

Without NASA's Manned Space Program, The Chilean Miners Would Be Dead

by Marsha Freeman

Oct. 29—The dramatic Oct. 13 rescue of 33 trapped miners in Chile, which captured the rapt attention of the world, was accomplished through an international mobilization, and the crucial help of American industrial ingenuity and NASA space exploration expertise.

On Oct. 28, American industry officials and NASA experts were invited to the White House to be congratulated on their success. It had been announced in the morning that President Obama would appear with the U.S.-Chile team in the Rose Garden to give a statement. He never showed. Perhaps he was afraid that *EIR* would ask if there would have been a successful rescue, if his program to shut down the space agency's manned space program had been carried out.

At a brief exchange with the press, following the meeting between President Obama and the U.S.-Chile team, *EIR*'s Bill Jones directed a question to the NASA officials.

Jones said to NASA Administrator Charlie Bolden: "I'd like to address at least one question to the NASA people present. Is it not the case that this tremendous rescue was only possible because of what we had learned during five decades of manned space exploration?" Bolden, somewhat taken aback at being in the center of attention, nevertheless came forward.

"Yes," he said, "it is a result of the 50 years of experience in space flight, by the understanding acquired by human space flight, and by the engineering capabilities developed there. For instance, the doctors here who were there, can tell you how important their knowledge of the psychological and physical conditions in space were."

Bolden then called on Dr. Michael Duncan, who had led the NASA team in Chile, to comment. "Five decades in space flight were very important for this. In particular, the lessons in long-duration space flight gave us important insights into how to manage this difficult situation." He then praised the work of the Chilean teams that were engaged at the site.

Unstated was the fact that Obama still insists on

shutting down the manned space program. As Lyndon LaRouche remarked, if Obama had been President earlier, the miners would have died.

The Rescue Plan

Seventeen days after the collapse of a gold and copper mine in Chile trapped 33 miners more than 2,000 feet underground, a hand-written note they sent to the surface reported that all of the men were alive and well. The people and government of Chile were greatly relieved. They now faced the task of keeping the men alive and in good health, mentally and physically, and devising a plan to rescue them.

On Aug. 25, NASA experts in human health at the Johnson Space Center in Houston reported that they had been contacted, through the U.S. State Department, by the government of Chile, to engage their support for the trapped miners. NASA's Johnson Space Center is responsible for the training of astronauts, their health and performance while they are in space, and through Mission Control, is their link to the rest of society.

Johnson experts were asked to provide "technical advice related to life sciences," including effective psychological support for the trapped men, who, it was expected, would have to wait months to be rescued. Over the past 50 years of human space flight, NASA has had extensive experience in dealing with a broad range of psychological issues, in otherwise healthy individuals, during long-duration space flights. Space exploration involves one of the most intensive experiences in social isolation. NASA has also had extensive experience in solving, and preventing, such problems.

A week later, a team of four NASA experts traveled to the mine site. Actually, NASA astrobiologists were already familiar with the mine's Atacama desert terrain, since teams of scientists have spent time there, studying this driest region on Earth as an analogue to the deserts of Mars.

On Sept. 7, at a press briefing in Houston, the NASA team reported on its three-day visit to the mine. They



Government of Chile/Hugo Infante

Miner Mario Gomez steps out of the NASA-designed capsule (seen behind him), which brought each of the 33 Chilean miners and several rescue workers, one by one, safely to the surface. NASA's decades of experience in developing the technology for the space program is largely responsible for the success of the rescue mission.

described the overall effort underway as “very impressive.” While NASA astronauts have faced many extreme situations, the plight of the miners is “unprecedented in scope,” stated Dr. James Polk, NASA chief of space medicine, because there are so many of them, so far down, for so long.

He explained the intricacies of re-feeding people who are starving, and that the Ministry of Health had managed to do that without any harm to the health of the miners. For 17 days, with no contact with the outside world, the miners had rationed a couple of days worth of supplies, each eating a spoonful of tuna fish and one of milk, every other day, to keep everyone alive.

Dr. Duncan, who led the NASA team, explained that the Chilean Space Agency had facilitated their visit. The experts from both countries agreed that what had kept the miners alive until contact was made, was their ability to organize themselves under a leader, and into groups, each with a specific area of responsibility. There was a complete commitment to be prepared to be rescued.

After contact was made with the miners, they were able to receive supplies through a six-foot-long tube (*paloma*, or dove) that was lowered down through a small hole that had been drilled. This 24-hour-a-day op-

eration delivered food, water, cots designed to fit into a tube with a 4-inch diameter, medicine, books, and other supplies.

