

Parks Canada's EAP Contaminated Sites Cleanup

By Frank B. Edwards, 2010

For Parks Canada

Stokes Point, a long sandspit that curves elegantly into the Beaufort Sea, has provided safe harbour to Inuvialuit hunters for centuries. Travellers caught between the whaling grounds of Shingle Point to the east and Hershel Island to the west still escape gales by sheltering in the lee of the 3.5 kilometre spit, traditionally known as Iqpiquuuq.

Three small, makeshift seasonal houses remain on the beach but in a landscape of flat coastal plain and rolling hills, it is the bright white domes of an unmanned short-range radar station that serve as navigational landmarks for families passing through in search of belugas, caribou and berries. Set on top of a moraine, they are the dominant feature on the low horizon.

The domes are the successors to a Distant Early Warning (DEW) military base called BAR-B that brought the realities of the Cold War to the Arctic in the 1950s. Today the radar installation is an anomaly in the tundra wilderness of Ivvavik National Park but it also marks the site of an ambitious contamination cleanup being mounted this summer by Parks Canada.

Using \$6.2 million dollars from Canada's Economic Action Plan (EAP) infrastructure funds, Parks Canada is removing tons of soil tainted by contaminants such as arsenic, lead, petroleum and PCBs – vestiges of the site's DEW line days when migrating herds of Porcupine caribou were only a curious distraction from the business of preparing for nuclear war and ecological integrity was not a serious concern.

By the end of this summer, the Stokes Point site will be safer for humans and wildlife again although it will take several years for the excavation scars to heal over in the harsh Arctic ecology.

Across the country, Parks Canada is investing \$32 million of infrastructure funding in the assessment and cleanup of contaminated sites within its parks and national historic sites. Almost half of the contamination relates to activities that took place long before the land came into possession of Parks Canada but the "contaminated sites" program is about rehabilitating land, not about casting blame.

“Once it becomes a national historic site or park, the problem becomes ours to manage,” explains Dr. Mikailou Sy, a senior program advisor and acting program manager.

Changing environmental standards can also require cleanups that were not previously necessary. “What were once acceptable practices have changed so that new environmental quality standards now apply and all of a sudden you have something that is contaminated.”

Today, he advises Parks Canada managers, engineers and scientists cleaning up dozens of environmental hotspots, including industrial brownfields along the Lachine Canal, a broken pipeline on the shore of Halifax’s McNabs Island, chemical-soaked middens on Alberta’s Bar U Ranch National Historic Site and the remnants of Ivvavik’s old DEW Line installation.

In the two years of the EAP program, Dr. Sy and his colleagues have shepherded 167 projects through the funding and planning process, applying \$32 million to 80 environmental assessments and 87 clean ups. At \$6.2 million, the Stokes Point remediation is the most expensive, largely because of its remote Arctic location. Closer to Dr. Sy’s Gatineau office, the clean up of former industrial land alongside Montreal’s 14.5-km Lachine Canal is perhaps the most complicated.

“Parts of the Lachine Canal National Historic Site property are recreational while others are residential and the different uses have different standards even though they are on the same site,” says Dr. Sy, who has degrees in hydraulics, forestry and plant biology. Adding to the complexity are the different types of soil and differing acceptable levels for various chemicals.

“In order to know if a site is contaminated you have to assess the concentration of each contaminant relative to its land use, the impacted media and applicable regulations.”

The changing use of a site is yet another complicating factor, according to Jean-Claude Prévost, a senior environmental quality advisor for the Lachine Canal cleanup.

The land around a former Stelco plant only became an issue after construction of residential condominiums, he says. “At one time, the park property was undeveloped brownfield with no paths – only a few people used it. But the addition of condos put pressure on Parks Canada to develop the site. Last year, we did an excavation of the

surface soil, replaced it with clean fill and landscaped it with a multi-use path for walking and rollerblading make it more suitable and safer for the people that are now using it.”

Parks Canada began to identify possible contaminated hotspots in national parks and historic sites several years ago and has taken advantage of the EAP funds to start work that would have otherwise had to wait. Since 2003, its list of suspected contaminated sites has grown from 325 to 437 – several of them along the Lachine Canal. (They are included in the Federal Contaminated Sites Action Plan, inaugurated in 2005, which now has 3,500 possible sites across Canada awaiting assessments with 700 remediation projects already underway or complete.)

Contamination clean-up is not simply a case of excavating polluted soil and filling in the hole. Before remediation can take place, each suspected site undergoes a six-step assessment phase to identify the source, nature and extent of the contamination, identify the risk to humans and the environment, and determine the implications of managing or removing the contaminants.

