

Keeping the water clean at CFB Esquimalt

Every ship in the Canadian Navy arrives in port with oily wastewater swishing around inside its hull.

Now, thanks to some far-sighted work by DND, DCC and their private sector partners, an upgraded oily wastewater treatment plant will clean the wastewater inside the ships that dock at CFB Esquimalt.

The \$2.2 million project is using technology that was developed in Canada with the prototype plant located at a North Vancouver shipyard, said Mike Hubbard, DCC's Contract Coordinator. Not only is this method more efficient, it will allow DND to reduce manpower costs.

"It's technology that's allowing DND to really push the envelope," said Rick Gudz, DCC's Esquimalt Site Manager.

"We're the first base in Canada to be using this," he said. "We had McKay Creek Technology and Associated Engineering put it together as a plant. It's such an efficient process. It's going to reduce the manpower required. It's a first of a kind."

When the Navy's ships are out at sea, their ballast tanks are filled with seawater, which helps balance the ship. But these tanks inevitably turn into a communal cesspool, which, over the course of a voyage, ends up containing oil, diesel and other hydrocarbons that run down through the ship.

"Essentially what you have is seawater, which is heavily contaminated with hydrocarbons," said Mike. "Of course, they can't dump this stuff at sea, so they bring the ship in and treat and separate the hydrocarbons from the water."

DCC and DND worked closely with McKay Creek and Associated Engineers to design and build a plant that links the base's existing plant with the new technology.

"Most of the tanks and the pipes and pumps are from the existing plant — we've just changed the method of removing the oil with an electro-coagulation unit," said Mike.

The new wastewater treatment plant can be used with any ship that can get oil in its bilge water — and that's pretty much every ship. And there are other uses for the hydrocarbons once they're cleaned out of the water.

"Some of the oil can actually be re-used in the boilers on the base," noted Mike.

The bilge water takes quite a journey once it leaves the hull of a ship. It's pumped into two large tanks, via the plant's main sump. A skimmer is run over the surface of the water, which catches the free oil that rises to the top of the tanks. The skimmed oil is then pumped into a separator, which removes



The Floc Separator, also known as the "Volcano," separates the coagulated molecules from the water. The water then enters the sand filters, while the floc, or sludge, is pumped to the pressure filters. This intricate piece of machinery is part of CFB Esquimalt's new oily wastewater treatment plant.

any remaining water. The oil is sent directly to storage tanks for use as fuel in the dockyard boilers.

The remainder of the water in the tanks is pumped from bottom into an aeration tank. Air is added to the liquid, and then passed through the heart of the new process, an electro coagulation cell. This cell contains two electrodes, which turn negative ions to positive ions. These attract each other, which helps the particulate in the water to bind to each other as small globules.

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Sharing expertise at the UXO PMO

A core group of DCC and DND personnel are working together to coordinate the clearance of unexploded explosive ordnance (UXO) across the country.

Their base of operations is the Unexploded Explosive Ordnance Project Management Office (PMO) in Ottawa, which houses the UXO Legacy Sites program. Their work will take staff to sites across the country.

And business is booming.

Jonathon Preston, an Environmental Project Coordinator, is one of eight DCC staff members stationed at the PMO. Personnel began to move into the new office in March 2006.

The PMO officially began its operations in April. At the forefront are Program Director Fran MacBride and Project Director Maj. Matt Braid, both of DND, as well as Anita Peetsma, Communications Specialist for the program.

On the DCC side, Austin Baird is Acting Program Director; Art Mulak is the Practice Area Leader; Rod Watson is providing quality assurance and quality control services; Steve King is providing expertise in geophysics; Mira Pellerin is a UXO technician developing a UXO library database; Michel Vallee is an IT specialist; Anne Clark is providing administrative support; and Jonathon is providing acting project management services.

"We're enjoying the opportunity to help DND set up a program like this," said Jonathon, noting that DCC has been involved in every step of the way, "from day one."

The PMO team is working on several UXO initiatives. Jonathon is heading the risk assessment and clearance of Lac Saint-Pierre, a former CF munitions testing facility in Quebec. Beginning in the mid-1960s, munitions were fired on land as well as into the lake. This continued until 2000, when the range was closed, and the land was turned over for public use.

Lac Saint-Pierre poses one of the most significant challenges for the PMO.

"There are estimated to be several hundred thousand projectiles in the lake," he explained. An additional problem posed by this site is the fact that the range is located upstream from Nicolet, Que.

