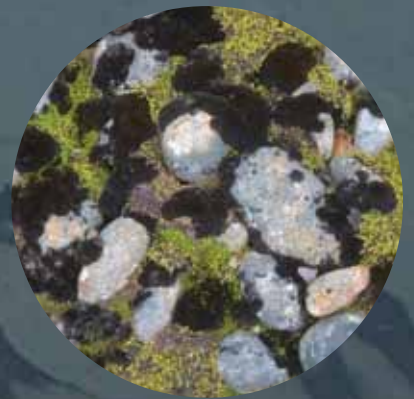
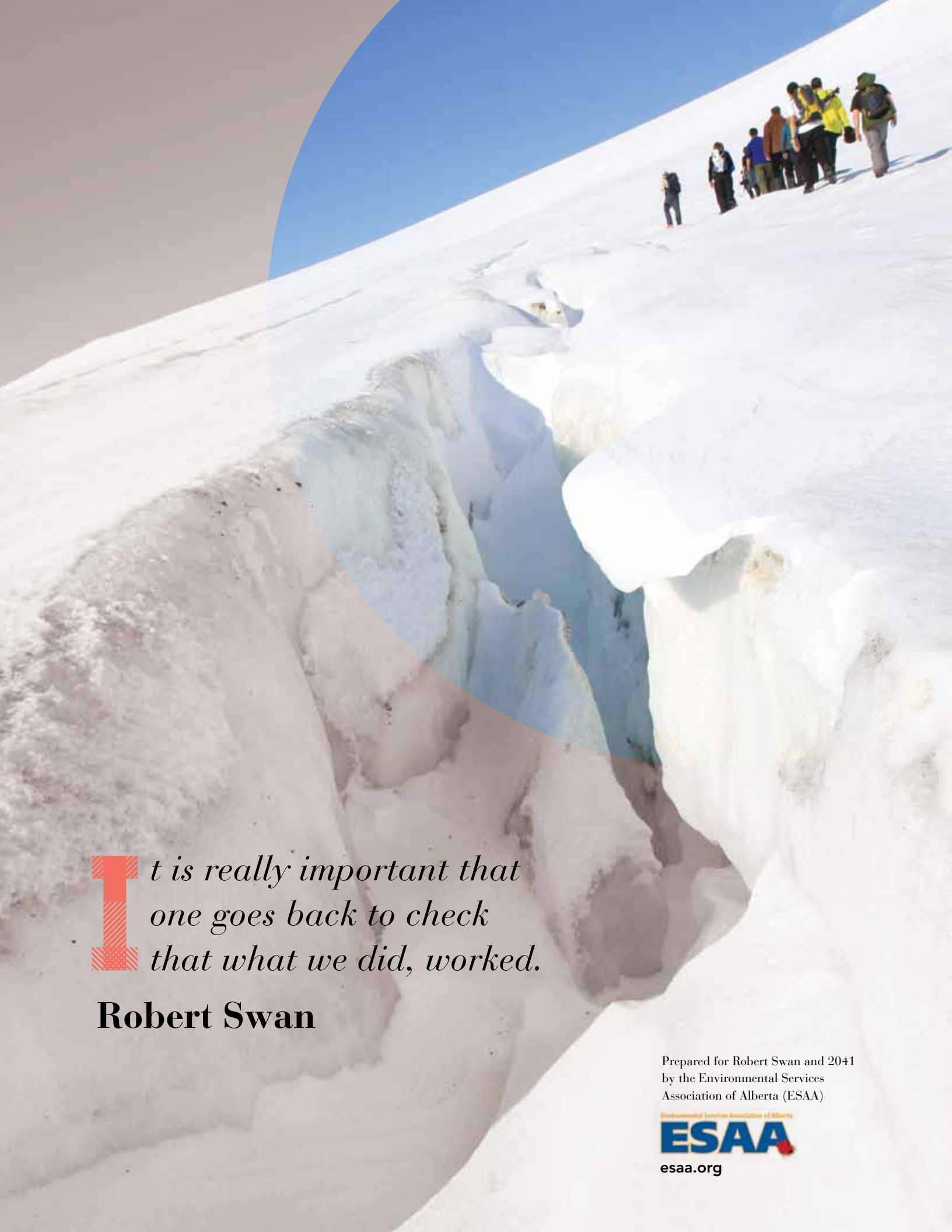


