The Antarctic Sun

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December 8, 2002

Photo by Kristan Hutchison/The Antarctic Sun

Alternative Energy Specialist Joe Yarkin does preventative maintenance on solar panels at Lake Hoare field camp in the Dry Valleys. Wind and solar power could eventually provide up to 100 percent of the power for field camps and 20 percent of the power for stations.

Wind power may pay big dividends

By Mark Sabbatini
Sun staff

Wind generators proposed at McMurdo Station and the South Pole will provide only a small fraction of the total power used, but could play a key role in a large-scale cutback of fuel shipments to Antarctica.

Officials seeking a 10 percent reduction in fuel usage are hoping the 80-feet-high wind generators can create half of that, with conservation efforts providing the rest. Those savings, combined with increased fuel storage capacity at McMurdo, may allow a tanker ship to bring fuel every other year instead of annually.

"Any reduced consumption of fuel reduces our emissions into the environment, and if we can reduce the tanker trips, we reduce the exposure to damage to the vessels and fuel spills," Erick Chiang, head of the Polar Research Support section for the Office of Polar Programs of the National Science Foundation, wrote in an e-mail. "So the real benefit is summed up in cost savings and reduced impact to the environment."

About 6.5 million gallons of various fuels are burned by the U.S. Antarctic Program each year. A kilowatt-hour of electricity generated from fuel costs 15 cents at McMurdo – comparable to more expensive rates in some cities – but $1.20 at Amundsen-Scott South Pole Station.

Wind power would cost about 19 cents a

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A healthy read on Ice culture

Team studies population through work and play

By Mark Sabbatini
Sun staff

For Tim Dye's group, busing dishes and drinking coffee is serious science.

Working and playing full-time at McMurdo Station is their way of learning how the health of Antarctica's workers may be affected by the local culture. The three-year National Science Foundation funded anthropology study by the five-person team is similar to several others they have done worldwide, generally trying to understand an isolated society by becoming part of it.

"We go from one culture to another, always the town idiots, not knowing what we're doing until people show us their way of thinking and doing things," said Dye, a University of Rochester Medical Center professor who is one of two principal investigators for the project. He noted "our methods are looking and listening…we get excited when we start to know what you know."

Knowing what cultural factors influence health in Antarctica's isolated environment may lead to ways of preventing adverse effects, Dye said. It may also provide clues to how people may react in future settings of extreme isolation, such as space sta-

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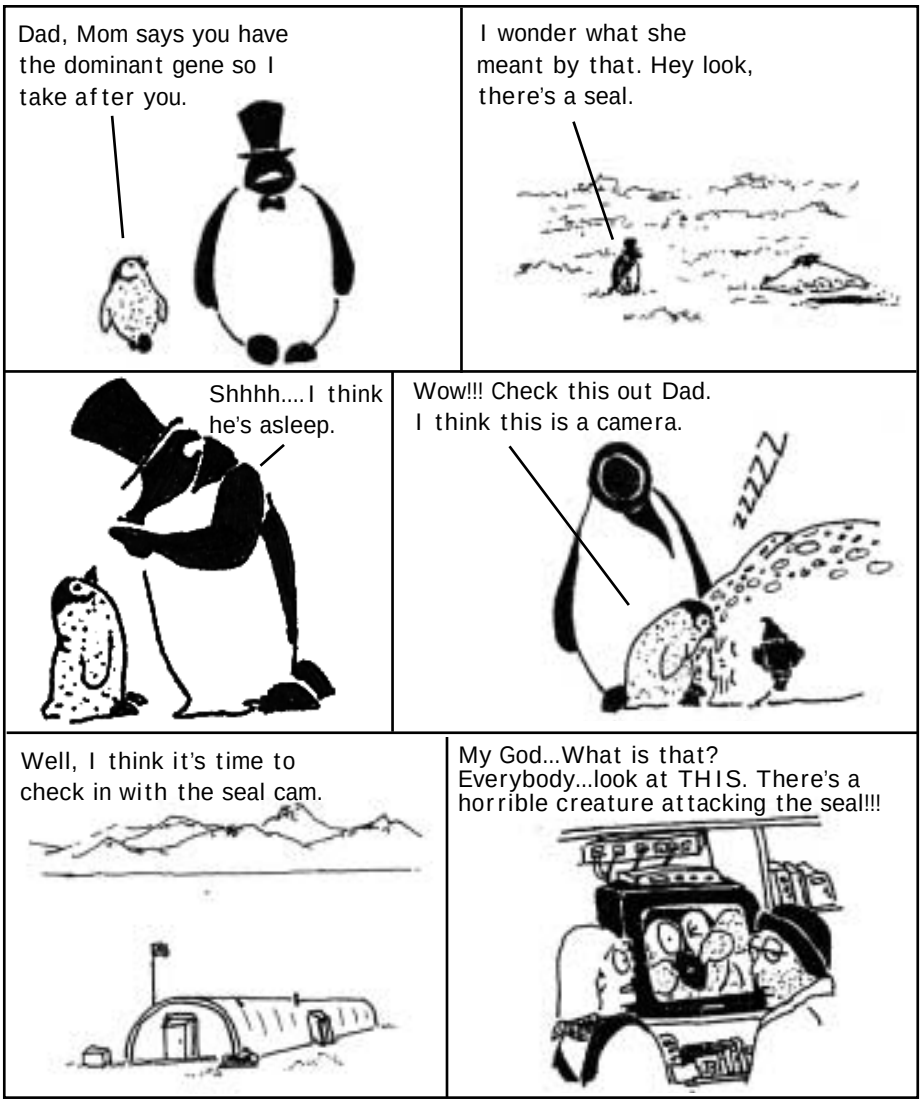
INSIDE

Quote of the Week

"The two best things about Lake Hoare: Rae's cooking and the rocket toilet."

— Scientist in Taylor Valley

Ross Island Chronicles By Chico



Cold, hard facts

Energy

Shower cost per minute:
McMurdo - six cents
South Pole - $1

Cost per gallon of auto fuel:
McM - $1.25, Pole - $15

Cost of operating a 60-watt light bulb for a year: McM - $8, Pole - $590

Cost for a load of laundry:
McM - 80 cents, Pole - $13

Gallons of fuel burned each year: ground - 3.1 million, aviation - 3.2 million, gasoline - 130,000

Recommended maximum amount of power McMurdo and South Pole stations should rely on wind generators for: 20 percent

Percentage of power remote field camps can theoretically get from existing wind and solar generators: 100.

