

AUDIO LOG TRANSCRIPT: SOL 119

You know what!? Fuck this! Fuck this airlock, fuck that Hab, and fuck this whole planet!

Seriously, this is it! I've had it! I've got a few minutes before I run out of air and I'll be damned if I spend them playing Mars's little game. I'm so god damned sick of it I could puke!

All I have to do is sit here. The air will leak out and I'll die.

I'll be done. No more getting my hopes up, no more self-delusion, and no more problem-solving. I've fucking *had it!*

AUDIO LOG TRANSCRIPT: SOL 119.(2).

Sigh...okay. I've had my tantrum and now I have to figure out how to stay alive. Again. Okay, let's see what I can do here....

I'm in the airlock. I can see the Hab out the window; it's a good 50 meters away. Normally, the airlock is *attached* to the Hab. So that's a problem.

The airlock's on its side, and I can hear a steady hiss. So either it's leaking or there are snakes in here. Either way, I'm in trouble.

Also, during the...whatever the fuck happened...I got bounced around like a pinball and smashed my faceplate. Air is notoriously uncooperative when it comes to giant, gaping holes in your EVA suit.

Looks like the Hab is completely deflated and collapsed. So even if I had a functional EVA suit to leave the airlock with, I wouldn't have anywhere to go. So that sucks.

I gotta think for a minute. And I have to get out of this EVA suit. It's bulky, and the airlock is cramped. Besides, it's not like it's doing me any good.

Things aren't as bad as they seem.

I'm still fucked, mind you. Just not as deeply.

Not sure what happened to the Hab, but the rover's probably fine. It's not ideal, but at least it's not a leaky phone booth.

I have a patch kit on my EVA suit, of course. The same kind that saved my life back on Sol 6. But don't get excited. It won't do the suit any good. The patch kit is a cone-shaped valve with super-sticky resin on the wide end. It's just too small to deal with a hole larger than eight centimeters. And really, if you have a nine-centimeter hole, you're going to be dead way before you could whip out the kit.

Still, it's an asset, and maybe I can use it to stop the airlock leak. And that's my top priority right now.

It's a small leak. With the faceplate gone, the EVA suit is effectively managing the whole airlock. It's been adding air to make up for the missing pressure. But it'll run out eventually.

I need to find the leak. I think it's near my feet, judging by the sound. Now that I'm out of the suit, I can turn around and get a look....

I don't see anything.... I can hear it, but...it's down here somewhere, but I don't know where.

I can only think of one way to find it: Start a fire!

Yeah, I know. A lot of my ideas involve setting something on fire. And yes, deliberately starting a fire in a tiny, enclosed space is usually a terrible idea. But I need the smoke. Just a little wisp of it.

As usual, I'm working with stuff that was deliberately designed not to burn. But no amount of careful design by NASA can get around a determined arsonist with a tank of pure oxygen.

Unfortunately, the EVA suit is made entirely of nonflammable materials. So is the airlock. My clothes are

fireproof as well, even the thread.

I was originally planning to check the solar array, doing repairs as needed after last night's storm. So I have my toolbox with me. But looking through it, I see it's all metal or nonflammable plastic.

I just realized I do have something flammable: my own hair. It'll have to do. There's a sharp knife in the tool kit. I'll shave some arm hairs off into a little pile.

Next step: oxygen. I don't have anything so refined as pure oxygen flow. All I can do is muck with the EVA suit controls to increase oxygen percentage in the whole airlock. I figure bumping it to 40 percent will do.

All I need now is a spark.

The EVA suit has electronics, but it runs on very low voltage. I don't think I could get an arc with it. Besides, I don't want to mess with the suit. I need it working to get from the airlock to the rover.

The airlock itself has electronics, but it ran on Hab power. I guess NASA never considered what would happen if it was launched fifty meters. Lazy bums.

Plastic might not burn, but anyone who's played with a balloon knows it's great at building up static charge. Once I do that, I should be able to make a spark just by touching a metal tool.

Fun fact: This is exactly how the Apollo 1 crew died. Wish me luck!

AUDIO LOG TRANSCRIPT: SOL 119 (4)

I'm in a box full of burning-hair smell. It's not a good smell.

On my first try, the fire lit, but the smoke just drifted randomly around. My own breathing was screwing it up. So I held my breath and tried again.