ANTARCTICA CLEANUP

THE STORY OF BELLINGSHAUSEN STATION





I *t is really important that
one goes back to check
that what we did, worked.*

Robert Swan

Prepared for Robert Swan and 2041
by the Environmental Services
Association of Alberta (ESAA)

Environmental Services Association of Alberta
ESAA
esaa.org

ANTARCTICA CLEANUP

THE STORY OF BELLINGSHAUSEN STATION

“Antarctica has a garbage problem.” That’s how Robert Swan starts the chapter on Bellingshausen in his book, *Antarctica 2041: My Quest to Save the Earth’s Last Wilderness*. As a testament to his action-oriented life, he decided to do something about it and went on to lead the largest single cleanup of garbage on the continent.

This is the story of the international effort that accomplished what some said could not be done and what many had never tried or cared enough to do before. It is the story about the hundreds of people who volunteered to help and who continue to preserve the beauty and fragile environment on the continent, inspiring others with their work. This is the story of Canada’s involvement with the Bellingshausen station cleanup and 2041’s continuing legacy of positive change and environmental awareness that reverberates around the world.



Robert Swan, OBE

Michelle Barkhouse, part of the IAE 2011 expedition, joined ESAA Team Canada when they visited the Bellingshausen tank farm on March 15, 2011.



THE SHORT STORY

In 1996, polar explorer Robert Swan took 35 young people from 25 nations to Antarctica in support of his organization; 2041 – a global initiative to preserve the continent. With the cooperation of volunteers and the Russian government, Robert Swan and his team set out to remove and recycle over 1,500 tonnes of waste from the Russian research station at Bellingshausen, King George Island, located off the Antarctic Peninsula (see lower left on map). Five years later, through the team's enormous fundraising effort, planning and project execution, the waste and debris was finally consolidated and removed from the continent for recycling and proper disposal.

In October 2010, at the Environmental Services

Association of Alberta (ESAA) Remediation Technologies Conference in Banff, Canada, Robert Swan delivered a passionate keynote address that challenged the ESAA membership to get involved with helping to preserve Antarctica for future generations. Robert wanted the knowledgeable Canadian cold-weather soil and cleanup professionals to investigate the current environmental conditions at Bellingshausen – ten years after the cleanup – and provide a report for him to take to the Earth Summit in Rio de Janeiro (Rio+20) in June 2012. In response to Robert's challenge, five members collaborated to form ESAA Team Canada and joined the 2041 Inspire Antarctica Expedition (IAE) in March 2011.