Source: Rick Hasbrouck, RPSC; U.S. Antarctic Program

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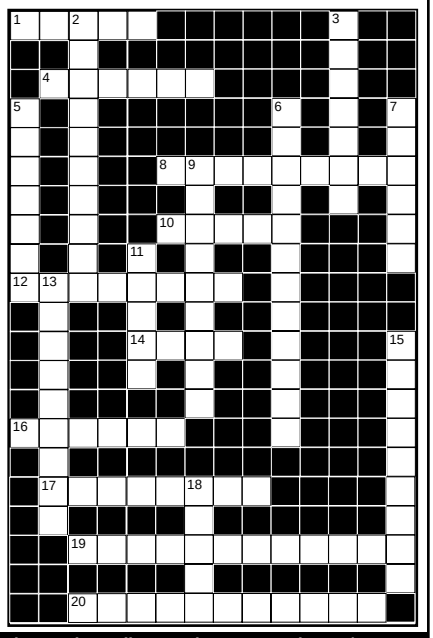
Web address: www.polar.org/antsun

Katabatic Krosswords: Moments in Antarctic history

Across
1. The first person to cross Antarctica
4. The first large permanent base on the continent
8. Shackleton's most famous Antarctic ship
10. Antarctic tourist flights were temporarily suspended after this 1979 commercial airliner event
12. Leader of the first party to survive an Antarctic winter
14. Said in 1774 that Antarctica "will never be explored"
16. Site of lowest recorded temperature in 1983
17. Regular visits to the Ice by these non-scientists started in 1958
19. Scott's original name for what is now Discovery Hut
20. Navy aircraft discovered this landmark in 1958

Down
2. First steamship to cross Antarctic Circle
3. Nine nations sign treaty in 1937 trying to regulate this sea-based activity
5. The first professional photographer on the continent
6. The first to use dogs in Antarctica
7. This international agreement took effect in 1961
9. Amundsen's originally stated destination
11. The month Amundsen announces his success
13. The first to lead an ascent of Mount Erebus
15. The first woman to reach Antarctica
18. Famed explorer also first Antarctic aeronaut

Solution on page 8



Squares too small? No pencil to erase your mistakes? Try our interactive online puzzle at www.polar.org/antsun

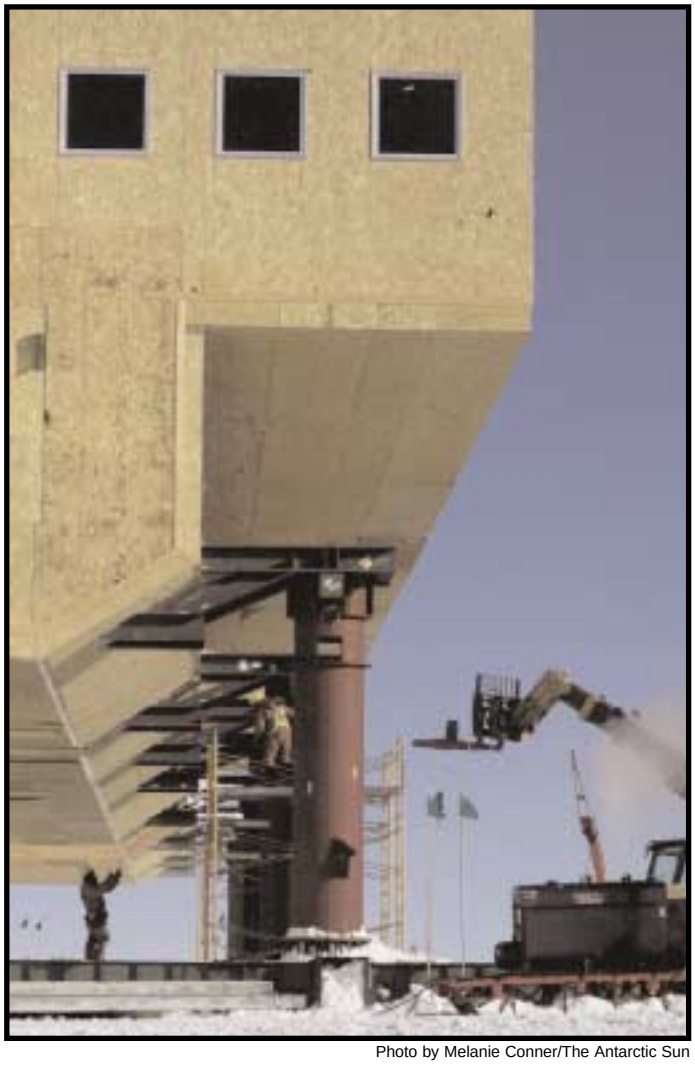


Photo by Melanie Conner/The Antarctic Sun

Photo by Melanie Conner/The Antarctic Sun

Workers raise portions of the new elevated station, bringing the silver staircase cylinder and main station back to the same level.

New station settles in

By Mark Sabbatini
Sun staff

Designers knew the new South Pole station would gradually sink into its snow foundation, but not this quickly.

The station, elevated about 14 feet above ground level on support posts, was expected to sink 36 inches during the next 20 years. But measurements from the past two years show the station is currently sinking about five inches a year, which has officials trying to figure out the cause, and if there's a way to slow the pace.

The good news is data collected so far indicates the accelerated pace of sinking may not be a long-term problem, said Dennis Berry, the lead structural engineer for the new station.

"All the indications we've got is it should taper off with time," he said.

It may also be possible to modify the support columns and other parts of the station so it can be raised more than the 12 feet planned in the original design, Berry said. He said modifications may also allow the station to handle larger amounts of imbalance between columns if one is sinking at a greater rate than another, which would be a greater threat to the station's structural integrity than uniform settlement.

"I think everybody realizes there's not a lot of information on building in snow," said Frank Brier, the National Science Foundation project manager for the new station.

