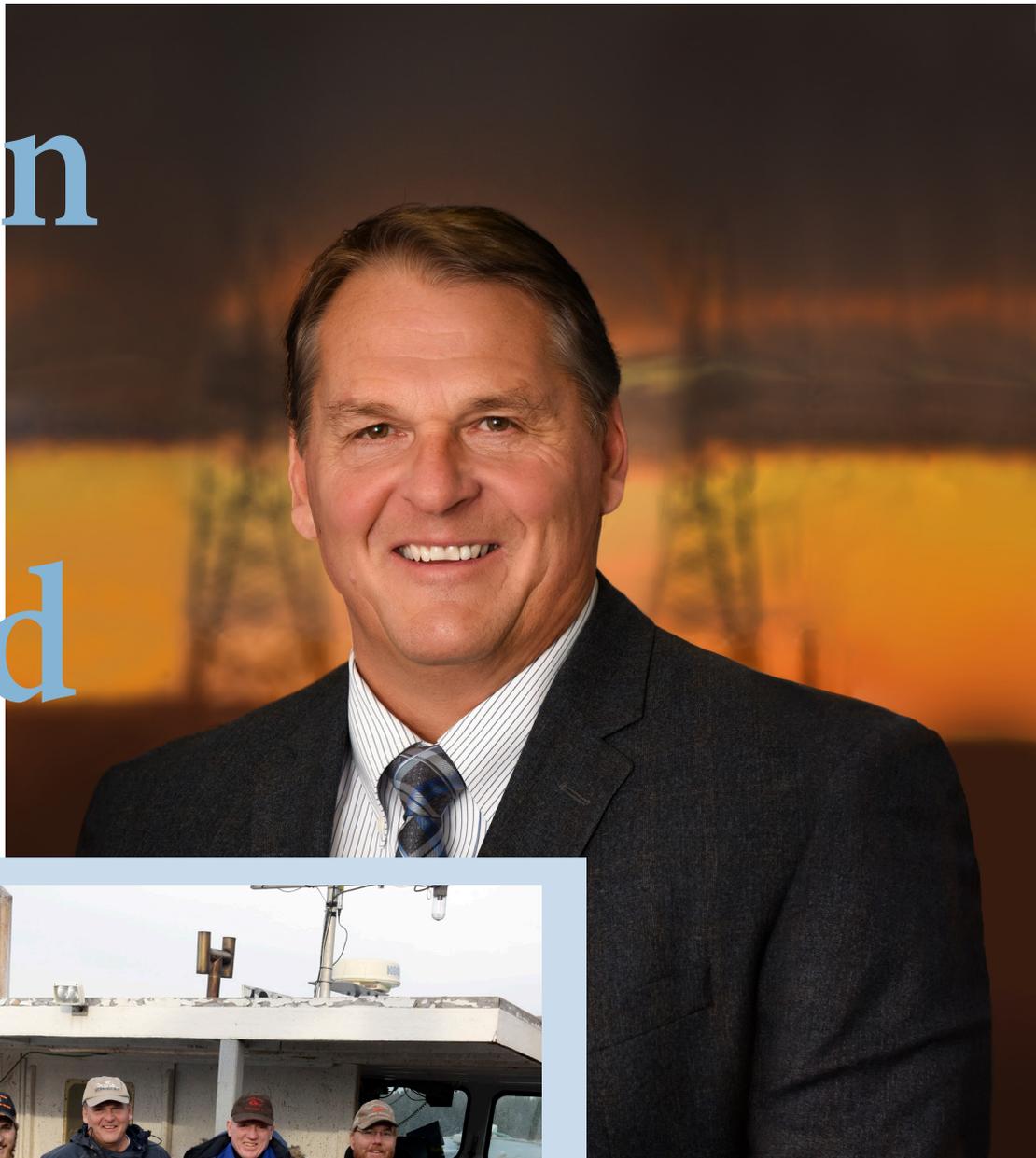


Salt in the Blood



**A nuclear leader finds himself at home
on the Bay of Fundy**

Spotlight on operators:
Brett Plummer, VP Nuclear & Chief Nuclear Officer

Salt in the blood

A nuclear leader finds himself at home in the Bay of Fundy

When Brett Plummer came to Point Lepreau two years ago, he brought a bred-in-the-bone understanding of the sea, nuclear plants and the people who rely upon both for their home, food and livelihood.

New Brunswick Power's Point Lepreau nuclear plant is tucked into the northern shore of the Bay of Fundy, in the Musquash local service district, less than 50 kilometres west of Saint John.

The Bay is also home to Fundy National Park, where thousands of visitors come each year to experience the world's highest tides and rarest whales along with dinosaur fossils, semi-precious minerals, waterfalls and trails. The Bay's eco-system has made it a national treasure and home to a thriving fishing industry run by a tightly-knit community.