"Because of ice flows over the last 30 years, there is evidence of munitions scrap being brought downstream, which ends up on the beaches in Nicolet."

Furthermore, the area is home to one of the richest wetlands on the St-Lawrence River. So DND and DCC are working to ensure public safety as well as environmental preservation.

In order to meet these challenges, contractors conducted a shoreline sweep and reconnaissance of the beaches to look for munitions prior to Saint-Jean-Baptiste Day celebrations in June, when the area would be taken over by tourists. The next steps for staff include conducting geophysical surveys of the channels at Nicolet and Landroche, as well as awarding a contract to a project management support company from the industry.

"They will advise us on which technology we should use, what we should focus our efforts



Remnants of unexploded explosive ordnance (UXO) unearthed by the DCC/DND UXO Project Management Office Team. The team is developing standardized contracts, as well as links to DCC UXO personnel in different regions and bases across the country.

on, and how we can best address the problem," said Jonathon.

Military research is also being conducted for the program. Defence Research and Development Canada (DRDC) is assisting in the Lac Saint-Pierre project, providing answers to fundamental questions related to environmental and technological

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Expanding services in the Atlantic Region

A lot can change in six years. Just ask Area Manager Tricia Isnor, who began at DCC in Environmental Services (ES) in 2000.

Back then, four staff were stationed at the Atlantic Regional Office in Dartmouth, Nova Scotia. And the bulk of services offered by the region were primarily construction-based.

Today, the regional office employs 20 staff, and more than half work in ES. The growth being seen by the Atlantic region can be attributed to a number of factors, said Tricia.

First, DND is asking for more environmental expertise. For example, the Gagetown, Greenwood and Goose Bay sites have recently acquired five more Environmental Coordinators in order to meet client needs. Recent major Atlantic projects that centre around environmental cleanup include a contaminated sites remediation project at Goose Bay, a UXO contaminated sites project at Peach Lake, and remediation of a former central heating plant site at 14 Wing Greenwood (see related article, page 3).

DND is also developing a greater awareness of the Atlantic region's services and capabilities.

"It's about making the client more aware of the services we can provide, and the client using those services," said Tricia.

DND's needs in the Atlantic region are also being met directly at the site level. A number of large projects have emerged at various bases across the region. These include the 2 RCR Complex at CFB Gagetown, New Brunswick, the Maritime

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Turning on energy-saving solutions

When it comes to improving energy efficiency, increasing reliability and helping to create environmental sustainability on behalf of DND, DCC is a natural source of expertise.

The Central Heating Plant facility at 14 Wing Greenwood is a good example of the Corporation's ingenuity.



The \$11.6 million Central Heating Plant was built to increase both the reliability and efficiency of the heating system at CFB Greenwood, as well as reduce maintenance costs by 50 per cent. The project was a unique opportunity for DCC, as it involved providing services for the tender and the award of the contract of the boiler system (\$2.8 million) as well as the building construction (\$8.8 million). The new facility replaced two older central heating plants.

DCC provided contract management and tendering services for the construction of the new central heating plant (CHP) project at the base, which opened in December 2004. But the work involves more than unveiling a new facility.

"It's really a series of projects all tying in together," said Atlantic Regional Director Ross Welsman. Remediation of North Side Lower Zeke's Brook began in 2004, and involved excavation of the soil at and below the water table as well as disposal of contaminated soil.

The site recently entered its third and final phase of remediation, after which part of the area will be transformed into Greenbelt land, while other areas will eventually be developed. Eighty per cent of the funding for this project came from the Federal Contaminated Sites Accelerated Action Program (FCSAAP), an initiative created in 2003 for the remediation of contaminated federal government sites.

DCC has been able to carry the project a step further by helping DND to clean up the site. The Corporation is providing services in construction procurement, contract management, and procurement of the design consultant for this \$4.7-million project. The three-year project is scheduled to wrap-up in December 2006.

The \$11.6-million CHP facility was built to increase the efficiency of the base's heating system. It will reduce maintenance costs by 50 per cent, and replaced the original two CHPs at the base, which were more than half a century old. They were demolished in 2005. One of these facilities was located next to North Side Lower Zeke's Brook, a small brook that winds its way around the south perimeter of the base and flows into the Annapolis River.

As with most power plants of its age, it left the soil, groundwater, sediment, and surface water contaminated with metals and other chemicals.

Trevor Rogers, Special Project Engineer at the Atlantic Regional office in Dartmouth, worked on the first phase of the project.