The new station will replace the South Pole's landmark dome, which is being gradually buried by snow accumulation. All of the buildings rest on a foundation of ice about two miles thick, which is slowly, but constantly, shifting.

Workers noticed a platform between the new station and a tower linking it to the dome level structures was uneven, leading to the analysis of the settlement rate, Brier said.

It's likely either the footing of the columns are sinking, or the entire snow field 25 feet below the surface is dropping, Brier said. He said it will likely take another year or two for a team of engineers and other experts to come up with a solid diagnosis of the problem.

"If the footings are sinking into the snow, maybe we can increase the size of the footing and spread the weight around," he said. "If the entire snow field is settling, we will not have many options."

Brier said the new garage and power plant buildings constructed at the same level as the old South Pole station dome are not sinking.

The station's design allows for about three inches of difference between columns, Brier said. Settlement so far has been "very uniform," but a leveling process will occur sooner than planned.

"We always assumed we'd go four to five years without leveling, but we're going to level about half of the columns this year," Brier said.

A new construction schedule and cost projections also factor

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Photo by Kristan Hutchison/The Antarctic Sun

At left, the footings under the main section of the new station have been settling faster than the staircase tower. Below, workers jack up the station in increments to bring the sections level with each other.

Settled

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in a leveling process every year, he said.

Four to five additional people are working at the Pole for two months this season to ensure the process won't affect other construction activities, Brier said. Some of the summer work may also be shifted to winter if necessary.

Delays in delivery of materials to the Pole during the past two years and an increase in scope to add 40 more bedrooms has resulted in a one-year delay in the station's completion date and a slight increase in its cost, Brier said. Completion is scheduled for fiscal 2007 at a cost of about $135 million, compared to $128 million originally estimated.

Nearly 4 million pounds of equipment and materials are scheduled to be shipped to the Pole this summer, Brier said. Shipments, all of which must fit into an LC-130 plane, were short by 1.2 million pounds of cargo last season, due largely to weather.

"In essence, that resulted in a delay of one year," he said.

As of early last week, only 66 of the planned 91 flights had reached the Pole, but Brier said "The success rate this time of year is always low."

A total of 332 missions are planned this season, so the current shortfall is not a significant amount of that total, according to Brian Stone, the National Science Foundation representative at McMurdo Station.

Brier said $60 million has been spent on construction to date, including all of the building materials. But he said it might still be possible to meet the original cost by using value engineering on remaining work, and maintaining the current high level of construction efficiency. "We still have a lot of opportunities to save money," he said.

A new dining hall and living space for 50 people are scheduled to open in January, Brier said. Winter workers will finish a new medical center and computer lab.

"The plan is for most of the winter staff to live in the new elevated station," he said.

Photo by Melanie Conner/The Antarctic Sun

around the continent

PALMER

Gash duty cleans up

By Tom Cohenour
Palmer correspondent

Residents of Palmer Station are required to "volunteer" one evening per week for kitchen and dining room clean up after supper. "Thanks for gashing!" exclaims chef Wendy Beeler after the ritual gash is complete.

The etymology of gash is unclear, but the duties are well defined.

It's all about cleanup.

The British appear to have originated the term gash as slang for garbage. It's likely the Cockney's, natives of London's east end who were famous for twisting words, gave birth to the expression. From there the term made its way to Palmer Station, probably through interaction between British and U.S. Naval personnel.

Since Palmer doesn't have a janitorial staff, everybody on station takes a turn at gashing. Times vary from a record setting flash gash of 23 minutes to a painfully slow hour-and-a-half. A typical cleanup scenario has five gashers, begins at 6:30 p.m., and lasts one hour.

It's been said that the great thing about gash is that it builds camaraderie and community spirit. Scientists, tradespeople, support staff and station management all share in the cleaning duties and work side by side. Since it's a job that has to be done, looking on the bright side is a wise approach.

Photo by Tom Cohenour/For the Sun

Hugh Ducklow, science and LTER leader at Palmer, runs left over food through the garbage disposal.

The first order of business is to select the all-important music.

Slow music makes for a slow gash. And few people like gash enough to spend more time cleaning than is necessary. Besides, seeing the gashers prancing around to the lively tunes of Gypsy Kings, Santana, Heart, or Smash Mouth almost makes a person want to join in the fun.

The remaining 14 items on the checklist involve stimulating activities like refrigerate leftovers, vacuum dining area, mop kitchen, refill juice machine, send dishes through Phil, and dump food scraps down "baby grinder," the garbage disposal.

Gashers are careful not to let the baby grinder spit up. It can get messy. The industrial grade garbage disposal unit chews up nearly anything fed to it. Gashers quickly learn to cover the cavernous mouth of the baby grinder before pushing the start button. Those who haven't learned usually end up with squishy, wet goo sprayed on their clothes, in their face, and on the floor.

Stray spoons and forks accidentally swallowed by the disposal unit get mangled into impressive artwork. Some have even become Christmas ornaments. Maintenance personnel wielding huge vise grips look like crazed dentists when they are called upon to extract demolished silverware tightly jammed into the jaws of the baby grinder.

Gash is so much a part of life at Palmer that some people count their time by it. "I've already gashed eight times this season," someone might say. Or, "I only have two gashes left before I leave the Ice."

Regardless of how many times a person gashes, or how few; regardless of how fast, or how slow; regardless of what day of the week they choose, gash is still all about cleaning up. And Wendy is there to say, "Thanks for gashing!"

Photo by Tom Cohenour/For the Sun

Gash duties include wiping down the tables and general cleanup

SOUTH POLE

Making time for a holiday

By Tracy Sheeley
Pole correspondent

Thanksgiving has come and gone, leaving most Polies wondering where November went. The holiday celebration was enjoyed by all. Many on station volunteered their time to the dining hall to peel potatoes, assemble pies, wash dishes and serve as wine stewards - and any other duties as assigned. Our dining hall staff worked tirelessly to pull off a great feast, and no one left the table hungry. Thanksgiving dinner was also a moment in history — it is the last Thanksgiving holiday to be celebrated under the dome. Next year we will be feasting in the elevated station. The residents of the Pole salute all those who have come before us, and lived and worked under the dome for so many years.

