

Day 199

ASTP AIR-TO-GROUND VOICE TRANSCRIPTION

19 29 59 ACDR-OM (This is a happy time for the whole crew. We're happy, very happy to receive - to be together here in the first international flight after 2 years of joint preparation and training. We astronauts and cosmonauts - not only - not only have worked together, but we've become good friends. I'm sure that our joint work, friendship, will continue, even after this flight. I am also sure, dear television viewers, that this flight will open the way to further cooperation and friendship between our two countries. The - yesterday's - let the things that went on yesterday and today in our flight be a good thing for both of our peoples. Thank you and good luck.)

CC-H (We heard you very well. Thank you.)

DMP-DM Hey, Bo, you read the DM?

CC-H Roger, docking module pilot. Read you loud and clear.

DMP-DM Okay. Which TMs - or TV do you want back in here? We took one out, you know, and I'm supposed to check the monitor, and we've got nothing here right this minute.

19 31 47 SCDR-OM Ladies and gentlemen of the press. You can see with me Tom Stafford, Soyuz - Apollo commander, today in space, in orbital module of the Soyuz spacecraft, the representatives of two countries: Soviet Union and the United States - United States and Soviet Union. We are conducting - we are conducting our Soviet - our joint Soviet/American flight because our people and our governments want to work together in spirit of cooperation between our country, because many experts in the America and in the Soviet Union did a great job to make this flight possible. We worked together during - for 2-1/2 years. We know each other very well. I know Tom Stafford, Deke Slayton, and Vance Brand are very hard-working guys. We like to work together again. Before our joint flight, we were a lot of times in the United States and the American astronauts were a lot of times in the Soviet Union. Every time we knew each other better and better. We know a lot about America, American people, about American customs. We know

what the American people want. I am very glad that today we work - we are working in space together with our good friends, Tom, Deke, and Vance. I'm sure that our joint flight is the beginning of very great cooperation in space. Thank you very much.

CC-H (Thank you very much, Alexey.)

CC-H Docking module pilot, Houston.

DMP-DM Go ahead, Bo.

19 34 27 CC-H Deke, we would like you to place the camera in the position of 871 where you got the old one out.

DMP-DM Yes, but which one?

DMP-DM You just want to replace the one under 71 that was there?

CC-H The one that was in the TSB that should have gone on position 11 - -

ACDR-OM Hey, Deke, what step you doing now?

CC-H - - should go into 871, because you took the one from 871 and put it in 11.

DMP-DM Okay. I thought you wanted the TSB ... because you thought it was a bad camera.

CC-H Roger; it is. But we think it will work better in the DM.

DMP-DM Okay.

SCDR-OM Deke, how do you read me?

DMP-DM (Excellent, Alexey.)

SCDR-OM What are you doing now?

DMP-DM (First ...)

SCDR-OM (How do you read me?)

CC-H Command module, Houston.

19 37 30 DMP-DM Go ahead, Bo. Vance is ... I'm in the DM.

CC-H This is for the command module. We are going to have a couple minutes of data here. We're finished with the TVs. We would like you to go down to 181 and turn the TV POWER switches, OFF.

19 38 11 DMP-DM Okay, Bo. For your information, I'm hooking up this - this 871 TV to DM1.

CC-H Command module pilot - or docking module pilot, say again, please. You had quite a bit of background noise.

DMP-DM I'm hooking up this TV on 871 to DM1 TV station.

CC-H Understand. You're putting it on 871.

DMP-DM Yeah, that's where you said to put it.

CC-H And we've got about a minute and a half until we go LOS. We're going to be at Vanguard at 79:31. That's about 36 minutes transfer time, and if the command module did not hear, we would like the TV POWER switches OFF.

19 51 47 CC-H Apollo, Houston through Vanguard for 7 minutes, standing by.

DMP-DM (Soyuz, Apollo. I'm beginning ...)

DMP-DM (Soyuz, Apollo.)

ACDR-OM Go ahead, Deke.

DMP-DM (I'm beginning ...)

ACDR-OM Okay.

DMP-DM Okay. (Soyuz, Apollo. Docking module pressurization to 490 millimeters.)

19 54 23 SCDR-OM Docking module pressurize to 490 millimeters.

SFE-DM Roger.

SCDR-OM Deke, ... Soyuz. Tunnel 2 pressure equalization ...
7 - 7 minutes.

DMP-DM (Right.)

19 56 54 DMP-DM Houston, Apollo.

CC-H Apollo, Houston. Go ahead.

DMP-DM Yeah, Bo. You want to pass on this hatch 3 integrity check again?

CC-H Apollo, Houston. We don't think you can gain any time by deleting it, since Soyuz is going to be doing their pressurization.

DMP-DM Roger.

20 17 54 CC-H Apollo, Houston through Rosman. Over.

CMP-CM Roger. Loud and clear.

CC-H We have you for a couple of U.S. stations and then ATS.

CMP-CM Okay.

ACDR-OM Hey there, Bo. We're all over the DM here or OM, rather - -

SCDR-OM (Laughter) Houston ... (laughter), Houston ...

ACDR-OM - - with the old microbial exchange.

CC-H Roger. Understand. You're in the microbial exchange.

ACDR-OM Right.

CC-H Apollo, Houston. There are 30 seconds until LOS. We'll pick you up at Newson - Newfoundland for a few seconds and then ATS.

20 19 12 CMP-CM Okay, Bo.

USA ...

20 21 35 CC-H Apollo, Houston. Through Newfoundland and then ATS.

CMP-CM Okay, Bo.

DMP-DM ... step 16, Bo.

USA ...

CC-H Roger, understand. Step number 16 and if you have a DM Checklist in your hand, would you go to page 5-16, step 26.

DMP-DM Go ahead.

CC-H Deke, did you answer me? I thought I heard you very weakly.

DMP-DM Rog. Standing by for your info on step 26.

20 22 22 CC-H Roger. Where it says, "AC DM SOYUZ TUNNEL VENT ISOLATION - OPEN and DM SOYUZ TUNNEL VENT - VENT." Cross those two steps out, temporarily, and the Soyuz crew will give you an okay to vent the tunnel to vacuum.

DMP-DM Okay, we do that later ...

USSR-OM ...

USA Yeah.

CC-H They'll give you that okay later - perhaps 20 minutes or a half hour later.

DMP-DM Okay.

DMP-DM Good.

USSR-OM ...

USSR-OM ...

DMP-DM ...

USSR-OM ...

USSR-OM (Another time, listen to me.)

20 23 48 SFE-OM (... step - I'm going to give you the exact information one more time. Do you read me? In 2 steps. First, 6 minutes, nominal 10. Within 6 minutes, second step. In 20 minutes, nominal 1 millimeter within 6. Everything is normal. Inform Apollo about the hatch integrity and close the hatch.)

SFE-OM (At what time did you say?)

DMP-DM (... 00 - 00 - 54:01:09.)

20 24 49 CC-H Command module pilot, Houston.

CMP-CM Go ahead, Bo.

CC-H In your Flight Plan down on page 4.2-34 - -

SFE-OM SW transmitter 1, SW transmitter 2.

CC-H - - there's a note to roll left to 60 degrees. We would like to change that to 100 degrees.

SFE-OM (We will be ready.)

CMP-CM Roger. At 80:54 roll left 100 degrees instead - instead of 60.

SFE-OM (What? What?)

CC-H Roger.

SCDR-OM (Roger. We were receiving.)

SFE-OM (Who received?)

SFE-OM (We'd like to sleep some more, but we don't have the time. Last night we only got 5 hours actually. It's okay. We feel pretty good.)

20 27 06 CC-H Command module, Houston. On panel 181, we would like the three TV CAMERA switches ON.

20 28 12 CC-H Command module, Houston. We would like the three TV CAMERA POWER switches on panel 181 turned ON.

20 28 20 CMP-CM They're ON, Bo.

CC-H Thank you.

CMP-CM All ready.

SFE-OM (Yes, Soyuz. We're experimenting ... with ... nitrogen.)

Day 199

CC-H And, Vance, we're getting a good picture of you there in the command module.

CMP-CM Okay.

20 29 57 ACDR-OM *** Okay.

ACDR-OM *** Okay, Bo. We're hooking up the TV cameras in the orbital module to DML on the docking module.

CC-H Thank you for the report.

USSR-OM ...

USA Give way to the ...

20 31 49 ACDR-OM Hey, Bo. The significance of switching these things is that we've got 2 hooked into 1 and vice versa from what the checklist called for after we got through with the switching around here. So, this is not the right cameras, but they're going to reach in different - -

CC-H ...

ACDR-OM - - DM positions.

ACDR-OM Okay. DM2 POWER's ON and that's the power that goes into the orbital module 1, Bo.

CC-H Roger. Understand.

ACDR-OM I'm sorry, it's DML - DML goes into the orbital module now.

20 32 33 CC-H Understand.

USA ***

20 34 49 ACDR-DM Bo, how do you read me now?

CC-H Apollo commander. We read you fine.

ACDR-DM Okay, I'm hooked up back on the docking module audio.

CC-H Understand.

USSR ...

20 35 30 CC-H Command module, Houston.

CMP Go ahead.

20 35 36 CC-H On panel number 10, we would like to check the VHF FM thumbwheel, no higher than 3.

CMP Okay, you're echoning - echoing but understand on 9 and 10. The VHF - VHF FM thumbwheel's on 3?

CC-H Negative. On panel 10 - panel 10 only - VHF thumbwheel on 3.

USA Thank you.

CMP Okay, you're echoing bad - echoing badly, but I took that to mean on those two panels VHF thumbwheel on FM on 3.

CC-H Negative, only on 10.

20 36 24 CMP (Very good.) Thank you.

CC-H And the S-BAND thumbwheel all the way decrease.

CMP Which thumbwheel?

CC-H S-BAND, decrease.

20 36 49 CMP Very good, S-BAND decrease. It's already there - full decrease.

CC-H Roger. Copy.

20 38 58 CC-H Command module, Houston. Are we still echoing?

CMP No, you just got rid of it, Bo.

CC-H Thank you.

ACDR Sound good now, Bo.

CC-H Thank you.

Day 199

20 42 08 CC-H Docking module, Houston. Are your televisions set up yet, so that we can turn on the TV in the DM?

ACDR Roger. You're all set.

DMP Yeah, they've been up for a while, Bo. They're already turned on.

CC-H Thank you.

CC-H Command module, Houston.

CMP Go ahead.

20 42 53 CC-H On panel 181, we'd like you to check or verify that the CM/DM CAMERA POWER switch is ON.

CMP Okay.

20 43 11 CMP Yeah, that's verified. It's ON.

CC-H Thank you.

CMP TV STATION SELECT is on CM, however. Would you like that - UP TELEMETRY?

CC-H Roger. We'd like that to UP TELEMETRY.

20 43 29 CMP You've got it.

CC-H And, docking module, we have a good picture.

DMP Okay.

20 47 30 ACDR (Goodby.)

MS (Goodby.)

DMP (Goodby.)

DMP (We wish you the best of success. We hope we've opened a new era in history of man.)

SCDR Good luck.

DMP (Our next meeting will be on the ground.)

DMP (Step 20, Valeriy.)

20 50 03 SFE 20 is completed.

DMP Hey, Vance, do you read us?

DMP Vance, you read?

CMP Yes, I read. Go ahead, Deke.

20 50 40 DMP Okay, got to do a little reconfiguring here.
Panel 6, VHF FM to RECEIVE; AM, OFF; AUDIO CONTROL,
NORMAL; verify POWER, OFF.

CMP Okay. It's in work.

20 51 19 CMP POWER coming OFF now.

20 52 43 DMP Okay, Vance. At panel 6, have FM, T/R; AM, T/R,
POWER ...

DMP (Two shutters.)

20 56 39 ACDR, (Yeah, this is your step.)

ACDR Okay, Bo. Valeriy is working on their hatch
getting things set up for the UVA eclipse.

CC-H Roger. Copy.

20 56 49 ACDR Solar eclipse.

END OF TAPE

Day 199

ASTP AIR-TO-GROUND VOICE TRANSCRIPTION

21 00 13 ACDR Okay, they're closing hatch 4.
CC-H Roger. We see it on TV.
21 00 57 DMP Gentlemen, it's closed.
21 00 58 ACDR Hatch 3 is closed. (Hatch 3.)
DMP Yeah.
CC-H Roger.
ACDR Vance, you read?
DMP Vance, you read - read us? Hello, there.
ACDR Vance, how do you read? Vance, you read?
USSR (...)
21 01 49 ACDR (Soyuz, how do you read me?)
CC-H Houston. Read you.
CMP How do you read, Tom?
ACDR Loud and clear, Vance.
CMP Okay, I assume you got the ca - cable disconnected okay.
ACDR Yeah, right - -
DMP Yeah.
ACDR - - we got the cables disconnected. We called you.
CMP Okay, we must be out of configuration. Didn't get it.
ACDR Okay. Vance, would you set MASTER on the CM camera?
21 03 33 CMP Rog. MASTER on the CM.

21 04 32 CMP Houston, Apollo.
 ACDR Houston - -
 CMP Houston, Apollo.
 CC-H Apollo, Houston. Go ahead.

21 04 50 CMP Roger. I have P52 results for you.
 CC-H Apollo, Houston. Go ahead.

21 04 56 CMP Okay, stars 33 and 35; NOUN 05, all balls; NOUN 93,
 plus 00.129, minus 00.084, minus 00.088; and it was
 torqued at 43:00.
 CC-H Roger, I understand. 3, 35; all balls; plus
 00.129, minus 00.084, minus 00.088; and that was
 torqued at 080:43:00.
 CMP Roger.
 ACDR (Soyuz, this is Apollo. We're getting ready to
 dump the pressure in tunnel 2. Over.)
 SCDR We are ready.
 ACDR (Read you.)

21 06 45 ACDR (I'm beginning the dump.)
 CMP Hey, Tom. I've got the probe and the drogue in the
 tunnel. When you come through, we might temporarily
 put them in the DM so we got a little working room
 here.
 ACDR Yeah, I think that's a great idea. Let's go ahead
 and we'll - we'll stow them up here for tonight.
 What do you think?
 CMP Super idea.
 CC-H Apollo, Houston. We're going to terminate the TV
 here until we can get some data for this last few
 minutes before LOS. Would you please flip the
 three POWER switches on 181, OFF.

21 08 19 CMP Roger. Switches going OFF, Bo. See you soon.

Day 199

CC-H Okay, there's no hurry. We were just LOS for a while and we'd noticed the time was getting about that time where you might have heard and we were just wondering. And, Apollo, Houston. We're 30 seconds from LOS. Give you a call at Newfoundland in about 5 minutes.

ACDR Okay, and I'll check with him, Dick.

21 48 22 CC-H Okay.

21 54 21 CC-H Apollo, Houston. Newfoundland for 7 minutes.

21 54 54 CC-H Apollo, Houston. AOS in Newfoundland for 2 minutes - for 7 minutes, excuse me.

ACDR Roger.

CC-H And, Apollo, Houston. Just so we can keep our records straight, wonder if we could verify a couple of switches. One is on panel 181. Like to verify that the TV AMPLIFIER has been put to BYPASS.

21 55 45 CMP That's verified, Dick.

CC-H Okay. And the other one is - when we had data, which we don't have right now here at Newfoundland, it didn't look like we had started the - or gotten the WASTE STOWAGE VENT valve to VENT. So we'd just like to just verify that those two callouts about 81 hours in the Flight Plan in the CP's column had gotten done.

CMP Yeah, that's done. We have the QD attachment on the waste vent, and the vent is open.

21 56 19 CC-H Okay, real fine. We'll be locking up on the ATS here very shortly. Sometime this evening, I've got a new block data pad for you. So, at your convenience, when you - somebody gets out the Updates Book, I'll be glad to read it up.

CMP Okay, maybe we - -

21 58 57 ACDR (Soyuz, Apollo.)

21 59 03 ACDR (Yes. Okay if I start the pressure dump to equalize tunnel 2 right now? Over.)

22 00 05 SCDR (... Valeriy. ... astronaut. No.)
SFE (- - Soyuz. How do you read? Over.)
SFE (Yes. We read you. Over.)
SCDR (Over.)

22 05 56 CC-M (Yes, Soyuz. How do you read me?)

22 06 30 CC-H Apollo, Houston. We've been having some discussion on the ground here as to what is causing the echo that you've been hearing. I am presently transmitting simul: S-band through the satellite and VHF through the Madrid tracking station. Wanted to get a voice check with you and see if it's - you've got an echo now.

ACDR We've got a heck of an echo, Dick.

SCDR (Moscow, Soyuz. How do you read me? Over.)

CC-H Okay. Fine, Tom. Stand by.

22 07 18 CC-H Okay. Apollo, Houston. Now we're configured where the VHF uplink is inhibited at Madrid, and I'm transmitting only S-band through the satellite. How do you read and how's the echo?

ACDR You're reading loud and clear, Dick. And there's absolutely no echo.

CC-H Okay. Copy. Thank you very much.

22 12 34 CC-H Apollo, Houston. In looking through the checklist, we thought there might be some things you might want to get ahead on. One that you could get ahead on, if you want, that we're interested in is the waste water dump listed on the next Flight Plan page at about 83 hours, or just before bedtime. We're going to dump the waste water tonight to 50 percent instead of 60 percent, per the Flight Plan, and that's a 7-minute dump. We'd like to watch it on - on while we have data, which we do now. So if you'd like to do it now, give us a MARK, and I'll time it for you. It's a 7-minute dump. Also, we were wondering if you're out of the DM Checklist yet?

Day 199

CMP Deke is just finishing up on the DM Checklist. And Roger, I'll start that dump in a minute or 2 here, Dick.

CC-H Okay. When you start it, why don't you give me a MARK and I'll be sure and remind you.

22 13 34 CMP Hey, and just an idea. We'd sure much rather use that water with the secondary loop going if you guys would like to get rid of it - some of it that way.

CC-H Okay. Stand by just a second, please.

CC-H Vance, that'd be perfectly okay with us. Why don't you activate the secondary and we'll - we may have to do some dump later on this evening before you go to bed, but we'll recompute it.

22 14 15 CMP Okay. Very good. We'll op - we'll start the secondary ...

CC-H Okay.

22 15 38 CC-H Apollo, Houston. If you'll give us ACCEPT, we'll give you a new state vector and uplink the jet on monitor load.

22 19 20 DMP Dick, you reading us?

CC-H Apollo, Houston. Deke, I think that was you and I barely heard you. Say again.

DMP Rog. I want to give you a little status on the DM here. We started getting MASTER ALARMS with the - both PARTIAL PRESSURES. A and B coming on at the same time. And we've obviously got enough total pressure, and it's stable at about 170, but what's going on is it's glitching periodically and dropping down in the range of 100 to 110, which triggers the lights. So we've pulled the circuit breaker on the C&W in the DM.

CC-H Okay, Deke. Copy.

DMP I pumped in some more O₂ to make sure we had plenty of it in here, and I think it's just a transient thing that's happening to the sensors.

22 20 24 CC-H Okay, Deke. Thanks for letting us know.

22 25 08 CC-H Apollo, Houston. Deke, since you made your call, we've been looking at the PP - PPO₂ and CO₂ - the two partial pressure sensors in the docking module. And they've - they're steady now. What we were thinking about doing, while we have data, was to go ahead and have you push the CAUTION/WARNING circuit breaker back IN, and see if there might be a relationship between that circuit - the CAUTION/WARNING being operable and the two circuit breakers. We are not planning on sleeping this way if it does keep bugging you. But we got about another 20 minutes of data here on the ATS.

DMP Okay, I'll put the breaker back.

CC-H Okay.

22 25 55 DMP That was just a transient from putting the breaker in - -

CC-H Okay.

DMP - - the pressure's still up there.

CC-H Okay.

DMP And, as far as status, Dick, I'm working on the furnace. We're up there for 070.

22 26 21 CC-H Okay, real fine, Deke. Thanks for letting us know. Incidentally, the uplink is complete, but we'd like you to leave the computer in it - the UP TELEMETRY switch in ACCEPT. This is the night you'll sleep with it in ACCEPT, and we'll get the long EMP in overnight. But the computer's yours.

ACDR Okay, understand. Leave it in ACCEPT.

22 26 44 CC-H Okay.

END OF TAPE

Day 199

ASTP AIR-TO-GROUND VOICE TRANSCRIPTION

22 34 03 CC-H Apollo, Houston. I've got some news down here whenever you guys are settled down and would like to hear it. Either - we've got about 10 minutes left here on this ATS pass, and several more passes this evening. So anytime you'd like to hear it, I'll read it up to you.

ACDR Well, why don't you wait until later? We're still busy kind of cleaning up the huge - huge pile here and getting ready for supper. We'll take - we'd sure like some on the next pass, Dick.

CC-H Okay. Why don't you call me and tell me when you're ready. It's just sitting here, and I figured you were busy as beavers straightening up. So just press on with it.

22 34 33 ACDR Okay.

22 43 51 CC-H Apollo, Houston. We're 2 minutes from ATS LOS. We're going to drop out 3 or 4 minutes. And I'll call you at Orroral Valley.

ACDR Real good. Thank you, Dick.

CC-H Okay. See you later.

22 44 03 ACDR Okay.

22 48 05 CC-H Apollo, Houston. Orroral Valley for 4 minutes.

ACDR Roger, Dick.

22 50 35 CC-H Apollo, Houston. We're 1 minute from LOS. Hawaii at 82:45. See you there.

ACDR Real good. Thank you.

22 50 43 CC-H Okay.

23 05 32 CC-H Apollo, Houston. Hawaii for 7 minutes.

ACDR Okay, Dick.

23 10 58 CC-H Apollo, Houston. 1 minute until LOS; Goldstone at 82:57. See you there.

ACDR Roger.

23 17 03 CC-H Apollo, Houston. Short pass at Goldstone for 2 minutes.

CC-H Apollo, Houston. Short pass at Goldstone for 2 minutes.

ACDR Houston, go ahead.

CC-H Tom, we got a real low elevation pass at Goldstone, just a couple of minutes here. We'll pick you up at Newfoundland in about 10 minutes from now.

ACDR Okay. Thank you.

23 28 42 CC-H Apollo, Houston through the ATS. How do you read?

ACDR Loud and clear.

CC-H Okay.

ACDR Dick, everytime anybody's come over the ATS, they've always had an echo. Over.

CC-H Stand by just a second, Tom.

ACDR Now it's okay.

CC-H Okay. Apollo, Houston. How do you read now? 1, 2, 3, 4, 5; 5, 4, 3, 2, 1. Short count, out.

ACDR Loud and clear.

23 29 17 CC-H Okay, fine. I think what was - I think possibly what was happening there is that we also had AOS Newfoundland, and I just didn't give you a call because we were talking about something, and that's VHF.

23 29 33 ACDR Roger.

23 44 50 CC-H Apollo, Houston.

ACDR Go ahead, Houston.

CC-H Tom, we've got about 35 more minutes here in this ATS pass. And I've got a list of things here - not major things, but I wanted to be sure to talk to - start talking to you about them and get a few pieces of information up and down. And we may get through a little bit early. And we were thinking about just saying good night whenever we get through with the list.

ACDR Okay, Dick, but you've got a double - you've got a real echo again.

CC-H Okay. Stand by a second, please.

23 45 43 CC-H Apollo, Houston. How do you read now?

ACDR It's loud and clear. Wait until I get a pencil, Dick.

CC-H Okay. Real fine, Tom.

23 47 19 ACDR Okay, Dick. Everybody's on the headset. Go ahead.

CC-H Okay; real fine. First thing, our data shows that we have not gotten a good purge, even though Vance did a report while ago that the waste stowage vent valve had been opened. It - it may be clogged. We're not sure. Assuming that it is open, what we'd like to do is go ahead and close the waste stowage vent valve. And then we'd like to do - and that combined with the PPO₂ sensor problem or potential problem we had in the docking module. What we'd like you to do is get out the Docking Module Checklist, turn to page 15-1, and in there is a short procedure which is entitled "DM/CM O₂ purge." We'd like you to accomplish that procedure except in st - in the procedure it says "Purge until the PPO₂ is greater than 240 millimeters." But this time you can change that number to 165. That - we want to pump up the PPO₂ to 165 or greater. And at that - and then we'll - what we'd suggest is sleeping with the CAUTION AND WARNING circuit breaker pushed IN. And, Deke, if it wakes you up during the night at all and it's this problem, just pull it out and go back to sleep and don't worry about it.

23 48 44 DMP Hey, Dick, the partial was 170 to 180 when I left it. I've never seen it any lower than that except for those transients.

CC-H Okay. Our data shows 150 now, Deke. You might - -

DMP Okay, well, maybe our gage is - -

CC-H Okay.

DMP Maybe our gage is bad then.

CC-H Okay. While we think about that then, one other reminder for you, Deke, is we want to go ahead and get the furnace started per the Flight Plan there. And the reason we're - want to go ahead and get it started is because the longer we delay, it - it gives us a little problem tomorrow in thinking about the helium injection. Okay, the - the next item that I had is - is that we do want to do a short water - waste water dump. What we want to do is dump the waste water for 4 minutes, and if you'll go ahead and start that any time and give me a mark, I'll time it for you.

ACDR Okay, that should work right away.

23 50 11 CC-H Okay. Another thing out of the presleep checklist you might do for us is give us a VERB 74 and also read us down the battery readings - that's bat C and the two pyro batteries, the voltages.

23 50 25 ACDR Okay. VERB 74 coming at you now.

DMP Okay, BAT C is reading 37, PYRO A is 37, and PYRO B is 37.

CC-H Okay. Sounds real good. Just a second; let me look down my list here.

CMP Okay.

CC-H Okay. I got two pieces of - of things I need to get up to you. One is, I want to read to you a block data pad that's - so you need the Updates Book. And the other one, I've got some changes that I want to put in the Flight Plan Supplement under - in the section that has Vance Brand's meals in it.