TIMELINE: BELLINGSHAUSEN STATION

1959 Antarctic Treaty signed as world leaders recognize the need for shared and neutral management of the continent.

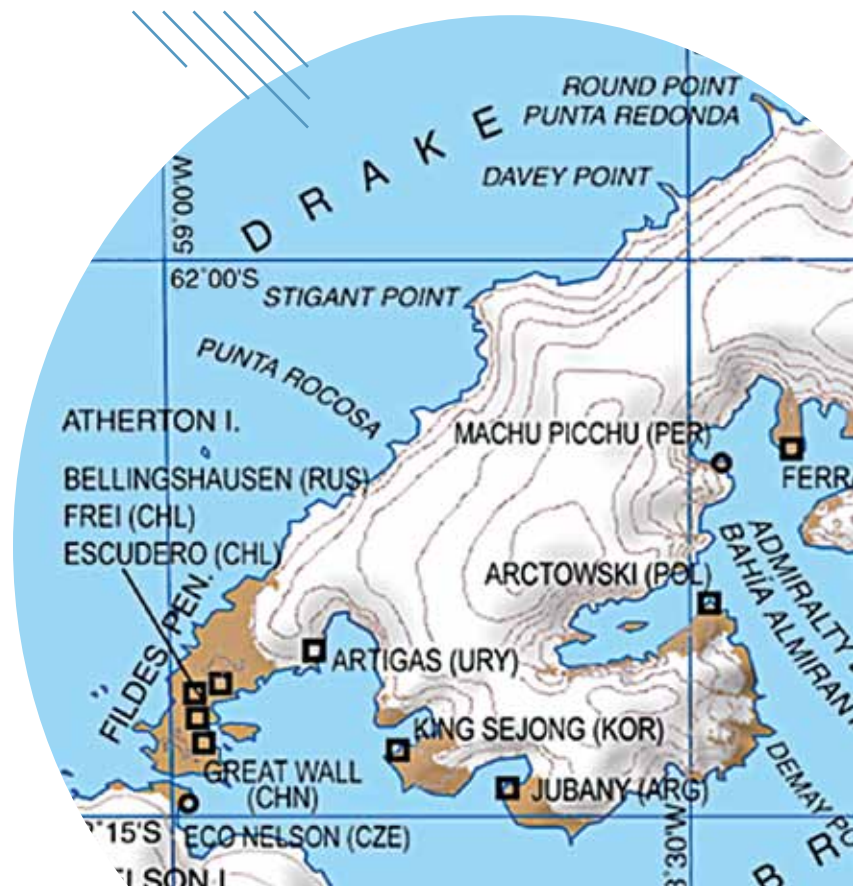
FEBRUARY 1968 The Bellingshausen station on King George island, off the northern tip of the Antarctic Peninsula was opened by the USSR. The staff in winter season consisted of about 20 persons. Aerometeorological, oceanological, glaciological and geophysical observations were carried out there, as well as biological and medical investigations.¹



1986
Robert Swan reaches South Pole.



1989
Robert Swan reaches North Pole and becomes first person in history to walk to both poles.



THE HISTORY OF BELLINGSHAUSEN

Bellingshausen Station is located on the Fildes Peninsula, on the western edge of King George Island – part of the South Shetland Islands off the Antarctic Peninsula. KGI, as it is sometimes called, is mostly ice-covered, about 80 km long and has two large bays, Maxwell Bay and Admiralty Bay, which remain largely ice-free throughout the year. There are several research stations on the island, but the main four are the Chilean Base Presidente Eduardo Frei Montalva station, the Chinese Great Wall station, the Uruguayan Artigas base, and the Russian (formally Soviet) Bellingshausen station.^{Ref.#1}

In 1966, an area of 1.8 km² in the Fildes Peninsula was designated as a Specially Protected Area (SPA) due to its “outstanding ecological interest” and unique paleontological diversity.^{Ref.#2} The SPA was reduced in size and was eventually revoked in 1975 as pressures on

the area increased. A two-part Site of Special Scientific Interest (SSSI) was designated by the Secretariat of the Antarctic Treaty to protect geological features and, as a result, the Fildes Peninsula became one of the most polluted parts of Antarctica. Consequently, environmental groups, including Greenpeace and 2041, have given great focus to the area.

Bellingshausen station was constructed by the Soviet Union within the SPA area in 1968 and was once the flagship station for the State Polar Institute in St. Petersburg. The Trinity Church, the only permanently staffed Eastern Orthodox church in Antarctica, is part of the station and overlooks the base. Nearby, on an adjacent bay, there is a fuel tank farm containing nine above-ground tanks – some which have been converted for waste storage.

1991 Antarctic Environmental Protocol comes into effect for a fifty-year period– the impetus for Robert Swan to create the 2041 organization.

1992 The first Earth Summit held in Rio de Janeiro, Brazil. Robert was invited by UK Prime Minister John Major to attend and given a mandate by his mentor Jacques Cousteau to preserve Antarctica.



1994 Robert began working with Misha Malakhov, a Russian professor with influence at Bellingshausen to plan the removal of waste on the beach.

1996 Canadian “VIEW Foundation” program under Russian Antarctic Expedition (RAE) management conducted an early cleanup program at the station. Volunteers collected garbage and a total of 20 drums of small waste and 500 meters of old fuel hoses were shipped out of Antarctica.