Depending on the site, Health Canada, Environment Canada, Department of Fisheries and Oceans, and the Department of National Defence might become involved, as well as a variety of provincial and municipal agencies.

Remediation usually follows an assessment but sometimes the assessment suggests that it is safer to leave a contaminated site undisturbed, especially when it is underwater.

That is the case in a number of places along the Lachine Canal, a recreational waterway in downtown Montreal that was once lined with a variety of heavy industries such as steel and iron mills, leather and food processing plants, and chemical, paint and textile factories. While the companies used the canal as a source of hydraulic power, many chemicals found their way into the water either through dumping or runoff from the soil that was tainted by the factories.

“There is 150 years worth of sediment at the bottom of the canal,” says Mr. Prévost, who lists zinc, lead, copper and, to a lesser extent, cadmium and mercury, as the main problems. “But there is also a layer of cleaner sediment on top of the old sediment.”

Left in place, that clean sediment can provide an effective barrier between the water and the stew of pollutants beneath it. Dredging would only disturb it, releasing heavy metals into the canal and the St. Lawrence River. While the contaminant levels are

closely monitored, the silt will be left dormant unless there is evidence that contaminants are escaping into the water.

“There was a lot of debate years ago before the canal could be opened for boating in 2002,” explains Mr. Prévost. “The studies that were done concluded that the sediments could be left in place as long as the speed of the boats was regulated so that they don’t stir up the sediments.”

The strip of parkland along either side of the canal receives treatment specific to its use. Land in “transit areas” that attract joggers and cyclists typically have 30 centimetres of topsoil replaced with clean fill, and then are topped with grasses and pathways. Playgrounds and property leased to neighbouring condo owners for backyards receive a more in-depth treatment. Usually a metre of soil will be removed and impermeable membranes set down before new fill is added.

“We could remove less soil and forbid gardening there but it is more complicated than that. You’re never guaranteed that people are doing what they are supposed to do,” says Mr. Prévost.

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Contaminant clean-up is never a simple matter of digging up tainted soil and replacing it with clean fill, but it becomes especially complex at national historic sites that are certain to be of archaeological interest. Archaeological investigations are a standard part of the clean ups along the 185-year-old Lachine Canal as well as all other Parks Canada sites, including the garbage dumps of the Bar U Ranch National Historic Site in southern Alberta.

Originally spread over 360,000 acres and home to 30,000 cattle, the Bar U was one of the West’s largest corporate ranches from 1882 until it was parcelled off in the 1950s. Today, Parks Canada manages 367 acres around the cluster of barns, bunk houses and sheds that once made up its headquarters.

While more than 10,000 visitors a year roam its trails and poke through its 35 buildings, archaeologists have been exploring the ranch’s middens – or garbage dumps – that contain a valuable historic record of ranch life in the 19th and early 20th century. Unfortunately, along with the discarded tools, horse harness and crockery, there are leaking containers of paint and pesticides.

“Early ranchers used to get rid of their garbage by digging a big hole and throwing in whatever they had,” says Dr. Sy. “And, once it was full, they would just cover it up with soil and then dig another hole.

“Today those things that they buried have some archaeological value so we can’t just get rid of that kind of contamination... Instead we are risk-managing the site, stabilizing it rather than removing it.

“ In this part of our work, we have to take into account two things that are core to our mandate: the commemorative integrity of the area, particularly in a national historic, as well as the ecological integrity of the area... We have to preserve the archaeological record.”

Because of the expense of an archaeological dig in a toxic site, the ranching artefacts will remain undisturbed until their recovery becomes a budget priority in the future. For now, Parks Canada will secure the contaminants safely, removing the topsoil with minimal disturbance to the middens and covering them with clean soil over top a membrane that plant roots will be unable to penetrate. Fences will be erected to keep people and animals off the site until natural grasses have matured and cattle can graze safely once more.

Such risk management schemes require regular monitoring to ensure that the contaminants stay in place and do not migrate, as is the case with oil and petroleum products. Heavy metals tend not to migrate because they are more tightly bound to the soil “matrix” but can enter plants through their root systems. The containment strategy’s main goal is to prevent contaminants from reaching people, domestic animals, wildlife and plants.

“It is a balancing act,” explains Dr. Sy. “There are human health concerns if people are drinking groundwater from a well that has heavy metals. So we have to determine how to honour our preservation mandate while addressing the human and environmental risks.

“... but so long as it is not posing a risk to human health or the environment there is no need for further action.”

