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Hi, I am Clive Davis.

In 1987 I was an electrical engineer at the Department of Public Works.

I accompanied an expedition to Sanae 3 to help solve problems with the fire alarm system as well as to investigate the conditions in preparation for designing a new base in the near future.

This video was taken by Hennie Stassen with the departmental camera and of which I was given a copy.

00:00:30:04

This is a Muskeg, a type of tracked vehicle in use at that time and originating from Canada.

00:00:44:05

Rubber bladders were used to transport and store the polar diesel fuel used for the generators and vehicles. Here they are being prepared to receive fuel pumped from the ship.

00:01:34:07

The Capacity 50 000 Litres each.

00:01:51:17

A muskeg descends the ramp from the top of the ice shelf onto the bay ice.

The ship can be seen in the distance.

If there was suitable bay ice present it made offloading the ship very easy. The ship's crane could load straight on to a sledge waiting on the bay ice.

This was seldom the case, in fact this was the only year we were able to do this on any of the trips I accompanied.

00:02:26:08

The ship is right up against the ice shelf in order to pump the fuel into the bladders.

00:03:47:03

A view along the edge of the ice shelf. This is a dangerous place to stand as it could easily collapse.

00:03:04:01

The flow meter indicating how much fuel is being pumped.

00:03:33:18

One of the bladders almost full.

00:03:42:22

The refuelling operation is complete and the Agulhas pulls back from the ice shelf.

00:04:07:23

The fuel bladders on a bulldog sledge. These sledges have a form of suspension whereas the normal ones are flat on the ice and give a very bumpy ride as they rise up over each mound and drop down on the far side.

00:04:40:19

Here we are on a sled being pulled by a Caterpillar. This was our usual means of transport from the Emergency (E-base) where we were accommodated, to the Sanae 3 base. Sometimes a Muskeg did the pulling.

00:05:14:20

The ventilator and access shafts of the Sanae 3 base can be seen about 500m away as viewed from the E-base. At this stage, Sanae 3 was about 10m below the surface.

00:05:32:21

The E base consisted of 4 buildings each mounted on a platform . These were raised 4m above the surface on scaffolding that could be extended each year as the snow level built up.

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This crane is used to hoist fuel drums up for the generators and buckets of snow for the snow melter

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A portable snow melter was used to replace the clumsy bucket system. The water was pumped directly up the pipe into the water tank in the base.

00:06:29:13

The 4 buildings and access staircase of E-base.

00:07:03:23

The sleeping quarters.

00:07:18:24

A room in the sleeping quarters. Here the overwintering doctor is with Dirk van Schalkwyk, of the Department of Environmental Affairs.

00:07:38:13

The E-base Dining room. Christmas dinner is being prepared.

00:08:26:14

The kitchen.

00:08:59:05

Two Air Force chefs cooked our meals.

00:09:24:19

An additional 2 fuel bunkers are being constructed for the Sanae 3. This will be connected to the existing bunker below by a vertical shaft so that it can be access from within.

The construction consists of Armco shells, thick corrugated steel plates, usually used for culverts in South Africa.

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The 2 bunkers are connected by an interleading tunnel

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One of the ventilator shafts for the base below. The cowl is to prevent snow from entering, but this type was not very successful and some were replaced with a new test design.

All the shafts had to be extended each year to stay above as the snow build up.

00:10:44:17

The shaft

00:10:55:17

Adding the extension.

00:11:36:24

The sewerage pipeline. This led off some distance away and the sewerage was just dumped into the

snow. This is no longer permitted.

00:11:49:09

The main entrance shaft. A stepladder gives access to a hatch on top and a staircase leads down to the base. This shaft has already been extended.

00:12:06:22

A temporary welding workshop, shielded from the wind by curtains.

00:12:49:04

The poles mark a cable or pipeline route to a scientific experiment.

00:13:19:08

Another view of the above surface elements of Sanae 3. The shafts, outdoor experiments and balloon hut. Several of these had had accidents with the hydrogen in the past and were thus kept a safe distance away.

00:13:35:05

Here we arrive back at E-base in a storm.

00:13:54:14

We are wearing the old type of clothing which protected one from the weather, but were not suitable for working in. Lying on or touching the snow would let the wet through.