ACDR Under Vance Brand's meals. Okay, hang on a minute.

CC-H Okay, real fine.

23 51 14 ACDR We're starting the dump now.

CC-H Okay, I'll call you back when to secure it. Thank you.

23 51 50 DMP Okay, Dick. I've got the supplemental, and I'm on Vance's pages here ...

CC-H Okay, fir - the comment, Deke - the first one is on page 1-26.

DMP Okay.

CC-H Okay, over there in the left column for day 5, meal A, after "Breakfast roll," add the number "2" and then delete the item below it, "Raisin and spice cereal."

DMP Okay. Copy.

23 52 34 CC-H Okay, down in - down in meal B after "Salmon," add the number "2" and then down in meal Charlie, delete "Fruit cocktail."

DMP Okay; got those.

CC-H Okay. Now on the next page, Deke, I want you to make the same changes exactly to day 9, meals A, B, and C.

DMP Okay.

CC-H Okay. That's got that, and again, the other thing I have here is a block data pad for the Updates Book.

ACDR Okay, Dick. I've got that.

23 53 13 CC-H Okay. If you're ready to copy, I'll start with NOUN 33. I'm - I'm sorry, Tom. I'm sorry, Tom. We - -

ACDR Okay.

CC-H Are you ready to copy?

ACDR Go ahead.

CC-H Okay.

ACDR Yeah, go ahead.

23 53 34 CC-H Okay. Starting with NOUN 33. 129:38:34; minus 198.9, plus 000.0, plus 021.3; 004, 331, 352; 182.0; 00:08; 198, 1560.2, 25773, 25:52; 27:05. The second item there, the NOUN 66, is NA; bank angle 297/042, 32:35, 35:36; plus 14.75, minus 164.25. And, Tom, before you go ahead and do your readback, we're at the point where we can stop the waste water dump.

23 55 20 ACDR Okay, WASTE WATER DUMP, OFF.

CC-H Okay. Understand you've secured the WASTE WATER DUMP, and I'm ready to hear the - -

ACDR ... Vance is at work on the ... That one was in work. Sorry.

CC-H Okay; fine. Now - and I'm ready for the readback.

ACDR Okay. 129:38:34; minus 198.9, plus all balls, plus 021.3; 004, 331, 352; 182.0, 00:08; 198, 1560.2, 25773, 25:52; 27:05. NA. 297/042, 32:35, 35:36; plus 14.75, and minus 164.25. Over.

CC-H Okay. Good readback. Incidentally, I forgot to tell you, this is for rev 78. And I've got three remarks for you on the pad. Number 1, it's an orbital REFSMMAT. Number 2, the CM/SM sep is yaw right to 0.37 degrees. And note 3 is a NOUN 48, the trims - or pitch trim is plus 0.11, yaw trim, minus 0.63. And the weights are as follows: CSM, 26650; docking module, 4620. Over.

23 57 14 ACDR Okay. Readback rev 78, orbital REFSMMAT, CM/SM sep yaw right, 0.37 degrees. NOUN 48: pitch, plus 0.11; yaw, minus 0.63. Weight: CSM, 26650; DM 4620. Over.

CC-H Okay. That's a good readback. I missed one thing in the Flight Plan Supplement on the meals, but it's not important to get it up tonight. If you still have the book there, I'll give it to you. Otherwise, I'll catch it later.

DMP I've got the book right here. Go ahead.

CC-H Okay. Again, it's still in the same section. It's in Vance's, and it's - the first one is for day 7, which is on page 1-26, Deke, up there in meal Alfa.

DMP Okay. Rog, go ahead.

CC-H Okay. Stand by just a - oh, okay. Excuse me. Okay. Day 7, meal Alfa, you need to put a "2" after the "breakfast roll." And do the same thing again on the next page to day 11.

DMP Okay.

CC-H Okay, let me get off the line here a second. I think that's almost all the official things I have. I do have some news here in a second, but let me come back to you.

23 58 37 ACDR Okay.

END OF TAPE

Day 200

ASTP AIR-TO-GROUND VOICE TRANSCRIPTION

00 00 01 CC-H Apollo, Houston. That's all the official business we have. We got about 20 more minutes left in the - in this ATS pass, and I've got some news here if you'd like to hear it.

ACDR Okay, go ahead. And we'll start this DM purge in about 10 to 15 minutes or so.

CC-H Okay, Tom. Fine, and I'll - and, well, I'm - you'll get the rest of the items in the presleep checklist and the Flight Plan, I'm sure. So, no problem. Well, first of all, the big news here today was you guys. You dominated all the news meder - media all day. All three network news programs this evening had Apollo-Soyuz featured on them, and the press coverage was - was very complete. And they're just - they followed all your activities as I'm sure that they will tomorrow.

The House has passed and sent the White House a bill extending Federal price controls on domestic oil. Under the bill passed yesterday. price controls expiring August 31st would continue through the end of the year. President Ford, however, is expected to vet - to veto the bill. The U.S. Department of Agriculture predicted a small buildup of the world's depleted food stocks in the coming year, thanks to a record crop estimate of almost 10 billion tons of wheat, corn, and other cereals. Administration officials citing statistics released by the Commerce Department say the worst recession since World War II has ended and ended between April and June and a recovery has started. The White House Office of Management and Budget has re - recommended dropping the F-15, excuse me, the F-18 fighter program and has ordered the United States Navy to develop a new and low-cost plane. An exhibit of American home furnishings and gadgets has opened in Moscow to large, enthusiastic crowds. Called "Technology for the American Home," the exhibit is designed to give the Soviets an idea of life in the United States. Also, it was released today that a record number of tree seedlings were planted in Texas during the year. And we're reminded of that since you guys exchange tree seeds on orbit today. Over 51 million tree seedlings were planted in Texas during the past year.

On the sports scene, the Phillies took the Astros 6 to 5 in the season opener Thursday night, and it was our Astros 60th loss of the year. In the American League, the Oakland A's picked up ground on both their closest rivals in the Western Division, while the Red Sox gained a full game on their second-place rivals in the Eastern Division. The A's now lead by 9-1/2 games in the west and the Red Sox by 5-1/2 games in the east. Rod Curl owned the first round lead in the 200 thousand Pleasant Valley Classic Golf Tournament. He made six bogies - excuse me, he made six birdies and a bogie Thursday for a 5 under par 66 and a single-stroke lead over Miller Barber.

Last item in the news today is that wide receiver Bobby Hayes, who was the double gold medal winner in the 1964 Olympics and a 10-year NFL veteran, Thursday was traded by the Dallas Cowboys to the San Francisco 49'ers in exchange for an undisclosed high-draft choice. That's the end of what I had here in front of me for the news tonight. Deke, one thing that I wanted to mention to you - and that was that your sister-in-law who's - is - who was in the minor accident down at the Cape remains in very good shape. She's recovering nicely. She is in the hospital in Rockledge, Florida, and is going to be released in the next couple or 3 days. She was able to watch the launch out the window of the hospital room. And - and for all of you, your families are doing real fine. They enjoyed the launch very much and naturally are very interested as the days of the mission go by.

00 04 19 DMP Thank you, Dick.

ACDR Thanks a lot for a complete report, Dick.

ACDR Dick, and it's also been - -

DMP ...

ACDR - - a real long day as you can tell, and - I also want to thank you for all the work you did on getting these joint activity things going when you came on-board.

CC-H Well, thanks, Tom, very much. Today sure pl - panned out right. I was gone all day of course, but when I got in here and saw you guys after this long day - were exactly on schedule, I know it'd gone well.

00 05 39 CC-H Apollo, Houston. It has been a long day. We - I got two reminders, and then I'm going to go ahead and sign off, and I'll just be standing by for the rest of this ATS pass. We want to make sure we deactivate the secondary evaporator prior to you going to bed. The procedure's page 1-18 of the Systems Checklist. Also we want to be sure and turn off the secondary loop pump. We'll - we have about - -

ACDR We ...

CC-H We have about 13 or 14 minutes left in this ATS pass, and I'll be sitting here standing by, but I won't make any more calls. So you guys get squared away and go to bed, and we'll see you bright and early in the morning.

CMP Okay, Dick. We'll see you in the morning.

00 06 23 CC-H Okay. Good night, all of you.

00 06 28 DMP Okay. Buenas noches.

00 17 48 CC-H Apollo, Houston. We can still you're - see that you're still up because we can see the purge going on in the DM. I just wanted to be sure and remind you to get the furnace started.

00 17 58 ACDR Okay.

END OF TAPE

Day 200

ASTP AIR-TO-GROUND VOICE TRANSCRIPTION

02 03 37 CC-H Apollo, Houston talking at you through Guam for 3 minutes. Sorry to give you a call, but see your M C&W and - put the cabin pressure in the O₂ FLOW. We suggest you close your waste stowage vent valve.

02 04 18 CC-H Apollo, Houston. Once more, we see the pressure was coming down pretty low, and the O₂ flow up. We recommend checking the WASTE STOWAGE VENT valve, CLOSED. Also make sure that all the relief valves in the DM are buttoned up real good. We also see that we have le - left the secondary loop pump on. We recommend turning that off, if we can and - because it's just going to heat up the cabin. And also if you can get the potable inlet valve closed; to save us a little water, we'd appreciate it tonight.

02 30 34 DMP ..., Dick. We're ready to talk to you now.

02 31 05 CC-H Apollo, Houston. You're calling?

02 31 33 CC-H Apollo, Houston. How do you read?

02 48 56 ACDR (... Goodby. ...)

02 49 07 USSR (... Goodby. ...) -

ACDR (Best wishes. It's time to return.)

ACDR (...)

ACDR (I'm sure that we opened - -)

02 49 56 ACDR We hope - we hope it'll be there in the history of man.

END OF TAPE

Day 200

ASTP AIR-TO-GROUND VOICE TRANSCRIPTION

08 10 00 (Music: "Tenderness")

08 13 14 USSR ...
USSR ***
USSR ***

08 14 02 (Music: "Tenderness")

CC-M (This is Moscow. How do you read me?)

SCDR (Moscow, this is Soyuz. I read you well.)

CC-M (I read you well, also. Are you ready to do TV - 12?)

SCDR (With commentary?)

CC-M (That's correct. Did you do all the preparations for this broadcast?)

SCDR (Yes, we have, all of them.)

CC-M (Okay. At this time, I want to give the floor to your backup crew.)

MCC-M (This is for ... I heard you. Soyuz, how do you read me? ...)

08 14 47 SCDR (Apollo, thank you. I read you very well. ... here to the Mission Control Center. We slept very well, and I know that you slept very well.)

MCC-M We hear your voice very well. We were at the Cosmodrome, and now we have the opportunity to come here to the Center. How's everything going?)

08 15 01 SCDR (Everything is going beautifully. As they say in English, everything is going on schedule. Everything is going smoothly.)

SCDR (I think that it will continue the same way, also.)

MCC-M (I have the privilege of conveying regards from your wives. They are worried, excited, watching your flights very intently. They are waiting for you to land.)

SCDR (Convey to them that they don't have to worry. Everything is going well. All the systems are functioning perfectly. We feel beautifully. If we didn't have any limitation, we would stay up here even longer. We feel very well, especially today. On previous evenings - nights we had to sleep. How about the people in Apollo? Are they awake yet?)

MCC-M (They are. They should be getting up, also.)

SCDR (How about the people on the ground? Are they up, ready?)

MCC-M (Yes, they're up.)

08 16 19 SCDR (Okay. Convey the same regards to them.)

MCC-M (How was yesterday?)

SCDR (Yesterday was a very busy day for us. We had to work hard. We had all the transfers and, obviously, we're a little tired.)

MCC-M (Here on the ground, we followed everything and we - we're in the conclusion that everything went beautifully and that everything will continue just as smoothly.)

08 16 33 CC-H Apollo, Houston. Good morning. We're talking at you through the end of an ATS pass. We'll see you at Hawaii in about 13 minutes. That's at 92:10.

SCDR (We're ready for the undocking and the docking and for the solar eclipse, the UVA.)

CC-M (Sure. You'll have a very long day even today. You'll have to work hard. Now, I want to give Nikolay the microphone. He wants to say a few words to you, also.)

SCDR (How is the picture? Is it normal? Is it good?)

Day 200

08 17 13 SCDR (Moscow, this is Soyuz. How is the picture? Is it good?)

MCC-M (Soyuz, I'm Rukavishnikov. Yes, you have a very beautiful picture. I see even the cap on your CCU. That - that one.)

SCDR (Oh, oh - that cap that is flying around. Okay.)

08 17 59 MCC-M (Well, I won't take too much time. I want to say - convey my regards to you, wish you the best.)

08 29 29 CC-H Apollo, Houston; AOS Hawaii. We have you for about 6 minutes.

CC-H Apollo, Houston. Good morning. How do you read?

CMP Morning, Crip. How are you today?

CC-H Doing great down here. How about you guys?

CMP Everybody got a good sleep here.

CC-H That's good to hear. We've been down here wide awake. At least that's what I'm telling myself.

CMP Yeah. It's kind of early down there, isn't it?

CC-H Oh, yeah, a little bit. One item I need to get up to you at this Hawaii pass. We've got scheduled, under Deke, a - helium injection at about 92:40 hours, and we need to delete that due to getting started a little bit late - getting the furnace sample started a little bit late - and we're going to pick it out a little bit later about - and we'll give you a real-time call when we want it - want the helium injection done.

CMP Okay. I'll pass that on to Deke.

CC-H Would appreciate it.

08 31 11 CC-H Also, Vance, want to let you know that we did get your UVA EMP loaded in and might remind you to look in your G&C Checklist - on page 1-36 and review the notes - the restrictions on that particular page regarding EMP.

CMP Okay. Got that. I'll give it a look.

08 31 38 CC-H Okay, fine. Incidentally, we got a little bit concerned last night. We saw the C&W and noticed that the - the O₂ FLOW HIGH and the pressure being down a little bit, and we tried to get to you about it and couldn't get up for some reason, or didn't get any response, but we - looks like it was taken care of. Could you update us on that a little bit?

CMP Stand by. Just a second; we're switching around headsets.

CC-H Okay, fine.

08 34 58 CC-H Apollo, Houston. We are 1 minute from LOS. Our next station contact will be when we see you at the ATS. That's at 92:40.

ACDR Okay, Crip.

CC-H And we'll try to pick up the morning report from you when we get down there.

08 35 28 ACDR Okay, and we'll try to have it ready.

09 01 11 CC-H Apollo, Houston, AOS through the ATS for about 4 - 50 minutes.

ACDR Roger, Bob. Good morning.

CC-H Good morning.

ACDR Well, we're just completing the fuel-cell purge.

CC-H Very good.

CC-H Tom, I had asked Vance and didn't know if you got it, where we - last night we saw you guys got a C&W, apparently a HIGH O₂ FLOW, and we saw the cabin pressure down a little bit and then come back up, and we tried to give you a call on it because we were somewhat concerned, but we couldn't get to you. Can you enlighten us about that, please?

09 01 59 ACDR I think everybody slept like a lock - rock after that long day yesterday. I didn't - I didn't even hear it.

ACDR No, nobody heard it.

09 02 22 ACDR Right now the cabin pressure looks like about 4.9 - solid.

CC-H Yeah, it's in - it's in good shape right now. I guess that we, from our data here, it looked like somebody had put in some O₂ from the - from the DM but - you say no action was taken there?

ACDR Roger. We did a real healthy purge last night in the DM - before we went to sleep.

CC-H Okay, did you all perchance - were you doing anything associated with that after - after Dick quit talking to you last night?

09 03 02 ACDR Oh - yeah, yeah, we did quite a bit, after Dick quit talking, to really get the purge up.

CC-H Okay, maybe what we're talking about was associated with you guys still doing some of that purge action then.

DMP Hey, Dick. Or is this Crip?

CC-H Yeah, this is Crip here.

DMP Oh, yeah, Crip. Hey, I went back there and purged again; in fact, I purged up until I went to sleep to make sure we had enough there, and I was reading about - as close as I could get - 240 partial when we quit. And I checked it this morning first thing when I woke up, and I'm reading 210 in there now. So it's still well above where it ought to be triggering a caution and warning in the DM.

09 03 52 CC-H Okay, that - that must have been what we were looking at. And when we tried to give you a call about it, we couldn't get up to you for some reason, but that sounds like what you were doing.

CC-H Okay, we're standing by to - to hear the morning report. Also, I might ask how your temperature is this morning. We noticed that we left the secondary loop - pump on last night. And we would suggest that you go ahead and turn it off. However, if you're a little bit warm or the humidity is a little bit high, you might go ahead and turn on that secondary evap and bring it down. We have an adequate amount of water for it.

09 04 44 ACDR Okay, we'll turn the evap off.

CC-H I - did you say - the evap is off - I guess. We noticed that the pump is still on, which really doesn't help out your temperature situation. It just sets and flows hot glycol around. If you're - if you're hot right now, you can go ahead and activate the evaporator. If not, just go ahead and secure the pump.

ACDR Yeah, we're still warm.

CC-H Okay, fine.

09 05 52 ACDR Okay, SECONDARY LOOP, ON.

CC-H Okay, copy that.

ACDR Okay, Crip, you ready for the morning report?

CC-H Yes, sir, shoot it to us.

ACDR Okay, ate everything for breakfast and lunch. For dinner I skipped the cranberry sauce and the brownies. Addition was a lemonade and coffee with cream and sugar. Okay, I had 6 hours of full sleep, real good sleep. PRD is 11005; had two Lomotils and non-prophylactic. Over.

CC-H Copy.

ACDR For Vance. He had everything but lemonade for breakfast; lunch was all over in the Soyuz. Okay, for dinner - no pea soup, no mashed potatoes, and no peach ambrosia or coffee but added pecan cookies. Okay, PRD reading is 48135. Had 6 good hours - 6 good hours of sleep, and he got an estimated 60 seconds of water. For Deke, everything for breakfast,

09 11 05 ACDR Roger. Double change at 93:50.
Tom, the only other item I was curious about -
unfortunately, we tried to end up giving you a
call in the middle of the night because I thought
you were trying to call me and, as it turned out,
I think we had - we were copying a - a tower fre-
quency up from Atlanta through the command module
and back down here. Has that kind of stuff been
bugging you guys in the evenings?
Yeah, it has been, usually, but last night every-
body slept so sound we didn't hear anything. But
we've got LA tower, Atlanta tower, Heathrow,
Dusseldorf, and a bunch of others.
09 12 02 CMP Yeah, and Crip, I looked at the squawk box this
morning, and it was turned off. So, that's prob-
ably what did it. But I think we had somebody on
the headset, but he probably slept through. So I
guess that's probably one reason why we slept so
well, though, because every night we have been
getting every tower in Europe and parts of the U.S.
CC-H Okay, I - I think that probably also answers why
I couldn't get to you when I was concerned about
the - that dump thing. We didn't realize that Deke
was purging out there. I guess - after this even-
ing, we should be rid of that VHF problem though,
since we won't be working in the relay mode any.
CMP Right.
09 14 28 ACDR Say, Crip; Tom.
CC-H Go ahead.
ACDR To save us - to save us the trouble of looking it
up, we want to shoot some pictures of the Soyuz
out with the Nikon. Could you give us a typical
exposure, air-to-air, using the lens we got near
the ... exposure ASA of 500, to save us from looking
it up?

macaroni and ch - no macaroni and cheese for lunch, no rye bread, and - no macaroni and cheese because, you know, afraid to reconstitute from the previous experience. And cherry nut cake was too crumbly to eat for dinner. Everything else he had. FRD reading is 61005; 6 hours of good sleep; estimated 75 gulps.

09 09 33 00-H

Okay, we copied all your report there, Tom. Appreciate it. The - I guess I had a couple of items - I guess we needed to get clarified. We, normally, when you change the LIOH cans up there, can see a drop in our PFCO₂, and yesterday evening we had one scheduled for about 83:30. We didn't see that corresponding drop. Could you let us know whether that LIOH change was made?

ACDH

That LIOH wasn't made.

00-H

Understand it was not made. What we would recommend is that - we've got a change coming up at about 93:50 - correct - yeah, that's right, 93:50.

03 10 19 00-H

Apollo, Soyuz. How do you read me?

ACDH

(I hear you well, Alexey; how do you read me?)

SCDH

...

ACDS

... Valeriy?

SEFE

I read well.

ACDH

(Thank you. Good morning.)

CTE

(Good morning, Valeriy.)

ACDH

Pardon me, Houston. Go ahead. We were just talking to Soyuz there.

00-H

Reg. I heard Valeriy coming through. What we were going to recommend is, on that LIOH can change we've got scheduled at 93:50, just go ahead and change both of them, and the one - you can go back and read at 83:30 - that was supposed to put number 9 into Alfa and take 7 and put it in D-4. And you can just add that on to the - so you can change both of them out at 93:50.

Day 200

TAG Tape 200-03/T-48
Page 9

CC-H We'll get it for you.

09 14 49 ACDR Thank you.

END OF TAPE

Day 200

ASTP AIR-TO-GROUND VOICE TRANSCRIPTION

09 15 13 CC-H Tom, can you tell us what lens you do have on now?
ACDR Oh, yeah. It'll be the - wide-angle lens on that -
on the Nikon.
CC-H Copy.
ACDR The only time we ever had the 300 on was when we
were just coming - checking the docking mechanism.

09 25 50 CC-H Apollo, Houston. Tom, I can give you some info
regarding those lens settings for the photos, if
you would like.
ACDR Okay.
CC-H Okay. We're assuming that you've got CI film in
there since you've mentioned the ASA 500. We're
recommending - -
ACDR ...
CC-H Okay. It's about f-stop of 4 and speed about 1/500.
You might verify that with the built-in light meter
on the Nikon itself.
ACDR All right. We'll do that.
CC-H Okay, Tom, and - -
ACDR Thank you, Crip.
CC-H Yeah. On your - on your report you gave us this
morning, on the - the Lomotil we're assuming that
you took that yesterday evening. Would you like
any - any help from us for recommending or - your
menu changes for the next couple of days to help
you out a little bit?
ACDR No, I'll just stay off the coffee. I think we're
in good shape.
CC-H Okay.

09 30 06 CC-H Apollo, Houston. We're still with you for about 26 minutes and while you guys are having breakfast, I can give you a little news, or we can just save it like Dick did this evening - or yesterday evening, rather - and read it to you then.

CMP We'd love to hear you, Crip. ... give us some news.

CC-H Okay. We got a little disturbance on the line here. I'll hold up a minute.

09 31 37 CC-H Apollo, Houston. Could you have CM-1, MASTER, and CM-2, SLAVE, please?

09 32 21 CC-H We're getting a pretty good TV picture now. It's been dropping in and out, and my downlink voice has been a little fouled up. A little bit dark right now, though.

CMP Rog, Crip. We might have the food tray in the way. We'll try to move it a little bit.

CC-H I seem to be seeing you pretty good there. See you working with your juice or whatever it is.

CMP Turns out the MDCs make a pretty good table as well as an instrument panel. Don't know what Rockwell would think of that, but that's how they get used a lot.

09 33 14 CC-H Roger.

09 34 07 CC-H Deke, is there any chance of you shading that window up there by - by your shoulder? It kind of fouls up the picture for us a little bit.

DMP Could you stand by a second, Crip? I guess I could put the window cover on.

CC-H We'd appreciate it if it doesn't interrupt your breakfast there too much. While you guys are doing that I can try to come at you with a little bit of news. I think, as Dick told you yesterday, you guys have been - been the big stars. Everything that's been going on up there and - been making quite a bit of news items. One thing that's kind of

interesting, we got a news item here from Moscow that - and excuse my trying to pronunc - pronounce the Russian names, but it's a gentleman by the name of Spadimaken Da - Davidili, I guess, has named his twin sons Apollo and Soyuz according to the Tass news agency. The twins were born in Soviet Kirghizia in central Asia where Davidili works in a plant processing semiprecious stones, Tass reported Friday.

Even in London you're making news. The head barman in a London hotel announced the creation Friday of a new cocktail in honor of the Apollo-Soyuz space flight. Barman Joe Gilmore said the new drink, called "Linkup," is made of equal parts of Southern Comfort and Russian vodka with a teaspoon of fresh lime shaken up well with ice. The hotel has said samples of the cocktail, along with letters of congratulations, were being flown to Kaliningrad from - and Houston in ice coolers to await the spacemen's return to Earth.

09 35 44 DMP That sounds great. Can you send one up?

ACDR And congratulations to the gentleman in the Soviet Union on his kiddies.

CC-H Roger.

CC-H President Ford has taken the unusual step of giving Soviet leader Brezhnev a peek at letters he wrote privately to - to Congressmen before the Congressmen had a chance to read them. In the letters, Ford announced his intention to seek remedial legislation from Congress to improve trade terms for the Soviet Union. Senate Republican leader Hugh Scott - -

SCDR (Standing by, Moscow.)

CC-H - - handed the two letters to - -

SCDR (Moscow, this is Soyuz. How do you read me?)

CC-H - - to Brezhnev when he and a 14-member senatorial delegation met with the Soviet chief in the Kremlin July the 2nd during the recent Congressional recess. I see that we're coming up on a pass over the Soviet Union, and they're probably going to be talking - -

09 36 39 SCDR (Moscow, this is Soyuz. I read you well.)

CC-H - - a little bit, I'll pause just a moment.

CC-M (Soyuz, this is - good day, I hear you well, this is Moscow. Ready to receive all your data?)

SCDR (Okay. The windows are closed.)

CC-M (Okay. How about the T-1. Is it on?)

SCDR (Okay. If we turn on this light, there'll be too much light. Too much glare. You see how much light there is?)

CC-M (The picture wasn't bad at all.)

USSR (That's right. Maybe we can get a better one.)