My second try, the EVA suit threw everything off. There's a gentle flow of air coming out of the faceplate as the suit constantly replaces the missing air. So I shut the suit down, held my breath, and tried again. I had to be quick; the pressure was dropping.

My third try, the quick arm movements I used to set the fire messed everything up. Just moving around makes enough turbulence to send the smoke everywhere.

The fourth time I kept the suit turned off, held my breath, and when the time came to light the fire, I did it very slowly. Then I watched as the little wisp of smoke drifted toward the floor of the airlock, disappearing through a hairline fracture.

I have you now, little leak!

I gasped for air and turned the EVA suit back on. The pressure had dropped to 0.9 atmospheres during my little experiment. But there was plenty of oxygen in the air for me and my hair-fire to breathe. The suit quickly got things back to normal.

Looking at the fracture, I see that it's pretty tiny. It would be a cinch to seal it with the suit's patch kit, but now that I think about it, that's a bad idea.

I'll need to do some kind of repair to the faceplate. I don't know how just yet, but the patch kit and its pressure-resistant resin are probably really important. And I can't do it bit by bit, either. Once I break the seal on the patch kit, the binary components of the resin mix and I have sixty seconds before it hardens. I can't just take a little to fix the airlock.

Given time, I might be able to come up with a plan for the faceplate. Then, I could take a few seconds during that plan to scrape resin over the airlock fracture. But I don't have time.

I'm down to 40 percent of my N<sub>2</sub> tank. I need to seal that fracture now, and I need to do it without using the patch kit.

First idea: Little Dutch Boy. I'm licking my palm and placing it over the crack.

Okay...I can't quite make a perfect seal, so there's airflow...getting colder now...getting pretty uncomfortable... Okay, fuck this.

On to idea number two. Tape!

I have duct tape in my toolbox. Let's slap some on and see if it slows the flow. I wonder how long it will last before the pressure rips it. Putting it on now.

There we go...still holding...

Lemme check the suit.... Readouts say the pressure is stable. Looks like the duct tape made a good seal.

Let's see if it holds....

AUDIO LOG TRANSCRIPT: SOL 119 (5)

It's been fifteen minutes, and the tape is still holding. Looks like that problem is solved.

Sort of anticlimactic, really. I was already working out how to cover the breach with ice. I have two liters of water in the EVA suit's "hamster-feeder." I could have shut off the suit's heating systems and let the airlock cool to freezing. Then I'd...Well, whatever.

Coulda done it with ice. I'm just sayin'.

All right. On to my next problem: How do I fix the EVA suit? Duct tape might seal a hairline crack, but it can't hold an atmosphere of pressure against the size of my broken faceplate.

The patch kit is too small, but still useful. I can spread the resin around the edge of where the faceplate was, then stick something on to cover the hole. Problem is, what do I use to cover the hole? Something that can stand up to a lot of pressure.

Looking around, the only thing I see that can hold an atmosphere is the EVA suit itself. There's plenty of material to work with, and I can even cut it. Remember when I was

cutting Hab canvas into strips? Those same shears are right here in my tool kit.

Cutting a chunk out of my EVA suit leaves it with another hole. But a hole I can control the shape and location of.

Yeah...I think I see a solution here. I'm going to cut off my arm!

Well, no. Not *my* arm. The EVA suit's arm. I'll cut right below the left elbow. Then I can cut along its length, turning it into a rectangle. It'll be big enough to seal the faceplate, and it'll be held in place by the resin.

Material designed to withstand atmospheric pressure? Check.

Resin designed to seal a breach against that pressure? Check.

And what about the gaping hole on the stumpy arm? Unlike my faceplate, the suit's material is flexible. I'll press it together and seal it with resin. I'll have to press my left arm against my side while I'm in the suit, but there'll be room.

I'll be spreading the resin pretty thin, but it's literally the strongest adhesive known to man. And it doesn't have to be a perfect seal. It just has to last long enough for me to get to safety.

And where will that "safety" be? Not a damn clue.

Anyway, one problem at a time. Right now I'm fixing the EVA suit.

AUDIO LOG TRANSCRIPT: SOL 119 (6)

Cutting the arm off the suit was easy; so was cutting along its length to make a rectangle. Those shears are strong as hell.