There were plenty of activities to distract us from our full stomachs. Friday night marked the annual disco party, which was well attended by those who lived through the disco era as well as those who are experiencing it for the first time. Prizes were presented for "best-dressed." The pool tournament, another annual event, attracted sharp shooters over the weekend. Hill Pierce took high honors, followed by Glen Horning in second and Chad Kukla in third place.

The snow stakes runs are happening every few days at the Pole. "Snow stakes" is Pole-speak for the South Pole Long-Term Mass Accumulation Network. A line of stakes is driven into the snow in six grid directions from the station, extending 12 miles (20 kilometers) in each direction. Each year, a group heads out to measure

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the week in weather

McMurdo Station
High: 36F/2C Low:-2F/-17C
Wind: 43 mph/69 kph
Windchill: -47F/-44C

Palmer Station
High: 38F/4C Low: 25F/-4C
Wind: 40 mph/64kph
Melted precipitation: 5.7 mm
Snowfall: 1 cm.

South Pole Station
High: -24F/-31C Low:-43F/-42C
Wind: 14mph/22kph

Pole

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snow accumulation at each stake on each line. The stakes are spread 1,650 feet (500 meters) apart, and the roundtrip takes measures between six and eight hours. Ellen Mosely-Thompson of Ohio State University started the study in 1992. The data gathered is utilized by many science groups, both at South Pole and worldwide. Our meteorology department makes the runs and gathers volunteers from the station population to assist. It is a rare opportunity to get away from the station and experience the vastness of the polar plateau firsthand.

Construction crews continue to work three shifts on a wide variety of tasks...finishing work in the elevated station, constructing antennas for science (see last week's update), and beginning work on a new solar observatory are all in a day's work for our FEMC crews.

Although working in South Pole temperatures can be exhausting, our diverse group has found the energy to share their talents and skills. For those looking to broaden their horizons, we have classes in yoga, tai chi, pilates, Spanish and dancing.

Photo by Kristan Hutchison/The Antarctic Sun

The weekly tai chi class in the South Pole gym.

There is no away: Where the waste goes when it's thrown out

By Anne Dal Vera
Special to The Antarctic Sun

We generate a lot of trash here in the U.S. Antarctic Program, from computer debris to food waste. Cardboard is used to package everything from spare parts for Caterpillar equipment to recreation equipment. Every day several huge bins of cardboard are processed in the waste barn. The McMurdo Station kitchen alone fills a dumpster a day.

Imagine you got a package from home and threw "away" the cardboard box with your name on it. (Of course, you flattened the box.) The dumpster of cardboard is carried by a loader to the barn, where it is dumped on the floor. Waste technicians pick up each piece of cardboard and load it onto a conveyor belt, which carries the cardboard up to the chute of the baler. The baler senses the cardboard, crushes it into a compact bale, wraps the bundle with wire ties, and pushes the 1,290 pound bale out the side of the waste barn. An M4K pickle loads the bale into a millvan outside. When the millvan is full, it is closed, tagged and staged at Fortress Rocks.

In January the millvans filled with all kinds of waste are moved to the wharf to wait for the supply ship to arrive and be unloaded. All the waste containers are loaded onto the ship in the first few days after ship offload.

The ship takes everything to Port Hueneme, where different categories of trash and recycling are trucked to their destinations.

Six trucks, each carrying two millvans of cardboard bales, drive nearly 900 miles to the Willamette Industries paperboard plant in Oregon for recycling. The bales are opened, and your box is combined with other grades of paper and mixed in a slurry — like a blender with water that turns the cardboard into pulp. Your cardboard box is very strong because of the length and thickness of the fiber. Each time a fiber is recycled it becomes shorter and weaker. The most common secondary uses for cardboard are cereal boxes, egg cartons, liner board and weaker boxes.

Cardboard is bleached on occasion, but your box is not bleached at the Willamette mill. It will become a fruit crate or a melon box or another type of new box for the agricultural industry.

When cardboard is used for other items, it is bleached with chlorine bleach. This is commonly done when it is recycled for paper towels and other household uses, such as writing paper or construction paper.

The Antarctic Program earns money from recycling the 181,000 pounds of cardboard it sends to Willamette. The program also uses boxes purchased from recycled content mills, possibly the same mill. The cardboard box you "threw away" might boomerang back to the ice in a different reincarnation years from now.

Continental Drift

How often do you communicate with your family and how?

"Probably three to four times a week. A phone call once a week and e-mail two to three times."
Ian Guptill
South Pole Station carpenter's apprentice from Berwick, Maine

"I call my grandma once a week. She says she lives vicariously through me, so I have to keep her up to date."
Linda Hamilton
Palmer Station painter apprentice from Salt Lake City

"By e-mail about every other week. I've been here a month and I've called twice."
Chad Carpenter
McMurdo Station electrician from South Texas