00:14:48:17

Bolting together an Armco shell.

00:15:09:15

A fuel bunker is being made for the E-base to replace having to hoist the drums up. It is being constructed below the surface to prevent snow build up in the vicinity of the structure. It will contain a rubber bladder fuel tank, the fuel being pumped up to the day tank in the E-base.

00:15:45:22

Here Hein Smith and I are modifying the fire alarm system in the E-base. The refrigeration panels it is constructed of give off a toxic gas if they catch fire. A reliable fire alarm system is therefore critical.

00:17:25:13

The new bunker is receiving fuel.

00:17:43:07

A Muskeg being refuelled from the Sanae 3 tanks.

00:17:51:19

A ride in a Muskeg. Although it has suspension, the ride is very bumpy with a lot of rocking backwards and forwards and one has to brace oneself.

00:18:18:02

This is a view below a building in the Sanae 3 base. The buildings were constructed inside large Armco shells. The heat escaping from the buildings caused the shells to melt their way down into the ice at different rates. This caused them to be misaligned with the horizontal and the buildings had to be levelled by means of jacks to compensate.

00:18:52:24

Some overwintering team members in the Sanae 3 lounge. The instrument on the wall in the corner gives readings of the temperature and wind speed on the surface.

00:19:15:02

The games room

00:19:24:18

Beyond the curtain is the movie theatre. This was still in the days of projectors and film.

00:19:42:01

The Sanae 3 fire alarm panel.

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The schematic diagram of the buildings and interconnecting tunnels.

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The long tunnel at the bottom is the inclined shaft to the surface.

00:20:20:24

The inclined shaft was to enable the vehicles and other large equipment, the generating sets for example, to be transported in or out of the base. This shaft also became buried by snow build up during the year and had to be first cleared and then extended. The Cats would doze a ramp down to it as near as possible, but the last part had to be done by hand to prevent damage to the structure. Below the surface, the ice is very hard and requires jack hammers to break it.

00:21:26:04

The Cat clearing away the ice at the bottom of the ramp.

00:21:46:22

When one one exerts oneself and breathes hard, ones dark goggles mist up,. We did without them for short periods. Long exposure without them could lead to snow blindness.

00:22:46:07

These are storage platforms for building materials such as the poles for E-base and other equipment that cannot be got below, These platforms also had to be raised.

00:23:21:06

This is a summer base "Sarie Marais" at the mountain of Grunhogna, 200km away from Sanae 3. This base is near to where the new Sanae 4 base is built, about 40km away from it.

00:15:10:16

One of the old type of skidoos.

00:25:33:12

Clearing the snow build up off the catwalks.

00:25:59:14

A view of Lorenzenpiggen, a mountain peak very close to where Sanae 4 is built.

00:26:12:00

The "Sarie Marais" base below.

00:26:21:21

The helicopter refuelled from drums brought by snow vehicles.

00:27:24:03

The radio room in E-base. From here contact could be made with Sanae 3 base and the ship.

00:28:23:00

The catwalks around the buildings of E-base.

00:28:51:04

The ablution block.

The showers,

00:29:11:23

laundry,

00:29:30:16

urinals,

00:29:42:15

water tank which was the old snow melter

00:29:59:22

and chemical toilets.

00:30:14:24

The E-base workshop and hardware store.

00:30:27:08

The E-base generating sets. These were air cooled for simplicity, but were wasteful of heat.

The control panels

00:31:14:16

The generator day fuel tanks and the switch to start the pumps in the new fuel bunker.

00:31:22:08

The inclined shaft has been cleared at last. We only had time to remove a generating set to be returned to Cape Town for repairs, then another storm closed the shaft up again.

00:31:43:07

This is tour down below in the Sanae 3 base

00:31:48:04

The inside of the inclined shaft, the sides lined with spares.

00:31:56:18

Some buckling of the plates from pressure from the ice surrounding it.

00:32:38:14

The door to the power plant. The engines are air cooled and the lagged pipes lead air in from the ventilation shaft.

00:33:00:17

The Sanae 3 workshop.

00:33:47:18

The tank on the right is the snow melter with a shaft leading down to it from the surface. Snow is shovelled in from above, is melted by heat from the engine exhaust gasses and electrical elements and pumped into the big white storage tank on the left.

