

## 16.0 LANDING AND RECOVERY

### 16.1 TOUCHDOWN - IMPACT

- Collins I felt a solid jolt. It was a lot harder than I expected.
- Aldrin It pitched me forward with a little bit of sideways rotation. I was standing by with my fingers quite close to the circuit breaker. The checklist fell, and the pen or pencil, whatever I had, dropped. It didn't seem as though there was any way of keeping your fingers on the circuit breakers.
- Armstrong When you are 18 knots away, it looks pretty promising.
- Collins I think those procedures for the main chute are well worked out. I think it is 50/50 whether or not you are going to STABLE 2.

### 16.3 POSTLANDING CHECKLIST

- Collins The postlanding checklist worked well. The big item for us was that we not contaminate the world by leaving the postlanding vent open. We had that underlined and circled in our procedures to close that vent valve prior to popping the circuit breakers on panel 250. I'd like to say for the following crews that they pay attention to that in their training. If you cut the power on panel 250 before you get the vent valve closed, in theory, the whole world gets contaminated, and everybody is mad at you.
- Aldrin I have a couple of things noted in the checklist. I don't think any of the flight have ever used the CM RCS preheat. If you miss a circuit breaker, it is not real obvious that you are going to come back and see that circuit breaker later. You do, but it is tucked away. For example, when you get ready to preheat, you push some circuit breakers in and turn the heaters on. You wait awhile then pull some circuit breakers out again. The way the checklist is written, some of those circuit breakers stay in and you wonder whether you ought to go through the mechanics of checking all those things off. The other one is the CM RCS activation. When we got to the point of bringing the various logic switches on, the sequence arm circuit breakers were out. Mike called it to my attention that unless we pushed those in, we weren't going to get any RCS pressurization. We didn't go back and research this at that particular time. I believe that if the checklist people check, they will find that those circuit breakers should be called out to be pushed in at that point.
- During the CM RCS check, it says to go to spacecraft control SCS, but it doesn't tell you what mode to be in for the check. I think you want a minimum impulse. I think that it is logical that it be called out in the checklist.

### 16.4 TEMPERATURE AND HUMIDITY

- Collins It was definitely humid inside. We got about a quart of water in through the snorkel valve. It was definitely humid, but it was comfortable.

### 16.5 COMMUNICATIONS

- Collins Communications were good after we became STABLE 1. Of course, we could not hear anybody in STABLE 2, because the antennas were in the water.

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## 16.7 BATTERY POWER

Collins Battery power was more than adequate for the brief duration we were in the spacecraft. I don't recall the voltage, or you mentioning it.

Aldrin On the main chutes after we dumped propellant durin the purge cycle, you could see flame coming out of the thrusters and going by the side windows. When we opened up the valves, there was a fairly strong odor of propellants. It didn't last particularly long. It seemed to me we had plenty of time, and it might be advisable to delay that a little bit longer.

The visibility out the side window coming down was quite good and I felt that you could look out and almost see impact by looking out to the side. This would involve some risk to your neck at the time. I think you could determine levels of 50 feet or less and then put your head back on the couch. I didn't see any need to do that, but the capability does exist.

This business about hitting the water without putting the chutes out because of altimeter failure is kind of a "Mickey Mouse" simulator pad.

Collins I think it is a good thing though. I think the more answers you can mess up inside the simulator, the better it is. They ought to trick you into coming in with your PYRO circuit breakers out, with your ELS circuit breakers out, with your PYRO's not armed, with your ELS LOGIC off, or with your ELS AUTO switch in MANUAL. Any one of those things can really foul you up. To get a successful entry, you have to have the ELS circuit breakers in, the PYRO's armed, ELS AUTO on, and the ELS LOGIC on. Those are important things in the 101 checklist items. Most of them are really not critical, but those few items are. I managed to foul each one of them up at least once during the various simulations. I was glad that I had because I was darn sure going to make positive that each of those switches were in the proper position.

Armstrong I agree with that. What Buzz is saying is that this lack of information about how high you are is not real. If you are in a lighted condition, and we were in a relatively well-lighted condition during chute deployment, this information is a lot more readily available in flight than it is in a simulator. You can see the clouds coming up, and you are watching yourself go through cloud layers, and then you can see the water down below you. You have a lot of cues as to how high you are which aren't available in the simulator.

Aldrin That's true.

## 16.10 SEASICKNESS

Collins Nobody got sick. We each took a pill prior to entry and a second pill on the water. Those pills are called Hyacynth and Dexedrine, and they seem to work fine.

Aldrin No side effects at all.

## 16.11 INTERNAL TEMPERATURE CHANGES

Collins There didn't appear to be any. We were comfortable on the water, and I guess at the time it probably warmed up a little. We weren't in it long enough to really feel any sudden changes. There weren't any.

## 16.12 STABLE 1 OR STABLE 2 - UPRIGHTING PROCEDURES

Collins We were in STABLE 2. The float bags worked fine. We were in STABLE 2 4 or 5 minutes.

Aldrin It didn't seem like it was anywhere near as long as it was during the tank or Gulf training exercises.

Collins I am sure the reason was that we were bobbing around fairly well.

Aldrin As soon as they became almost full, the wave action tipped it back over.