About 300 miles from the Bay sits Westport Island, Maine, another tightly-knit community whose population of under 700 swells to 1,200 with the summer's tourist season and where a fresh lobster dinner is never hard to come by.

The two towns share a reliance on the sea. They also share a common resident in Point Lepreau's Chief Nuclear Officer, Brett Plummer, a commercially-licensed lobster trapper, who calls both home.

Plummer joined New Brunswick Power in November 2015,

On the cover: (Top) Brett Plummer in his office with the sun setting over Point Lepreau. (Bottom) An avid fisherman with a commercial lobster trapping licence in Maine, Plummer found himself in familiar territory on a fishing boat with (l-r) Brent Ingalls, Joe Abbott and Captain Jeff Abbott.
Photos courtesy of New Brunswick Power

three years to the month after Lepreau, a single-unit, CANDU 6 plant, had returned to service from a mid-life refurbishment. Plummer has spent more than four decades in a nuclear career that included 18 months at the Institute of Nuclear Power Operations (INPO), where he recalls visiting the best-run nuclear plants and the worst. His time at INPO is coupled with deep operating experience in operations and projects at Maine Yankee and Seabrook Station (outside of Boston) as well as life in the U.S. Navy, where for a time, he lived on a nuclear-powered submarine. It's an experience that gave him a healthy respect for two things: reactors and teamwork.

At Seabrook, where Plummer was operations manager, he says, "We created a vision of what we wanted to become, and got everyone engaged and working towards common goals. In a relatively short time, we moved from the middle of the pack to become one of the top performing nuclear power plants in the world." It is a level of performance Seabrook has maintained in the years since, he says. It is a feat Plummer and the Point Lepreau team is now working to achieve.

From project to operations

Back in the fall of 2012, Point Lepreau was celebrating project completion after a long, hard-fought refurbishment. It was also facing fatigue from the rigours of the multi-year project. Many long-time employees, with deep plant knowledge and experience, had been holding on to see the project through to completion. Now, with the refurbishment

accomplished, they were ready to retire and pass the baton. As a transition strategy, New Brunswick Power hired a seasoned management team, including a CNO, from Ontario Power Generation, to give the station experienced leadership as it got its operational feet back under it and started to rebuild its own human resource. The strategy allowed the station to benefit from being part of a larger fleet on which it could draw experience and resource in the short term.

Paul Thompson, a key member of the leadership team during the project period, recalls the challenges the station faced during those first few transitional years. He says the Point Lepreau team had a big learning curve moving from a project mentality back into an operational one



Brett Plummer and the Point Lepreau Nuclear Generating Station team have created a 'teaching' culture to help integrate new staff and re-enforce operationally-focused behaviours in the plant. Above, Plummer (top right) with some members of his team in the PLNGS training simulator. (l-r): Leah Belding, Shift Supervisor-in-Training, Gerry Fairweather, Shift Supervisor and John McNiven, Licenced Control Room Operator.

Photo courtesy: New Brunswick Power

while at the same time working to maintain historical knowledge despite the departure of retirees. As well, he says, plant equipment that had not been part of the refurbishment scope remained on the maintenance log all while the plant was working to produce power and hire and train the new workforce. It was a tough combination of factors and the plant suffered from a high forced loss rate in 2015.

Despite the setbacks, when he arrived late that year, Plummer says, the mindset shift back into operations was starting to take hold.

“There was a lot of work done around establishing a solid set of behaviours, prior to my arrival,” recalls Plummer. “And, the team had excellent corporate support for this as well. We needed to continue to build on that and build the trust within the organization. We are really here together to get this plant to excellence and it’s to everybody’s benefit to do that. I am not sure everyone saw that, initially.”

If people were starting to understand *what* to do, they did not necessarily yet understand *why*, he says.

Controlling the plant

The golden rule of reactor safety is there is no risk to the public and environment from nuclear operation provided the reactor is controlled, the fuel is cooled and the radioactivity, contained. If there was a nuclear bible, control – cool – contain would be part of the 10 commandments. As Plummer talks about his focus at Point Lepreau to date, the word control comes up a lot.

The team, he says, “had to learn how you get ahead of the plant and control the plant instead of the plant controlling you. One of the things we had to learn was you don’t just wait and react and fire fight. You get ahead of it and control it...we don’t want to fire-fight short-term equipment issues.”

After the unplanned outages of 2015, he says, “We had to do a lot of immediate work on equipment reliability. We really needed to change the mindset when it came to equipment reliability and condition monitoring to a prevention culture.”