Cleaning the glass off the faceplate took longer than I'd expected. It's unlikely it would puncture EVA suit material, but I'm not taking any chances. Besides, I don't want glass in my face when I'm wearing it.

Then came the tricky part. Once I broke the seal on the patch kit, I had sixty seconds before the resin set. I scooped it off the patch kit with my fingers and quickly spread it around the rim of the faceplate. Then I took what was left and sealed the arm hole.

I pressed the rectangle of suit material onto the helmet with both hands while using my knee to keep pressure on the arm's seam.

I held on until I'd counted 120 seconds. Just to be sure.

It seemed to work well. The seal looked strong and the resin was rock-hard. I did, however, glue my hand to the helmet.

Stop laughing.

In retrospect, using my fingers to spread the resin wasn't the best plan. Fortunately, my left hand was still free. After some grunting and a lot of profanities, I was able to reach the toolbox. Once I got a screwdriver, I chiseled myself free (feeling really stupid the whole time). It was a delicate process because I didn't want to flay the skin off my fingers. I had to get the screwdriver between the helmet and the resin. I freed my hand and didn't draw blood, so I call that a win. Though I'll have hardened resin on my fingers for days, just like a kid who played with Krazy Glue.

Using the arm computer, I had the suit overpressurize to 1.2 atmospheres. The faceplate patch bowed outward but otherwise held firm. The arm filled in, threatening to tear the new seam, but stayed in one piece.

Then I watched the readouts to see how airtight things were.

Answer: Not very.

It absolutely *pissed* the air out. In sixty seconds it leaked so much it pressurized the whole airlock to 1.2 atmospheres.

The suit is designed for eight hours of use. That works out to 250 milliliters of liquid oxygen. Just to be safe, the suit has a full liter of O<sub>2</sub> capacity. But that's only half the story. The rest of the air is nitrogen. It's just there to add pressure. When

the suit leaks, that's what it backfills with. The suit has two liters of liquid N<sub>2</sub> storage.

Let's call the volume of the airlock two cubic meters. The inflated EVA suit probably takes up half of it. So it took five minutes to add 0.2 atmospheres to 1 cubic meter. That's 285 grams of air (trust me on the math). The air in the tanks is around 1 gram per cubic centimeter, meaning I just lost 285 milliliters.

The three tanks combined had 3000 milliliters to start with. A lot of that was used to maintain pressure while the airlock was leaking. Also, my breathing turned some oxygen into carbon dioxide, which was captured by the suit's CO<sub>2</sub> filters.

Checking the readouts, I see that I have 410 milliliters of oxygen, 738 milliliters of nitrogen. Together, they make almost 1150 milliliters to work with. That, divided by 285 milliliters lost per minute...

Once I'm out of the airlock, this EVA suit will only last four minutes.

Fuck.

AUDIO LOG TRANSCRIPT: SOL 119 (7).

Okay, I've been thinking some more.

What good is going to the rover? I'd just be trapped there instead. The extra room would be nice, but I'd still die eventually. No water reclaimer, no oxygenator, no food. Take your pick; all of those problems are fatal.

I need to fix the Hab. I know what to do; we practiced it in training. But it'll take a long time. I'll have to scrounge around in the now-collapsed canvas to get the spare material for patching. Then I have to find the breach and seal-strip a patch in place.

But it'll take hours to repair, and my EVA suit is useless.

I'll need another suit. Martinez's used to be in the rover. I hauled it all the way to the *Pathfinder* site and back, just in



case I needed a spare. But when I returned, I put it back in the Hab.

Damn it!

All right, so I'll need to get another suit before going to the rover. Which one? Johanssen's is too small for me (tiny little gal, our Johanssen). Lewis's is full of water. Actually, by now it's full of slowly sublimating ice. The mangled, glued-together suit I have with me is my original one. That leaves just Martinez, Vogel, and Beck's.

I left Martinez's near my bunk, in case I needed a suit in a hurry. Of course, after that sudden decompression, it could be anywhere. Still, it's a place to start.

Next problem: I'm like 50 meters from the Hab. Running in 0.4 g while wearing a bulky EVA suit isn't easy. At best, I can trundle 2 meters per second. That's a precious 25 seconds; almost an eighth of my four minutes. I've got to bring that down.

But how?

AUDIO LOG TRANSCRIPT: SOL 119 (8)

I'll roll the damn airlock.