CC-M (Moscow. The picture is good.)

SCDR (Okay. We're ready to receive radiograms. Zero 20.)

CC-M (How about a little bit later?)

USSR (Okay. We'll wait.)

SCDR (We're feeling good. My beat is 40, Valeriy's is 51.)

09 39 03 CC-H Gents, we still - we got a good picture right now, but as soon as Vance is going to move his elbow, we get that light flaring, the one right over your shoulder, Deke. I wonder if those are filtered. It doesn't look like they are.

ACDR/CMP Yeah, they are.

CC-M (Soyuz, this is Moscow. We're ready to receive report about pressurization.)

SCDR (Okay. I will give it to you now.)

CC-H Okay, if that light's got the filter on it, we need the - the Polaroid - there we go - to adjust it down. Thank you, Vance. Just about right there. You got the focus on - on that last one.

Day 200

09 39 40 CMP Yeah, and we'll have to read just that ..., give me
 the - -

 CC-H Yeah. You just had the filter, if you can - about
 10, I believe, is the number.

 CMP Wait a minute. The lens came off.

 CC-H The lens came off! Well, that - that would do it
 to you.

 SFE (Moscow, this is Soyuz 2. I'm ready to give you pad
 20.)

 CC-M (Okay. We're ready.)

 SFE (Number 1. 01, 00, 02, 00, 03, 00, 04, 11, 25, 00,
 06, 00, 07, 00, 08, 00, 09, 11, 10, 11, 00.)

 CC-M (We read you well. Confirmed. Thank you, Soyuz 2.)

 CC-M (Soyuz 2, this is Moscow. Okay. Give me - I'll
 give you parameters for 12 and 13.)

 SFE (Pad 20?)

 CC-M (Yes, for pad 20.)

09 41 39 CC-H Can we help you with any numbers there, Vance?

 CMP Does it still look - yeah, I guess it does look a
 little out of focus, doesn't it?

 CC-H Yeah, it - -

 CMP Okay.

 CC-H - - the focus isn't really all that bad right now - -

 SCDR (Zero number 12, 00.)

 CC-H - - but when you put it back on, apparently, though,
 the filter is not - not correct. So, if you just
 hold the lens and twist the filter a little bit, I
 think we'll be in good shape.

 SCDR (Okay. 13 and 14, 00.)

 CC-M (Received you. Thank you, Soyuz.)

CC-H Almost - right - right there, that's good.

CMP Okay. How's the focus? Okay?

09 42 23 CC-H I'm no expert but it looks good to me.

CC-H I think I've got a majority vote here that it looks good.

CMP Okay.

CC-M (We opened valve ...)

SFE (The pressure's 20.)

CC-M (Received it, Soyuz 2.)

CC-H I didn't think you guys got to hear my good wake-up music this morning with the speaker box turned off.

09 43 11 CMP Yeah, we - we were kind of wondering what it would be like. Hate to have missed it.

CC-H Oh, well. We'll come back at you.

CMP I think we'll have to give you some wake-up music in return sometime, too.

09 43 27 CC-H Well, we'd appreciate that.

USSR (550 pressure.)

USSR (We've got an awful lot of stuff around and after we do the pressurization, we will systematically put everything away.)

USSR (It's already put together and packed. We just have to carry it over to the descent vehicle.)

CC-M (Roger, Soyuz.)

SFE (Pressure is 610.)

MCC-M (Roger, Soyuz 2. 610.)

09 46 43 CC-H We turned the camera up for a minute and looked out the window. It looked kind of pretty, but we're back with you again.

CMP Very good.

USSR (***) 80.)

USSR (690.)

CMP Crip. Just one thing to mention. We've got a little bit of moisture on the inside of the outer pane - it looks like - of window 5, and I think if we get in a sunny attitude it might evaporate, but right now it's - well, I don't know if it could bother the SAM or the photos or not. We'll see.

CC-H Does it appear to be outside? Is that what you said, Vance?

09 47 49 USSR (***) 10 ...)

CMP Looks like - you know, you have a couple of panels and it looks like it might be on the inside of the outer panel.

USSR (As to above data and system check, everything is nominal.)

CC-H Copy.

CC-M (Everything?)

USSR (***) the check. We have it from pad 3.)

09 48 18 CC-H Okay. We're about ready to - to lose you here through the ATS, and our next station - -

USSR (***) 10 millimeters within 13 seconds.)

CC-H - - contact will be through the Vanguard, and that's about 24 minutes away.

CMP See you then.

09 48 31 CC-H Okeydoke. Vanguard at 93:52.

09 48 37 CMP Rog. Have a good breakfast, if you haven't already.

USSR (... spacecraft ...)

CC-H Well, I was thinking more like dinner.

CMP Yeah, we're doing fine.

USSR (We feel cool air.)

USSR (How do you ***)

09 50 05 CC-H ...

USSR (Roger. Copied 780.)

10 12 24 CC-H Apollo, Houston. We're AOS at Vanguard. We have you for about 6 minutes.

ACDR Roger, Dick. Or is it Crip?

CC-H Still Crip here. I'm probably going to be giving it to Bo shortly. Only one item I'd like to pass to you up on this pass, I believe, is that I think they had - told you that one of your TV cameras was causing us a little bit of problem with color glitches yesterday, and they had you switch it around. That was the one that we've currently got on station 11 - panel 11. And what we'd like you to do if you can, to allow us to ensure that we're going to have good TV for the rest of the day, is to switch the cameras that you have on 11 and 871. And what we want you to do is to disconnect the cables at the camera. In other words, do not exchange the camera cables.

ACDR Okay, Crip. I'll do that. And also we got the LiOH changed out.

10 13 20 CC-H Okay, good deal. Thanks a lot, Tom.

CC-H The O₂ flow is - pretty high. We'd like to verify that the WASTE STOWAGE VENT valve is CLOSED, please.

CMP I think it's still open, Crip. Venting from - the urine or either ...

CC-H Okay, that's fine.

10 17 32 CC-H Apollo, Houston. We are about 45 seconds from LOS. Our next station contact will be through ATS and that's at about 94:13. Tom, one item on that camera exchange you're making for me. We want the one that

you end up installing on panel 11 to be put in MASTER and the one that you take over to 871 to be in SLAVE. That's just changing the position on each of those cameras.

10 18 00 ACDR Roger. Panel 11, MASTER.
CC-H Thank you.
CC-H I'll be saying good evening to you and talk to you in the morning.
ACDR Okay. Thank you, Crip, ...

10 18 21 CC-H The next morning, that is.
ACDR Roger.

10 34 17 CC-H (Good morning, crew.)
ACDR (Good morning, Bo; how are you?)
CC-H (Okay. We're on ATS here.)
ACDR (We ***)

10 40 27 ACDR Houston, Apollo.
CC-H Apollo, Houston. Go ahead.
ACDR Yeah, Bo. Say, all three of us just want to thank you so much for doing a great job on CAP COMM yesterday. That was a long, rugged day, and everything you did keeping the things coordinated was outstanding. Just wanted you to know how much we appreciate it.
CC-H Okay. It was my pleasure. It was certainly an interesting day.

10 40 50 ACDR (Yes.)

END OF TAPE

Day 200

ASTP AIR-TO-GROUND VOICE TRANSCRIPTION

10 46 57 CC-H Apollo, Houston. We'd like ACCEPT so we can give you a new REFSMMAT.

10 47 05 ACDR Okay, Bo. Got it.

CC-H Thank you, and I have the undocking pad, which is on page 7-1 of volume II of the Flight Plan. When somebody has a chance, give me a call and I'll pass that to you.

ACDR Okay. Going to it now, Bo.

DMP ..., we've already maneuvered into the block one, incidentally - baseline, rather.

CC-H Roger. We understand that. We're sorry it's late, but it needs to be tweaked.

DMP Okay.

ACDR Okay, Bo. Go ahead.

CC-H Roger. Page 7-1, the final: 095:43:12.00; 173.29, 272.03, 350.89. We've already locked up on ATS, so those high-gain angles are not applicable and, of course, you only have to put these fine numbers in on the trim, just before undocking.

10 48 35 ACDR Okay, on the readback on the final undocking pad - 095:43:12.00; 173.29, 270.03, 350.89.

CC-H The seconds were 20.00.

ACDR Roger. So the time's 095:43:20.00. Right?

CC-H That's a good readback.

ACDR Thank you.

CC-H And, Tom, while you have that checklist out, there is one more change, I'm sorry. And that's at 95:26, where it says "Primary evaporator checklist," also add in "Deactivate secondary evap, S/1-18." Did you get all that?

ACDR Yeah, deactivate the second one.

CC-H Deactivate the secondary evaporator. Roger.

ACDR Roger.

CC-H And we're finished with the uplink; we can go BLOCK.

10 49 48 ACDR Okay.

10 50 09 CC-H Apollo, Houston. Someone here heard a discrepancy in the pitch number. Could you confirm that that is 272.03?

ACDR 270.03.

CC-H Negative. It should be 272.03.

ACDR Okay.

10 50 32 CC-H Thank you.

11 02 33 CC-H Apollo, Houston. We'd like you to leave the shades in that you don't need out for the UVA, so that it won't - so that we get better TV.

DMP Unfortunately, Bo, we need about all we can get for visibility.

CC-H You were kind of garbled, Deke. Did I understand that you said you wanted those windows open for visibility?

DMP Yes. We want everything we got.

CC-H Roger.

CC-H And, Apollo, as you probably guessed, we are getting - TV of the inside of the command module now, and there seems to be something over the TV.

CC-H Thank you.

11 04 11 CMP Houston, look. We - we've got some fantastic viewing and picture taking of Africa right now.

11 08 54 CC-H Roger.

CC-H Command module, Houston. That out-the-window camera is really giving us a good view this afternoon.

DMP Okay, thank you.

DMP If it's half as good as ours, you ought to be having a ball.

CC-H We have one request. That camera that - item that was in front of the camera that Vance had taken down really was helping before. It was blocking some of the light that was coming out of the center hatch window.

11 09 26 CC-H That's perfect. right now.

CMP Okay, does that help?

CC-H That's - that's just right.

DMP Okay. I've blocked the number 1 window here with a map. Is that helping you some?

CC-H Roger.

11 09 43 DMP I'm going to have to take it down periodically to get a view here.

11 13 12 ACDR Hello, Houston; Apollo.

CC-H Apollo, Houston. Go ahead.

ACDR Roger. For a change, we thought we'd give you some wake-up music.

(Music: "Proud Mary")

11 15 07 SCDR (Apollo, this is Soyuz. How do you read me?)

SCDR (Apollo, this is Soyuz. How do you read?)

ACDR (Excellent. How me?)

SCDR (I hear you poorly, with a great deal of interference.)

ACDR (Repeat please, Soyuz. ...)

SCDR (How do you read me?)

ACDR Hey, Houston, we'll have this - and other good selections for you later on.

CC-H (Thank you, Apollo. We read you well.)

SCDR We are now in the orbital module, in Soyuz. We're going to go to descent vehicle.

CMP (Good.)

CMP Houston, Apollo.

CC-H Apollo, Houston. Go ahead.

CC-M (Moscow. Soyuz, how do you read me?)

SCDR (I read you excellently. We are now in the orbital module, in our spacesuits. We are transferring into the DV.)

SCDR (Onboard everything is normal. The pressure is excellent and everything is on schedule.)

11 16 36 CMP Houston, Apollo. Occasionally, we get some very good viewing because of attitude, weather, et cetera. We just now got a couple of visual observations, things that we haven't been able to get as well before. For example, saw the Levantine Rift and Egypt - I think might have seen the pyramids; that's - the ... that we have. And now I've got to see a picture or a layout of - of how the pyramids are laid out when we get back, but I saw two specks that might have been pyramids.

CC-H Say again what the specks might have been.

CMP We think they're the pyramids of Egypt, and that happens to be a visual observation. ...

SCDR (We will close the open ... valve on Soyuz.)

CC-H Understand.

CMP ...

CC-H Experiments asked us to relay that they appreciate the good work.

CMP Right.

SCDR (Repeat it again.)

DMP This is probably a good time to comment, we haven't done much good work in that area so far due to a combination of cloud cover and time constraint.

11 18 18 CC-H More days are coming, and we're looking at that picture out the window and it looks pretty fantastic now with Soyuz just over the horizon.

CMP Right.

MCC-M (...)

SFE (Roger.)

MCC-M (... some kind of loud noise, it's coming periodically, ... we don't understand because of the loud noise.)

SFE (... Manual control.)

DMP Soyuz, Apollo.

CC-H Apollo, Houston. Go ahead.

CMP No, we're calling Soyuz, Bo.

CC-H I'm sorry.

DMP Okay. Soyuz, Apollo. Soyuz, Apollo.

SFE (Moscow, this is Soyuz. We are transferring to the DV.)

ACDR (...)

SFE Apollo, Soyuz. Apollo, this is Soyuz. How do you read me?

DMP (Valeriy, I read you, okay.)

SFE Quite well.

DMP (Good. The undocking time now is 95 hours 33 minutes 20 seconds GET.)

SFE (... we will fly.)

DMP (...)

11 21 24 CC-H Apollo, Houston. There's about a minute and a half of ATS until ATS LOS. We'll see you at Vanguard at 95:24.

DMP Roger, Bo. 95:24.

SFE (Moscow, this is Soyuz 2. Can you ... there already.)

11 44 03 CC-H Apollo, Houston through Vanguard for 7 minutes.

CMP I read 5 by, Bo.

ACDR And, Bo, we have synced our clocks with the Soyuz. And you ready to copy the P52, Bo?

CC-H Ready for the P52, and understand you're synced.

ACDR Roger. Star 32, star 40, NOUN 05, all balls; plus 81, minus 10.1, minus 49; torqued, 95:14:16. Over.

CC-H Understand 32, 40, all balls; plus 81, minus 10.1, minus 49; 95:14:16.

ACDR Roger.

CC-H Apollo, Houston. Just a reminder to change your NOUN 22's and tweak up the attitude.

ACDR Roger.

11 47 28 CC-H Apollo, Houston. One more small item. When you deactivate the primary and secondary evaporators, we'd also like you to make sure the waste stowage vent valve is closed.

ACDR Okay.

11 48 06 CC-H And, Apollo, Houston. Just one more item. We need the PUMP, OFF, in the secondary evaporator loop.

11 48 12 ACDR Roger. PUMP, OFF, in the secondary evaporator loop. We'll deactivate the secondary as well as the primary at the same time.

11 48 20 CC-H Roger. Deactivate both the primary and the secondary.

11 50 17 CC-H Apollo, Houston. There is about 1 minute until LOS.
We'll see you at ATS at 95:46.

ACDR Roger.

11 50 56 CC-H Apollo, Houston. We're going to need those evapora-
tors off as quickly as you can get to them.

ACDR Okay.

11 51 02 CC-H And the pump.

11 51 06 ACDR Okay. The pump's off, everything's - the evaporators
are now, Bo.

11 51 09 CC-H Roger. Thank you. And the pump's off, too.

11 51 12 ACDR We had EVAP, OFF ...

END OF TAPE

ASTP AIR-TO-GROUND VOICE TRANSCRIPTION

12 06 45 ACDR Okay, the next one is ... Center him in the COAS.
DMP And I don't control - -
ACDR And at 4 minutes, thrust X - plus-X, four jets for
16 seconds, for 4 minutes.
DMP Am I supposed to control roll or not? Does it say?
ACDR No.
DMP I don't?
CMP You eventually have to - -
ACDR You - eventually you have to, you ... - -
CMP - - ... because you've got to go up and dock with it.
DMP Yeah.
ACDR It's easier if you do.
DMP But I wasn't sure about this point - ... wanted me
to - -
CMP Let's see, I guess our shadow's off of us now. ...
- -
ACDR Yeah. Okay - -
CMP - - about where it came off.
ACDR Okay, Deke. Stand by. Plus-X for 16 seconds.
12 07 22 ACDR MARK it.
DMP Okay, ...
ACDR Okay, 8 seconds gone; 10 seconds; 13, 14, 15 -
12 07 37 ACDR 16. That's it. Stop.
ACDR (Soyuz, this is Apollo.)
SCDR Apollo; stationkeeping.

DMP No, no. No, we're not either, Tom.

USA ...

ACDR (50 meters.)

USA Okay.

CC-H Apollo, Houston through ATS. And we're hearing your calls.

12 08 14 DMP Roger. We've undocked and stationkeeping.

ACDR Everything was on time, Bo.

CC-H Roger. Thank you. And if someone can get that out-the-window camera and check that it's in AVERAGE, it may help our picture.

12 08 35 ACDR It's in AVERAGE, Bo.

CC-H Thank you.

SCDR Soyuz orientation lights on.

ACDR (Roger.)

CC-H Apollo, Houston. May we ask you put that out-the-window camera to PEAK.

CMP Roger.

12 09 03 ACDR You got PEAK, Bo.

CC-H Thank you.

CC-H Apollo, Houston. On panel 230, we'd like the UP TELEMETRY switch to UP TELEMETRY.

ACDR Roger.

12 09 41 ACDR Bo, it's in UP TELEMETRY.

CC-H Roger. Understand. The panel 230 UP TELEMETRY switch was in UP TELEMETRY.

ACDR That's right, sir. How's your picture on the tube, Bo?

CC-H Pretty good. We see Soyuz there and understand the picture's even going to get better as we get into the daylight.

ACDR Oh, yeah.

USA ...

ACDR (About 50 meters now.)

USSR (About 30 meters?)

ACDR (50. 50.)

CC-H Apollo, Houston. On panel 181, we need the TV STATION SELECT CM and CM1 to UP TELEMETRY.

ACDR Say again, Bo?

CC-H On panel 181, those two TV STATION SELECT switches in the upper left-hand corner - to the center UP TELEMETRY position.

USSR (...)

ACDR (...)

SCDR What is the rate now?

ACDR (There is stationkeeping.)

SCDR What distance stationkeeping?

SCDR 50 meters.

ACDR (Roger.)

CC-H And, Apollo, Houston. We need that out-the-window camera back to AVERAGE because we've gone away from the Earth.

SCDR I'm ready.

12 12 33 ACDR Roger. You got AVERAGE.

SFE Soyuz ready for orientation.

ACDR (Okay. Ready.)

12 13 41 SFE Initiating orientation.
ACDR (All right.)

12 15 19 CC-H Apollo, Houston. The TV picture is so good we can see the capture latches.
ACDR Roger, Bo. Roger.
CC-H Apollo, Houston. Could you give us an estimate of your range?
ACDR Okay. Deke has the same problem I have. The COAS is completely washed out. It's full up, it's so bright out here.
CC-H Understand.
ACDR We can look and ballpark it; it's about 50 meters, plus or minus 1 or 2.

12 16 00 CC-H Roger.

12 18 14 SFE Orientation established.
ACDR (All right.)

12 20 20 SCDR I see guide ring extending.
ACDR (Roger. Understand you.)
CC-H Apollo, Houston. We would like you to go PEAK on the out-the-window camera.
ACDR Roger.

12 20 47 ACDR You've got PEAK, Bo.
CC-H Thank you. The reason I called that is whether - depends on whether or not we can see the Earth.
ACDR Yeah, Bo; understand.
CC-H Apollo, Houston. We'd also like you to go to GAMMA 1/2 on the out-the-window camera.
ACDR Stand by. We're real busy.

Day 200

CC-H Okay.

12 22 35 ACDR You've got 1/2 GAMMA, Bo.

CC-H Thank you.

CMP And, Bo, we think maybe his docking attitude isn't exactly what we've got on the pad.

ACDR We know it's not, Bo.

CC-H Roger. We'll check that.

ACDR Roll looks good. Pitch and yaw are a little off.

CC-H Understand.

CC-H Could you give us your attitude? We don't have any data here, because we're watching TV.

12 23 04 SCDR APDS mode accomplished.

ACDR (Say again, please.)

SCDR APDS mode accomplished.

ACDR (Roger. Roger. Understand you.)

DMP I'll give you our docking attitude as soon as we have it refined here.

CC-H Roger.

SCDR Everything is ready.

12 24 09 DMP Okay, Bo. We're pretty close. The docking attitude at 195.7, 208.1, and 21 degrees point 3.

CC-H Roger.

12 24 54 ACDR (Soyuz, this is Apollo. Orientation established. Ready for docking.)

SCDR We are ready. Go ahead, Tom.

ACDR Rog, Alexey. Understand.

CC-H Apollo, Houston. On the out-the-window camera, we would like you to go AVERAGE again, please.

12 27 21 ACDR (Soyuz. Am now approaching Soyuz. We are ready.)

SCDR Can't understand you, repeat it, Tom.

ACDR (Am approaching Soyuz.)

SCDR Okay, keep coming, Tom.

12 27 54 CC-H Apollo, Houston. On the out-the-window camera, we'd like you to go to LINEAR again, please.

ACDR ...

CC-H That did it. That's a good picture.

ACDR Okay, Houston. Deke's having the same problem with COAS washout that I had.

DMP ... it's so bright.

CC-H Roger. Understand.

12 28 57 DMP You can see absolutely zero COAS.

ACDR (Distance 30 meters.)

USSR ...

ACDR (Very slow, very slow.)

DMP Bo, hold on a second.

SCDR ... meters.

CC-H Apollo, Houston. We're getting a good picture but the camera is moved a little. Can we ask you to move it to the right and up - up a little bit. Thank you.

12 33 41 CMP (Contact.)

12 34 39 SCDR Apollo, this is Soyuz. Initiation - initiating retraction.

CMP (Okay.)

Day 200

CC-H Apollo, Houston. It was a beautiful docking. We had a good picture. We can see Italy coming up in the Mediterranean right now.

CMP (Okay.)

12 37 41 SCDR (We have capture. Now in the process of closing the latches. We did the solar eclipse experiment. Everything following the program.)

CC-H Apollo, Houston. It looks like we lost communications with you for a while, but we're back again.

12 38 34 DMP Okay. We were getting into gimbal out there, Bo, for some reason. So we got to manually crank out of there; that's - probably we're in some weird attitude right now.

CC-H Understand.

12 40 38 SFE (This is Soyuz 2. Interface seal compressed. Over. Soyuz.)

ACDR ...

12 40 52 SFE Interface seal compressed.

ACDR (Okay; Roger. Understand you.)

12 40 57 SCDR APD mode - APDS mode accomplished.

ACDR (All right.)

CC-H Apollo, Houston. Over.

ACDR Go ahead, Bo.

CC-H We see you have the SECONDARY of - LOOP and PUMP ON. And we think that - you probably don't need it on. Could you comment on that?

ACDR Yeah, we're burning up in here, Bo.

CC-H Understand.

ACDR It's a little hot with all the cameras on.

ACDR Houston, Apollo.

CC-H Go ahead.

DMP Yeah, we're in some random attitude here, due to getting into that gimbal lock situation. And we're debating whether to maneuver back to the docked attitude or leave things go. What's your recommendation?

CC-H Let me check on that for you, Deke.

DMP Okay.

CC-H Apollo, Houston. We suggest you maneuver back to the docking attitude at this time, and that's 197, 205, 014.

DMP Okay. Roger. That was our opinion, too. Just ...

USA ...

12 45 15 SFE (I hear you excellently. How do you read me? Everything is normal. We're doing the rough pressure integrity check. 1 minute, time. The contact was proper; everything is normal. This is the third day that we've been bothered by - tormented by some other station. So every time we pass over this area, 194 degrees, then we get interference from a very loud station, some sort of airport weather station, and it just completely interferes and blocks all the comm.)

CC-H Apollo, Houston. Over.

SFE (The moment we get into the docking or undocking area.)

CC-H Apollo, we remind you just to tell Soyuz you're going to maneuver, and we'd like the three camera switches on 181, OFF, and we're going to be doing a VTR dump here, so there will be no downvoice for approximately 5 minutes.

CMP Okay.

12 52 37 SCDR (Pressure 800 in the orbital module; 810 in the descent vehicle.)

CC-H Apollo, Houston. There are 2 minutes until ATS LOS. We'll see you at Guam at 96:39.

Day 200

12 56 23 CMP Okay, Bo. And we've got the hatch out and the UVA cable connected to ...

CC-H Roger. I understood that you have the hatch out.

CMP That's affirmative. And the UVA prep checklist complete.

CC-H Roger. And we have an addition. At 96:40 GET, we'd like you to do a helium injection. DM Checklist, D/7-5, and you've already gotten the hatch out.

12 56 53 CMP That's affirm. And we got that helium injection 7-5.

13 02 10 SCDR Tom, just now we are in the orbital module.

ACDR (Roger. You are in the orbital module.)

CC-H Apollo, Houston through Guam for 4 minutes.

DMP Okay, Bo.

CC-H I have got the second undocking pad on page 7.7, if somebody can copy.

DMP Stand by.

ACDR Just a second.

CC-H Apollo, Houston. Over.

DMP Roger, Bo. Ready to copy the second undocking.

CC-H Roger. That's on page 7-7. Undocking time is as scheduled. 026.00; 307.00, 322.00; high gains: plus 003, plus 230. Over.

DMP Roger. I missed the first angle. The nominal time for undocking, then give me a roll angle.

CC-H The roll was 026.00.

ACDR Okay. Nominal time, which should be 099:07 and four balls; ti - roll 026.00, 307.00, 322.00; plus 003 for pitch, plus 230 for yaw. Over.

13 04 55 CC-H Roger. That was a good readback. And just some information about your fuel. In the simulator you used about 120. This undocking and redocking you used about 200. You're about 200 above the experiments redline.

ACDR Roger.

ACDR Okay, Bo. Thank you.

CC-H Roger.

CC-H Apollo, Houston. There is less than a minute until LOS; Santiago at 97:16.

ACDR Roger. And, Bo, again, you wanted the helium inject at this time, right, at 96:40?

CC-H That's affirmative.

ACDR Okay. That's page 7-3 in the DM Checklist.