THE ANTARCTIC TREATY AND ENVIRONMENT



At the height of the Cold War, 12 nations signed The Antarctic Treaty, developed to manage the ungoverned continent of Antarctica and to prevent nuclear testing and industrial exploration. The Treaty specified the “use of Antarctica for peaceful purposes only, facilitation of scientific research in Antarctica, [and...] preservation and conservation of living resources in Antarctica.”^{Ref#3} In 1959, the draft designated the continent as a natural reserve, devoted to peace and science. Since the Treaty came into force in 1961, 36 other nations have signed it, including Canada.

In the late 1980s, the Antarctic Treaty nations stated they were “convinced of the need to enhance the protection of the Antarctic environment and dependent

and associated ecosystems and convinced of the need to strengthen the Antarctic Treaty.” To that end, the Antarctic Treaty was supplemented by the 1991 Protocol on Environmental Protection, commonly known as the Madrid Protocol.^{Ref#4} This protocol provides codes of conduct for waste management, the prevention of marine pollution, the protection of flora and fauna, and the development and management of protected areas. It also outlines the environmental impact assessments required for most activities. As early as the year 2041, “a conference shall be held as soon as practicable to review the operation of this Protocol.”^{Ref#5}

Robert Swan’s organization, 2041, was named to remind people of this date.

1996-2000 Swan returned every year with 2041 expedition participants and continued coordination & cleanup work with Russian engineers.

2001 In preparation for the waste removal process, large items were cut into manageable pieces.



LATE 2001 Heavy lifting equipment was shipped to Bellingshausen aboard the ship Anne Boye. Crews gathered the cleaned up material into bins and removed liquids to safe containers.

DECEMBER 2001 Beach is gradually cleared of debris.

During one night, tonnes of brash ice and growlers were thrust up on the beach. The boat was partially swamped and the barge shoved ashore.



ROBERT SWAN AND 2041 – A CALL TO ACTION

In the years that followed the construction of the Bellingshausen station, the USSR's poor economic conditions and lack of resources to manage and remove waste products resulted in thousands of tonnes of waste built up around the station.

In 1994, Robert Swan began working with Misha Malakhov, a hero of Russia, to look into ways of correcting this situation. The two travelled to Moscow and Bellingshausen to gain support and reconnoitre the station for a cleanup mission. Colonel Dr. Konstantin, who was in charge of the base, initiated a Russian ecological group to begin cleaning up the area. "The last few years have been tough. With not enough money to manage our waste properly we have been forced to bury it, burn it in open pits or dump it at sea. Hopefully now we can look at other ways with the help of equipment and advice from [Robert Swan]."^{Ref.#6}

Then, for three months starting in December 1995, a collaboration between the Canadian-based VIEW Foundation and the Russian Antarctic Expedition supported volunteers from Canada, the United

If you want to inspire young people to preserve Antarctica thirty years from now, you've got to have a great story to show that you've already been doing that.

Robert Swan

States, and South Africa to collect garbage from Bellingshausen and document their experiences.^{Ref#7}

Committed to his promise at the Earth Summit in 1992 and determined to do more, Robert Swan sent a team of environmental scientists to Bellingshausen in 1996 to help the Russians develop a waste management plan and prevent further long-term environmental impacts.

Between 1996 and 2000, Robert implemented a series of international youth projects at Bellingshausen to work with the Russians and consolidate the waste. Their mission, like all 2041 alumni, was to learn from their Antarctic experience and go back to their home countries as ambassadors for the protection of the continent.



JANUARY 2002

Mission accomplished—1,500 tonnes of solid waste and rubbish removed from the beach at Bellingshausen and shipped to Uruguay for recycling.



FEBRUARY 2002

The waste was lifted off the ship Anne Boye in Uruguay.



SEPTEMBER 2002 Robert delivered initial results of Bellingshausen cleanup to the Earth Summit in Johannesburg, South Africa and rededicated himself to a mission of education on the protection of Antarctica.

THE CLEANUP

Littered with the debris of years of occupation under the Soviet Union, the Bellingshausen beach was generally regarded as one of the biggest and untidiest eyesores on the Antarctic. By 2001, in a partnership with the Russian Arctic and Antarctic Research Institute, Robert had pulled together teams and equipment, scraped together sponsorship funds, and proceeded to move 1,500 tonnes of scrap metal and rubbish from a shallow volcanic beach to a recycling plant in Uruguay.