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In remote locations, clean-ups are approached cautiously because fragile ecosystems can take a long time to heal. Usually, they are given a low priority – unless people or wildlife are at risk of contamination.

Such is the case with the Stokes Point DEW Line station in Ivvavik National Park where military stores of fuel and chemicals began seeping into the tundra a half century ago. Despite the radar station's geographical isolation on the shore of the Beaufort Sea, the pollution it left is being treated as a risk to the health of the local population of Inuvialuit who hunt, fish and pick berries in the region.

Although the original military installation was abandoned in 1963, just six years after its construction, the site was re-occupied through the 1980s by BeauDril, Gulf Canada's marine exploration subsidiary, as an operations base for its Beaufort Sea energy exploration activities. By the time Ivvavik National Park created under the historic Inuvialuit Final Agreement in 1984, Stokes Point was in need of a clean up.

Over the next 20 years, the Canadian and American military tore down many of its buildings, burned off oil and petroleum remnants, and removed some debris in conjunction with the construction of a smaller, unmanned radar facility on the old DEW Line site in 1987. The clean ups were expensive and well-intentioned but they did not include significant environmental assessments; the health-risk of Stokes Point remained undefined until a two-year study was undertaken by scientists from Kingston's Royal Military College and specialists from Parks Canada in 2006 and 2007.

That study showed that besides the unsightly collection of rusting barrels, old building foundations and bits of discarded equipment, pockets of soil contained unsafe levels of heavy metals, pesticides, petroleum hydrocarbons and PCBs. Over two summers, a crew of 85 geographers, engineers, biologists, chemists, graduate students and an archaeologist scoured the area, taking hundreds of soil and plant samples. What they found were traces of lead, DDT, antimony – a metal used to harden lead batteries and bullets – PCBs from paint and electrical transformers, and arsenic.

“It sounds bad,” says eco-system scientist Nelson Perry who is co-lead of the project for Parks Canada. “But it is actually one of the cleaner DEW line sites because of the previous cleanups. Many of the contaminants are just above the safe threshold levels.”

Because Ivvavik is co-operatively managed with the Inuvialuit, the cleanup plan was developed with them as well as RMC's environmental advisory team and groups representing military and wildlife interests. In 2006, several local elders who had worked at the BAR-B site in the late 1950s were invited to tour Stokes Point. During that visit, they assured the scientists that a suspicious-looking hump was a natural feature and not an old landfill. In fact, there were no old landfills explained one elder who had worked there as a young man. All the garbage was simply bulldozed into the ocean.

With the elders' help, the team identified 13 places of archeological interest. None of them were in contaminated spots.

This summer, a crew of two dozen workers will fly in for a six-week long clean up. Overseen by representatives from Public Works and Parks Canada, they will load the contaminated soil into large "sea cans," the ubiquitous shipping containers of the North, and loaded onto barges for disposal in Alberta. Old drums, building debris and machine parts will be sent to a landfill in Inuvik, a 400-kilometre barge ride away. The excavations will be filled with gravel from an old pad left by BeauDril. Once a series of new soil samples are tested for contaminants, the crew will leave the site to recover at its own speed.

"It won't look much different than it does right now," says Mr. Perry, a native of Newfoundland who moved to the region 15 years ago to work as a science teacher before becoming an environmental scientist. "The surface debris will be removed – chunks of tracks from old cats and pilings will be gone – but the site won't look much different. Actually for a number of years it may look more disturbed as the backfilled areas naturally revegetate."

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Back in his Gatineau office, Dr. Sy has recently added the 437th site to his contamination list. At Terra Nova National Park in eastern Newfoundland, an old chemically-treated deck at the visitor facility was found to be rotting.

"It was a use that was acceptable long ago but now we have to react. We had to register it as contaminated and then we had to assess it and take action."

In his line of business, there is no shortage of projects. A year ago, an old navy pipeline on Halifax's McNab's Island was discovered leaking oil on land that had recently been transferred from Parks Canada to a provincial park. Meanwhile the new

Torngat Mountain National Park in Labrador has issues with abandoned fuel caches of rusting and a fuel leak in Jasper National Park has spread into ground leased to a communications company for a major telephone signal booster.

“Damaging the telephone facility during a clean up could disrupt phone communications and cost millions to repair,” says Dr. Sy, adding somewhat modestly. “This can be a complicated business.”

As Parks Canada approaches its centennial anniversary in 2011, it will have made a significant dent in Dr. Sy’s complicated list of contaminated sites thanks to the two years of EAP funding. The results may not be as readily visible as refurbished fort walls or new bridges but the clean up is an important part of the legacy that the agency leaves to Canada.