CC-H That was page 7-5.

13 06 16 ACDR Roger. 7-5.

END OF TAPE

Day 200

ASTP AIR-TO-GROUND VOICE TRANSCRIPTION

13 37 41 CC-H Apollo, Houston through Santiago and then ATS.
ACDR Roger, Bo. Read you loud and clear. How me?
CC-H Loud and clear.
ACDR Okay. The helium injection was done. And also, want to read the data from - copy the data from P52?

13 38 19 CC-H Roger. We're ready for the P52 data.
ACDR Star 33, star 42; NOUN 05, all zeros; plus 13, minus 18, and plus 4; platform torqued, 96:43:15.
CC-H Understand; 33, 42, all balls; plus 13, minus 18, plus 04; 96:43:15.
ACDR Roger.
CC-H And do you have the option 1 time?
ACDR Stand by.
CC-H Apollo, Houston. You can do that option 1 either in daylight or darkness, as you wish.

13 39 45 ACDR Yeah; Rog. We're going to do it -

13 42 20 CC-H Apollo, Houston now through ATS.
ACDR Roger; through ATS. Okay, we're pitching down with respect to the ground now. Stand by.
DMP Hello, Houston; Apollo.
CC-H Apollo, Houston. Go ahead.
DMP Bo, do you want us to - try this option 1 now and not worry about tweaking it up on stars after the platform goes into coarse aline, or would you prefer we wait until the next night pass?

CC-H Roger. We understand you'd like to do the option
1 now and not worry about tweaking it up until the
next night pass, and that's fine with us.

DMP Okay. It's either that or getting it the next night
pass, and if you prefer, I'll do it now.

CC-H Roger. We prefer you do it now, and if somebody's
down there, we'd like on panel 230 the UP TELEMETRY
switch to RELAY.

DMP Stand by. Tom's getting it.

13 43 55 ACDR You got RELAY.

CC-H Thank you.

13 44 18 CC-H And, Apollo, Houston. We need the UP TELEMETRY
switch now back to UP TELEMETRY.

13 45 29 CC-H Apollo, Houston. I think we've got a good ATS
lockup now.

13 47 58 CC-H Apollo, Houston. How do you read?

13 48 42 CC-H Apollo, Houston. If you read, we think you can go
NARROW and REACQ on the antenna now.

SCDR ...

13 49 37 CC-H Apollo, Houston. If you read, we think you can go
NARROW and REACQ on the ATS antenna now.

CC-H Apollo, Houston. If you read, NARROW and REACQ on
the ATS antenna.

13 50 40 ACDR Houston, Apollo.

CC-H Roger. We read you, Tom.

ACDR Hello, Houston; Apollo.

CC-H We read you. How do you read us?

ACDR Houston, Apollo. How do you read?

CC-H Apollo, Houston. We read you loud and clear.

Day 200

13 51 38 CC-H Apollo, Houston. Please go NARROW and REACQ on the
ATS antenna.

13 52 45 ACDR Hello, Houston; Apollo.
CC-H Apollo, Houston. We read you loud and clear.

13 53 32 CC-H Apollo, Houston. How do you read?

13 54 48 CC-H Apollo, Houston. How do you read?

13 55 17 CC-H Apollo, Houston. How do you read?

13 56 30 ACDR Hello, Houston; Apollo.
CC-H Apollo, Houston. Go ahead. We read you loud and
clear.

13 57 23 CC-H Apollo, Houston. How do you read?
ACDR Houston, Apollo. How do you read through Madrid?
CC-H Apollo, Houston. We read you. Go ahead.
ACDR Hello, Houston; Apollo. How do you read through
Madrid?
CC-H Apollo, Houston. We read you well through Madrid.
Go ahead.
CC-H Apollo, Houston through Madrid. How do you read?
ACDR Houston, Apollo. Do you read through Madrid?
CC-H Apollo, Houston through Madrid. How do you read us?

14 02 46 CC-H Apollo, Houston. How do you read?
CC-H Apollo, Houston. How do you read?

14 03 56 CC-H Apollo, Houston. How do you read?
ACDR Okay. Read you loud and clear, but the needle keeps
wavering on your station through Madrid. I wonder
what happened to the S-band? Over.
CC-H We're trying to figure that out. The angles that we
have for your ATS are minus 19 and 252.

ACDR Okay.

14 04 52 ACDR I've got a minus 19 and 252 on the REACQ. Is that any good through ATS?

CC-H Roger. We seem to be reading you quite well now. How are you reading us?

ACDR Loud and clear through ATS.

CC-H Roger. That's good. Do you have any messages?

ACDR No. You got an echo.

CC-H Roger. That's probably the VHF at Madrid.

CC-H And, Apollo, Houston. We would like you to go ACCEPT.

14 05 27 ACDR Roger. ACCEPT; got it.

14 05 30 CMP And the option 1 was - was completed.

CC-H Thank you.

CC-H Apollo, Houston. Do you have a time on that option 1?

CMP ...

14 06 33 CC-H Apollo, Houston. Do you have a time on that option 1?

14 07 21 CC-H Apollo, Houston. How do you read?

CMP Loud and clear, Bo. Haven't you been reading us?

CC-H Negative. You've been cut out by a lot of interference.

CMP Okay, Tom will come up with the time in just a minute; he's looking it up.

14 07 50 SCDR (Moscow, this is Soyuz. I read you well. Over.)

ACDR Okay, Bo. It was 97 plus 20.

SCDR (Rough integrity check results excellent. Exact integrity - pressure integrity check was performed for 10 minutes. The results are also excellent.)

CC-H Apollo, Houston. We would like to go BLOCK if you read.

ACDR Bo?

CC-H Roger. Go BLOCK on the computer. And we copied 97:20; was that for the option 1?

ACDR Roger. And we'll ... before it gets down to ...

14 09 52 DMP Houston, how do you read now?

CC-H We read you fairly well. Go ahead.

DMP Okay, just doing a comm check.

CC-H Roger. I have two notes for the UVA, when someone is ready to copy.

ACDR Go ahead.

CC-H The first is on the field of view. It is possible that the star tracker could indicate lock and be outside of the spectrometer field of view in yaw without an oscillation. And therefore you must fly the spacecraft with Soyuz reflector within plus or minus 1-1/4 degree of the center of the COAS calibration mark in yaw. Pitch is operating normally.

ACDR Roger. Possible in the field of view for it to indicate locked on but really be outside, so you must fly within plus or minus 1-1/4 degrees to center of the COAS. Over.

CC-H Roger. That's right. Within 1-1/4 degree of the center of the COAS cal mark. That's only for yaw.

DMP Okay, Bo. Yeah, Bo, we had 3 degrees to the right and 2-1/2 to the left, you may remember, on the cal ...

14 11 19 CC-H Roger. That's what brought this all about. And on the UVA RCS cutoff, if necessary, the PSM can be used

to depletion, which is 7 percent on the onboard meter. Then you are cleared to continue UVA on the quads until the lowest quad reads 80 percent.

DMP Okay. Got that.

CC-H Roger.

14 13 10 CC-H Apollo, Houston. On panel 10, we would like you to check the VHF FM thumbwheel at no higher than 3, and could you tell us where it is?

CMP Stand by.

CMP It doesn't have - VHF FM - -

DMP Thumbwheel ...

CMP - - and I'll position that to about 3 or less.

14 13 42 CC-H Roger. Understand it was at 5, and you're bringing it down to 3.

14 18 38 CC-H Apollo, Houston. On channel - on panel 230, we would like to verify that the UP TELEMETRY is in the center UP TELEMETRY position.

ACDR Okay. It's in RELAY going to UP TELEMETRY.

CC-H Thank you.

SFE Apollo, Soyuz. How do you read me?

ACDR (I hear you excellently.)

SFE The time to initiate undocking is 99:03:00 flight time.

ACDR (No, at 99:07:00. Over.)

SFE Mission Control - Moscow Mission Control said - told us that the time is 99:03:00 - the time to initiate undocking.

14 19 57 ACDR Bo, did you hear that on RELAY?

CC-H Roger. I did. Soyuz told you Moscow told them 99:03.

ACDR Roger.

SFE Do you read me?

ACDR Okay. It takes awhile for them to undock, so I - I see what they're hitting at.

SFE How do you read me?

ACDR (Roger. Understood you excellently.)

SFE Tom, are we still GO for undocking? The time of undocking, 99:03.

ACDR (Roger. Understand you. All right.)

ACDR Yes, Bo. We're squared away. We know that it takes them quite awhile to undock. There's no problem.

CC-H Roger. We believe so, too, but we're discussing it right now to make sure.

CMP ... their sequence starts - at that time, and it doesn't complete until 99:07.

CC-H Roger.

14 22 25 ACDR Bo, you got anything else for us on this - before we go over the hill on ATS and before we hit the eat period.

CC-H Negative. We were going to say that we do agree with you - that 99:03 is the time they start, and then your undocking time is the time that they sep - that you separate. We have one question and that is, how did the solar eclipse go?

DMP It went just fine as far as I could tell, Bo. We called them, said they had sunlight on their reflector. It was creeping in there fairly slow, but as soon as I saw it touch the edge, I gave them a call and - at about 2 minutes and 53 - 54 seconds.

CC-H I understand; 2 minutes 53 - 54 seconds is when you gave them a call saying they had some sunlight.

DMP That's affirm. It may have been a little earlier on it but I thought I'd better be conservative because I remember how sensitive they were to that.

CC-H Okay.

14 23 33 DMP The only other thing, Bo, just for your information, coming back in we were in good shape, and as long as they were above the horizon, we were in good shape. As soon as they got below the horizon, that COAS just washed out to nothing. And trying to judge translational requirements is a very *** so I think what I'm telling you is that the safest place we can be is going to be in close enough so we can see that cross on there - that standoff cross on there, especially if we're in an Earth background.

14 25 00 CC-H Roger. We understand what you're saying.

CC-H Apollo, Houston. We think the UVA here, you should probably be in local horizontal most of the time so you shouldn't have the problem -

DMP Yeah, that's true. We hope so.

14 25 05 ACDR Houston, Apollo.

CC-H Apollo, Houston. Go ahead.

ACDR Roger. We've got a little present here we want to - of music that - (western Oklahoman music for the Soyuz crew and for the people working in the MCC in Moscow.)

14 25 30 CC-H Understand you want to give us some music, and you want it to go to Moscow.

ACDR Okay, it's going to be playing now.

14 26 10 (Music: "(Hello, Darling)")

ACDR Over.

CC-H Apollo, Houston.

ACDR Go ahead.

CC-H That sounded like it was from far western Oklahoma, around Kiev.

ACDR No, that was Conway Twitty in Russian for the Soyuz crew and for the people in the Control Center.

ACDR I don't know whether my old friend, Jim Hartz, who's working upstairs on the third floor, recognized that or not. He's from Tulsa.

CC-H Roger.

14 31 26 CC-H Apollo, Houston. I have a block data here for rev 93. If and when somebody is ready to copy it, please give me a call.

ACDR Go ahead.

CC-H Roger. Rev 93. Time, 153:20:39; minus 193.9, plus all balls, plus 020.3; 002, 330, 355; 177.0; 00:08; 197, 1571.6, 25770, 26:03; 27:20, not applicable, 051/309, 32:44, 35:47, plus 19.77, minus 163.75. Over.

14 33 24 ACDR Roger. You want a readback on that?

CC-H If you wish.

ACDR Okay. Rev 93. Time 153:20:39; minus 193.9, plus all balls, plus 020.3; 002, 330, 355; 177.0; 00:08; 197, 1571.6, 25770, 26:03; 27:20, N/A; 051/309, 32:44, 35:47, plus 19.77, minus 163.75. Over.

CC-H Roger. That's a good readback. Remarks: orbital REFSMMAT, CM/SM sep, yaw left to 310, NOUN 48, pitch plus 0.04, yaw minus 0.67; CSM weight, 26240; DM weight, 4500.

ACDR Okay. Orbital REFSMMAT, CS/SM [sic] sep, yaw left 031 degrees, and the NOUN 48's pitch is plus 04, yaw minus 67; the weight is 26248 [sic], and 4500.

CC-H Roger. You were cut out of that yaw left - it was 310. Otherwise, it's all a good readback.

ACDR Okay.

CC-H And I have one other change for you, and that is the PSM cutoff for UVA should be 10 percent.

ACDR Roger. 10 percent.

CC-H And we're less than a minute from LOS. The next
pass is Orroral at 98:24.

14 35 30 CC-H And as we go over the hill, we see that you're in
ATT 1 RATE 2 instead of RATE 2.

14 46 59 ACDR Hello, Houston. Apollo through Orroral.

CC-H Roger. We read you through Orroral, and you are
GO for undocking.

14 47 28 CC-H Apollo, Houston. Over. How do you read?

END OF TAPE

Day 200

ASTP AIR-TO-GROUND VOICE TRANSCRIPTION

15 20 27 CC-H Apollo, Houston through ATS. Over.
ACDR Roger, Bo. Read you loud and clear.
CC-H Roger. You have a GO for undock. On panel 230, we would like the UP TELEMETRY switch to RELAY.

15 20 40 ACDR Roger. RELAY and we have the UV ABSORPTION POWER, ON, at 98 plus 56 plus 00.
CC-H Roger. 56 plus 00, the ABSORPTION POWER, ON, and on panel 181, we would like the three TV camera switches to the ON position - the POWER switches.
CC-H And, Apollo, Houston. We have our commands in, so on panel 230, the UP TELEMETRY switch to UP TELEMETRY, when you have a chance.

15 21 41 ACDR You got it.
CC-H Thank you.
CC-H Apollo, Houston. We have a good TV picture.
ACDR Okay.
SCDR Apollo, Soyuz.
ACDR (Over.)

15 22 53 SCDR Still undocking.
ACDR (All right.)

15 23 04 SCDR Undocking - Tom.
ACDR (Roger.)
ACDR Houston, do you have any recommendations for a new film magazine for the DAC?
CC-H We hear that; we'll check on it.

15 23 44 SCDR INTERFACE SEAL COMPRESS, OFF.

15 23 55 SCDR INDICATOR, OFF. INTERFACE SEAL COMPRESS, OFF.

CC-H Apollo, Houston. The internal camera is getting reflections from the window. Can you move it down a little so we won't see the Sun?

CC-H And, Apollo, Houston. If CX03 is empty, you can use CX04.

15 25 20 SCDR ..., OFF.

ACDR Roger.

15 26 23 SCDR Undocking accomplished.

ACDR (Okay.)

15 28 01 SCDR Tom, be careful ...

SCDR ... now.

ACDR (About 20 meters.)

SCDR 15!

ACDR (Right.)

15 30 56 ACDR What is your range now - rate?

ACDR (Velocity minus.)

15 34 13 SCDR Please inform us about - Apollo stationkeeping.

ACDR (20 meters.)

15 35 27 ACDR (Soyuz, this is Apollo. Now open the reflector covers, as programed.)

SCDR After Apollo stationkeeping.

ACDR (Yes. We are now stationkeeping. Open reflector covers, as programed.)

15 36 05 SCDR In just a moment, we are going to initiate orbital rate attitude: yaw 0 to 180.

15 36 23 CC-H Apollo, Houston. Just a reminder, we need the primary and secondary evaporators deactivated.

ACDR Roger.

15 37 45 CC-H Apollo, Houston. We need the PRIMARY EVAPORATOR to INCREASE.

SCDR ...?

ACDR (...)

SCDR Okay, ... 8.

ACDR ...

15 40 45 SCDR Apollo, Soyuz. We initiated orbital orientation.

ACDR (...)

15 41 34 ACDR (I'm beginning the experiment ...)

ACDR ...

SCDR We don't under - we did not understand you.

SCDR We did not understand you.

DMP ...

SCDR Do you have stationkeeping?

ACDR Yeah. (...)

15 42 10 CC-H Apollo, Houston. You have until 99:39 for full data take if you need the time.

CMP Okay.

15 42 20 SCDR The orbital attitude established.

ACDR (40 meters.)

15 42 38 DMP (Looking through the window on the right.)

CMP (... Over.)

15 44 25 SCDR (- - Moscow. The undocking went normal. The pressure is normal. We are now in orbit - orbital hold - mode. Apollo has left the field of view and we cannot see him so far.)

ACDR (...)

SCDR (The reflectors are opened - 50 meters.)

15 46 11 CC-H Apollo, Houston. We may lose ATS here. If we do, there are angles in your Flight Plan.

15 46 41 CC-H Apollo, Houston. We may lose ATS here. If we do, there are angles for reacquire in your Flight Plan.

ACDR Roger. I've got the plus - pitch, plus 15, and yaw, plus 214.

15 46 51 CC-H Roger. We still read you fine.

SCDR (...)

SCDR (...)

15 49 19 CC-H Apollo, Houston. It looks to us as if you may be out a little far and we think that perhaps a correction down and to the left would be appropriate.

DMP Yeah, that's the way we made the last one.

CC-H Roger.

15 49 41 SFE BEACONS, ON. ORIENTATION LIGHTS, ON.

ACDR (We see your beacons.)

CC-M (Soyuz, this is Moscow.)

CC-H Apollo, Houston. Just another reminder. If we lose the high-gain acquisition, you'll need to go RECORDERS, ON.

ACDR Say again, Bo.

15 52 19 CC-H Roger. If we lose high-gain antenna lockon, you'll have to put the RECORDERS, ON.

15 52 27 ACDR Okay. That's HIGH BIT RATE, FORWARD, COMMAND RESET, right?

CC-H Apollo. It doesn't look like we're going to lose you. We'll try to keep you clued if it looks like we will.

Day 200

15 53 33 CMP Okay.
ACDR All right, Bo.

15 59 42 CMP (Soyuz, this is Apollo. Turn off orientation lights.)
CMP (Soyuz, this is Apollo.)
CMP (Soyuz, this is Apollo. Turn off beacons and orientation lights, also.)
DMP (Soyuz, this is Apollo. How do you read?)
ACDR (Soyuz, this is Apollo. How do you read me?)

16 00 50 CMP Houston, Apollo.
DMP (Soyuz, this is Apollo.)
ACDR (Soyuz, this is Apollo. Turn off your orientation lights and beacons.)

16 01 13 CC-H Apollo, Houston. Did you call?
CMP Yes. Hey, would you call the Center and have them - well, I guess we - we're not over the U.S.S.R. but we have a problem. We can't get the Soyuz beacon and orientation lights off. Apparently they're not reading us.
CC-H Roger. Will try.
ACDR (Soyuz, this is Apollo. How do you read?)
SCDR I read you loud and clear, Tom.

16 01 43 ACDR Roger. (Turn off your orientation lights and beacons, please.)
SCDR Tom, I don't understand you.
ACDR (Turn off your orientation lights and beacons, immediately, please.)

16 02 09 SCDR Soyuz ORIENTATION LIGHTS, OFF.
ACDR (And beacons, too.)

ACDR (Also turn off your beacons, please. Turn off both the beacons and orientation lights.)

ACDR (Soyuz, this is Apollo. Turn off your beacons, please.)

16 03 15 SCDR Okay.

ACDR (Thank you.)

SCDR Soyuz BEACON, OFF.

ACDR (Thank you.)

SCDR You were calling our spacecraft?

ACDR (Yeah. Of course.)

16 04 34 CC-H Apollo, Houston. Experiment says it looks like we're getting good data.

DMP I hope so.

ACDR Roger. We had a hard time making them understand to get their beacons off.

CC-H Roger. We copied that.

16 04 44 ACDR Couldn't contact him at first.

16 08 54 DMP (Soyuz, this is Apollo. Turn on beacons and orientation lights, please.)

16 09 10 CC-H Apollo, Houston. We show you've finished your sweep. Could you give us a range reading?

SFE Our BEACON - our BEACON, ON.

CMP (Okay.)

DMP Okay, Bo. Our range reading is .05 to .06; I guess I don't have that much confidence.

CC-H Roger. .05 to .06. And - could you tell us if you visually saw the reflector covers open?

16 09 40 ACDR Yes, I did, Bo. I could - with the spotting scope, I could see each mirror inside of them.

CC-H Thank you very much.

16 12 25 CC-H Apollo, Houston. There are 2 minutes until ATC LOS. We'll see you at Orroral at 99:56.

ACDR Roger.

CMP Okay. And we're tracking in and out of - seems to be looking pretty good, Bo.

CC-H Roger. We'll have to - we'll try to give you a progress report or our evaluation there at Orroral. But it looked pretty good.

CMP Okay.

16 13 03 CC-H And, Apollo, Houston. Just a reminder, the Soyuz crew would be interested in a range readout every now and then.

CMP Yes.

ACDR (60 meters.)

SCDR Roger. 60 meters and -

SCDR 60 meters.

16 13 32 ACDR (Correct.)

16 17 50 ACDR (Soyuz, this is Apollo. And we're ready to turn on spotlight.)

16 18 23 CC-H Apollo, Houston through Orroral Valley for about 2-1/2 minutes.

DMP Roger. Got you, Bo. For your information, we think we got a great bias in the VHF. My guess is ... feet ... Incidentally, we got to ...

CC-H Sorry, Deke, but you were very garbled: could you try again? Heard a big bi - -

DMP I said our VHF ranging has a great bias in it. We gave you .05; I would say we were probably closer to 150 meters than we were 100.

CC-H Roger. I think everybody here concurs.

16 19 53 CC-H Apollo, Houston. There is about a minute until
Orroral LOS. AOS at Quito at 100 hours and 26
minutes.

END OF TAPE

Day 200

ASTP AIR-TO-GROUND VOICE TRANSCRIPTION

16 51 20 CC-H Apollo, Houston through Quito for another minute and a half.

ACDR Roger. We've just rolled 180 degrees, Bo.

CC-H Roger. We have a - an item here. Your maneuver looked good. It looked like you were locked on for a good period of time, but we have some doubt that their - their retrore - reflector was performing properly, and so we're going to ask the Soyuz to use their rear retroreflector. To do this, we would ask you to relay to them, their Control Center would like to speak to them through their ship.

ACDR (Soyuz, Apollo.)

SCDR Go ahead.

ACDR (Yes. MCC Moscow wants to talk to you over our ship.) Over.)

SCDR Okay, we are ready.

ACDR They're ready; they got it.

CC-H Roger. Thank you very much - -

SCDR (Moscow, Moscow, this is Soyuz. How do you read?)

CC-H - - and we'd like your ATTITUDE SET to GDC, if it is not.

16 52 27 SCDR (Thank you. We hear you excellently. We are now at 270 90. On the - from the right side, we see the Apollo - -)

16 54 36 CC-H Apollo, Houston through Bermuda. Over.

CMP Loud and clear, Bo. Bo, we have a question.

CC-H Go ahead.

CMP We thought we could see a light leak in their window - or perhaps not covered - one or the other. Would that have any effect on the experiment?

CC-H We'll check.

SCDR (This is Soyuz. I read you excellently. This is Soyuz. I hear you excellently.)

CC-M (...)

SCDR (...)

CC-M (...)

CC-H Command module, Houston.

SCDR (...)

CC-H We don't believe that light leak could have affected it, but we're checking it thoroughly.

CMP Okay.

ACDR Okay. Okay, and you heard, and you might relay to Moscow. We had a hard time getting them to turn off their beacons and lights.

16 55 55 CC-H Roger. We heard that.

CC-M (...)

SCDR (...)

CC-M (...)

16 56 49 SCDR (Okay. We've done that and ... course. Yes, this is Soyuz. We've already done that, and our course now is 270, 90. Roger.)

SFE (I don't understand what's new about this. That's what it was: 270, 90.)

CC-M (...)

SFE (Moscow, this is Soyuz. Our yaw was automatic.)

CC-M (...)

SFE (We got this course automatically, but, in the process of the maneuver ... right window ...)

CC-M (Right now.)

Day 200

16 58 22 SFE (We're now doing it. Our yaw now 270, 90. The Apollo will - the Apollo will go off to 500 meters, and we have to follow it and observe it visually through the right window. Correct?)

SFE (How did you read, Moscow?)

16 59 09 CC-H Apollo, Houston. Over.

ACDR Go ahead.

CC-H Apollo, did the light that was coming from the window appear to be as bright as that that was coming back from the reflector?

SCDR (...)

CC-H Apollo, Houston. Over.

17 00 03 SFE (No, we understood, but we have a question. Didn't it come out right with the right window?)

ACDR Go ahead. Bo, are you call - are you calling?

SFE (... not doing anything ... right window.)

CC-H Apollo, Houston in the blind. It looks to us as if you may have bumped the stick.

SFE (Moscow, Soyuz. Do you have anything from the biologists?)

SCDR (... the side one is working ...)

SFE (Yes.)

CC-M (...)

SFE (Yes.)

CC-M (...)

SCDR (Soyuz - -)

17 01 42 CC-H Apollo, Houston. Over.

SCDR (Roger. ... 270 The spacecraft is located We'll move farther away, and we know how to work now.)

SFE (So it's clear for you now.)

CC-M (...)

CC-H Apollo, Houston. Over.

SFE (... 70, 90 How did you read? Moscow, Moscow ... 70, 90. Moscow, Moscow, Soyuz. Over. Moscow, this is Soyuz. Over. So our course is ... 90. That's where we'll remain. ... it's the right window first Alexey, it's in your right window. Okay, we understand it now. My question is: didn't it work out from the side window? Roger. Not yet.)

17 03 47 CC-H Apollo, Houston. Over.

DMP Good, Bo.

CC-H Roger. It looks to us as if the Soyuz has started their maneuver. Can you see it?

SCDR (...)

DMP Negative. Not yet.

SCDR (Of course.)

CC-H Roger. We'd appreciate a call when you are able to see them maneuvering to their proper attitude.

DMP Well, I'm not sure what's "proper" if they didn't - -

ACDR They're still yawed 90 degrees, Bo.