Clive Clasby is one of the environmental scientists who helped Robert lead the largest single waste removal from the continent of Antarctica. Working with Iain Chapman, one of the world's most recognized expedition leaders, Clasby found a ship (the Danish crewed Anne Boye) that could load their equipment, clothing, food, a barge, and an old NATO-issue tugboat and make the trip from Shoreham, England to King George Island. They sourced tools and recruited marine personnel: Gerry Brennan, Stuart Kingston-Turner, and Clive Tyler. Robert gained support from two new sponsors; JCB, an international construction equipment manufacturer that donated equipment and trained the operators, and Serono, a major biotech company that funded the ship.

When they arrived in Maxwell Bay at Bellingshausen station in December 2001, Clasby and Chapman were greeted by Robert and fifty young people from all over the globe who had committed to help with the cleanup. What

Left-top: Loads were hoisted into the ships hold after being loaded onto the barge at shore.

Left-centre: Waste was loaded into bins, lifted onto the barge and transferred to the ship, which was anchored offshore.

Left-bottom: Elephant seal. In the background you can see a few last remaining items of waste.

JANUARY 2007 E-Base completed near Bellingshausen by Robert Swan & 2041- the first independently owned, renewable-energy powered, dedicated education facility on the continent.

FEBRUARY 2008 Expedition vessel Akademik Federov arrives with supplies, fuel, parts, equipment, staff, and probably waste transfer. Permafrost and soil science research is conducted at the station. Scheduled conservation and reclamation works continue.

DECEMBER 2008 Ecological equipment arrived from Russia. Equipment was donated to support conservation and reclamation operations at the station.

MARCH 2009 Construction of pipeline system for sewage water cleaning station.

APRIL 2009 Continuation of construction/ installation of the "ecological complex" and pipeline system for sewage water; restoration of the coastal infrastructure damaged by strong storm.



they saw on the beach was a bleak landscape, scoured by wind, ice and snow. There, at the shore's edge, was a pile of rubbish that had been gathered by Swan and the Russian engineers over the previous five years – it was over one hundred metres long, fifty metres wide, and three metres high, much of it frozen securely in the ground. “If it is your job to move it, it’s a fairly daunting and depressing sight,” said Clasby.

But the teams unloaded the equipment and set to work, despite the fact the weather could change from sun to snow to rain, fog and back to bright sunlight in the space of five minutes. They worked 20-hour days for seven weeks – onshore, hauling, cutting, and loading full containers on the barge and on the tugboat, taking them out to the ship.

The amount and variety of waste was staggering. The heaps contained everything from tracked amphibian vehicles and cranes to old toilets and fuel filling hoses. A load of oils and paint waste was safely removed and brought on board following a strict handling procedure to ensure not a single drop was spilled.

Then, one day, it was done. They had completed

the operation and all the waste was gone. They had succeeded in their goal, or so they thought. The weather decided to throw the cleanup crew a leaving party. Winds picked up to 110 kilometres per hour and temperatures dropped to minus 20 degrees centigrade. During the night, tonnes of brash ice and growlers were thrust up on the beach. The boat was partially swamped and the barge shoved ashore.

Up to their knees in ice water, the team bailed out the boat, struggling to get it floating and prepared for loading. By the end of that final long, cold, wet day, all that remained onshore were the few packaged supplies they gave to the Russian base staff.

The ship sailed on January 16, 2002. Waste removed, mission accomplished.

With small teams and a little funding, Swan successfully showed the commitment to overcome ridiculous odds and complete a seemingly impossible task. It was a significant undertaking that was also symbolic – a project that inspired governments to change way they managed waste in Antarctica.^{Ref.#8}

JANUARY 2010 Expedition vessel Multanovski arrives. Drums with hydrocarbon waste and metal scrap delivered to the shoreline for transferring to the expedition vessel. Russian-American group of scientists arrived for a 10-day seminar on consequences of global climate change.

MARCH 2010
Maintenance and repair of pipeline system at the petroleum tank farm. Containment and disposal of spilled diesel fuel using an absorbent; disposal of waste materials and garbage; packing metal scrap into containers.