It's basically a phone booth on its side. I did some experiments.

I figured if I want it to roll, I'll need to hit the wall as hard as possible. And I have to be in the air at the time. I can't press against some other part of the airlock. The forces would cancel each other out and it wouldn't move at all.

First I tried launching myself off one wall and slamming into the other. The airlock slid a little, but that's it.

Next, I tried doing a super-push-up to get airborne (0.4 g yay!) then kicking the wall with both feet. Again, it just slid.

The third time, I got it right. The trick was to plant both my feet on the ground, near the wall, then launch myself to the top

of the opposite wall and hit with my back. When I tried that just now, it gave me enough force and leverage to tip the airlock and roll it one face toward the Hab.

The airlock is a meter wide, so...sigh...I have to do it like fifty more times.

I'm gonna have a hell of a backache after this.

AUDIO LOG TRANSCRIPT: SOL 120

I have a hell of a backache.

The subtle and refined "hurl my body at the wall" technique had some flaws. It worked only one out of every ten tries, and it hurt a lot. I had to take breaks, stretch out, and generally convince myself to body-slam the wall again and again.

It took all damn night, but I made it.

I'm ten meters from the Hab now. I can't get any closer, 'cause the debris from the decompression is all over the place. This isn't an "all-terrain" airlock. I can't roll over that shit.

It was morning when the Hab popped. Now it's morning again. I've been in this damn box for an entire day. But I'm leaving soon.

I'm in the EVA suit now, and ready to roll.

All right...Okay...Once more through the plan: Use the manual valves to equalize the airlock. Get out and hurry to the Hab. Wander around under the collapsed canvas. Find Martinez's suit (or Vogel's if I run into it first). Get to the rover. Then I'm safe.

If I run out of time before finding a suit, I'll just run to the rover. I'll be in trouble, but I'll have time to think and materials to work with.

Deep breath...here we go!

LOG ENTRY: SOL 120

I'm alive! And I'm in the rover!

Things didn't go exactly as planned, but I'm not dead, so it's a win.

Equalizing the airlock went fine. I was out on the surface within thirty seconds. Skipping toward the Hab (the fastest way to move in this gravity), I passed through the field of debris. The rupture had really sent things flying, myself included.

It was hard to see; my faceplate was covered by the makeshift patch. Fortunately, my arm had a camera. NASA discovered that turning your whole EVA-suited body to look at something was a strenuous waste of time. So they mounted a small camera on the right arm. The feed is projected on the inner faceplate. This allows us to look at things just by pointing at them.

The faceplate patch wasn't exactly smooth or reflective, so I had to look at a rippled, messed-up version of the camera feed. Still, it was enough to see what was going on.

I beelined for where the airlock used to be. I knew there had to be a pretty big hole there, so I'd be able to get in. I found it easily. And boy is it a nasty rip! It's going to be a pain in the ass to fix it.

That's when the flaws in my plan started to reveal themselves. I only had one arm to work with. My left arm was pinned against my body, while the stumpy arm of the suit bounced freely. So as I moved around under the canvas, I had to use my one good arm to hold the canvas up. It slowed me down.

From what I could see, the interior of the Hab is chaos. Everything's moved. Entire tables and bunks are meters away from where they started. Lighter objects are wildly jumbled, many of them out on the surface. Everything's covered in soil and mangled potato plants.

Trudging onward, I got to where I'd left Martinez's suit. To my shock, it was still there!

"Yay!" I naively thought. "Problem solved."

Unfortunately, the suit was pinned under a table, which was held down by the collapsed canvas. If I'd had both arms, I could have pulled it free, but with only one, I just couldn't do it.

Running low on time, I detached the helmet. Setting it aside, I reached past the table to get Martinez's patch kit. I found it with the help of the arm-camera. I dropped it in the helmet and hauled ass out of there.

I barely made it to the rover in time. My ears were popping from pressure loss just as the rover's airlock filled with wonderful 1-atmosphere air.

Crawling in, I collapsed and panted for a moment.

So I'm back in the rover. Just like I was back on the Great *Pathfinder* Recovery Expedition. Ugh. At least this time it smells a little better.

NASA's probably pretty worried about me by now. They probably saw the airlock move back to the Hab, so they know I'm alive, but they'll want status. And as it happens, it's the rover that communicates with *Pathfinder*.