Collins That's right.

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### 16.14 INITIAL SITTING OR STANDING

Collins I don't think any of the three of us had any of those symptoms.

### 16.15 INTERNAL PRESSURE

Collins Internal pressure was fine. We used the dump valve as per the checklist, and it worked out well.

### 16.16 RECOVERY OPERATIONS

Collins Recovery operations went very smoothly. The swimmer threw the BIG's into us. We put the BIG's on inside the spacecraft. We put them on in the lower equipment bay. Neil did first, then I did after him. Buzz put his on in the right-hand seat. We went out; Neil first, then me, and then Buzz. It's necessary, at least the way we had practiced it, for us to help one another in sealing the BIG's around the head to make sure the zipper was fully closed.

### 16.19 EGRESS

Collins As we crossed the threshold of the hatch, we inflated our water wings and jumped into the raft. The BIG's swimmer had trouble getting the hatch closed. I don't know why. Neil went back to help him, and he still had trouble. I went back to help, and when I got there the hatch gear box was on neutral and the hatch handle was on neutral. He should have been able to close it. The hatch handle, instead of being up at its detent, was flopping free. All I did was take it and cram it up into the detent. Then he was able to close the hatch. He was really cranking on it. With neutral on those two pawl settings, there should be no impediment to closing the hatch. Even if the hatch handle is flopping loose, there isn't anything inside which mechanically would interfere with it. We finally helped him get the hatch closed.

We sprayed one another down inside the raft. There was some confusion on the chemical agents. There were two bottles of chemical agents. One of them was Betadyne, which is a soap-sudsy iodine solution, and the other one was Sodium Hypochlorite, a clear chemical spray. During our simulations we used Betadyne in both bottles. They found that the Betadyne broke down the waterproofing in the suit. They made a last-minute change and used Betadyne for scrubbing down the spacecraft, but they used Sodium Hypochlorite for scrubbing us down. I had read about this and knew that there was a change. While the swimmer was scrubbing the spacecraft, I grabbed the other bottle and started scrubbing Neil down. The swimmer got excited and didn't want me to do that. I found out later it was because if you inhale enough of this Sodium Hypochlorite through your intake valve you can cause problems inside the BIG. I'm not sure whether you get nauseated, you can't see or your eyes water.

You have to be careful and not spray too vigorously around the intake valve. You have to spray your glove and wipe it on rather than spray it directly on. I am sure future recoveries will have this worked out during their Gulf egress training. This is just another example where changes made between the training and the real thing have the potential of biting us.

Aldrin I thought the BIG was a well-designed garment. I was rather disappointed in the visibility. When we had our training exercise in the Gulf, I didn't notice as much fogging over on the inside of the visors as I did on the actual recovery. I thought for a while it was on the outside. I dipped down in the water, but couldn't seem to clear it at all. I don't know where it came from. It didn't seem to me that I was perspiring that much on the inside.

Armstrong I was just about to comment on the same thing. If there were any disadvantages to the BIG, as they were used in this operation, it was the lack of visibility due to condensation on the inside of the visor. It was so bad as to be nearly opaque.

Collins I didn't notice that it was any worse than the Gulf. I could see the helicopters clearly, the sling being lowered, and the swimmers. I could make out enough detail, for example, to read the face of a wrist watch. I could see fairly well.

Aldrin You could, but you would have to move it around to a clear spot.

Collins Maybe that's true.

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Armstrong It may have had something to do with the seal between the face and the mask.

Aldrin Yes.

Armstrong How tight that seal was determined whether or not that condensation was excessive or not. Perhaps you had a tighter seal. I think that my seal was fairly loose.

Collins So was mine. You remember, you wanted to tighten my mask.

Aldrin I tightened mine down. Mine was pretty tight so that I wasn't breathing in and out of the suit. Maybe that fact contributed to mine fogging up.

Collins Could be. I don't know.

Armstrong I had a loose fitting mask, too. I had the same problem.

### 16.21 CREW PICKUP

Collins We got into the raft, did our decontamination bit, and they picked us up. The helicopter pilot was real good. You put one hand or foot anywhere near that basket, though, and they start pulling. They don't wait for you to get in and get all comfortable before they retract. Just like a fisherman, they felt a nibble on the end of that line, and he startet cranking. Aboard the helicopter, we started storing heat. For the first time I became uncomfortably warm during the helicopter ride. That helicopter ride was as short as we are going to have them during this kind of operation. We debriefed the recovery people out on the ship and told them the same thing. When you get the crew on the helicopter, everybody shouldn't sit back and breathe a sigh of relief and think that the operation is all over; they should keep right on moving. This is the time when the crew is really starting to get uncomfortable. If the crew has to stay in that helicopter 15 or 20 minutes longer than we did, I guess the hood on the BIG would come off. That's a pretty wild guess.

Armstrong I agree.

Aldrin I agree.

Armstrong I think we were approaching the limit of how long you could expect people to stay in that garment.

Collins It was all right in the raft.

Aldrin The roughness of the water didn't bother me too much. The fact that we were getting just a few waves every now and then cooled you off. There was no way of measuring what the inside temperature of the chopper was except that we just started accumulating heat inside the suit.