Due to concerns over greenhouse gas emissions, a more modern, technologically advanced facility was needed. The new CHP has low nitrogen oxides emissions in order to meet government regulations, and is one of the most "technologically advanced, least-polluting plants of its type," explained Rogers.

The boilers were chosen specifically to aid in meeting Kyoto Protocol targets. Another technologically advanced feature is the burner management system (BMS), which allows the plant to be run by one operator who monitors and controls the boilers from a computer.

Trevor said one of the most interesting aspects of DCC's role was the procurement of two separate contracts within the same project.

"It was a challenging, yet interesting and efficient way of handling this project," he said.

DCC handled the tendering of the \$2.8 million goods contract for the boiler system as well as the \$8.8 million building construction contract.

"We were involved from the very beginning," he said.

DCC hired the design consultants and liaised with them in order to ensure that DND's requirements for environmental sustainability were fulfilled.

"We wanted to make sure government initiatives were being met," said Trevor.

The CHP currently runs on Bunker C fuel oil, but has the capability to upgrade to natural gas when the service becomes available in the area.

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"To ensure they stay as little globules, a small amount of polymer is added, which acts like a life jacket, which holds them together and makes them float better," said Mike.

This soupy mix is passed through a device called a flocc tank, which allows the particulates, or floc, to separate from the water.

"The floc is pumped through a large filter press which drains off excess liquids. The liquids are returned to the plant for reprocessing. The cake which is left in the filter is taken out and put into bins and shipped off to a toxic waste facility," said Mike.

The water from the flocc tank is further filtered through a pressure sand filter and a carbon filter before being discharged into the municipal sewer.

And while the water may not be drinkable, "it's still as good as seawater; it's still salty," he joked.

"We're now fairly well into this, and look to be commissioning in September."

aspects of UXO. The Quality Engineering Test Establishment (QETE), another branch of DND, will be conducting sediment sampling of underwater UXO across the lakebed to gauge the effect of munitions on life forms.

Lac Saint-Pierre can be seen as a kind of pilot project in UXO remediation, as it is the first one the PMO has undertaken since its formation, said Jonathon. The team is using this project to get consistent systems in place that it will need to use for the clearance of future sites.

Other UXO Legacy Sites that are in the beginning stages of either risk assessment or remediation include the former Consecon Air Weapons Range at Wellers Bay, Ont.; the Southwest Ring Road in Calgary; the former Tracadie Range in New Brunswick; and a former range in Vernon, B.C.

The PMO is also developing standardized contracts, as well as links to DCC UXO personnel in different regions and bases across the country.

“We want one, consistent UXO Service Area,” said Jonathon.

Jonathon said one of the most important aspects of this program is acknowledgement of the fact that past ranges have been environmentally unsustainable.

“We need to recognize this, and use it to plan our future use of ranges,” he said.

Helicopter Project (which is in its infancy) at 12 Wing Shearwater, demolition and renovations of an armoury in St. John’s, Newfoundland, as well as a training facility at 14 Wing Greenwood, among others.

Growth and development is, of course, not limited only to ES. Other DCC services offered by the Atlantic region are expanding as well. These include commissioning, contract management for special projects, and consultant project management.

“We’ve expanded these services, as well as Contracting,” Tricia explained.

To meet DND’s growing requirements, Tricia expects the number of employees to reach 25 by the end of the year.

New hires will include a Manager of Contract Services, three Environmental Coordinators, and more safety professionals.

Because of their experience in working directly for DND, the region also opts to promote current employees in order to meet new demands. For example, Trevor Rogers was promoted to Special Project Engineer, a new position created to meet the needs of that service line; Ross Welsman was recently promoted to Regional Director after the previous director retired; Tricia was promoted

to Area Manager to occupy Ross’s previous position; and Mike MacDougall was recently promoted from Contract Coordinator to UXO specialist.

Business has been booming in the Atlantic Region. And DCC, as always, stands ready to assist DND and the Canadian Forces.

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Defence Construction Canada (DCC) is a Crown corporation with a mandate to provide contracting, construction contract management and related services to the Department of National Defence (DND).



DCC staff in Environmental Services traveled to the Arctic this summer in order to perform environmental impact assessments of seven unmanned radar sites, which are part of the North Warning System (NWS). Shown here is a radar dish located at the Simpson Lake site in Nunavut. The North Warning System includes 47 unmanned radar sites located across Alaska, Yukon, Northwest Territories, Nunavut and down the Labrador coast. The sites are used to gather information about any airborne activity within their coverage area.