I tried to send a message, but *Pathfinder* isn't responding. That's not a big surprise. It's powered directly from the Hab, and the Hab is offline. During my brief, panicked scramble outside, I saw that *Pathfinder* was right where I left it, and the debris didn't reach that far out. It should be fine, once I get it some power.

As for my current situation, the big gain is the helmet. They're interchangeable, so I can replace my broken-ass one with Martinez's. The stumpy arm is still an issue, but the faceplate was the main source of leaks. And with the fresh patch kit, I can seal the arm with more resin.

But that can wait. I've been awake for over twenty-four hours. I'm not in any immediate danger, so I'm going to sleep.

Got a good night's sleep and made real progress today.

First thing I did was reseal the arm. Last time, I had to spread the resin pretty thin; I'd used most of it for the faceplate patch. But this time I had a whole patch kit just for the arm. I got a perfect seal.

I still only had a one-armed suit, but at least it didn't leak.

I'd lost most of my air yesterday, but I had a half hour of oxygen left. Like I said earlier, a human body doesn't need much oxygen. Maintaining pressure was the problem.

With that much time, I was able to take advantage of the rover's EVA tank-refill. Something I couldn't do with the leaky suit.

The tank-refill is an emergency measure. The expected use of the rover is to start with full EVA suits and come back with air to spare. It wasn't designed for long trips, or even overnights. But, just in case of emergency, it has refill hoses mounted on the exterior. Inside space was limited already, and NASA concluded that most air-related emergencies would be outdoors.

But refilling is slow, slower than my suit was leaking. So it wasn't any use to me until I swapped helmets. Now, with a solid suit capable of holding pressure, refilling the tanks was a breeze.

After refilling, and making sure the suit was still not leaking, I had a few immediate tasks to take care of. Much as I trust my handiwork, I wanted a two-armed suit.

I ventured back into the Hab. This time, not being rushed, I was able to use a pole to leverage the table off Martinez's suit. Pulling it loose, I dragged it back to the rover.

After a thorough diagnostic to be sure, I finally had a fully functional EVA suit! It took me two trips to get it, but I got it.

Tomorrow, I'll fix the Hab.

The first thing I did today was line up rocks near the rover to spell “A-okay.” That should make NASA happy.

I went into the Hab again to assess damage. My priority will be to get the structure intact and holding pressure. From there, I can work on fixing stuff that broke.

The Hab is normally a dome, with flexible support poles maintaining the arch and rigid, folding floor material to keep its base flat. The internal pressure was a vital part of its support. Without it, the whole thing collapsed. I inspected the poles, and none of them had broken. They’re just lying flat is all. I’ll have to re-couple a few of them, but that’ll be easy.

The hole where Airlock 1 used to be is huge, but surmountable. I have seal-strips and spare canvas. It’ll be a lot of work, but I can get the Hab together again. Once I do, I’ll reestablish power and get *Pathfinder* back online. From there, NASA can tell me how to fix anything I can’t figure out on my own.

I’m not worried about any of that. I have a much bigger problem.

The farm is dead.

With a complete loss of pressure, most of the water boiled off. Also, the temperature is well below freezing. Not even the bacteria in the soil can survive a catastrophe like that. Some of the crops were in pop-tents off the Hab. But they’re dead, too. I had them connected directly to the Hab via hoses to maintain air supply and temperature. When the Hab blew, the pop-tents depressurized as well. Even if they hadn’t, the freezing cold would have killed the crops.

Potatoes are now extinct on Mars.

So is the soil bacteria. I’ll never grow another plant so long as I’m here.

We had it all planned out. My farm would give me food till Sol 900. A supply probe would get here on Sol 856; way before I ran out. With the farm dead, that plan is history.

The ration packs won't have been affected by the explosion. And the potatoes I've already grown may be dead, but they're still food. I was just about to harvest, so it was a good time for this to happen, I guess.

The rations will last me till Sol 400. I can't say for sure how long the potatoes will last, until I see how many I got. But I can estimate. I had 400 plants, probably averaging 5 potatoes each: 2000 taters. At 150 calories each, I'll need to eat 10 per sol to survive. That means they'll last me 200 sols. Grand total: I have enough food to last till Sol 600.

By Sol 856 I'll be long dead.