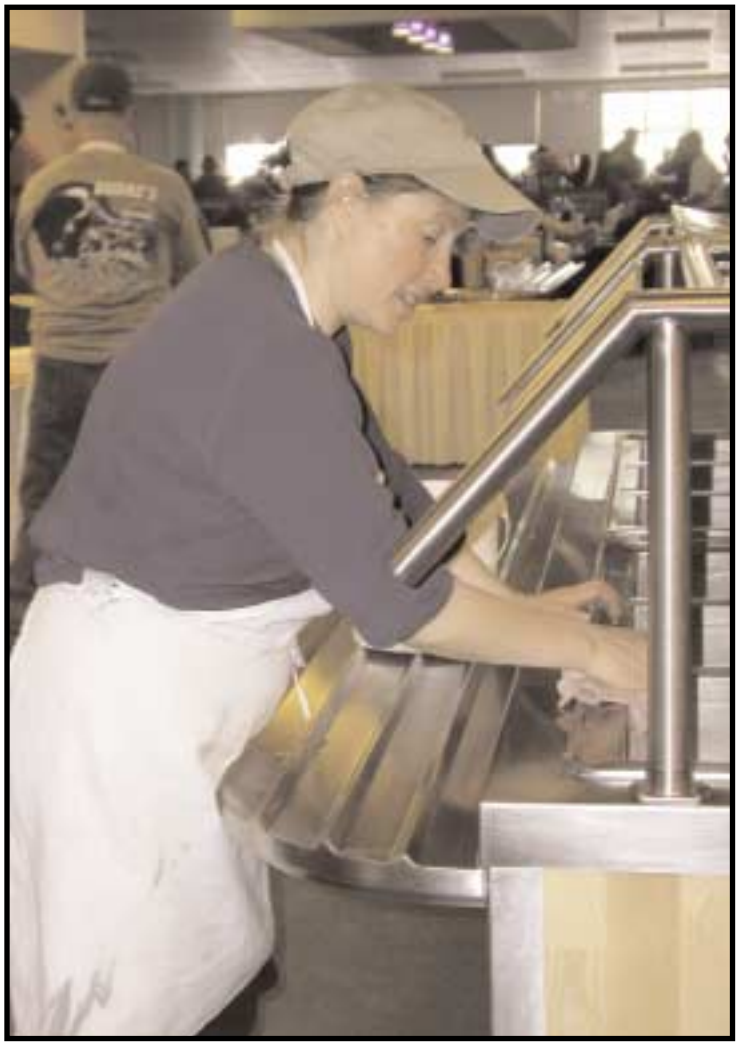

Photo by Mark Sabbatini/The Antarctic Sun

Nancy Chin, above, cleans up after Thanksgiving dinner at McMurdo Station as part of her research into the work and leisure culture of Antarctic scientists and support staff.

Below, Tim Dye drives a shuttle from McMurdo's ice runway as part of his work assignment for the project. Chin and Dye are the principal investigators for the University of Rochester Medical Center project.

Photo by Mark Sabbatini/The Antarctic Sun

Culture

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tions.

"A lot of people thought that we were at McMurdo to study abnormal behavior," he said. "That's not it at all. We're more interested in the daily routine tasks of living and working here."

Each team member is working in one or more departments at McMurdo and spending "leisure" time in specific social settings.

Dye worked as a shuttle driver and spent his off-hours at the Coffee house and other venues, trying to visit at many different times to get a sense of its busy and slack periods, before leaving in late November. Unlike most shuttle drivers, he kept a tape recorder, camera, personal data assistant and a video camera close at hand to capture his thoughts and discussions, in case opportunities for interviews arose.

There isn't much time for detailed scientific thinking while moving heavy pallets stacked with gear, said Kate Donhauser, a research assistant at the university who is spending her time at McMurdo as an outdoor cargo worker. The research value comes from the firsthand work experience and the interaction, hopefully as a true insider, with co-workers.

"It's not realistic to get a job and get any realistic assessment of it if you're only there for a week or so," she said.

Donhauser spends much of her "spare" time in the dining hall. Among the discoveries she has made through observation and talking to longtime employees are patterns in who sits where and with whom.

"It seems kind of random, but it's a practice in culture," she said, noting the diners have favorite tables and companions at many meals.

She works the day cargo shift, while fellow researcher Adam Rains is getting a perspective of how the overnight shift lives. He said the group of night workers at McMurdo seems to be somewhat more tight-knit because there's a smaller number of people they interact with.

"Since our schedules are inverted, there's not as many recreational activities and opportunities to socialize," he said. "That sort of forces a more confined social scene."

Rains is also the only smoker in the research group, so he is spending his "leisure" time at the Southern smoking bar and in designated smoking areas.

"My boss told me I wasn't allowed to quit smoking until I left," he quipped.

All of the researchers rise early and stay up late to make notes of their experiences, and often spend their few remaining waking hours interviewing people to get more in-depth perceptions.

"What gets me excited here is everybody has a story," said Nancy Chin, who is working three days a week in the dining hall and three doing other jobs such as janitorial work and helping science teams prepare for deep-field camp projects.

Chin, the principal co-investigator on the project, said she wanted to work in the dining hall because there's a lot of social interaction, and she has previously worked food service jobs. But she said her main area of interest is finding out more about scientists and how their teams are formed. Scientists are outnumbered about 7-to-1 by others at McMurdo and belong to a different social structure in many ways.

"Scientists are here at McMurdo, most of them, for a brief period of time and then they go out into the deep field," she said. Also, "There are a lot of people who don't have contact with the scientists. What's that like for them?"

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"Sometimes people don't even know their real reasons for coming here until we talk."
— Tim Dye, anthropologist

Culture

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Chin said she is also planning to do some narrative life histories of women who work in Antarctica and are interested in sharing their tales. During her "spare" time she visits the library, coffee house, religious services and yoga classes.

The anthropological study is unlike more familiar scientific projects at McMurdo because theories are generated from data collected during the project — a reversal of the usual scientific approach, Dye said. He said there will be little health data collected by the time the team ends its first season in mid-December, since participants must first get a firm idea of what the community is like.

"We have a sense that culture and health are related here," Dye said. "That's about as far as we've been willing to go with a hypothesis for now."

The team plans to spend longer periods of time on the Ice at different times of the year and visit different locations during the next two years, including some wintertime observations. Once they have a good grasp of the communities, they will spend less time doing day-to-day activities and focus more on specific incidents such as illness and injuries.

Other aspects of station life will be considered as well. Dye said a seemingly positive development, such as bringing Internet access to dorms at the South Pole, may have unanticipated results, as one community member brought up.

"Maybe there will be a smaller chance people are going to congregate," Dye said.

Some team members said they were initially concerned that people being observed and interviewed wouldn't act or talk honestly and normally. But Peter Fleming, who is working as a general assistant and observing the crowds at the non-smoking bar Gallagher's, said that hasn't been an issue.

"We're getting a lot of data," he said. "People have been very open about speaking to us."

There tends to be a transition period when team members are seen as outsiders, but that diminishes with time and a better understanding of the project, Donhauser said.

"I think what people fear is it's a study of the individual, when it's a study of the culture," she said.

Dye said they try to address ethical concerns by keeping all names and personal information confidential, and doing "nothing to harm the population." Dye said he hopes that makes people feel more at ease, since part of his job is figuring out underlying motives for things such as why people choose to come to Antarctica.

"Most people have more complicated reasons for coming here, and they may not even know it," he said.

Many people say they come for the adventure or the scenery, but Dye said oftentimes there are other reasons behind that.

"Sometimes people don't even know their real reasons for coming here until we talk," he said. "The people we've talked with seem to enjoy the time to discuss their lives and experiences with us."