Throughout the following weeks, the NASA health experts were in continuous communication with the Health Ministry, regarding diet and nutrition, exercise, social organization, and also issues related to the miners' readjustment after rescue, at the request of the Chileans.

A Below-Ground ‘Space’ Capsule

As the nutritional, health, and medical requirements of the miners were being met, the race began among three different drilling rigs in the effort to reach the miners as quickly as

possible. Due to the depth involved, and the hardness of the rock, the most advanced, and, in some cases, yet-to-be developed, drilling technology was needed.

All three of the drills that were engaged to free the miners suffered breakdowns and damaged parts, and had to be stopped at various times. Engineers back at their U.S. companies raced, not just to replace, but to improve their drill-bit design and manufacture, to operate in an environment they had never encountered before.

In the end, it was the American-made Schramm T130 drill—which was sent to Chile along with two expert drillers, and two Spanish-speaking assistants—which was the first to bore through the rock, and reach the miners, on Oct. 10. The rig and crew, had previously been drilling water wells in Afghanistan.

As soon as the miners were located, work began to design a capsule that would fit inside the 26-inch hole made by the drill rig, to bring each miner to the surface.

The NASA medical team that had traveled to Chile in early September also included a NASA engineer, Clint Cragg, who is a principal engineer at the Engineering and Safety Center at NASA Langley. He had been the commander of the U.S. Navy submarine, *Ohio*, before joining NASA seven years ago.



U.S. Embassy, Chile/Cicilia Penafiel

NASA engineer Clint Cragg (right) consults with René Aguilar, deputy chief of rescue operations for the Chilean mine disaster. Cragg, a former submarine commander, assembled a team of 20 NASA engineers, to devise the capsule that brought the miners to the surface.

Cragg had been assigned to support the NASA doctors, in case there were any technological device NASA could provide for the miners. While he was there, he had the opportunity to talk with a Chilean submarine skipper, about how the rescue operation efforts were evolving.

Cragg reported on Sept. 9, when he had returned from Chile, that the extraction capsule, about 13 feet long, would have to fit through a 26-inch diameter shaft. He offered to help put together suggestions on design criteria that could be used to evaluate ideas for the rescue capsule, which were being developed by three Chilean companies. When he returned to the U.S., he received an e-mail, taking him up on his offer. Cragg knew that while submariners spend time in isolated environments, only astronauts spend days in craft so small, there is basically only room for them, and the necessary equipment. That is what the capsule designers were facing.

Cragg went back to Virginia, and assembled a team of 20 NASA engineers, “from almost every [NASA] center around the country,” who spent three days, hammering out “a 12- to 13-page list of requirements for the capsule, and sent that to the Chilean Minister of Health.”

The 75 suggested design features included that the

capsule be built so a single miner could get himself in and secured. (The last man out would have no one to help him.) The NASA engineers recommended that the cage be equipped with an oxygen tank, that it be coated to reduce friction as it traveled up and down the shaft, and that it be open for air flow, but covered on top with mesh, in case there were any falling debris.

The engineers suggested that there be voice and video communication with the miner on the way up, to be able to monitor his physical and psychological status, and to be able to immediately identify any problem.

The capsule should be self-aligning to stay vertical and not tilt, they recommended. NASA had donated a special liquid diet for the miners to start taking when the bore hole reached them, designed to prevent nausea from any rotation of the capsule on the way up. This is similar to the problem suffered by about half of the people who have to adjust to microgravity during space missions.

“After we had sent the requirements,” Cragg reported on Oct. 13, “I got some communication from one of the Chilean Navy commanders intimately involved in the design process of the capsule. He told me that they had incorporated most of the suggestions we had provided to them.”

After the rescue of the miners, International Space Station commander, astronaut Doug Wheelock, speaking for the international crew of six, sent an audio message to the miners and the Chilean people, which he said he wanted to “pass along from outer space.” He commended the “heroes below and above the ground,” and congratulated the miners on their perseverance.

When the spacecraft carrying the Apollo 13 astronauts to the Moon suffered a catastrophic fuel tank explosion, imperiling the lives of the crew, flight director Gene Kranz told his team that “failure is not an option.” When politicians in the control room worried that this would be a disaster for NASA, Kranz retorted: “I believe this will be NASA’s finest hour.”

Cragg said that one of the things that he will remember from this experience “is [that] our agency has a lot of exceptional people. The 20 or so engineers who offered to drop everything and work with me for three days to put this requirements list together really exemplify the things that NASA stands for.”

Everything that NASA stands for, is what President Obama had proposed be dismantled, in his push to end manned space flight.