DMP It said 90 - 90 degrees in the orbital plane, here.

ACDR They're not yawed in plane, Bo; they're 90 degrees to it.

CC-H Roger. Understand. And you had a question about a magazine before, and I read you up a new one. If that one is now finished, you are cleared to use CX05, which is located in F-2.

CMP Thanks, Bo. For your info, we grabbed that one when we couldn't find the - called up. We could see it was a PAO mag.

Day 200

17 04 46 DMP And, for your info, Bo, the last time we came back into plane, we were sort of in the dark, and, boy, the sunrise - the Sun rising right behind the Soyuz was a real bear. Can anybody tell yet if that's going to happen next time around?

CC-H Apollo, we did not re - read you. You have a bad echo.

DMP Okay, I just wanted to inform you that the last time around, we came into plane in darkness, yet. And turns out that the sunrise is directly behind Soyuz. And we had a difficult time there until the Sun got over our head. I would expect the same thing to happen at the 500 meters.

CC-H Roger. We understand the problem, and I understand that the geometry should be the same, so, again, the Sun will be in your eyes. Apollo, I just gave you some bad information. The Sun will be behind you, so you should be able to see the Soyuz well.

DMP Yeah, we just got a - we just figured that out for ourselves here where it's going to be.

17 06 27 CC-H Apollo, Houston. To get a full data take on this, you need to start the maneuver by 101:08.

ACDR Roger. Is that the data take?

CC-H Apollo, Houston. Over. That 101:08 is the start-maneuver time.

ACDR Understand, Bo.

17 08 13 ACDR (I see you, Alexey.)

SCDR We see you.

ACDR Houston, Apollo.

SCDR ...

CC-H Apollo, Houston. Go ahead.

ACDR (...)

SCDR No.

ACDR Roger.

SCDR ... millimeters.

ACDR (...) Okay. On this start here, right now we're going in-plane forward; and he's yawed 90 degrees. Affirmative?

CC-H The - -

ACDR Is he going to keep his present -

CC-H That's right. He's going to keep that present attitude.

ACDR Okay. Yawed 90 degrees to the velocity vector. All right.

CC-H And, therefore, you should be able to see his rear retrore - reflector.

ACDR (All right.)

MCC-H That's correct.

17 09 56 ACDR (Initiating the maneuver.)

17 10 58 CC-H Apollo, Houston. Over. Apollo, Houston. Over.

MCC-H Okay. He's working there.

17 11 28 DMP Okay. We stopped the maneuver, Bo, if you didn't catch it. I had a wrong switch configuration here.

CC-H Roger. May we suggest that you go back and start again.

DMP Okay.

17 12 21 CC-H Apollo, Houston. We have about 15 minutes until you need to start the maneuver out of plane to get the full data take.

DMP Okay.

CC-H Apollo, if somebody has a chance, we would like PEAK on the out-the-window camera.

Day 200

17 13 12 SCDR (- - excellently. Moscow, Soyuz. I hear you excellently.)

SCDR (This is Soyuz. I hear you excellently. How do you read me?)

SCDR (Moscow, this is Soyuz. I read you excellently.)

CC-M (Roger, Soyuz.)

17 14 19 SCDR (Now the situation is as follows. Apollo went by our rear, and we saw it through our right window. The distance was about 30 or 40 meters. It is holding distance very well. Now I'm watching it through the right window. And we'll maneuver should something happen. Over.)

SCDR (It is a 180 degrees roll, in relation to us, upside down.)

SCDR (Roger.)

CC-H Apollo, Houston. We'll be - we'll be coming up on sunset here in just a few minutes.

ACDR Okay.

17 16 35 CC-H Apollo, Houston. There are about 5 minutes until sunset at this time. If someone has a chance, GAMMA 1/2 on the out-the-window camera.

17 18 45 CC-H Apollo, Houston. It looks like you just did your maneuver. Could you confirm that?

CMP That's a - -

CC-H And, Apollo, Houston. We're out of TV; we're just watching data again.

CMP Okay.

ACDR (Soyuz, this is Apollo. Now turn on the beacons please.)

17 20 28 SFE BEACON, ON.

ACDR (Thank you.)

ACDR (Also, turn on your orientation lights, please. I see - turn on your orientation lights.)

17 21 03 SFE ORIENTATION LIGHTS, ON.

ACDR (Thank you.)

SFE (Roger.)

17 22 26 SFE (Standing by.)

ACDR (Soyuz, this is Apollo. Now turn on your ranging, please.)

SFE Roger.

17 24 39 SFE ... On.

17 34 36 CC-H Apollo, Houston. Could we have you hit ERROR RESET?

CMP Roger. We'll hit it again.

CC-H Roger. We don't think that it's any problem, but we'd just like to see if there's another - another light.

ACDR (Soyuz, this is Apollo. Now turn off - please turn off your beacons and orientation lights. Over.)

17 37 39 SFE BEACON, OFF; ORIENTATION LIGHTS, OFF.

ACDR (Thank you.)

CMP Duh-tuh-duh-tuh-duh-tuh-duh-tuh-duh.

CC-H Apollo, Houston. It looks as if we're getting data.

ACDR Yeah, it does.

CC-H And, Apollo, Houston. This data - data does look better than our last.

ACDR Roger.

17 39 38 DMP If you believe our VHF ranging, Bo, we're exactly 500 meters, but I don't.

CC-H Roger. Understand. You show yourself at 500 meters.

DMP That's what the gage says.

CC-H Apollo, Houston. If you called, you were very weak.

17 41 50 SFE Apollo, Soyuz. What is the range now?

DMP (500 meters.)

SCDR Repeat it. What is the range now?

DMP (500 meters.)

SCDR 500 meters.

DMP (Yes,)

17 43 21 CC-H Apollo, Houston. Houst - Experiments liked your data.

DMP Okay. It looks good from here. Should be locked in the center of the yaw and the pitch.

CC-H Roger.

17 47 24 ACDR Data take complete, Houston. (Soyuz, this is Apollo. Turn on beacons and orientation lights.)

17 47 48 SCDR Okay. Soyuz ORIENTATION LIGHT, ON: Soyuz BEACON, ON.

ACDR (Thank you. I see your beacons and orientation lights.)

CC-H Apollo, Houston. Over.

ACDR ... Go ahead.

CC-H Roger. Looks like you're still above the redline but getting close. And we'd like to remind you again about the switchover on the PSM. And if you switch, we'd like you to be in - -

ACDR Okay. Do you want a switchover on the PSM and - -

CC-H Not now, but when it gets down to - -

ACDR 10 percent.

CC-H - - 10 percent.

ACDR/CMP Rog.

CC-H And, Apollo, Houston. When you do do the switchover from PSM, we'd like you to be in SCS, MIN IMPULSE.

ACDR Roger. SCS MIN IMPULSE.

17 48 55 CC-H And we have LOS coming right up, and we'll see you at MILA at 102:02.

ACDR Roger.

CMP Houston, Apollo.

CC-H Roger. We're going LOS. You got about 9-1/2 minutes of data. Go ahead.

CMP This is - Apollo, Houston. We got out to 0.24 on the EMS, which obviously biased - -

CC-H Roger. 0.24.

17 49 49 CMP - - on the 500 - -

END OF TAPE

Day 200

ASTP AIR-TO-GROUND VOICE TRANSCRIPTION

18 23 59 CC-H Apollo, Houston through MILA. Over.
ACDR Roger, Houston, 5 by.
ACDR ..., Bo. How do you read me?
CC-H Roger. We read you weak but queerly [sic].
ACDR Okay. We're stationkeeping here after the 500.
And - we'll be doing our pitch maneuver at 52 on
schedule. ... 16 ...
SCDR Before pitch maneuver, we are going to photograph
Apollo. Just now, I am going to see your space-
craft.
ACDR (Alexey, I see you through the observation window.)
18 24 48 CC-H Apollo, Houston. If you see the Sun coming in the
window, would you preas - please put the TV full
close, so it doesn't damage the TV?
ACDR Roger.
ACDR You getting a good picture, Bo?
CC-H Negative. Right now, we're not getting anything.
SCDR In 1 minute, I am going to initiate yaw maneuver.
ACDR (In 2 minutes, Alexey, we will begin.)
SCDR Before our pitch maneuver, we are going to photo-
graph Apollo.
SCDR I am going to perform your maneuver. And photograph
Apollo.
ACDR (I understand that. I will perform a pitch maneuver
in 1 minute and 30 seconds.)
18 26 55 CMP (Our maneuver will begin soon in ...)
SCDR Vance, we are going to see your spacecraft in our
right screen. Do you understand me?

18 27 13 SCDR We are going to photograph Apollo before our pitch maneuver.

CMP (Yes. Understood.)

ACDR (Soyuz, are you ready to photograph the Apollo?)

SCDR *** for rotation.

18 28 48 ACDR Houston, Apollo. How do you read?

CC-H Apollo, Houston. Go ahead.

ACDR Yeah. We're a little confused about what's going on up here. We were ready to do our pitch rotation, and Soyuz is just going through a 180 yaw at the present time - which we weren't aware of as being in the Flight Plan. Anyway, we're going to hold up here until we see what happened.

CC-H Understand.

18 29 22 ACDR Yeah, we were ... there for a second.

ACDR (Do you see Valeriy with the camera?)

ACDR (Soyuz, Apollo. Are you ready to photograph Apollo?)

SCDR Ready to photograph Apollo.

18 31 26 SCDR We are doing the pitch maneuver.

ACDR (1 minute, please.)

CC-H Apollo, Houston. Over.

ACDR Go ahead.

CC-H Since you've been delayed, we'd like to remind you that the second separation burn needs to be done exactly 8 minutes after the first.

ACDR Exactly 8 after the first.

CC-H Roger.

ACDR Yeah - -

Day 200

CMP That's good to know.

ACDR -- we - we understood that, Bo, and we were going to re - start in 52 minutes.

CC-H Roger.

18 31 58 ACDR He just finished his 180 yaw and in the process, we've closed on him a bit. So we're opening up.

DMP You got a picture there, Bo, as we come across Florida? ... coming across some other place.

CC-H Negative. We don't have TV here yet.

CMP It's really great.

SCDR (... for yourself.)

18 32 37 CC-H Apollo, Houston. You're clear to do your separation.

CC-H Apollo, Houston. Could you tell us what your status is?

18 34 32 ACDR (I'm beginning the maneuver.)

18 34 45 ACDR (I'm beginning the tangent.)

18 38 22 ACDR ...

CC-H Apollo, Houston through ATS again. Standing by.

18 42 30 ACDR (I'm beginning the maneuver from you.)

CC-H Apollo, Houston. When you have a chance, switch the PSM; we show it's empty.

CC-H And, Apollo, Houston. The ATS angles are minus 24 and 150.

18 43 25 ACDR (Soyuz, this is Apollo. Maneuver completed.)

ACDR (Soyuz, how do you read?)

CC-H Apollo, Houston. Over.

CMP (Soyuz, this is Apollo.)

ACDR (Soyuz, this is Apollo. How do you read me?)
CC-H Apollo, Houston. Over.
CC-H Apollo, Houston. Over.
ACDR Go ahead, Houston.
CC-H Roger. You can switch your PSM; we show that it's empty. And your high-gain antennas are minus 24 and 150.
ACDR Minus 24 and 150. Roger.
CC-H Roger.
CMP And we're showing - -
CC-H And the PSM is on Systems Checklist 1-3.
CMP Roger. And we're showing 14, but we'll switch over - 14 percent.
18 45 08 CC-H Apollo, Houston.
ACDR Okay, Bo, I've got minus 24 and 150 on REACQ.
CC-H Understand.
ACDR Houston, Apollo.
CC-H Apollo, Houston. Go ahead.
ACDR ...
USSR (Moscow, I read you excellently.)
CC-H Apollo, Houston. Go ahead.
18 46 15 ACDR Roger. I guess we're locked up now, and we're switched over to the quads.
CC-H Thank you.
CC-H And - -
SCDR Vance, how do you read me?

CMP (Excellently, Alexey.)

SCDR Thank you very much for your big job.

CMP (Thank you, also. This was a very good job.)

SCDR ... was well done.

18 46 52 CC-H Apollo, Houston. Could you tell us the status of the evaporators?

SCDR A very good show.

SCDR Now I see your spacecraft very, very ***

ACDR (Unfortunately, I cannot see you. All of the Sun is in the window.)

SCDR Yeah, yeah, yeah, yeah. Sorry.

18 47 37 CC-H Apollo, Houston. Over.

ACDR Go ahead.

CC-H We'd like to confirm you've deactivated primary evaporators - and secondary, as well.

ACDR That's affirmative. We've deactivate ***

SCDR ...

SCDR After - after our flight - after our flight, I will do - -

ACDR (All right.)

18 49 24 CC-H Apollo, Houston. Over.

ACDR Go ahead.

CC-H Is that checklist to protect the camera from the Sun?

ACDR Yeah. It sure is.

CC-H Okay, we couldn't tell whether you were trying to show us something or - protect the camera.

ACDR No, Bo, that Sun was right into the camera. Now it's just setting. And there's Soyuz. Maybe you can see him. Right there in the sunset. It's beautiful.

CC-H Negative. We don't have a picture.

ACDR I believe - we couldn't see him for the last 5 minutes, Bo, and - -

18 50 30 CC-H Apollo, Houston. We're back in the data mode now.

SCDR Apollo, Soyuz.

ACDR (Please turn on your orientation lights. Also, please turn on your ranging. All right.)

18 52 26 CMP (Soyuz, this is Apollo. Please turn on your ranging.)

SCDR Repeat.

SCDR Apollo, Soyuz. Repeat it.

CMP (Alexey, please turn on your ranging mode.)

SCDR Okay. Tom?

CC-H Apollo, Houston. We're just approaching the experiment redline.

ACDR Okay.

18 53 22 ACDR Roger. We have our separation burn and we're going away. Track ...

CC-H Roger.

CC-H Apollo, Houston. The PIs would like the experiment doors open a little early. If you can do it now, we'd appreciate it.

CMP Roger. Understand. Experiment doors open.

CC-H Roger.

ACDR (Soyuz, this is Apollo. Turn on your orientation lights, please. I do not see you.)

CC-H Apollo, Houston.

USSR ...

CC-H Just a reminder - for the procedure, turn the jets off before you open the UVA door.

ACDR Rog.

SFE How do you read me?

ACDR (Very good. Very, very good, Valeriy.)

SFE What did you say before?

18 55 18 CMP (Nothing, Valeriy.)

SFE ...

18 57 29 CMP Houston, we're opening the door now.

CC-H Roger. Copy.

18 58 12 CC-H Apollo, Houston. We seem to have lost range data. Could you please do a VHF RANGE RESET?

ACDR (Soyuz, this is Apollo. Now turn on ranging.)

SFE What did you say?

ACDR (Nothing, nothing. Ranging established.)

SFE What is the range now?

ACDR (1000 meters.)

18 59 28 CMP (Valeriy, distance exactly one-third mile.)

19 02 20 CMP Houston, Apollo.

CC-H Apollo, Houston. Go ahead.

CMP Bo, right now it's very interesting. We're looking down on him, and he's got a beacon flashing, and we can see the two lights very well. He's pulling ahead of us, and you can see the dark Earth in the background; it's - just as if an airliner's maybe going underneath us and pulling ahead of us a little bit; maybe 1000 feet below us or so.

CC-H Roger. Thanks. We don't have TV, only data right now. Could we ask you to hit the VHF RANGE RESET again?

ACDR Okay, we'll try her.

ACDR Okay, nothing happened again.

ACDR (Soyuz, this is Apollo. Please check your VHF ranging. Over.)

SCDR On.

ACDR (Thank you, thank you.)

CC-H Apollo, Houston. I have UVA supplemental data here. Is someone free to copy?

ACDR (Soyuz, this is Apollo. Now please turn off your orientation lights.)

SCDR You want the orientation lights on - off?

CMP Houston, Apollo.

CC-H Roger. I have a change to you at the end of this UVA. Ready to copy?

ACDR Go ahead.

19 05 12 CC-H Roger. At 102:50, we'd like to - there's a VERB 49 maneuver; we'd like to change that to read - at 102:52, change the VERB 49 maneuver to UV in-plane scan attitude 202, 301, 320 by 102:59.

ACDR Roger. Change it to UVA in-plane scan - angles 202, 301, 320 by 102 plus 59.

CC-H Roger. That's after this 1000-meter course, and maneuver to out-of-plane attitude by 103:04.

19 06 08 CMP Houston, Apollo. We have a little problem here on getting data. We haven't asked him to turn off his beacon yet, because it's just impossible to see the reflector at this distance.

CC-H Understand.

CC-H And, Apollo, Houston. Down about 103:30 it calls for waste water dump; don't do that dump.

CMP Roger.

ACDR (Soyuz, this is Apollo. Now please turn off your beacons.)

19 06 55 SFE Roger. Turn the beacon ... off?

ACDR (Soyuz, this is Apollo. Please turn on your orientation lights.)

SFE Roger.

19 07 11 SFE Orientation lights.

ACDR (Thank you.)

ACDR Hey, Bo. Can you tell us whether they're getting data or not down there?

CC-H Experiment says we're getting data.

CC-H Apollo, Houston. It looks like you're still getting good data.

ACDR Amazing.

19 08 52 CMP Okay, Houston, is that enough sweep data for you?

CC-H I'll check with Experiments.

CC-H Apollo, Houston. We'd like you to continue.

CMP Okay.

CC-H And, Apollo, we'll probably lose you on ATS and not pick you up again until Vanguard at 103:13.

CMP Okay, Bo.

ACDR Do you want to give us a cutoff criteria on this data take?

CC-H Roger. I'll ask Experiments again.

CC-H And, Apollo, Houston. We'd like you to track the light there for a second, so we can see what the light looks like on our data and then be able to filter that out later.

ACDR Okay.

CC-H And as soon as you do that - -

CMP Now, that means you want to - -

CC-H - - you're ready to terminate the experiment.

CMP Okay. Do you want to - Never mind.

ACDR What I've been doing, Bo, is fudging on the orientation light to where I think the beacon is because I think that's where the reflector is.

CC-H Roger. What they'd like you to do would be to track the light for a bit so that perhaps they can determine something from that and later filter that from the data. And as soon as you're finished with that you're cleared to go on to the in-plane scan attitude.

ACDR I understood that.

CMP You mean this beacon light, Bo?

CC-H Roger.

19 11 34 ACDR Okay. I'm done tracking the light.

CMP Do you need any data on the beacon, too, Bo?

CC-H Roger. We've got enough. You can now go to the in-plane scan attitude.

CMP Okay. Roger.

CMP I'd be curious to know - could you see any data from that little red light?

CC-H We don't think it looked any different, but they're evaluating it.

Day 200

TAG Tape 200-10/T-55
Page 11

CMP Okay.

CC-H Apollo, we see you maneuvering, and you're going to
lose ATS. We'll see you at Vanguard at 103:13.

ACDR Okay.

DMP Okay, we're maneuvering, and we'll do the out-of-
plane maneuver at 103:04. 103 plus ...

19 13 41 CC-H Roger.

END OF TAPE

ASTP AIR-TO-GROUND VOICE TRANSCRIPTION

19 33 49 CC-H Apollo, Houston through Vanguard for over 7 minutes.
ACDR Roger, Bo.
CC-H If you people have a second, I'd just like to give you a little report, here. There's no writing required.
ACDR Go ahead.
CC-H Well, we'd like to all congratulate you on the TV pictures. They were just great. Sorry we bugged you so much about the settings, but we've been running them down here, again and again, of that undocking and the UVA stuff. Talking about the TV, we would like you to turn OFF the three TV POWER switches down there on 181 - if you haven't already done so.

19 34 26 ACDR Yeah, I got those OFF by the checklist and the AMPLIFIER to BYPASS.
CC-H Great. The 150 data take - 150-meter data take - really looked smooth. I don't think you dropped out of there for more than a few seconds. Perhaps you were always on. The PI thinks there may have been some reflection off of the Soyuz window that degraded some of the data, although he thinks that we did receive good fluorescence data on the 150-meter data take.
DMP That's encouraging.
CC-H The 500 meter was flown perfect, just as - as was the 150, and we received excellent data. The PI has, on his little report here, that it was just perfect. 1000 meters - we're still interpreting the data, and they're not sure whether they got data off of the retroreflector or not, but that's still to be seen. However, it did look like you were locked up on something. And so, you people flew it fine. We're still about 60 pounds above the experiment red-line, and so there still should be enough gas to do everything else in the mission that's - that's programed.

19 35 45 DMP Okay. Great, Bo. And you can thank old Roger Burke, Steve Grega, and Bob Anderson down there - that this thing came off right, because they sure did all the work to make it go.

CC-H Roger. I'll tell them.

ACDR Bo, we have one question. On this urine dump - prepare for urine dump - we can dump it out of the bags but, also, what about the normal use of Myrtle. Can that be used? Over.

CC-H Apollo, Houston. At the scheduled urine dump times, you can dump any urine overboard from wherever you get it.

ACDR Okay, (laughter) Bo. Thank you.

CMP And Bo, as long as nice words are being said, I'd like to say that this is - the spacecraft's really been running well. G&N is just perfect, and as we all know, the new docking system is flawless. This sure is a pleasant thing for us up here.

19 37 19 CC-H Roger. Thank you.

DMP Just for your info, we got into trouble in the start of both of those sweeps. The 150 - Vance was so fast getting into the EMP 31 that I hadn't stopped our opening rate yet, which is my fault. And the second one, we started the sweep burn in ACCEL COMMAND instead of in RATE COMMAND, which threw us out of attitude, obviously. I just knocked it off, and went back and started all over. That's probably where a lot of our fuel went.

CC-H Roger. You had us all excited here on the beginning of each one of those, but you recovered beautifully. And those sweep burns were just as if - they were drawn right over the - the nominal line.

DMP Everybody helped up here, too.

19 40 16 CC-H Apollo, Houston. There is 1 minute until LOS. We'll see you at Rosman at 103:39.

20 00 13 CC-H Apollo, Houston through Rosman for a little over a minute.

Day 200

20 01 01 CC-H Apollo, Houston through Rosman for just a few seconds. We'll see you again at ATS.

20 06 59 USSR (1441.)

20 07 11 CC-H Apollo, Houston. We have AOS, ATS.
USSR ... (after 2 minutes. 12, 400, right?)

20 07 47 CC-H Apollo, Houston through ATS. Over.
DMP Roger, Bo. Got you. Go ahead.
CC-H Roger. How are things?
DMP Oh, just fine. We - we were just breaking out the chow here and trying to cook it up.
CC-H When you get settled down, I've got a couple things for you. Most of them don't require any copying. Just tell me when you're ready.
DMP Okay. We're ready if you don't ... to write.

20 08 27 CC-H Okay. The first is about waste water. It seems that we're getting marginal on waste water, and we can't use potable water for cooling. And we suggest that once you get comfortable, you shut down the secondary loop and the pump, and we think with the cameras off and the power amp off, it should stay comfortable there in the command module. We don't think the secondary loop without the evaporator helps very much, and we think that the pump and the secondary loop actually adds heat. And we'd like to caution you - -
DMP Okay, well, we think - -
CC-H Go ahead.
DMP Go ahead.

20 09 11 CC-H Oh, we'd - just one little caution. We'd like to say that when shutting down the secondary evaporator, you've got to be careful to stay in the RESET position for about a minute, or the evaporator will flash-freeze.

20 09 30 DMP Okay. I think, Bo, the DM will probably, in my opinion, start cooling down, since we've undocked. At least, I think that's the case. It was pretty cold down on the Soyuz end, up until we docked, and I noticed it was pretty warm in there last night. Be interesting to see what it is by tomorrow.

20 09 49 CC-H That's good news. We also think, with all the cameras off now, and with the ATS power amplifier off, and things like that, that we're not going to have the heat load in the command module.

20 10 02 DMP True.

CC-H The worry here is that we're going to run out of waste water, and then we won't have an evaporator to use, and we'll be hot for an extended period of time.

DMP Copy.

20 10 23 CC-H I've got one thing for Tom Stafford. Gene Cernan talked to Weatherford, Oklahoma, today, and he found out there that everything is fine, and Tom's mother is very proud of what's going on in the Apollo spacecraft.

ACDR Ah, real good. Thank you. Give her our regards. Thank you, Bo.

20 12 29 CC-H Apollo, Houston. We'd like someone to inhibit the AC ROLL so that the AUTO RCX - AUTO RCS SELECT switches agree with the DAP.

20 12 43 ACDR Want the AC ROLL OFF.

20 12 45 CC-H Roger.

20 19 93 CC-H Apollo, Houston. Over.

ACDR Go ahead, Houston.

CC-H This concerns the waste water. We know that your gage is very noisy and ours is noisy too. But they've been plotting the average, and they feel that the waste water tank is now down to about 15 percent, or 9 pounds, and so we'd like you to not evaporate, if at all possible.

CC-H The secondary loop, that is.

20 19 36 ACDR Okay, secondary. Keep the primary on? Over.

CC-H Roger.

20 19 41 ACDR Okay, we got the secondary loop off now, Bo.

20 19 45 CC-H Roger. And we'd like you to shut the secondary loop totally down and turn the pump off, too.

20 19 53 ACDR We've got the evaporator reset and the pump is off.

CC-H Thank you.

CMP Bo, would you like us to close the potable inlet for a while?

CC-H Let me ask EECOM.

20 20 53 CC-H Apollo, Houston. We agree with you. We'd like you to close the potable tank inlet valve.

20 21 00 CMP Okay, Bo.

20 24 46 CC-H Apollo, Houston. We're getting ready to dump the VTR. You won't have any downvoice for about a half hour while we dump it.

20 24 54 ACDR All right.

20 51 16 CC-H Apollo, Houston. We're back with you for a few minutes until ATS LOS.

ACDR Okay.