This is the first time the group has studied an American community located outside of the mainland U.S.

Their studies in foreign countries in recent years have been diverse, with efforts to address the problems equally varied. One project launched in 1998 in Costa Rica is attempting to improve education and community economy in some remote villages by converting large storage containers used for commercial shipping into communication centers. The centers have computers, a medicine room and a banking room with an automated teller machine.

"These people are willing to learn and they're willing to spend a lot of time learning," Fleming said, noting 60 such centers are planned for communities during the next few years, funded by various organizations and governments in Central America.

McMurdo is different in many ways from other international locations studied, Dye said. Much of the team's previous work has examined the at-large population of very poor communities, while McMurdo is populated by a relatively healthy group of people who want to work at the station and are generally happy as a result.

"What's interesting is I talk to a lot of people who say 'I have the best job in McMurdo,'" he said.

Photo by Mark Sabbatini/The Antarctic Sun

Peter Fleming, right, a research assistant at the University of Rochester Medical Center, helps a general assistant make improvements to the Science Support Center at McMurdo Station.

Answer to P. 2 crossword

Photo by Mark Sabbatini/The Antarctic Sun

Quinn Redman, a second-year cargo handler from Seattle, right, paints support posts for portable wind generators at McMurdo Station. He volunteers once a week with various alternative energy projects. At left, Alternative Energy Specialist Joe Yarkin works on other energy equipment that will be used in remote field camps.

Energy From page 1

kilowatt-hour plus the cost of construction, said Ed Cannon of the National Renewable Energy Laboratory in Golden, Colo. He said the construction expenses could be made up in about eight years due to factors such as lower fuel shipping costs.

An eight-day trip to scout locations for the wind generators, evaluate energy usage and examine conservation efforts was completed last week by Cannon, manager of the federal wind applications program for the Colorado laboratory. He and a handful of other people working on energy conservation projects marked a few areas where wind flow appears strong and consistent, with an eye on having the generators operating as soon as 2004.

"It takes at least a year's worth of data to be confident we have information on all the seasonal variations," he said.

The generators would be provided as part of an experimental alternative energy program by the U.S. Dept. of Energy, although it is not certain the two Antarctic sites will be selected as participants. Cannon said "it probably will happen," but extensive modeling and research is needed for a report due in February. If approved, equipment could potentially be shipped to the Ice late next year.

Small wind generators are being used at a number of field camps, generally in combination with solar power cells. Alternative power usage in remote areas has grown significantly in recent years, increasing from nine camps last season to as many as 15 this year, enabling many to make significant cutbacks in fuel usage and shipments.

"What we're trying to do is move some of that same focus and success to the stations," said Don Atwood, director of strategic initiatives for Raytheon Polar Services Co., which provides support services for the U.S. Antarctic Program.

Cannon said the generator designated for the Ice is the 100-kilowatt NorthWind 100 (renamed SouthWind 100 for Antarctic use), specially designed for extreme weather in remote areas by Northern Power Systems, a company based in Waitsfield, Vt. It features a minimum of moving parts, functioning without items found on many generators, such as a gear box.

"That cuts out a lot of the problems you would have with lubricants in a very cold environment," Cannon said.

A small, three-kilowatt turbine tested at the

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Powering down to save fuel

By Rick Hasbrouck
Energy outreach specialist

The Antarctic program aims to reduce its use of fuel by 10 percent, and the first step is conservation.

Conservation alone can often eliminate a considerable percentage of the energy demand, and should always be implemented before alternative energy sources are considered. Walking around the stations, it doesn't take long to recognize opportunities: outdoor lights are left on, heat emanates from leaky doors and open gaps, energy-gobbling incandescent light bulbs are everywhere, and a nighttime survey of offices will show many computers left on 24 hours a day. Together, we can do our part to change this situation.

The Energy Conservation Campaign at McMurdo and South Pole stations is part of a two-pronged energy management program that also includes evaluating alternative energy sources such as wind, solar and fuel cells. For the moment, the conservation program is focusing on the two larger stations, which use more fuel than Palmer Station.

Raytheon's corporate energy manager, Trevor Viljoen, recently spent three weeks at McMurdo and Amundsen-Scott South Pole stations. While in McMurdo, Viljoen surveyed buildings that have a history of high fuel consumption, ranking them by the gallons of fuel used per square foot per year. A Raytheon infrared camera also was used to document heat loss through the building walls, in a process known as thermography.

The worst offender in McMurdo was building 183, the old incinerator building now used as the pipefitter shop. Building inspections soon revealed the causes of the high

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Save

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energy use there and in other buildings. In building 183, adding a programmable thermostat, sealing gaps in doors and replacing a missing duct are expected to greatly reduce its use of heating fuel. The results of the energy surveys will be presented to the National Science Foundation to assist them with their long-term planning.

Taking the first steps

The energy awareness campaign is trying to educate and involve the community. I am asking for energy saving "Bright Ideas," which will be reviewed by energy councils at McMurdo and South Pole. The councils are charged with encouraging reduction in the consumption of fossil fuels, and to review and respond to the energy-saving ideas submitted by the community.

People can submit energy-saving "Bright Ideas" using a form found in the Outlook Public Folder "Corkboard" at McMurdo and from South Pole Area Director B.K. Grant. More than 90 Bright Ideas have already been received and are being assigned to the council members for review. The council hopes to implement some of the best ideas this summer and make a significant dent in the Antarctic program's energy use. Ideas received, announcements and energy facts will be posted on bulletin boards at McMurdo and South Pole.

One of the first big fixes will be to the hot water heating system in several McMurdo dorms. Over the winter, the heating systems in dorms 206 through 209 will be upgraded by replacing defective valves, adding insulation and making plumbing changes. That should result in better control of the building temperature, decreasing complaints of hot and cold rooms, reducing the need to open windows or plug in space heaters and saving considerable fuel. Dorms 208 and 209 are already connected to McMurdo's waste heat loop from the power plant, and any energy saved will be available for the future addition of buildings to the loop.