APRIL 2010 Initialization of the waste treatment system and its components. Maintenance of fuel storage, garbage removal, yard housekeeping, organizing building materials; garbage/waste cleaning at the Upper Hangar. Preparation of the ecological inventory of the station with ecological risk ratings for each of its components.²



TEAM CANADA 2011

In 2010, Swan asked the Environmental Services Association of Alberta (ESAA) to get involved by joining his 2011 expedition to Antarctica. He wanted the knowledgeable Canadian professionals to investigate the current environmental conditions at Bellingshausen and provide a report for him to take to Rio+20 in June 2012. Rising to the challenge, and with encouragement of the Alberta Minister of Environment, ESAA Team Canada joined the 2041 Antarctica Expedition in March 2011.

Team members visited the Bellingshausen station, and corresponding tank farm, on March 15, 2011 and discovered that the Russians had been inspired by Swan's action ten years previous. They were now being more proactive and dedicating more attention to the proper management of their wastes. (*see timeline below*)

Results from the site visit and field work confirmed that the Bellingshausen beach area remains free of any newly deposited waste and that the research station has made increased efforts to segregate wastes into decommissioned above-ground tanks for

storage. Although the beach remains clear of any newly deposited waste, there is evidence of residual impacts and further delineation of potential impacts is recommended. Further assessment work is necessary to determine the extent of the hydrocarbon impacts in the tank farm area.

As part of Team Canada's visual assessment, the Russians were observed placing domestic garbage and waste into three former fuel tanks, modified for this purpose, on the beach. This represented first-hand evidence that the Russians are managing their waste in a much more controlled manner.

Based on the onsite investigation in 2011, the team members concluded that the clean-up work conducted by 2041 and their Russian partners in 2001 was effective in removing the waste and that base staff should be commended for continuing to keep the beach area clear of debris.

The Russian Ecological Group of Bellingshausen is making a concerted effort, the penguins have returned, and E-Base remains as a continuing legacy of positive change.

MAY 2010 Maintenance of the diesel generator station; installation of new washrooms in the weather station; maintenance of the mothballed UNILOS ASTRA-20 and ASTRA-15 deep sewerage water treatment stations. The Ecological Group (division of the station personnel) packed metal scrap in a container, collected and transferred drums with fuel waste to the open storage site and compressed metal cans and tin garbage into drums.

JUNE/JULY 2010 Enrollment of the SoP for household and technological waste disposal. Upgrade of the intermittent tank for the ASTRA-20 station. Packing waste in containers, maintenance of diesel generator.

AUGUST 2010 Renovation of the UNILOS ASTRA-20 and ASTRA-15 deep sewerage water treatment stations. Collection and removal of household, kitchen, technological and construction waste. Transfer of hydrocarbon waste to the petroleum tank farm.

NOVEMBER 2010 Initialization and upgrade of the ASTRA-20 station. Packing metal scrap in containers, disposal of fuel waste at the petroleum tank farm, maintenance of diesel generator and water intake station, compressing metal cans and tin garbage into drums. maintenance/repair of the LASUR-1M station (ultrasound/ultraviolet disinfection of waste water).³



2012 AND NEXT STEPS

Since the 2001 cleanup effort, Swan has brought more than 670 people to Antarctica to learn, first hand, about Bellingshausen, the E-Base, and the wonders of a protected Antarctic environment.

The Russian government facilitated the creation of 2041's E-Base,^{Ref.#9} so have in some ways, done more for the preservation of Antarctica than many other countries on the continent. By allowing Swan to construct a zero-carbon, low-energy environmental study centre at Bellingshausen – the E-Base – the Russian government is helping educate people around the world about renewable energy. As Swan says, “If you can build a place to live using only renewable energy in the Antarctic climate, you can do it anywhere.”

The Canadian influence and leadership in the Bellingshausen story is intertwined with Robert's 2041 efforts and is a testament to how cooperation and dedication can overcome waste management

With Russian support, we have established the world's first education station on the site where the rubbish was to inspire young people and provide a resource for teachers around the world – all running on renewable resources. **Robert Swan**

challenges and educate people about climate change – not just in the Antarctic, but in Canada's own Arctic and around the world.