CC-H I have a couple of items. Two of them are questions and one is a task. Is someone free who can answer the questions?

ACDR Go ahead. We're still eating. No problem.

CC-H Okay. One is, what was the relative brightness on the window light - of the window light on Soyuz on the 150-meter UVA with respect to the retroreflector?

ACDR Deke's off the headset now. He's the only one that can answer that.

CC-H Okay. The other one is also on the UVA. And the request is, after you finish your dinner, we'd like someone to go down and open the cryo freezer cap, and then replace the cryo freezer cap. And the reason we're doing that is we think that there may be some ice buildup. And we'd like to break it loose so that it can be opened at a later time.

20 52 39 CMP Tom would like to know how long you want it open, Bo.

CC-H Roger. Just long enough - -

DMP Bo, this is Deke.

CC-H Apollo, Houston. Just long enough to open it, wait a few seconds, and put it back on.

DMP Bo, Deke. Are you trying to call me?

20 53 05 CC-H Roger, Deke. We had two questions on the UVA. The first was, what was the relative brightness of the window light on Soyuz on the 150-meter UVA with respect to the retroreflector?

DMP Well, the retroreflector was brighter. But I was very surprised that I could see that window light down there, and I couldn't see it well after the 150. It was dimmer - -

CC-H Deke, I'm afraid you were broken up. We heard you say that it was dimmer, but after that we couldn't read what you said.

DMP I said it was obviously dimmer. It's difficult for me to evaluate numerically how much dimmer. I'd say maybe 4 or 5 times. However, we had a pretty good cal, I think, and I was locked on pretty well to the reflector, and I would guess there might have been a degree displacement down to the window. So I would hope that the good data you were getting is coming from the reflector instead of the window.

20 54 27 CC-H Roger. Understand. And were you able to keep the COAS centered on the retroreflector while the Soyuz test meter indicated 2.5 volts?

DMP That's affirmative.

CC-H Okay. And - -

DMP It's either that or a cal mark.

CC-H Roger. Do you have any other comments, while they're still fresh, about the UVA?

20 54 53 DMP Well, as far as the data takes are concerned, they went pretty good, I think. We had the trajectory pretty well accurate. Initial conditions were all right. Sweeps went well. And we were locked on pretty good all the way through. 500 - ... was surprised that it was pretty easy to see the reflector. 1000 meter - -

20 55 19 CC-H Deke. Do you read?

20 55 27 CC-H Apollo, Houston.

20 56 59 CC-H Apollo, Houston through Orroral on VHF for about 2 minutes. I'm sorry we had a little bit early LOS there. If we - if you'd like to continue, go ahead.

CMP Stand by 1, Bo.

CC-H Roger. There's only about 1 minute left until LOS now. We'll see you at Vanguard at 104:47.

20 57 36 DMP Okay, Bo. Vanguard. ... lose you.

END OF TAPE

Day 200

ASTP AIR-TO-GROUND VOICE TRANSCRIPTION

21 07 03 CC-H Apollo, Houston. Hello at the Vanguard for 5 minutes. How y'all doing?

CMP Just fine, here, Dick. How are you?

CC-H Doing real great. Sounds like you guys have had another good day.

CMP Yes, it's been a big day and a lot of fun.

CC-H Well, it sure sounded like that down here. It's a real pretty day outside in Houston.

CMP That's right, it still is day - daytime in Houston. Seems to us like it ought to be nighttime over there.

CC-H Apollo, Houston. Two switches on panel 230 we'd like you to check. First, we would like the UP TELEMETRY switch to DIRECT and also the UV ABSORPTION POWER to ON. It's - that second one is listed in the Flight Plan.

ACDR Okay.

21 08 07 ACDR We have the UP TELEMETRY to DIRECT and the UV ABSORPTION POWER, ON.

CC-H Okay, Tom. Thanks a lot.

CC-H Okay. Now, Tom, while you're down there. We'd like UP TELEMETRY back to UP TELEMETRY; that's center. We need it to get in a quick command there.

21 08 27 ACDR Okay. I have UP TELEMETRY, center.

CC-H Okay. Thanks.

DMP Hey, Dick. The last time we talked to Bo, I guess we lost comm in the middle of the transmit there. But I don't have any idea where we lost it. Do you think you guys have any specific questions on the UV you wanted to ask me?

CC-H Okay, Deke. I tell you what, why don't we - I'm sure the Experiment Officer is going to be listening

to that tape, and so he'll know where you lost it. And if we need any more information from you, we'll write up a mission note and ask you a little bit later. Okay?

DMP Okay.

CC-H Apollo, Houston. We're 1 minute from LOS. I'll give you a call at Goldstone at 105 plus 05.

21 11 21 CC-H Apollo, Houston. I understand I dropped out. We're 30 seconds from LOS. Goldstone at 105 plus 05.

21 24 39 CC-H Apollo, Houston. Goldstone for 6 minutes.

ACDR Houston, Apollo.

CC-H Go ahead, Tom.

DMP Okay, this is Deke. We had you once there. We lost you apparently.

CC-H Oh, okay. Yeah, I gave an AOS call and didn't hear anything. We still have about 5 minutes here at Goldstone.

DMP Roger.

DMP Okay. We're finishing up the food here and then the leg measurements, fluids levels, and all that good stuff. Tom's been down - working on the freezer. He's got a couple of problems there which we were just about to look at. ...

CC-H Roger.

ACDR Yes, Dick. You know, I was going to open the freezer as requested. Just open it up and put her right back. You were afraid ice was forming. When I started to turn the cap, you know, from the lock position over, I could tell it had a lot of kind of memory in the system. It was very hard. I finally got it over to the place. And now I've had to brace my feet against the bulkhead, take both hands, and I'm just barely starting to move it. And the way that foam's formed, I'm afraid I'll just pop the top right out of it. So we're going to take it very easy with it.

CC-H Okay. Copy, Tom. And if you - why don't you guys just keep working on it and keep us advised ...

ACDR Okay. Yes. Well, we're working very gently up here, but it's really stuck in the bottle.

CC-H Roger. Understand.

21 27 07 CC-H And, Tom, Hous - Tom, Houston. We thought that might be the case because of the things we were doing with the cabin pressure last night. We thought you probably would have some trou - have some trouble. And that's the reason we wanted to go ahead and crack it this afternoon and see how much trouble you would have, or if you could get it off.

ACDR Okay. I'm working on it right now.

CC-H Okay. Fine.

ACDR ...

CC-H Apollo, Houston. Yes, go ahead.

ACDR ...

CC-H And, Tom, Houston. For some reason, about the first couple of minutes of this pass, we could barely hear either you or Deke - Deke - I was - then all of a sudden we were hearing you loud and clear, and Deke is still kind of down in the mud. He might reposition the mike if he gets a chance.

DMP Okay. How do you read now?

CC-H That's better, Deke. Thanks.

DMP Okay.

21 28 43 ACDR Okay. I got the cap - cap (cough) - I got the cap off, then I recycled it just real fast a couple of times. It's lots easier.

CC-H Okay. Fine, Tom. Thanks a lot.

CC-H Apollo, Houston. We're 1 minute from LOS Goldstone; Newfoundland in 5 minutes from now.

21 30 25 ACDR Okay.

21 38 53 CC-H Apollo, Houston through the satellite. How do you read?

CC-H Apollo, Houston. How do you read?

CC-H Apollo, Houston. Through the satellite, we've got a lot of loads to get in this pass. We'd like ACCEPT.

ACDR ...

CC-H Tom, we'd like ACCEPT. We've got a - Guidance Officer's got a whole bunch of loads he needs to get up during the pass.

ACDR ...

21 40 58 ACDR Okay. You got it.

CC-H Roger. I can - I can hear you keying. I can't hear you - what you said, but I do see we have ACCEPT. Thank you much.

CC-H Apollo, Houston. One thing on configuration, we see that RHC number 2, DIRECT POWER is ON. We think that probably ought to be OFF. And also, we'd like to confirm that Deke has reconfigured the - the various comm switches that are listed at about 105 hours.

DMP Okay, Dick. We're still apparently trying to get regrouped around here; eating, et cetera. We aren't quite with you yet. Stand by.

CC-H Okay. There's no hurry. We - we thought you probably were with us. No problem.

21 47 02 DMP Okay, Dick. We've got the comm reconfigured. What happened here is, we kind of skipped ahead and got on with the leg volume measurements. In fact, Tom and Vance are up in the DM doing that now, so we're a little spastic here.

CC-H Okay. No problem, Deke. Thanks for letting us know.

DMP Hey, Dick. You guys know when Soyuz reenters?

CC-H I'm sorry, I heard a question about Soyuz, but didn't copy. Say again.

DMP Yes. Do you know when they reenter? Is it tomorrow or later?

CC-H Oh, let me get you a time. Stand - stand by just a second.

DMP It's no big deal; we're just curious.

CC-H Roger. Understand.

21 49 33 CC-H Apollo, Houston. Deke, Soyuz will be up just something over another 24 hours. The time that they'll be coming down is 141 hours and 40 - something minutes, and that's about 5 a.m. - central daylight time here in Houston. And according to Flight Plan, you guys will be in the middle of a sleep period.

DMP Oh, okay. Thank you.

CC-H Apollo, Houston. I'm certainly in no hurry, because I don't know how busy y'all are at the moment. But, Tom, I can brief you on what we're uplinking into the computer whenever you have a chance to lis - listen. And also, I've got an update for the mapping pass you're going to do here in a couple revs, whenever you can copy that. No hurry on either one. We still got about one-half hour left on this ATS pass.

DMP Okay, Dick. I'll have him call you when he gets back down. We had a small disaster here. We lost the leg measuring tape.

CC-H (Laughter) Okay, let me know when y'all have a chance to listen. No - no hurry.

21 54 36 DMP Okay.

CMP Houston, Apollo.

CC-H Apollo, Houston. Go ahead.

CMP Dick, we're - we're just in the midst of some leg measurements, and I'm finished with mine. I can copy down anything you have.

CC-H Okay. There were - there was two things I wanted to tell you, Vance. One, I wanted to brief you on what we were doing to the computer. I can talk about that real - real fast here. What we're doing is we're uplinking the raster scan EMP; we're giving you a new orbital REFSMMAT; we're giving you a good state vector; we're fixing some DAP constants and one - one little oddball bit that was set during the UVA today; and - and we're also going to give you a high-gain EMP. And the - I do have a update to the next mapping pass. It's in the Earth Obs book.

22 02 35 CMP Okay. Stand by and I'll get it.

CC-H Okay.

CMP Okay. Ready to copy.

CC-H Okay, Vance. This is on mapping pass M-6 and I've got a start and a stop time update for you. The start time is as follows: 107:41:30; stop time, 107:53:30.

CMP Rog. Rev 64, M-6 mapping pass: start time, 107:41:30; stop time, 107:53:30.

CC-H Okay. While you're at it, if you can get out - if you've got the Flight Plan there, I've got a - at the tail end of today at about 108 hours and 40 minutes, I've got a couple of deletions there.

CMP Okay. Ready to copy.

22 04 23 CC-H Okay. It's real simple, Vance. In the AC's column at about 108 plus 40, where it says, "Verify cabin vent QD installed" and the "WASTE STOWAGE VENT to VENT" and also that note below that, delete all of that; we're not going to have to do that tonight. In other words, delete starting at "Verify cabin vent QD" all the way down through the note that says the time of "109 plus 29."

CMP Okay. That was - Oh, I see; I see where the note is. Okay. That's all - that's deleted from "Verify cabin vent QD" - through the following three steps after that.

Day 200

CC-H That's right, Vance. And that's all I've got right now. Thanks a lot. We still got about another 20 minutes here, and I'm standing by.

CMP Okay. Very good. And - with - if it's okay with you, we didn't turn off VHF FM the appointed time. We thought - you probably wouldn't mind if we left it up until we're out of range of Soyuz, or until sleep starts.

CC-H Okay. Thanks for letting us know, and I don't think we'll have any objection to that, but we'll talk about it here for a second. And keep the Flight Plan out just a second. I think there may be one more correction I have. Hang on just a minute.

22 05 55 CMP Okay.

CC-H Vance, Houston. I've got another correction in the Flight Plan in your column at 108 plus 32.

CMP Okay. Go ahead.

CC-H Okay. All I want to do there is delete the "rewind" out of that "Configure DSE" loop. And the reason we're doing this is we're planning on having you stop the DSE there, and then we're going to dump the raster scan data down here real quick - so we can take a look at it tonight.

22 06 44 CMP Okay, the "Configure DSE stop/rewind and command reset," I deleted "rewind."

CC-H That's right. Okay. Thanks a lot. I'll talk to you later.

CMP Okay.

CC-H Vance, Houston.

CMP Go ahead.

CC-H Hey, Vance, Bob Overmyer called from over at Moscow. The Soyuz crew has already gone to bed tonight, so we'd suggest turn the VHF FM to OFF now. But we certainly don't see anything wrong tomorrow, when you get up, to turn it back on and monitoring that

frequency during the day. Also we've got all the uplinks up, and you can go back to BLOCK; the computer's yours. And one other comment that doesn't require any action by you now, but down during the presleep period, there's a note about updating the lift-off time, and be advised we are going to update the lift-off time tonight by about 2 minutes.

22 10 30 CMP Okay. In other words, you're just - What do you mean lift-off time? You're just adjusting GET, is that right?

 CC-H Yes, yes, that's - that's right. We're - It's just an uplink to it - to up - update the CMC - -

 CMP Acquisitions.

 CC-H That's right.

22 10 55 CMP Right. Okay.

22 25 56 CC-H Apollo, Houston. We're a couple of minutes from ATS LOS. I'll give you a call at Orroral Valley in 4 minutes. See you there.

 CMP Okay, Dick. See you.

 CC-H Okay.

 CMP Just saw a beautiful sunset, or sunrise.

22 26 09 CC-H Roger.

END OF TAPE

Day 200

ASTP AIR-TO-GROUND VOICE TRANSCRIPTION

22 30 50 CC-H Apollo, Houston. Orroral Valley for 3 minutes.
CMP Okay.
CC-H And, Vance, Houston. Any time you have a chance, I'm not in a hurry because we've still got a couple of hours, but I've got an update to the raster scan time and a couple of comments. And that's in the Flight Plan at 108 hours and 25 minutes.
CMP Okay.
CC-H And, Vance, we do not need to get this up this pass if you're busy. No problem.
CMP Okay, I've got it here.
CC-H Okay. The time in the Flight Plan is 108 plus about 25. It's in the AC's column. The raster scan time should read 108:25:42.

22 31 50 CMP Okay. The new time is 108:25:42.
CC-H Okay. And right below that, Vance, we'd like to change - see that VERB 49 maneuver, and right after the VERB 49 maneuver, there's a parenthetical statement that says "By 108 plus 50." We'd - we'd like you to delete that and replace the "By 108:50" to read, "Not before 108:32."

22 32 17 CMP Not before 108:32. Okay.
CC-H Yeah, and the reason for this is, is that'll give you - that'll make sure that the EUV raster scan EMP is complete prior to the VERB 49 maneuver, which would - And we don't want to do the VERB 49 on top of it. Plus, it starts the VERB 49 maneuver to SI, in order for us to get as early a possible ATS acquisition so we can get the raster scan data down.
CMP Okay.
CC-H Okay, we're about a minute from LOS. Hawaii comes up at 106 plus 27. And incidentally, I meant - meant to tell you awhile ago, but the reason we're interested

in getting this raster scan data in a hurry, is - is since we didn't do a raster scan the other day, as you recall on - I think that was the second day, we want to take a look at this and - and make sure if there are any minor pad changes for tomorrow's work, we can get to work on them as soon as we can.

CMP Okay; understand.

CC-H Okay. See you at Hawaii.

CMP Righto. Out.

CMP Aloha.

22 33 27 CC-H Aloha.

22 47 52 CC-H Apollo, Houston. Hawaii for 7 - 6 minutes.

ACDR Roger, Dick. Understand.

CC-H Roger, Tom. And I don't have anything for you here. We're standing by, we - I'm assuming that you haven't started - we don't see any time on the VTR so I'm assuming that that setup is still going on.

ACDR On the VTR?

CC-H Well, I was looking at these demonstrations that I'm assuming Deke is setting up to put on the VTR.

ACDR Yeah. Deke's working that right now.

CC-H Okay. No problem.

CC-H Apollo, Houston. We're 1 minute from LOS Hawaii. We'll see you when you get locked up on the satellite.

22 53 12 ACDR Roger.

23 11 23 CC-H Apollo, Houston through the satellite. How do you read?

ACDR Loud and clear. How do you read us?

CC-H I read you loud and clear, Tom. I've got a couple of comments for you. First of all, just wanted to

tell Deke that we would like to get this furnace experiment work done about on time and so if he's running a little bit late on the demos, I don't know if he is or not, we'd like him - for him to interrupt that, do the furnace work, and then go back to the demos. Also, we're having - on the UVA experiment that's running now, we've got an indication that either we've got a transducer problem or possibly a problem with the N₂ lamps. And so I've got a change to make for the UVA shutdown that you're going to be doing here in a few minutes. It's on page 10-7 of the Joint Ops Checklist, and that's - those pages - page 10-7, the Joint Ops Checklist. The pages are also located in the back of your Experiments Book.

23 12 32 ACDR Okay. Well, Deke's running late on that foaming. It takes a lot to set all those little things up in zero g, lots more than it did in one g. And I'll tell him about the furnace.

 CC-H Yeah - -

 ACDR And we'll go look at this Joint Ops Checklist.

 CC-H Okay. Yeah, we just wanted for him to - we figured he was running a little bit late, but that's okay. We just wanted to let him know to stop, do the furnace, then go back to it.

23 14 41 ACDR ... Houston. How do you read?

 CC-H Loud and clear, Tom.

 ACDR Okay. I've got the 10-7. You said there's any mod to it?

 CC-H Yeah, it's very minor. What we want you to do is the following, Tom. First, we want you to complete the UVA shutdown there at the top of the page. After the shutdown is complete and prior to doing the UVA stow, what we want you to do is turn the UV ABSORPTION LAMPS and POWER to ON and leave it ON for 30 seconds and then turn the LAMPS OFF and the POWER OFF. And then go ahead with the stow. And this will put some data on the recorder or real time if we happen to have a lockup at that time, and give us some data to look at, see if we've really got a lamps problem or not.

ACDR Okay, let me read that back. At the time, do the top paragraph, UVA shutdown, then turn the UVA POWER and LAMPS ON for 30 seconds, then OFF. Right?

CC-H That's correct. After the shutdown procedure and prior to the stow procedure. Thank you much.

23 15 44 ACDR Real good. Thank you. Deke will knock off on that and start on the furnace checklist.

CC-H Okay. Real fine. And incidentally, we've been watching you guys load P20 and it looks good to us.

ACDR Okay.

23 16 05 CMP Okay. And we're in the maneuver, as you know.

CC-H I'm sorry, Vance. Say again.

CMP We're in the roll maneuver now.

CC-H Roger. As you probably know, we are going to lose ATS LOS here during the maneuver for about 5 minutes, and I'll call you when we get locked back up.

ACDR Okay.

23 17 27 CC-H Apollo, Houston. Just a reminder. It's not printed in the Flight Plan, but the acquisition after we lose comm and get rolled all the way around on the UVA, the acquisition angles up there above for the first acquisition you just made are still good.

CMP Okay.

23 26 49 CC-H Apollo, Houston. We're locked up again through the satellite.

ACDR Real good, Dick. We're about to end roll.

CC-H Okay.

23 27 38 ACDR Dick, if you want me to, I'll call out these steps.

CC-H Okay, Tom. Since I don't have much else to listen to, and it will help us, why don't you?

ACDR Okay. UVA ABSORPTION LAMPS, OFF -

23 27 51 ACDR MARK. UVA POWER, OFF -

23 27 54 ACDR MARK. UVA COVERS, CLOSE -

23 27 57 ACDR MARK it. Barber pole - and gray.

CC-H Okay.

ACDR Now I'll go - I'll go turn the UVA POWER ON and the LAMPS ON for 30 seconds.

CC-H Okay.

23 28 22 ACDR POWER, ON, and LAMPS, ON.

CC-H Okay.

ACDR Stand by. LAMPS, OFF, POWER, OFF -

23 29 09 ACDR MARK it.

CC-H Okay. Thanks very much, Tom.

ACDR Okay. If you're all finished, we're going to wait for a while to drag that cable through. We'll do that later.

CC-H Okay, fine. Thank you very much. We'll take a look at the data and let you know.

ACDR Okay.

23 36 38 ACDR Houston, are you reading our DSKY?

CC-H Negative, Tom. We're dumping data, and so we're not getting live downlink now.

ACDR Okay.

ACDR Vance is doing the P52.

CC-H Okay. We're not getting the data. So when you get it, just read it down to me, please.

ACDR Will do.

ADCR Okay, Dick - -

CC-H Tom, I'm standing by to copy, but you're breaking up. Say again.

ADCR Roger. How do you read now?

CC-H Loud and clear now.

23 38 02 ADCR Okay. Star 02 - star 02, 07; NOUN 05, all zeros; plus 50, minus 81, plus 20; torqued 107 plus 17 plus 17. Over.

CC-H Roger; Tom. Copy. Thank you very much.

23 40 12 CC-H Apollo, Houston for Tom. Tom, for your information, that little test that we ran on the UVA - that you ran for us, verified that that N₂ lamp problem was not a lamp problem but an instrumentation problem. And not only that, when you did it, it resynched the timing in there and fixed the telemetry point. So it worked well and no degradation to the experiment.

ADCR Okay. Real good. Thank you, Dick.

CC-H Roger. Thank you.

23 45 20 CC-H Apollo, Houston. We still don't have data, so we really can't monitor how you're coming along. I just wanted to know how you were doing on the P52 option 1?

CMP Not very well, Dick. You know, we're maneuvering like mad here, and it was a real mistake to make an option 1 while we're maneuvering at this rate. If there wasn't so much light lost in the telescope, it would be no problem. But it takes quite a period of dark adaption to see any stars, and I can't even pick out Rigel yet. So I know I'm off several degrees just due to movement while the thing was posttorquing.

23 46 10 CC-H Okay. What we'd recommend you do then is go ahead, and - we only have about 7 minutes of nighttime left - we'd recommend stopping the maneuver and be sure and get the option 1 because that's most important, and - and then start the maneuver again.

CMP Well, that's not the problem, Dick. It isn't a problem of having to stop the motion; the problem is that while the posttorquing was going on, the spacecraft was moving and the platform was frozen, and auto optics is no help at all now.

CC-H Roger.

CMP I'd suggest we just maybe press on since we only have 7 minutes, and let me go ahead and do the Earth obs, and then maybe the next night pass try to tweak out on a good P52 option 3.

CC-H Okay. Stand - stand by just a second, please.

23 47 22 CC-H Vance, the problem that we have looking at the Flight Plan is we just will not have time to do it during that next night pass because EUV raster scan starts almost right there at darkness itself. And we really want to get the raster scan since we missed the one the other day and - -

CMP Okay. Well, I'll tell you how bad it is. I don't know if this telescope has more light loss than usual. It's not anything to compare with the simulator. And in my whole telescope field of view right now, with the dark adaption I've got, I can see one star.

CC-H Roger.

CMP Oh, I can see two now. I'll try.

CC-H Okay.

ACDR Yeah, Dick. Look at the way they compress things on the timeline here to make sure that one has to follow another. It's really success oriented. And to me, they've just crammed too much into this one period here. Also, this - doing this rate while - rate like this is - what you can see through the telescope is kind of bad.

CMP That works great for an option 3, but it's very poor for an option 1.

CC-H Roger. I understand, and we're talking to see how we can help you out.

23 50 30 CC-H Apollo, Houston. On panel 230, we'd like the UP
TELEMETRY switch to RELAY.

END OF TAPE

Day 201

ASTP AIR-TO-GROUND VOICE TRANSCRIPTION

00 01 53 CC-H Apollo, Houston through Orroral Valley on VHF.

00 02 31 CC-H Apollo, Houston through Orroral Valley on VHF.

CMP Roger. Loud and clear, Dick. We're in the middle of this vis obs pass right now.

CC-H Roger. If anyone is free, on panel 230, we'd like the UP TELEMETRY switch to DIRECT.

CMP Okay. Tom's getting that.

ACDR How do you read me, Dick?

CC-H Loud and clear, Tom. How me?

ACDR Okay. Lots better now.

00 03 37 CC-H And, Apollo, Houston. We're not going to have another pass prior to the next Newfoundland or ATS AOS. We want you to do the raster scan per the checklist. And following the raster scan, we'd like to pick up another P52 option 3. And will - we will reconstruct the data after the experiment run.

ACDR Okay. If you can do it that way. We said we'd stay up a little extra in this sleep period - -

00 04 26 CC-H Apollo, Houston. On panel 230 we'd like the UP TELEMETRY switch back to center, UP TELEMETRY. And negative, Tom, we do not want to - we do not want to keep you up after the end of the sleep period.

ACDR Okay.

ACDR UP TELEMETRY, center.

CC-H Thank you.

00 05 00 CC-H Apollo, Houston. We're about to go LOS at Orroral Valley. See you on the ATS.

00 42 21 CC-H Apollo, Houston. Bermuda for 7 minutes.

CMP Roger, Dick.

CC-H And, Apollo, Houston. I was - dropped out on - LOS during the middle of your Earth obs, and I was - just wanted to make sure that you got the message that I had. What we'd like you to do is go ahead and do the EUV raster scan on the times in the checklist. And then after you have maneuvered to the so - to the sleep attitude and still in that night pass, do a P52 option 3. Over.

CMP Okay, Dick. Understand.

CC-H Okay. And then - -

CMP I - I think that will be a good opportunity to do that P52. It may take about 15 minutes of dark adaption before I can do it. And that'll give me enough time.