Plummer says the station took the equipment reliability effort in phases: The first was to assess the plant to ensure there were no immediate vulnerabilities to challenge the plant in the short term. The second was working with system engineers and bringing in mentors to teach and model excellent condition monitoring and walk down of the plant systems; and the third was focused on a longer-term solution: creation of a dedicated team whose job was to reconstitute the reliability documents and processes to ensure the plant was on the leading side of latest methodologies.

To gain the breathing room they needed to further develop the long-term plan, they started pegging off short-term equipment issues with razor-sharp focus that began every morning with a review to understand what the issues were, the associated risks, the appropriate measures and contingencies and to confirm the issue could be resolved in a timely manner.

While the plant is still working on the timeliness, Plummer says, “We are much, much better at identifying the issues

and trying to get ahead of it. That was one of the immediate aspects of moving from construction to operating and being in prevention mode versus reacting.”

Building the team

Once Plummer established the new leadership team, one of their first actions together was to develop a leadership boot camp, which was rolled out across the entire employee

“When you have a culture of teaching and you show people how it should be done, and you explain why it should be done... then people will see the benefit and change their behaviour accordingly. And that’s what we are seeing.”

population of more than 1,000 people, including contractors. (There is no differentiation between employees and contractors at the plant, Plummer says, adding everyone is equal in both learning and accountability.)

The goal was to help every person see their own role within the operation and to understand how they personally impact the station’s goals.

A vision to achieve excellence requires a long-term plan that everyone can look at and know what part belongs to them. But before that could happen, Plummer and his leadership team had to do a lot of listening to hear what people had to say about the challenges being encountered across the plant. Once they understood the issues, they worked to transparently address them; in a way people could visibly see what was being done with their concerns and how the planned improvements will take effect.

“We want to get people to the point they trust the leadership and actually feel like they’re part of the team and contributing,” says Plummer. “It’s one team with trust that had to be established. And, I think we are at that point. I think we have established that and we’re rowing in the same direction. We’ve established a team; we’re moving forward together toward excellence. Now if we empower and engage people, we should see that rate of change toward excellence increase.”

Part of the ongoing work has been the continual hiring and training of new employees as Lepreau manages its aging demographic, a task that will stay with them over the next several years as more retirement dates arrive. The arrival of so many new faces provided an opportunity to establish a “culture of teaching,” says Plummer.

“We had to teach the organization how to run an excellent nuclear power plant. When you have a culture of teaching and you show people how it should be done, and you explain why it should be done -- which is one of the emphases of the leadership boot camp -- then people will see the benefit and change their behaviour accordingly. And that’s what we are seeing.”

Training is a big day-to-day focus at the station. There are



The Musquash Fire Rescue Department is a key partner in emergency preparedness for Point Lepreau. Chief Wayne Pollock (second from right) is also co-chair of the plant's community liaison committee. *Photo courtesy: New Brunswick Power*

three control room operator courses running concurrently, dynamic learning activities have been introduced and black belt mentors have been engaged to help the team with the learning curve. For some of the new hires, this includes translating skills honed in another industry and learning how to apply them to nuclear, with its own set of specific requirements. Each time there is an unplanned event whether at Lepreau or elsewhere in the industry, Plummer says, it is a chance to stop and to learn.

"The safety culture aspect is extremely important and the new folks coming in, through no fault of their own, need training to truly understand the importance, significance and the uniqueness of running a nuclear facility. We give folks training in that regard. A large part of the leadership boot camp was focused on the nuclear safety aspect, based on understanding the safety versus production balance, and making sure they're always tilting in the safety position," he says. "One of the things we have recently rolled out is how even in the most routine, perceived low-risk task, you need to run this plant like a nuclear professional, every day."

With his depth of experience, it might have been tempting for Plummer to simply draw up a plan himself for others to execute. But, he is emphatic that every person on the team needs to go through the learning process, assume the ownership and drive the change in their areas of accountability if Lepreau is going to achieve excellence.

He is excited now to see people gaining confidence and momentum in their own program areas and starting to reach out for benchmarking opportunities to bring new ideas back to the station for implementation. It is evidence, he believes, of the learning taking root.

Part of a village

If forms of electricity generation had personalities, nuclear's footprint requires it be an extrovert. With its size, power and

potential to impact the environment, economy and well-being of citizens (positively or negatively), it is the big kid who cannot hide in the crowd.

Similarly, the plant is also impacted, for better or worse, by its surroundings and the people who inhabit them. Just like what is happening with the internal team, Plummer and his team need a trusting symbiotic relationship with its communities for the plant to thrive.

For Plummer, the Point Lepreau community, its geography, its people and habits is very much like those he has lived in all his life. It is, as they say, a cultural fit.