Some of the best ways to save energy cost little to nothing and can be done immediately, such as turning off the lights when you leave a room. In that spirit, exterior lights are being shut off on buildings now that it's light 24 hours a day. The McMurdo Energy Council also has ordered 1,200 compact fluorescent bulbs to replace incandescent bulbs in dorms and workplaces. Many of us already use these efficient bulbs at

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South Pole a few years ago tended to freeze up during long, cold periods with no wind activity, with the lubrication failing to work properly, Cannon said.

Daytime demand for power is about 1.6 megawatts at McMurdo Station and 500 to 600 kilowatts at the South Pole, Cannon said. He said the stations shouldn't attempt to have more than 20 percent of their total power supplied by wind, due to factors such as its unpredictability, and the pilot program is for only a single generator at each station.

The favored site at McMurdo after preliminary study is a ridgetop that overlooks McMurdo from the north. Officials monitoring the site for three days found consistently favorable conditions.

"It's up high where it's fairly likely they'll have strong winds," Cannon said. The prevailing air flow is also over smoother land than other potential sites, meaning it's less likely to swirl.

The generator needs winds of at least 15 mph to run and stops operating if speeds exceed 40 mph, because such winds can cause damage.

> "We should be able to get 5 percent (energy savings) just by people turning off their lights and computers, and people changing their behavior."
>
> *— Rick Hasbrouck*
> *Energy outreach specialist*

One of the negative aspects of wind power is the blades of the generators have been known to strike and kill birds, Cannon said. The problem has been limited to a few areas and species in the U.S., but input from wildlife biologists will be sought and considered with any tower placed at McMurdo.

"I don't know how skua fly and their behavior, but there's nothing to indicate it should be a problem," he said.

The issue of making sure the tower doesn't visually impede any cultural landmarks is also a consideration, but Cannon said that doesn't appear to be a major concern.

"As you look around McMurdo, it's not like it's an attractive place anyway," he said. "You've got all of your utilities above ground."

Besides, "if you're in the industry, they're not big pieces of machinery – they're kinetic sculpture," he said.

The same amount of scrutiny isn't needed at the South Pole – at least when it comes to wind exposure, Cannon said.

"The winds at the Pole are great," he said. "They tend to be constant and they never have tended to be extremely high."

The flat terrain also means a tower can be placed just about anywhere and be effective, Cannon added.

But there are other considerations, including making sure the generator doesn't interfere with research in areas where extreme quiet, darkness or purity of air are required. Cannon said the generator is likely to be placed near a collection of buildings and portable shelters that serve as the housing area for summer workers.

Installation will be performed by specialized workers, but regular staff at the stations should be able to maintain the generators, Cannon said.

"It's a power house," he said. "It just happens be on top of a very tall pole."

Another factor is cargo space. Supply flights to the South Pole have been behind schedule for the past two seasons, causing delays in the construction of a new station. The generator and support tower are likely to take up two full LC-130 flights at a time when such space is at a premium.

Cannon said that space will be eventually reclaimed through fewer shipments of fuel to the South Pole, but it will be "multiple seasons" before that occurs.

"That's the big trade-off, really," he said. "You have to invest something up front to get any long-term benefits."

Antarctic stations experienced a fuel crisis during the late 1980s, with low amounts in storage forcing a scaling back of operations at the end of seasons, Chiang wrote. "As a consequence, we initiated fuel conservation which focused on unplugging vehicles, restricting the use of vehicles, and shutting down buildings."

"Then, as now, fiscal realities were a driver," he noted. "When faced with the prospect of increasing the fuel budget of the program, or conserving the use of fuel, our first efforts focused on conservation."

A number of older buildings were demolished or upgraded, an effort that is continuing, Chiang wrote.

"There are still some obvious measures that still are problems, heating in the dormitories for example, but by and large, we are saving fuel to the point where, along with the new fuel storage capacity (at McMurdo), we can think about conserving enough fuel to enable us to consider strategies so that we may only have to bring the tanker in every other year."

It cost $4.1 million to bring the tanker

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Photo illustration by Mark Sabbatini/The Antarctic Sun

An 80-feet-high 100-kilowatt wind generator, being considered for a pilot program, as it might appear on a ridgetop overlooking McMurdo Station.

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to McMurdo last season, not including the cost of fuel, Chiang wrote.

Structural improvements, planned or already underway, include repairing cracks in buildings, adding insulation and turning off outside lights during the 24-hour summer days. There are five energy monitors in dorm buildings, with plans for 10 more by the end of the summer, said RPSC Energy Outreach Specialist Rick Hasbrouck.

"We're just in the measuring phase right now," he said. "We're getting our baseline because we haven't had one before."

About half of the remote field camps operated by the U.S. in Antarctica now have some sort of alternative power, said Joe Yarkin, alternative energy specialist for RPSC. Larger sites, such as the eight-person Davis seal camp near McMurdo, are using a combined portable solar/wind system capable of producing up to two kilowatts of energy. That is more than enough for the dozen laptop computers and other electronic items at the camp.

"When we were out there last week, they hadn't turned on their generators for a week," Yarkin said.

Equipment and upgrades are also being brought this season to several locations in the Dry Valleys, Cape Royds and Cape Crozier. He said there are still plenty of opportunities to expand alternative power use in the field, but fuel generators will still be needed for backup purposes and for some of the power at larger sites.

Yarkin said a number of people at McMurdo are volunteering to make wind towers and rebuild burnt-out generators. Quinn Redman, a second-year cargo handler from Seattle working with Yarkin last week, said he volunteers every Wednesday because he wants to be able to do alternative power work at McMurdo or somewhere in the U.S.

Such attitudes and awareness are a large part of the power-saving efforts being implemented by the U.S. Antarctic Program as it seeks a 5 percent reduction in overall usage through conservation.

"We should be able to get 5 percent just by people turning off their lights and computers, and people changing their behavior," Hasbrouck said.

About 570 people attended one of the half-hour energy conservation presentations given recently at McMurdo by Hasbrouck. They were reminded of facts, such as a load of laundry costs 80 cents at McMurdo and $13 at the South Pole, and that reducing carbon dioxide emissions 10 percent a year would be the equivalent of planting 550 acres of trees.

About 80 people have submitted energy saving ideas since, with incentives such as a $100 prize for the best submission. Atwood said the long-term goal is to make such ideas second nature for everyone.