DECEMBER 2010 Decommission and removal of containers from the Lower Hangar. Maintenance/cleaning of the HP-8 petroleum tank. Helping Chinese and Chilean stations in loading/unloading cargo and fuel from a Korean vessel. Road maintenance, delivery of empty drums to the tank farm.



JANUARY 2011 Transfer of construction and household waste to the designated tank that was set up for storage at the petroleum tank farm. Transfer of diesel fuel from the petroleum tank farm to the dispensing containers at the station.



FEBRUARY 2011 Ecological works at the station site (housekeeping, cleaning). Another annual volunteer clean-up of the station site. Transfer of construction and household waste to the designated storage tank at the tank farm (observed by ESAA Team in March 2011).

WHAT'S NEXT?

With Russian support, Swan looks forward to receiving any request for technical and financial help to continue other work, such as removing the abandoned fuel tanks at Bellingshausen or new environmental initiatives at other stations in the Antarctic.

ESAA Team Canada welcomes Robert's challenge to lead environmental cleanup and sustainable development initiatives in the Arctic and will be discussing several such projects at upcoming RemTech conferences in 2012 and 2013 – the year Canada becomes Chair of the Arctic Council.

MARCH 2011 Removal and incineration of garbage and kitchen waste. Demolishing and preparation to remove the old buildings at the Chilean Station on the Slalom Lake. New pipeline system completed for the ASTRA-20 station.

MARCH 15, 2011 As part of 2041 IAE 2011, the ESAA Team Canada team of environmental professionals conducted a site investigation to look at conditions since the original clean-up work was completed.



OCTOBER 2011 ESAA Team Canada presents overview of mission and work at Bellingshausen to sold-out RemTech conference in Banff, Alberta where a year before, Robert spoke to the same audience and asked for ESAA support on the 2011 mission.

Canada showed leadership in helping me and the Russians in the Antarctic, but Canada also needs to look at the Arctic and use its expertise to make sure that the exploitation of the Arctic is done smart, right and clean. What's happening in the Arctic now must NOT happen in the Antarctic. **Robert Swan**

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- 3 Maintenance of the UNILOS ASTRA-20 deep sewerage water treatment station http://www.optiplast.ru/e-store/xml_catalog/1337/6817

Some additional timeline information provided by Russian Antarctic Expedition Dispatch Reports (<http://www.aari.nw.ru/news/news.php>) and <http://info.raexp.ru/base-bellingshausen.html>

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Clive Clasby, Senior Environmental Crime Officer, UK Environment Agency

Robert Swan, OBE, Founder of 2041.org

Photography:

Clive Clasby, Gavin Scott, Dayle Pett, Jennifer Keller, Jack Tissot, Joe Chowaniec, Todd Latham and John Luck (2041.org)

FEBRUARY 2012 Robert returns to Bellingshausen every year with a new group of inspired students and professionals.

JUNE 2012 Robert Swan presents this report to the Earth Summit Rio +20 in Rio de Janeiro, Brazil

2041 The 1991 Environmental Protocol, which protects Antarctica from exploitation, comes up for review.





Above:
ENVIRONMENTAL SERVICES
ASSOCIATION OF ALBERTA (ESAA)
Joe Barraclough and
Joe Chowaniec
Edmonton, AB

L-R: Gavin Scott,
Michelle Barkhouse,
Jennifer Keller, Robert Swan,
Dayle Pett, Todd Latham and
Tyler Barkhouse.

TEAM CANADA

2011 EXPEDITION MEMBERS

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Tyler is the Director of Environment and Geosciences for the Focus Corporation. Tyler's 25-year career as an environmental engineer has taken him to over 50 locations throughout the Canadian Arctic, including 21 Canadian DEW Line Stations, and numerous high Arctic weather stations and airports.

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Todd is President of Actual Media Inc. a specialized business publishing, research and creative design company that produces ReNew Canada – the infrastructure renewal magazine, and Water Canada – the complete water magazine.

The world ought to have the
sense to leave just one place
on earth alone – Antarctica.

Sir Peter Scott