CC-H Okay, real fine. And then we'll be able to reconstruct the data after you do that option 3. And we don't think we'll have any problems.

CMP Okay. I'm glad to hear that. And the other possibility: I could have put a square search out for that star, but the - for the short time that I had. But the danger is there that if you can't identify it in the telescope, you don't really know that you have the right star ...

CC-H Roger. And stand by, Vance. I'm get - getting another input. Stand by.

00 45 20 CC-H Apollo, Houston. The DAP is not set up correctly. What we need to do is do a VERB 48 and set up the register 1 per the Flight Plan at 61101, even if it delays the raster scan start. And then we'll - -

CMP Okay.

CC-H And then - then we'll - After you do that, then we'll have to trim - I'm sorry. Just do what I told you.

CMP Roger.

ACDR That was 61101. Right, Dick?

CC-H That's affirm, 61101.

00 46 23 CMP Advise - way back, we had to put these phony numbers in the DAP too. You might check them later under NOUN 47, but they're close.

Day 201

CC-H Okay.

00 47 06 CC-H Apollo, Houston. Your attitude looks good to us now, and we're not too late. We can go ahead and start.

CMP Okay, we'll start right - -

CMP Okay, we ENTERed on the 82720 - -

CC-H Okay. Thank you.

00 47 27 CMP - - on VERB ... 31.

00 48 23 CMP Dick, how long do you want this raster scan to run?

CC-H 6 minutes, Vance. And we're about - you'll get a flashing "37" when it's - when it's done, and you're - and after that, you can go ahead and do the next maneuver. We're about 30 seconds from LOS, and Ascension comes up at 108 plus 40.

CMP Okay.

CC-H And, Vance, one reminder. We'd like you to acquire the ATS as soon as you get in attitude.

00 48 54 CMP Okay.

00 59 53 CC-H Apollo, Houston. Ascension for 4 - for 3 minutes.

01 00 37 CC-H Apollo, Houston. Ascension for a couple of minutes.

ACDR Okay, Dick. Read you loud and clear. And we're maneuvering now to the sleep attitude.

CC-H I didn't quite copy, Tom. I understand that you're now maneuvering to the sleep attitude. When you get in the attitude, we'd like you to get a quick ATS lock and then do the P52. If you should have any problem though, getting the ATS locked up, don't delay the P52 too long because that's what we really want.

ACDR Okay.

CMP Very good.

01 01 55 CMP Houston, Apollo.

CC-H Go ahead, Vance.

CC-H Apollo, Houston. Go ahead.

CMP Hey, Dick. We're about halfway through the night pass, I believe, and this is a very slow maneuver rate. I'm wondering if you wanted us to stop here and do that P52, since it's important, and then continue on. Or - because you know, if we don't get through this until the end of the night pass, we might slip another rev on getting that P52.

CC-H Okay, stand by just a second, Vance.

01 02 35 CC-H Apollo, Houston. Vance, we'd like you to go to the sleep attitude. If you'd like to go to a - at a higher rate, either by doing it manually or - or increasing the rate in the DAP, that's fine with us. We're about 20 seconds from LOS, and we'll see you when you get us locked up on the ATS.

01 02 51 CMP Okay.

01 13 36 CC-H Apollo, Houston. In the blind, we think you ought to be able to acquire the ATS now.

01 14 50 CC-H Apollo, Houston. In the blind, we're seeing some activity on the ATS. We think you ought to be able to acquire it now.

01 20 29 CC-H Apollo, Houston through the satellite. How do you read?

ACDR Loud and clear.

CC-H Roger, Tom. How are you doing?

ACDR Slow.

ACDR Stand by, we'll talk to you in a minute.

CC-H Okay, Tom.

01 21 51 ACDR ..., Bo.

01 23 26 ACDR Houston, Apollo.

CC-H Go ahead, Tom.

ACDR Okay. Vance got it. And - you ready to copy?

CC-H Roger, Tom. We want - we watched you do them, so we have the data. Thanks very much.

ACDR Okay.

CC-H And, Apollo, Houston. We got behind on our uplinks because of all this. And now that you're in P00, we'd like ACCEPT, and we'll give you - we'll finish them up.

ACDR Stand by. Vance wants to do a check here.

CC-H Okay; fine.

CC-H And, Tom, Houston. When you - when one of you guys get - gets around to it, we'd like somebody to - or like Deke to do the furnace ops that's listed up there at a little after 108 hours.

01 24 27 ACDR Okay, I'll - yeah. This whole thing - they've really jammed this time line on us. Everything is running behind time, and either - one of the three of us will get it. Okay?

CC-H Understand, Tom.

ACDR Okay. You got P00 and ACCEPT and the star checked.

CC-H Okay; real fine. Thanks much.

DMP Dick, how do you read?

CC-H Loud and clear, Deke.

DMP Okay. I finished the demos, and I was supposed to give you some data on - on the foaming one - the color or liquid crystals. Ready to log it on page 1-71 in the Experiments Checklist?

CC-H Stand by. Just a second, please.

DMP Okay.

01 25 52 CC-H Okay, Deke. Go ahead.

DMP Okay. Number 1 is a dark blue.

CC-H Okay.

DMP Number 2 is green.

CC-H Okay.

DMP It is a green green. Number 3 is a dark green.

CC-H Okay.

DMP And number 4 is a kind of a dark reddish brown.

CC-H Okay. Real quickly: 1 is dark blue, 2 is green, 3 is dark green, 4 is a dark reddish brown.

DMP That's affirm.

01 26 28 CC-H Thanks a lot, Deke.

DMP Right. Our old bathroom up there is also all blue-red at this point.

01 26 59 CC-H Deke, Houston. You broke up on that last transmission. If it was important, say again, please.

DMP It really wasn't. I was just commenting that we had a lot of blue and red dyes associated with those experiments, and our bathroom up there has been repainted with them.

CC-H I see. Okay. Copy.

01 27 58 CC-H Apollo, Houston. Two things, one on configuration on panel 400, the VTR. We would like the VTR POWER to ON and TELEMETRY POWER to ON so we can do the dumps tonight. Also, if you guys would like to activate the - to turn on the secondary coolant loop pump and activate the - the evaporator here for a few minutes before sleep time, you could get a few minutes worth of extra cooling. And I'll call you at our last pass tonight, which is Guam, and get you to turn it off.

01 28 56 CMP Houston, Apollo.

CC-H Go ahead, Vance.

CMP Okay. We've got the water boiler running and advise that it looked like that star was only or - the stars were only a couple of degrees away from where they should be. But after about 10 minutes of dark adaption, I could see the first two that I got, and the third one that I checked on, I could only see in the sextant. So that's just to give you an idea of the problem on how we have to depend on auto optics with this particular light loss.

CC-H Roger, Vance. Copy. Just at about the time - and incidentally, Vance, you were just about coming into li - into daylight at about the time you were working on that last star, so I'm sure it was even - even harder. And we're sorry for all the confusion and the crowding on this, but in the end it worked out real fine. Thank you very much.

01 29 59 CMP Okay. Glad if it all worked out.

END OF TAPE

Day 201

ASTP AIR-TO-GROUND VOICE TRANSCRIPTION

01 30 16 ACDR Okay, Dick. The old crystal growth has been activated, and we'll go to work on your furnace.

CC-H Okay. Real fine.

CC-H Apollo, Houston. One other comment. The MCC-Moscow overheard our conversation about the - about the VHF in the morning. It turns out that the first couple of hours after you're up, they're going to be very busy, and they requested that we not turn the VHF FM on until 119 hours. I've made a note in my checklist down here, so that you don't have to. And at that time, I'll give you a call; and after that time, you can turn it on and leave it on for the rest of the time.

CMP Okay. Very good. We'll have it off, and just wait until you let us know.

CC-H Okay.

01 32 34 CC-H Apollo, Houston. We got about 5 minutes left in this ATS pass. EECOM has been noticing for the last several minutes that the O₂ flow is high, and we were not sure what the cause of it was and wanted to check.

CMP Okay. Well, we were just using our waste management system, I think, Dick.

CC-H Okay. I understand.

CMP In - in conjunction with the purge.

01 34 05 CC-H Apollo, Houston. A while ago, I read up a change to Vance to delete the waste stowage vent purge this evening. So, we'd like to - I thought I'd got that up; sorry about that - and we'd like to get the purge terminated.

CMP Sorry, we were all off the line. Please repeat.

CC-H Oh, okay, Vance. We were a little confused about your last comment about the purge, because that was what I'd read up to you, oh, an hour or so ago to delete in the Flight Plan. If the purge is going on, we'd like to get it terminated.

CMP Okay. Stand by 1.

CC-H Okay. And - -

CMP Right. Okay. Right. Agreed.

01 34 53 CC-H Roger. Okay. In the presleep checklist, there's a couple of things. Any time you can give us a VERB 74, we'd appreciate it. Also, we're - also, we need a readout on the battery volts. And, also, tonight, the G&C would like a readout on the RCS quad percentage quantities.

CMP Okay. I can give you all those things right now. If you're ready for the VERB 74, I'll send it.

CC-H That's affirm, Vance. We're ready.

01 35 31 CMP Okay. It's in. Okay, other things: BAT C, 37 volts.

CC-H Okay.

CMP BAT A, 32; BAT C, 37; pyro BAT A, 36.9; pyro BAT B, 37 volts. And now for the quads.

CC-H Roger, Vance. And we're a couple of minutes from ATS LOS. We'll see you at Guam, so keep on reading, please.

CMP Roger. Okay. Quad A, 76; quad B, 92-1/2.

CC-H Okay.

CMP Quad C, 82-1/2.

CC-H Okay.

CMP Quad D, 89.

CC-H Okay, and, also, we need the PSM, please.

CMP Roger. 14-1/2.

CC-H Okay. Fine. I got them all. And Guam comes up in 5 minutes. I'll call you there.

01 36 52 CMP Okay, Dick.

01 42 13 CC-H Apollo, Houston through Guam for about 6 minutes.

CMP Roger. Loud and clear.

CC-H Roger. And, Vance, this is the la - I have a feeling that you guys are running late and - and - may be up for a little while; but, at any rate, this is our last scheduled pass for this evening, and I've got several items that I wanted to pass up to you just - that I need to get up. And if I can get them up here, we won't have to use another pass.

CMP Okay, fine. Go right ahead. I think we'll be - we're getting in pretty good shape here.

CC-H Okay. One thing, somebody might be getting out the Updates Book because I've got a change to - a couple of T_{ig} times in there for the block data. And you can let me know when you've got that in hand. We want to load the DAP register 1 for the Flight Plan at 6 plus four 1's; 61111. After that, we want to do - PRO through the VERB 49 to trim the sleep attitude and make sure plus the sleep - presleep checklist, that the optics are zero and the power off.

01 43 39 CMP Roger, Dick. We've got the DAP loaded. And what would you like in VERB 47 - or NOUN 47?

CC-H Excuse me, you may have misunderstand [sic] me. We just wanted you to trim up the sleep attitude by going through VERB - doing a VERB 49 trim maneuver.

CMP Roger; I understand. NOUN 47 is inaccurate. Sometime, we'll have to get an update from you. But that can wait.

CC-H Okay, good. Yeah, we'll - I will.

CMP Okay.

CC-H One other thing I forgot to tell you a while ago. The computer is yours, and you can go to BLOCK.

01 44 21 CMP Okay. BLOCK.

 CC-H Okay, another thing is, here at Guam, we want to be sure and get the secondary coolant loop turned down, so we want to deactivate the evaporator and turn the pump off.

 CMP Okay, that's in work.

 CC-H Okay. The - you have - we've loaded up you a new lift-off time, so we'd like you to sync the mission timer.

01 44 50 CMP Okay. We'll sync that with NOUN 65.

 CC-H Okay, and stand by just a second.

01 45 01 CC-H Apollo, Houston. We'd like you to keep the secondary coola - coolant loop pump on until you've deactivated the evaporator and then the pump off.

 CMP Okay.

 CMP We've been bit a few times on leaving that on too long, so I guess we were getting spring loaded.

 CC-H Roger. I don't know, I'm assuming you've - we can't tell for sure by our data, but we want to make sure that we get the purge terminated also. We can't tell.

 CMP It's terminated - already.

01 45 42 CC-H Okay, real fine. And tomorrow morning's wake-up time is the nominal one. It's at Vanguard at 117 hours and 30 minutes, and I'll be calling you there.

 CMP Okay, and just repeat the first item you had. I didn't get that one. I didn't note that one.

 CC-H I think - I mentioned that I've got a T_{ig} update in the Updates Book, that I need to do to two of your block data pads, and the second thing, I think I mentioned, was the - was changing the DAP, which you've done.

 DMP Okay, yeah, it was the updates thing that I knew we missed.

CC-H Yeah, if you could - we've still got about 2 minutes here if you can find the Updates Book, and I need to update the T_{ig} time on rev 78 and rev 93.

01 47 00 CMP Okay. Go ahead, Dick.

CC-H Okay. The rev 78 T_{ig} time should be 129:36:34. And the - -

CMP Okay. Go ahead.

CC-H Okay. And the rev 93 T_{ig} time should be 153:18:39.

USA Roger. Update to 78 T_{ig} time 129:36:34; 93 is 153:18:39.

CC-H Okay. Stand by just a second.

CC-H And, Vance, one more thing. The high-gain angles for tonight are a pitch of minus 48 and a yaw of 258, and we need to set those.

01 48 00 CMP Okay. That's in work.

CC-H Okay. And we're satisfied with the evaporator now. We'd like the SECONDARY COOLANT LOOP PUMP, OFF. Incidentally, we're about 20 seconds from LOS. I'm going to be standing here - standing by here on these upcoming next couple STDN passes and also on ATS, and I've got some news here that I haven't had time to read to you tonight. If you'd like to hear it or talk about anything else, just give me a call when we get locked up per the Flight Plan.

CC-H And if I don't hear from you, have a good night's sleep, and we'll see you in the morning.

CMP Okay. Ordinarily, we'd like news, but we still have some work, so maybe we'd better get at it and see you in the morning. Thank you.

CC-H Okay, great. I'll still be here, so I'll - I'll be - I'll have it in the morning. See you then.

CMP Great.

CMP And Deke says to tell you he's gone through ...

01 49 08 CC-H I'm sorry; you cut out. If you're still there, say again.

02 17 08 CC-H Apollo, Houston.

02 18 00 CC-H Apollo, Houston. If you read, no acknowledgment necessary, but we need REACQ and NARROW on panel 230 for the high gain so we can use it tonight. I'm sorry, on panel 3.

CC-H Apollo - Apollo, Houston.

02 19 18 CC-H Apollo, Houston in the blind. On panel 230, we need REACQ and NARROW.

02 19 51 CC-H Thank you much, Apollo. We're going over the hill at Bermuda.

02 24 08 CC-H Apollo, Houston. One of the things that I forgot to verify this evening, I believe, was to make sure that the speaker box was on so we have comm if we need it all night. We'd appreciate knowing that it is.

END OF TAPE

Day 201

TAG Tape 201-03/T-61
Time: 201:02:27 to 201:02:45
Page 1

ASTP AIR-TO-GROUND VOICE TRANSCRIPTION

REST PERIOD - NO COMMUNICATIONS

Day 201

ASTP AIR-TO-GROUND VOICE TRANSCRIPTION

09 54 08 CC-H (Music)

09 56 27 CC-H Good morning, Apollo. We're AOS through the Vanguard. We've got you for about 3 more minutes.

CC-H Apollo, Houston. We need to get the VTR POWER and TELEMETRY and INTERLEAVER switch on panel 400 ON to allow us to dump some recordings. If you could get that for us, please, we would appreciate it. That's contrary to what you will be reading in your Flight Plan if you've taken a look at it. We want the VTR POWER, TELEMETRY POWER, and INTERLEAVER all ON.

CC-H Apollo, Houston. We are a couple of minutes from LOS. Our next station contact will be through the ATS at 117:53. We have a scheduled waste water dump at that particular period that we would like to delete. And assuming that we're - you're probably going to have some problems with the Soviets using your VHF AM on Alfa, we would like you to select VHF Bravo - Bravo SIMPLEX - Bravo.

09 58 20 CMP Okay. SIMPLEX Bravo. Good morning, Crip.

CC-H Good morning, Vance. You sure sound all bright-eyed and bushy-tailed there.

09 58 33 CMP And, hey, we've got your INTERLEAVER and all that. And we want to go to VHF Alfa.

CC-H We assume we're Alfa now and we'd like to go to SIMPLEX Bravo.

09 58 44 CMP Okay. SIMPLEX Bravo.

CMP And, let's see, that means SIMPLEX Alfa should be OFF.

CC-H I'm sorry.

CC-H SIMPLEX Alfa should be OFF. Okay. Alfa's OFF and Bravo's ON.

CMP Okay. Hey, nice music there this morning.

CC-H Okay. Glad you enjoyed it. That's what you missed yesterday. Also, we show that the VHF RANGING is ON, and left over from yesterday. If you'd secure that for us, we'd appreciate it.

09 59 23 CMP Okay. It's secured.

CC-H Sorry to wake you up and have you start throwing switches all around like that. Maybe we'll relax a little bit here later.

CMP There's no problem. We're sort of used to throwing switches by now.

CC-H Roger. Going over the hill.

09 59 44 CMP Okay.

10 21 56 CC-H Apollo, Houston. We're AOS through the ATS. We have you for 43 minutes.

DMP Okay, Crip. Read you 5 by. How you reading us?

CC-H Loud and clear, Deke. How are you this morning?

DMP Just fine. Seemed like kind of a short one, but mighty fine.

CC-H Well, we're looking forward to getting - getting lots of good experimental data here.

DMP You bet. How's everybody down there today?

CC-H All bright-eyed and bushy-tailed.

DMP Outstanding.

CC-H You guys did a super job during that joint phase.

DMP Well, thank you. A lot of people did a good job on that ...

CC-H One item I could use this morning, if anybody's handy to do it, is to get the POTABLE INLET valve opened up.

DMP POTABLE INLET valve opened. Okay, we'll do that in a second.

Day 201

Page 3

10 24 17 CC-H Apollo, Houston. If we could have ACCEPT, please, we're going to uplink to you coming up on this Ascension pass and also we're going to be dumping our VTRs, so we're going to lose voice here with you for a few minutes. I'll give you a call when we lock it back up. There is no update on the time for your mapping pads on this upcoming pass.

10 29 29 CC-H Apollo, Houston. We're talking at you now through Ascension. We've got you for about 3 and 1/2 minutes.

END OF TAPE

Day 201

ASTP AIR-TO-GROUND VOICE TRANSCRIPTION

10 30 51 CC-H Apollo, Houston. We're a couple of minutes from LOS through Ascension here. The computer belongs to you once more, so you can go back to BLOCK and we'll drop out. And we're going to terminate this VTR dump so we'll have voice across Africa. And, for your information, the weather's looking good across there. You're probably going to have little problems with the Guinea Current due to clouds, but it looks great across the desert.

10 34 42 CC-H Apollo, Houston. We're AOS through the ATS. We'll be talking with you across Africa here.

10 35 17 CMP Roger, Crip.

CC-H Rog. We're just going to be sitting here listening to you as you go across.

10 35 25 CMP Okay.

10 49 44 CC-H Apollo, Houston. We'll be losing you shortly here on the ATS. Our next station contact will be through the Vanguard at 119:04 - 119:04. And that's about 36 minutes away. We'll try to get your morning report there. How did - how did the pass go, coming across Africa?

10 50 05 CMP Man! It was swift. A lot to see. I had clouds up almost to Lake Chad, and then right over the Lake Chad area. Had - scattered to broken. So it was poor for - for photography. But from then on, it was wide open. Got a lot of pictures. And, of course, I got a good view of - Cairo area, Levantine Rift. We'll be talking into the tape recorder now. And - as I said - have a lot of photos.

CC-H Very good, Vance. Thank you.

10 50 43 DMP As far as the mapping part's concerned, Dick [sic], we're doing it out of window 5. And that window is obviously considerably colder than number 1. And we have a continual problem with that window fogging over on us.

CC-H Copy that. It's fogged up pretty good.

DMP Well, I've got it wiped down. The problem is that it keeps fogging, and you just have to keep wiping it.

CC-H Copy.

10 51 12 CC-H See you at Vanguard.

10 51 15 DMP Okay.

11 25 26 CC-H Apollo, Houston. We are AOS through Vanguard for 7 minutes.

USA Okay, Crip.

11 25 57 CC-H Apollo, Houston. If you read, I - got a couple items I need to update you on, on this morning's activities.

CMP Go ahead, Crip. How do you read, Crip?

CC-H Okay. Loud and clear, Vance. One item: I think you guys had talked about turning on your VHF FM so you could talk to your buddies if you wanted to, and you've got a GO on going ahead and doing that, if you'd like.

CMP Okay, real good. Right now, we're too busy to do it, but we'll do it first chance we get - -

CC-H Okay. Fine.

CMP - - just for our own benefit.

CC-H Okeydoke. Vance, do you have a coup - time to make a couple of small mods in your time line for this morning?

CMP All right.

CC-H You can pull out the book there, on - talking about 1 - oh, about 119:35 is the first one.

CMP Okay. Go.

CC-H Okay. We want to - to delete that helium injection you have there and move it over under Deke's column, at 120:10. And that's due to getting it in a little bit late last night.

Day 201

11 27 05 CMP Okay. Stand by 1 and we'll copy it.

11 27 43 CMP Okay; next.

 CC-H Okay, fine. And assuming we've got it moved over, what we want you to do at that time, at 119:35 where you did have the helium inject, we saw a little problem with the X-ray when we were doing that EUV raster scan yesterday and we want to do a purge on it. Actually - and we have checked the attitude at the - that you're at there and everything's okay. You can actually go to the book and do it or it's only three steps we really need, and I can give those to you if you want to write them in now.

 CMP Okay. I'll write them.

 CC-H Okay. At 119:35, we want X-RAY COVER, OPEN.

 CMP Go.

 CC-H Okay. X-RAY LOW-VOLTAGE POWER, ON.

 CMP Go ahead.

 CC-H And X-RAY PURGE, START. And that's really all you need to do. You'll pick up everything else when you're - you're doing the cal, you can - which is called for next in your activities. You'll find out later when you pull out the EUV pad, you'll be following this activity with a cal and if you do that on time, everything will work out hunky-dory.

 CMP Okay. Very good.

11 29 01 CC-H Okay. One item is that - and I'll try to give you a call to remind you at - when we get AOS through the ATS but - but prior to doing this activity, we're going to have you shut down the primary evaporator - or deactivate the primary evaporator early so it won't get involved or won't be on when we're doing this - this purge.

 CMP Okay. Understand.

 CC-H Okay. We've got about 3 more minutes left through this pass, and either now or a little bit later, whenever it's convenient, we can - can get the

morning report in. Incidentally, for the upcoming mapping pass, there are no - not - no time updates, so you can start those nominal time.

CMP Okay. We're having a real hard time getting breakfast here, Crip. Could we delay this morning report - -

CC-H Okay, yeah.

CMP - - for you for a while?

11 29 48 CC-H We'll delay it. No sweat. Incidentally, we show the urine dump port as still active and, of course, we'd like to get that secured before we also get into - get into doing this pass.

11 30 00 CMP Okay. We've been venting it. I'll close it now.

11 31 55 CC-H Apollo, Houston. We are 1 minute from LOS. Next station contact will be through the ATS at 119:26. See you there.

11 32 03 DMP Okay.

11 57 15 CC-H Apollo, Houston. On panel 230, UP TELEMETRY to RELAY, UP TELEMETRY to RELAY; in the blind.

11 59 59 CC-H Apollo, Houston. We're AOS through Ascension. We're talking at you for about 6 minutes.

12 00 18 CC-H Apollo, Houston. I'm going to have to give you a time update for this EUV rev 72 pass we got, if you can get your Flight Plan Supplement out.

END OF TAPE

Day 201

ASTP AIR-TO-GROUND VOICE TRANSCRIPTION

12 00 43 CC-H Apollo, Houston. How do you read?

12 01 13 CC-H Apollo, Houston. How do you read through Ascension?
ACDR, Crip. A double echo.
CC-H Good morning. I have a - an update to your EUV rev 72 pad, if you want to pull out your Flight Plan Supplement.

12 02 04 CMP Go ahead, Crip. Go ahead, Crip.
CMP Houston, how do you read?
CC-H Apollo, Houston. Read you loud and clear. How me?
CMP With a lot of echoes, but go ahead with your EUV.
CC-H Okay, Vance. Sunset time will be 120:14:33. And I'm assuming you've initiated the purge. Did you get the PRIMARY EVAP secured for us - or deactivated?

12 03 57 CMP The echoes are making it bad. Please repeat.
CC-H We copy your - drifting - out attitude. You want to give us a VERB 58 to get back in, please?
ACDR Crip, you've got about four echos, and are completely unreadable.
CMP Crip, the one thing I did get is that the - we are now counting up to 120:14:33 instead of 120:14:16. Is that affirm?
CC-H That is affirmative - affirmative.
CC-H Apollo, Houston. How do you read now?
ACDR There you go; lots better.

12 04 01 CC-H Okay. We had a double comm configuration at you for a moment. We need to verify that the PRIMARY EVAPO-RATOR is secured, and we also need a VERB 58 to - because we're drifting out of attitude here.

12 07 34 CMP Houston, Apollo.

CC-H Go ahead.

CMP Okay. Do you - on the EUV pad, at 35, do you still want an X ray cal, for background?

CC-H That's affirmative.

CMP Okay.

CC-H And we're watching you - from here -

12 11 14 CMP Okay, Crip. We have a GO for the cal?

CC-H That's affirmative - that's affirmative.

CMP Okay.

12 13 45 CMP Cal procedure's complete, Crip.