From First Nation communities, to local officials, residents, children's groups, members of the fishing community, as well as labour groups representing employees and contractors, there are many active partners who have

contributed to the station's plan through their input. Many do more. They are partners who help improve the outcomes of the community and the station. This includes both near-site neighbours and those further afield who have a keen interest in the plant's effect on people and the environment.

Earlier this year, the Lepreau team took a road trip visiting Dipper Harbour, Saint John and St. George, to host open houses for people who may not be part of the immediate community but have an interest in the plant just the same.

"Those public meetings, open houses, were done by volunteers from the station and the surrounding communities," says Plummer who describes how the volunteers set up information stations representing all facets of plant activity. "Part of it is for the public to understand it is their neighbours and their community members who are running these facilities, not a bunch of strangers."

A few minutes' drive down the road from the plant is the Musquash Fire Rescue Department. A mighty volunteer force of about 50 responders, the department has always been a key partner to the station. It has become more connected in recent years, reflecting the increased emphasis on emergency preparedness. Fire Chief Wayne Pollack is also co-chair of the plant's community liaison committee. Weekly drills and training integrate the volunteer force and station responders who together have developed a cohesive plan should an event ever require their combined efforts. Every one of them knows their way around the nuclear plant with synchronized precision. The department is a partner in response and also in education.

The station also benefits from a strong relationship with its industry partners, including CANDU Owners Group (COG). New Brunswick has been an active leader, through Paul Thompson's participation as a committee chair, to bring the CANDU6 Fleet together to develop strategies for issues of common interest

with a special emphasis on obsolescence management. Thompson has also provided OPEX from the Lepreau refurbishment to help operators going through the mid-life projects now. And in turn, Lepreau has benefited from OPEX, research and peer groups, including one specifically focused on improving equipment reliability across the CANDU / PHWR fleet, a collaborative effort that has paid off with demonstrated improvements in its members' plants.

Early Results

- It is early days and there is still a lot to be accomplished, says Plummer. But already, the plant is getting wind in its sails.
- Today, the plant has a 10-year plan, with planned maintenance outage dates and the names of accountable individuals beside actions. Staff know there is a job for them in that future and they know what it is and why it is required.
- The plant has a vision, a strategy and a road map, communicated in a 43-page pocket handbook people carry with them as a reminder of what they have learned in boot camp and the key station work priorities and goals.
- In early 2017, the station won the EPRI technology transfer award (all CANDU plants are members of EPRI through COG membership) for the work of Jennifer Lennox, a program specialist in the engineering programs group who joined Lepreau just eight years prior to winning the award. Lennox was recognized for her work in the development and implementation of a program to maintain operability, and ultimately protect reliability of heat exchangers. An immediate benefit was improved management of degradation of the seal oil cooler.
- Point Lepreau has reduced its forced loss rate from 17% a year ago, down to 2.74% this year.

Numbers are great, especially when they are in the green. But at shift end, when Plummer makes the quick trek back home to Little Lepreau, the real value of the team's work and those ever-improving numbers, stretches out in front of him. Fishing boats coming in from the day at sea filled with food for thousands of families while kayakers paddle along the shoreline. The air is clear and the local economy is strong. It's just day-to-day life carrying on along this coast he now calls home; a coast and community very much like the one he came from. 

Point Lepreau at CANDU Owners Group

New Brunswick (NB) Power's Point Lepreau Nuclear Generating Station (PLNGS) is a key member of many COG research and development programs, joint projects, peer groups and events. The station also participates in many other information exchange activities through COG to achieve *excellence through collaboration*.

Information Exchange

Other COG members and supplier participants have benefited from PLNGS's participation in COG Collaboration Week, COG/IAEA Technical Committee Meetings and other events and workshops where Point Lepreau staff frequently share their own experiences with refurbishment, post-refurbishment operations and other relevant industry topics such as obsolescence, life cycle and asset management. Through COG, the Point Lepreau team works with industry peers on regulatory issues and standards common industry-wide.

NB Power's Deputy Chief Nuclear Officer Paul Thompson is a COG Board Member and chairs the C6 Fleet Committee. Thompson is a regular speaker at many COG events sharing his wealth of CANDU knowledge and decades of experience. Point Lepreau is a regular participant in COG's OPEX screening meetings and online forums. Each year, COG's online Question and Answer program generates about 200 responses to questions posed in real time across the CANDU industry.

Joint Projects and R&D

The Point Lepreau plant is a member of several COG R&D program areas including fuel channel R&D, safety and licencing, Industry Standard Toolset, chemistry, materials and components and the health safety and environment program. Research has helped Point Lepreau on issues big and small from fish impingement to feeder integrity to development of environmentally-qualified grease.

Through just one of its joint projects, the fueling machine ram seal project, Point Lepreau is expected to significantly improve the reliability of its fueling machines, reducing the maintenance burden and achieving significant savings.

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