"What we're trying to effect here is a cultural change, and that takes time," he said.

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home because they can save 75 percent of lighting costs and last 10 times longer than their incandescent counterparts – 10,000 hours versus a standard incandescent at 1,000 hours. The U.S. Department of Energy reports that one compact fluorescent bulb can save 50 to 60 gallons of oil in its lifetime, which is typically three to five years.

Shutting off your computer is another simple step that makes a big difference in electrical power use, but requires only a change in habit. These are the no-cost changes that will get the ball rolling.

An easy and low-cost way to save on heating costs is to add weather stripping to doors and windows that are drafty. Many garage doors at McMurdo don't seal well and let the cold wind infiltrate the warehouses. These kind of low-cost steps will receive the next priority in our energy savings program.

McMurdo drivers are also being asked not to idle vehicles, since that wastes about a gallon of gasoline or diesel fuel per hour. At this time of year, outside temperatures are high enough that idling of light vehicles is not needed except for five minutes to warm-up when first starting at the beginning of the shift.

Other energy saving ideas will be implemented as time and resources allow, with the ones that don't require materials or labor expenditures taking the lead.

Finally, the higher-cost measures will be considered, such as thawing meat in rolling thaw boxes instead of running water to thaw food in the kitchen.

Moving ahead

The energy conservation program is in full swing, but still needs a slogan and logo. Send in your suggestions to rick.hasbrouck@mcmurdo.gov. The best slogan and logo will be chosen on Dec. 15, and will each earn $100. Other awards will follow for the best energy-saving Bright Ideas. Thanks to all those who have already submitted suggestions, and thanks for everyone's continuing support in conserving fuel, power and water.

Profile

Sweeping moves at the South Pole

By Kristan Hutchison/*Sun staff*

David Stecco danced his way to the South Pole.

At least, he's pretty sure he was hired as janitor more for his ability to jump, jive and swing than the way he wields a toilet brush .

"I strongly suspect Alex (Brown) hired me just so I would teach swing down here," said Stecco, who was happy to oblige.

Brown, the station's support supervisor, said she hired Stecco for his jovial attitude, but his willingness to teach both swing dance and tai chi at Amundsen-Scott South Pole Station has been a plus..

In fact, it would be hard to keep him from dancing. Stecco discovered swing dance when a friend dragged him to a big band night. His friend didn't stick around, but Stecco was hooked by the hopping music and began taking lessons. After a year of lessons, and another just dancing, he was asked to join the Jumpin' Jive Cats, a professional swing troupe based in Fort Collins, Colo. He danced and taught with the troupe for about five years, including performing at a halftime show for the Denver Nuggets basketball team.

"It's probably as professional as I'll get at anything," Stecco said.

Stecco can do all the flashy air moves, tossing his partner around like a toy.

"They're not that hard," Stecco said. "The irony of that is almost nobody really does those moves, unless they're choreographed steps."

On a packed dance floor, swinging a lady around is a good way for someone to lose an eye, or at least bump an elbow, Stecco said. He may teach a couple of the easier air steps at the South Pole, using mats underneath to cushion any falls.

Choreographed or not, once the music starts Stecco just falls into the groove.

"It's almost identical to sparring," said Stecco, who also has a black belt in Shaolin Kung Fu. "You may plan your first one or two motions, and after that it's all reaction."

Stecco started kung fu about two years ago, and soon was training 20 to 25 hours a week. He earned his black belt in 18 months and now is an assistant instructor at the school in Denver. He teaches tai chi once a week at the South Pole as well and often practices his kung fu moves before the class starts.

"Hopefully I'll come back in better shape than when I left," said Stecco, who expects to participate in a sparring competition this spring. "That's kind of a motivator."

His other goal, and the main reason he won't be wintering, is to be ready to test for his second black belt in two years, when his kung fu school travels to the Shaolin Temple in Fukien province, China.

Kung fu is mostly a sport for Stecco, who hasn't been in a fight since sixth grade.

He's the kind of guy who breaks tension with a joke instead of a jab, and is known at the South Pole for his quick wit and good humor.

"He's just a fun guy. He comes up with wacky things," said Marra Bennett, a general assistant at the South Pole. "He doesn't hold back."

Fast-talk and his 5-foot-10 extra-large size kept Stecco from having to throw a punch in two years as a bouncer at a pub in Fort Collins called Sullivan's.

"It's about as Irish as a box of Lucky Charms," Stecco said.

He used the same skills working at the Colorado State University library. The library was flooded, so he was often answering calls from people irate that the journal issue they needed was missing.

Professional dancer David Stucco teaches tai chi at the South Pole during his free time, when he is not sweeping floors or cleaning toilets

Photo by Kristan Hutchison/ The Antarctic Sun

"I got a feel for calming someone down," Stecco said.

Stecco spent six years in college, bouncing through a variety of majors. He started out in pre-med, and for a while had a job removing corneas from corpses to be used in eye surgery.

"I had to do a recovery on a carload of teenagers and that pretty much blew it all out of me," said Stecco, who switched to physics and, finally, to biology.

Stecco ended up focusing on entomology, the study of bugs. Though he was an undergraduate student, he had the opportunity to do original research on a postdoctoral project on Russian wheat aphids.

"I'm more of a dirty hands kind of guy. I'd go out and collect samples all day, things like that," Stecco said.

Insects are one of the things he misses at the South Pole.

"It's kind of weird being in a place that doesn't have any bugs at all," Stecco said. "I'll see something, usually it's steam from someone breathing out, and I'll think 'Oh, a bug.'"

By the time he graduated, Stecco was burnt out on school. He got a job with a large insurance company in Denver and became one of 5,000 employees working in three towers.

"For me, it felt like the place careers go to die. It's all office space cubicles," said Stecco, who began applying to work in Antarctica. He'd seen the photos his college roommate, Suzanne Worker, brought back from her two seasons at the South Pole. He applied three times before finally getting hired as the sole janitor at the South Pole, a title that doesn't start to describe his role on the station. He's as likely to be helping in the store and checking rooms as actually cleaning.

"Yesterday was the most janitorial day I've had," Stecco said two Tuesdays ago. "I actually got to sweep, mop and clean a toilet."