The two generating sets are in front of the tanks and the small generator set in the foreground is for emergency power. The lagged pipes from the exhaust lead to the heat exchanger in the snow melter.

00:34:20:01

The drying room is situated next to the engines where the heat from them can dry ones washing.

00:34:42:10

The shower and bathroom.

00:35:12:06

One of the interconnecting tunnels between the buildings.

00:35:22:00

The entrance to a building.

00:35:29:11

The fuel bunker.

00:35:46:20

The upper level of the fuel bunker.

00:36:17:24

The hatch where the pipe enters is to the shaft leading up to the additional new bunkers constructed on the surface

00:36:26:08

The gym.

00:36:45:09

The Sanae 3 Radio room.

00:36:52:15

Note the teleprinters, this was still before fax machines were in general use.

00:37:00:04

The radio was manned 24 hours a day and had contact with E-Base, other countries' bases in Antarctica and shipping in the vicinity. It had contact with SA via the Derdepoort Telecom station near Pretoria. From this room we could radio phone home. Calls had to be booked and we were limited to 5 minutes per call.

00:37:27:11

On the radio room wall hangs a map of Antarctica, showing the various bases.

Sanae 3 just to the left of the northernmost point. The Russians to the right of it are the nearest neighbours.

00:38:24:15

This is a small emergency generator at the bottom of a ventilator shaft. It should not have anything packed on it.

00:38:36:18

The air is drawn in from the surface and heated inside this diesel fuelled Wanson heater,

00:38:50:15

which then circulates it throughout the building.

00:38:56:09

The Electronic workshop with tools and components..

We made a lot of use of this room as we had to modify and even make some of our own printed circuit boards.

00:39:15:10

Some tomatoes being grown by hydroponics. This is no longer allowed in Antarctica.

00:39:27:09

The Doctor's rooms.

00:39:37:12

The operating table.

00:40:01:09

The medicine store.

00:40:39:02

A small bath and urinal for the use of the doctor and patients.

00:40:59:14

One of the rooms in the sleeping quarters. The rooms were very small, about 12 square metres. During the overwintering period there would be only one team member per room. But during the takeover period the replacement member would share while "learning the ropes".

00:41:22:03

The main access shaft up to the surface, with staircase.

00:41:34:12

One of the interconnecting tunnels. They are full of boxes that have been sent down in the hoist and are waiting to be sorted and packed in the stores.

00:41:49:03

The entrance to the science block. The entrances were initially at the same level as the tunnels. With the warping of the Armco shells caused by the uneven sinking of each, the buildings had to be levelled and a step built up to make up the difference in height.

00:42:08:04

The passage in the science block.

00:42:19:20

Another tomato plant.

00:42:31:17

One of the labs with instruments recording.

00:43:22:15

It is 20 to 10 at night.

00:43:27:18

The Weather Bureau.

In the new Sanae 4 base, this has all been replaced with an automatic station and no overwintering meteorologist is required.

00:44:31:04

Some old computers in one of the labs. In Sanae 4 most of the electro-mechanical recorders etc. have been replaced by PC based systems.

00:44:51:13

PC's were just becoming available at this time. For those that remember them, here is an Olivetti

00:45:08:14

This is the food store with enough food to last for the year.

00:45:18:06

The staircase leads to an upper level where spares are kept.

00:45:36:09

The upper level, the Sanae 3 hardware store

00:45:47:13

A smoke detector of the fire alarm system..

00:46:29:06

It is tea time and here our maintenance team are relaxing in the dining room and kitchen area.

00:46:43:18

The newspaper is not the latest and came down with us on the ship.

00:47:24:07

The washing up area. The floor is raised to house a waste water tank underneath. When full, the water then was pumped out into the snow.

00:47:48:18

The kitchen.

00:48:19:05

A view down the side of a building, between it and the Armco shell

00:48:30:11

On the roof of the building.

Some of the Armco plates are beginning to buckle. These eventually pressed down on the building and crushed the roofs and walls.

00:49:06:02

Here the roof is already in contact with the shell and can not be levelled any further.



00:49:20:20

A last view of the E-base from the helicopter as we head off for the ship.