CC-H Rog. And - a little bit of good information for you, here. That EUV raster scan we did yesterday. We came off with 0.3 of a degree pointing error, which is great. And - so, we won't have to go through and try to do any updates on all those EUV pads. I know you guys have some - we still show the OPTICS, ON - you can secure that. ... you got your P52 out of the road, and, whenever we get a chance, we'll take that data here.

CMP Okay.

12 15 30 CMP Okay, Crip. Here's the P52.

CC-H Okay. Give it to me.

CMP Stars 4 and 14. We had to make a 90-degree roll to find stars from that attitude. NOUN 05, all balls; NOUN 93, plus 00.106, minus 00.093, minus 00.004. I mean - say that one again; Z, minus four balls 5; GET, 119:16:25.

Day 201

12 16 10 CC-H Okay. We got all that and we'll - going to lose you here, and we'll see you at Guam at 1 - 120:19. And that's about 25 minutes away.

12 25 35 CC-H Apollo, Houston. We terminated our VTR dump, so we're back with you through the ATC. And we have you for about 10 more minutes.

DMP Say again, Houston.

CC-H Just telling you that we had terminated our VTR dump. Consequently, I could talk to you again, or you can talk to me, whichever way we desire to go. And we've got you for about 10 minutes.

DMP Okay. Well, we're still trying to get regrouped here, after that last Earth obs. So - some of us starting breakfast, and some trying to finish.

CC-H Okay. Understand. Getting up and getting that pass off early there kind of complicates the morning. But we're with you. We're still standing by for the morning status report any time it's convenient for somebody to give it to us. Also, we'd like to get a reading off of the quad Alfa propellant, any time somebody could. We've - we've had a discrepancy between our reading and yours. We think yours is correct and ours has just got a bias on it.

CC-H Y'all can work those in at your leisure.

DMP Okay. Tom's coming back on the air, here. Let me get ...

ACDR Okay, Crip. How do you read me?

CC-H Loud and clear, Tom. How me?

12 26 50 ACDR Loud and clear. What do you - Okay. I got quad Alfa propellant quantity - we're reading about 85-1/2 percent.

CC-H Okay. Real fine. Thank you very much.

ACDR Okay. For my menu yesterday. For breakfast - I didn't have the coffee. I ... take those wonderful vitamins. And I had tea with su - with sugar and lemon. For lunch - I didn't eat the soup or the

coffee, but I added tea with sugar and lemon. For dinner - I had everything but the vanilla pudding; added a strawberry drink and tea with sugar and lemon. PRD today reads: 11007; 7 hours of good sleep, no medication.

CC-H ... , Tom.

ACDR Go ahead.

CC-H Roger. We copied all that. Standing by for the CP's.

ACDR Okay.

12 28 54 ACDR Okay. Here we go, for Vance. He had two breakfast rolls instead of one. Knock out the spice cereal. For lunch - everything. For dinner - no fruit cocktail, but added in a cocoa. Okay; 7 hours of good sleep; PRD reading 48182. No - no medication.

ACDR Okay.

ACDR Okay; Deke ate everything on his menu, plus strawberry. His reading is 61006; 7 hours, good sleep; 30 gulps. And we got to get busy. Talk to you later.

CC-H Okeydoke.

12 33 57 DMP Houston, Apollo.

CC-H Go ahead.

12 34 00 DMP Okay, Crip. I got the helium inject done. The temperature is 549.

CC-H Okay, Deke. Thank you very much.

CC-H Apollo, Houston. We're going to lose you here, shortly, and in your maneuvers - and we'll have you again at Guam in 7 minutes.

12 34 39 USA Roger.

12 36 06 ACDR Crip, do you read us?

CC-H That's affirmative.

ACDR Do you want us to go to HIGH BIT RATE, FORWARD, COMMAND, and RESET?

CC-H That's affirmative.

CC-H And we'll lose you when you go do that.

12 36 22 CC-H Okay, and also we'd like to verify that - the GLYCOL EVAPORATOR WATERFLOW ...

12 42 11 CC-H Apollo, Houston. We're AOS through Guam for 6 minutes.

ACDR Roger.

12 46 07 CC-H Apollo, Houston. I don't know whether you got my last call regarding it, but on the GLYCOL EVAPORATOR WATER FLOW valve - we need to make sure that's in the OFF position - center, OFF.

CC-H The reason for that is that we're - our data looks a little bit funny down here now.

12 46 29 ACDR Okay. We had the switch in the wrong position. Because of the position here, it's hard to tell whether it's center OFF or ON.

CC-H Rog. Did you have it in the ON position?

ACDR Yeah. Sorry.

CC-H Okay, fine. Thank you.

12 47 05 CC-H Apollo, Houston. We're 1 minute from LOS. Next station contact through Santiago in 32 minutes at 120:57 - 120:57.

12 47 16 ACDR Okay.

13 21 15 CC-H Apollo, Houston. We're locked up through Santiago, and we should be with you for about 57 minutes.

DMP Roger.

CC-H Apollo, Houston. If somebody's got a moment, we'd like to verify a switch position on panel 230.

CMP Okay. Stand by.

CMP Okay. What is it, Crip?

CC-H Okay. Down in the lower right-hand corner there on the - under RELAY MODE CONTROL, the TV REALTIME/PLAYBACK. Can you tell us where that is?

CMP Just a minute.

CMP Or UP TLM, rather.

CC-H Sorry, Vance. Say again, please.

13 24 02 CMP Roger. The REALTIME/PLAYBACK switch is in UP TLM position - middle position.

CC-H Okay. Fine. And we have drifted out of attitude, we noticed, and somebody's going to have to give us a VERB 58.

13 29 15 CC-H Apollo, Houston. When somebody gets a chance, I have the new pad time for rev 73, and also we got a switch verification again we're going to need to do, but no big hurry on either.

CMP Okay, ready.

CC-H Okay. If you want to copy that time down, Vance, it's for rev 73. And understand you are ready to copy?

CMP That's right, Crip.

CC-H Okay. It's 121:43:27; 14 - 121:43:27.

13 29 51 CMP Okay. Got it.

END OF TAPE

Day 201

ASTP AIR-TO-GROUND VOICE TRANSCRIPTION

13 29 55 CC-H Okay. And that switch - we're going to need to make sure it's in the right position for a couple of little TV things that we've got. On 181, we need to verify that the CM/DM POWER switch is ON.

CMP Okay.

13 30 34 CMP Okay. That switch is OFF, Crip.

CC-H Understand it was OFF? If it was, we need - we need to turn it ON.

13 30 44 CMP Okay, coming ON.

CC-H Okay. And we're just going to leave that switch ON now.

CMP Roger.

13 35 27 CMP Crip, are you there?

CC-H That's affirm, Vance. Go ahead.

CMP In line with our recent policy, I'd like to activate the secondary loop for a little while, evaporator 2, if that's okay.

CC-H Stand by 1 on that, Vance.

CC-H Vance, we - we think we've got a problem - that little switch problem we had earlier on the primary loop. We believe we've got water in there and it's cold and we think - we think we're going to freeze it up. So we'd like you to stand by on that. We're getting ready here, we believe, to scrub the rev 74 pass so that we can roll the thing over and execute the ECS/SSR-2 procedure, which is to thaw that vent out.

CMP Understand.

CC-H And I'll - I'll get with you a little bit more information on that shortly.

13 36 31 CMP Okay.

13 53 03 CMP Houston, Apollo.
 CC-H Go ahead.

13 53 07 CMP Okay; we're maneuvering.
 CC-H Copy.
 CMP VERB 49.
 CC-H Okay, fine. Vance, for your information, we were looking at the small mound of data when we came through Madrid. We're dumping now so we're not - we're dumping DSE so we're not looking at real-time data. Consequently, we're still trying to ponder whether you're - whether that loop was actually frozen up, and - But right now we're thinking we can press on; because it looked like from the blurb of data that we got that it was working properly.
 CMP Okay. It looks to me like the primary loop is working properly. But I'm wondering about the capability of the secondary right now. I could try to turn it on real quick and see for you, if you wish. I - when we talked before, we started to turn it on just for a moment. It didn't look like it was going to work normal, and turned it right off.

13 54 09 CC-H Okay. I think, per our agreement on operating these experiments, we should not have the - either of the evaporators on at this time. So I think we'd better hold up on that if that's okay.
 CMP Okay. Well, right now the status of the primary is that it's operating; and it looks like it's operating in a normal range, although it's got the glycol evap temperature down to about 39 or 40. We can turn it off right now.
 CC-H Okay. Yeah, we had assumed that you guys had already deactivated that. That was called out at 25.
 CMP Okay. We were - -
 CC-H Before you secure - -
 CMP - - hesitating to touch - we were hesitating to touch it, simply because we knew we might have to roll around and unfreeze it.

CC-H Okay. Why don't you go ahead and give up the steam pressure and - -

13 55 01 CMP Okay. Steam pressure is 0.12 on the primary system and the glycol evap temperature's down to about 38. And, of course, the secondary coolant loop is on. We're holding to turn it off until we hear from you right now.

13 56 11 ACDR Okay, Crip. Do you read us?

CC-H I'm sorry. Say again, Tom.

ACDR Roger. Do you want us to turn that evap off now?

CC-H Stand by.

ACDR Or do you want to look at the data some more?

13 56 23 CC-H That's affirmative. We want to go ahead and deactivate it.

ACDR All right. Turn it off.

CMP Houston, Apollo.

CC-H Go ahead.

13 57 47 CMP Okay. We've deactivated it. And Tom's still got his thumb on the INCREASE switch. But it looks like the steam pressure is not going above about 0.17 or 0.18.

CC-H Copy that.

CMP Glycol evap temperatures are at 46 right now.

CC-H I'm - I'm advised that that's a satisfactory reading - that you're reading the vapor pressure right now.

CMP Okay. Good.

ACDR Okay. You want us to press on with the next one?

CC-H Yes, sir.

14 05 18 CC-H Apollo, Houston. We got a small problem on the X-RAY HIGH POWER down on panel 230. We'd like you to take it OFF, and then go to 2, if you would. Somebody can get it for us.

14 05 30 CMP Understand.

CC-H Okay - -

CM Hold it. What HIGH VOLTAGE POWER to 2?

CC-H We want you to delay in OFF for 5 seconds.

14 06 12 CC-H Apollo, Houston in the blind. On the HIGH GAIN ANTENNA, would you go to NARROW and REACQ, please - NARROW and REACQ.

CC-H Apollo, Houston. We're locked back up with you. We dropped out there awhile.

14 08 32 CC-H Apollo, Houston. We see you're a little bit behind on the pad there. Recommend you go to the 3 plus 30 DET time and go ahead and proceed with that one.

ACDR Crip, how do you read?

CC-H Loud and clear. How me?

CC-H Apollo, Houston. Read you loud and clear.

14 11 33 CC-H Apollo, Houston. We're back with you. How do you read?

14 14 13 CC-H Apollo, Houston in the blind. If you read, we would like you to perform an X-ray powerdown; X-ray powerdown. The data is not looking good to us.

14 15 17 ACDR Crip, how do you read?

14 15 19 CC-H Loud and clear. How me?

14 15 23 ACDR Crip, how do you read?

CC-H Loud and clear, Tom. How me?

CC-H Apollo, Houston in the blind. We're going LOS from the ATS. We'll see you at Orroral in 9 minutes.

14 17 50 CC-H ... and x-ray powerdown.

14 26 37 CC-H Apollo, Houston. We're AOS through Orroral. Talking to you for 2 minutes. And we need the X-ray power-down performed, please. The data on that instrument is not normal.

14 26 48 ACDR X-ray power down. Okay.

CC-H And no need to acknowledge. We were getting downlinks to you on the ATS awhile ago. We had an up-link problem. Apparently we were locked on a side-lobe, or something at you, but we got good downlink.

ACDR Okay. You want the X-ray powerdown now?

CC-H That's affirmative.

14 28 08 DMP Okay. X-ray's powered down, Crip.

CC-H Okay, Deke. Thank you.

CC-H Okay. We're about 30 seconds from LOS, and our next station contact is through the ATS at 122:40, about 34 minutes away.

14 28 33 DMP Okay.

14 58 19 CC-H Apollo, Houston. We're here with you very briefly through Quito.

ACDR How do you read, Houston?

CC-H We're reading you clear but scratchy.

ACDR Okay. Look, get with Farouk. This attitude for visual obs - ... was okay but we - there's no room to get your head around or look upside down and *** just makes everything about twice as easy.

14 58 58 CC-H Tom, if you're still reading, we're breaking up. I'll get your comment when we get - get in the ATS contact.

END OF TAPE

Day 201

ASTP AIR-TO-GROUND VOICE TRANSCRIPTION

15 02 59 CC-H Apollo, Houston in the blind. Panel 230, we need UP TELEMETRY to RELAY, please.

CC-H Apollo, Houston in the blind. Panel 230, we need UP TELEMETRY switch to RELAY, please.

ACDR Houston, Apollo. Do you read?

CC-H Apollo, Houston. Reading you loud and clear now, Tom.

ACDR Okay. Did you get my last transmission?

CC-H Negative. I understood that you were having some kind of problem with your vis obs attitude in the window, and I'd like to get that again, if I could.

15 04 14 ACDR Okay. Look, I'm sure this was optimized because sometimes you do the vis obs at the mapping appi - attitude. I'm now wings level. There - I've gotten a lot of cloud cover, of course, so I can't see much, so I'm not losing too much by talking to you. What we want to do is to - to - on my - just the vis obs only to roll to heads up. Because if we could sit down behind the couch, this attitude wouldn't be bad. But the trouble is, there's not enough room to sit down behind the couch and look out where you're going. You can't get in there. You're too high. So we want to roll to heads up, pitch down, looking straight forward for the vis obs attitude when it's not associated with the mapping. Can you get Farouk and his troops tracking on that? Over.

CC-H Okay, Tom. I think we understand that, and we'll - we'll take a look at it for the upcoming passes.

ACDR Yeah, this heads down; when you look out like that to get the view, you're - you're straining yourself up against the instrument panel, holding your feet in the struts against the tunnel, and everything in the book is left and right. Well, you can overcome that, but you just can't get the lead-in. I tried sitting upside down on the couch, but the only way you can see it out is through the other side of the window. It's really a hell of an awkward situation.

So we want to pitch down at least 30 or 40 degrees, nose down, and we'll take everything coming head on for the vis obs wings level. Over.

CC-H Okay. If I'm understanding, you're talking about wings level, heads up, pitch down, about 30 to 40 degrees. Is that correct?

ACDR Yeah, at least. Whatever it takes to get that window out good instead of this heads down.

15 05 48 ACDR The mapping passes we'll have to leave like they are. We understand that, but when he includes mapping with vis obs, there's nothing we can do about that. But as far as just pure vis obs by itself, we want heads up, pitch down to a degree. He should be able to determine that. I'm going to say - oh, at least pitch down about 30 - 30 - 30 degrees - 40 degrees.

CC-H Okay. Fine, Tom. And just to make sure that we do understand that, we're talking about with docking module forward. Is that correct?

ACDR Oh, yeah. Docking module forward, pitch down.

CC-H Okay.

ACDR Looking out window 3.

CC-H Rog to that.

15 06 30 CC-H Okay, when somebody gets a chance; on that panel 230, we can go ahead and go back to UP TELEMETRY on the switch.

15 11 30 CC-H Apollo, Houston, for the AC. Tom, when you get a moment there, you can talk a little bit, we'd like a few clarifications on that attitude that you were requesting.

ACDR No, just before - Hang on. I got a target here.

CC-H Go ahead. No problem, we can just get you whenever you've got some time to talk.

ACDR Okay, Crip. Back with you.

CC-H Okay, Tom. One of the things we want to clarify - We're assuming that you want to be with your back to the couch. Is that correct?

15 14 25 ACDR Yeah, well, it gives your back - with my back to the couch now, looking forward. And again - No, you - you can do it, but it just seems easier if you're heads up on it looking down forward. Of course, I guess you don't get the high-gain antenna, so that's something to play off.

CC-H Yeah, we're going to have to look at the high-gain antenna. One other item. Have you got any real preference as to whether the objects are moving from the top of the window down or from the bottom of the window up?

ACDR No, I don't think so. You talking retrograde?

CC-H That's affirm.

ACDR No. I think it's easier when you get a lead into it coming forward.

CC-H I'm sorry. I didn't quite get all that. You said a lead into it, which you prefer coming from the top of the window down, then?

15 15 16 ACDR Well, like for right now, yeah, I've been coming from the top of the window down, as they're going forward here. Let's - let's just go ahead and see what we've got here for a while. Sometime later on, as we get an opportunity where it's not coupled into an antenna angle, we might just take a look at it and do it ourselves.

CC-H Okay. One other - -

ACDR ...

CC-H Okay. We'll - we'll go ahead and take a look at it. One of the things we are considering was the - using some - the attitudes similar to the mapping pass that we used for window 5 and only to set it up for window 3. But we'll - we'll get - look at it down here and get back so that we can give you a new one.

ACDR Okay.

15 20 25 CC-H Apollo, Houston, for anybody. I guess specifically the CP - probably be the one involved. I do have the new start time for the helium glow scan.

ACDR Okay, Crip. I'm the only one on the headset now.

CC-H Okay. No big - no big hurry here, Tom. But we - want to write it down in the helium glow scan pad: rev 74/75.

ACDR Okay. Rev 74/75: helium glow scan. Okay. Deke will count them. I'm still taking some pictures.

CC-H Okay.

ACDR Trying to.

DMP Okay. Go ahead, Crip.

CC-H Okay, Deke. You got that out? The new time is 123:28:21.

15 21 39 DMP Okay. 123:28:21, and that's page 6-5.

CC-H That's correct, and, also, we need to delete - that is, delete X-ray ops from - from this pass.

DMP Understand. Delete X-ray ops.

15 21 56 CC-H Rog. And I got one item I'd like to go ahead and do now. We'd like you to deactivate the PRIMARY EVAPORATOR at this time, if you would.

15 22 05 DMP Okay. It's done.

CC-H And, Deke, no need to respond, but when somebody gets started on these experiments or going down to panel 230, I got one switch that I need to change, and you just tell me when somebody's down there.

DMP Okay. I'll be down there in about 10 seconds.

CC-H Okay. There's no rush.

DMP Okay. Go ahead.

15 22 40 CC-H Okay. What we're going to do is to go ahead and ask you to turn on the X-RAY LOW-VOLTAGE POWER at this

time, and we're going to leave it on. Essentially, we'll be leaving it on for the remainder of the mission. What we're trying to do is to get a little heat into that particular instrument because we think that may cure the problem that we're seeing with what appears to be some contamination. I would suggest that you either put a little piece of tape over it, and we'll also - can modify the SM experiment cue card you got down there to delete turning the LOW-VOLTAGE POWER, OFF on the X-ray powerdown.

DMP Okay. So you want the LOW - LOW-VOLTAGE POWER, ON all the time.

CC-H That's affirmative. And if - just for making everything hunky-dory, if under X-ray ops on that cue card - if you wanted to just put a "verify" after that part where we turn LOW-VOLTAGE POWER, ON normally, that would probably help out.

15 23 35 DMP Okay. We'll fix it. It's ON right now.

15 23 38 CC-H Okay. Fine. Thank you very much.

15 43 35 CC-H Apollo, Houston. We see that you're sitting here all squared away, ready for this upcoming helium glow pass. Might just remind you again - the way we'd talked about it - that X-ray that we're not going to be doing is - occurs several times - turning it on and off along with the EUV on this pass. Of course, that's to keep from dragging it through the Sun. So, remember, we don't want to turn the X-ray back on. And, of course, we do want to get the EUV powered down at applicable places and then powered back up. Might also inform you that, even though my voice hasn't changed, our team has changed. I now represent the voice of the Amber Team, Frank Littleton's team. We're looking forward to the rest of the day's operations with you.

CMP Very good, Crip. Understand you don't want the X-ray on.

CC-H Roger, Vance.

CMP Houston - Houston, Apollo.

CC-H Rog, Vance. Go ahead.

15 47 16 CMP Okay. We've loaded up P20 option 2. And we see that the start for it is - is a PRO at 00 on the DET. Seems to me we'd load up a time in NOUN 34, normally. Don't we?

CC-H Negative.

CMP Don't you want - -

CC-H No, Vance. What we're going to be doing - You should have a time and the - and the pass loaded. And we'll be initiating all of these on - by PROing on your NOUN 34's.

CMP Okay. As long as the times in the past were okay. Understand.

CC-H That's affirm. That's - -

CMP NOUN or 000.

15 47 50 CC-H Okay. And we're about to go LOS when you initiate this P20. And we'll have you again in about 11 minutes through Orroral. That's at 123:36.

15 48 05 CMP Okay. Understand.

15 54 16 ACDR Houston, Apollo.

15 59 35 CC-H Apollo, Houston. We're AOS through Orroral. We have you for 3 minutes.

ACDR Okay, Crip.

CMP And, Crip, I called just before we went over the hill. We wanted to know how the data is coming.

CC-H Okay, what we saw was looking good. We were dropping out due to your maneuver there, but everything right now is looking okay. We're not - we're not looking at data at this particular moment. I'm talking to you on VHF only.

ACDR Right. Okay. Got it.

CC-H ... to STDN.

ACDR Say again.

Day 201

16 01 22 CC-H We need that panel 230 switch - UP TELEMETRY switch to DIRECT, please.

ACDR Okay.

16 01 42 CC-H Apollo, Houston. We are 1 minute from LOS. Next station contact through Quito in 27 minutes, and if we could have the UP TELEMETRY switch back to UP TELEMETRY, when you get a chance.

16 01 53 CMP Okay. UP TELEMETRY switch back to UP TELEMETRY.

16 29 16 CC-H Apollo, Houston. AOS through Quito for 5 minutes.

CMP Roger, Crip. Quito for 5.

ACDR ... program.

CC-H I'm sorry we dropped out there, Tom, and I didn't catch all your comments.

16 29 39 CC-H We got ... comm right now. Why don't you wait ...?

END OF TAPE

Day 201

ASTP AIR--TO-GROUND VOICE TRANSCRIPTION

16 30 13 CC-H Okay, Apollo. I think we locked up pretty good. I'll try to stay out of your hair on this pass.

ACDR Okay, Crip. Everything seems to be going real good on the helium glow.

CC-H Roger. Thank you.

ACDR Crip, today seems like kind of a more normal workday compared to those last five.

CC-H Well, we hoped - be a little bit more relaxed there. Still, it - it's going to keep you busy, I think.

ACDR ... busy quite so ... but it's not like three people climbing all over each other for about 16 or 18 hours.

16 33 51 CC-H Yeah, that vehicle's not that big. We're going over the hill, and we'll pick you up at MILA in about - about 1 minute.

CC-H Going over the hill. See you in MILA in about a minute.

ACDR Okay.

16 35 22 CC-H Apollo, Houston. We're locked up now through MILA and with the ATS. We should have you for about 55 minutes.

CMP Okay, Dick. I mean Crip. Sorry.

CC-H Okay, Charlie.

CMP (Laughter) Joe. I mean Jack. I mean Bill.

CC-H Roger, Ann.

16 40 07 CC-H Apollo, Houston for the CP. We don't want to mess up your maneuvering here, but we'd like to verify - You told us you tried to turn the secondary evap on after we thought we had the - the problem there. I'd like to verify that you did and what you saw with it.

CMP I turned it on, I guess, for about 1/2 minute, and I just noticed that the steam pressure didn't want to come down. It only came down a small bit.

CC-H Okay.

CMP How's the primary evaporator appear to you down there now?

16 40 45 CC-H We're pretty sure that - that we've got a blockage somewhere, and we're - we're concerned what we want to do about it.

CC-H How's the cabin temp running for you guys? Getting a little warm?

ACDR No. It's not too bad, Crip. It's - it's a little warm. We're all here in our T-shirts, but we got the cabin fan running. I'm sure that's pulled some of the cold air out of the docking module down here.

CC-H Okay.

ACDR It - it's not cool. But, on the other hand, it's not warm like it was before.

CC-H Okay. Copy that.

16 45 59 CC-H Apollo, Houston. We're about a minute and a half from LOS through Newfoundland. And we won't have you through the ATS until 124:52. At that time, we'll be talking to you about modifying our attitude so we can put a little Sun on the - the water port, and we will also - I'm sorry, I was telling you a story. We're going to have Madrid in about 5 minutes, as INCO corrects me. But we're going to be deleting activating the primary evaporator, and we're going to leave that off the rest of the day if - if your comfort stays okay. And just try to let that port sublimate out.

ACDR Okay.

DMP Hey, Dick. Where are we right this minute?

CC-H Oh, you're North Atlantic. You're just off the coast of Newfoundland, probably - almost 1000 miles.

DMP Must be right on the airways. I see a couple of contrails, and I can almost make out one airplane down there, going west.

CC-H It's probably a pretty good - Yeah, that'd be just about the primary route between the States and Europe.

DMP Yes.

16 51 29 CC-H Apollo, Houston. We're AOS through Madrid for 2 minutes.

DMP Okay.

DMP Hey, Crip. You may be happy to know that our fish farm is doing well. I don't count any missing ones.

CC-H Very good. Any additional ones?

DMP Well, I was going to just - getting ready to ask you that question, but I've got five in all compartments except one, which has six.

CC-H Okay.

DMP You might check and see whether there's anything unusual about that.

16 53 34 CC-H Apollo, Houston. Getting ready to go over the hill, and again we'll see you when you finish up this helium glow.

17 15 06 CC-H Apollo, Houston. We're AOS through the ATS. We have you for 16 minutes.

CC-H Apollo, Houston. We're AOS, if you read. I need to make some modifications to our Flight Plan here, and if somebody could dig it out.

CC-H Apollo, Houston. How do you read through the ATS?

CMP Loud and clear. How do you read, Clip - Crip?

CC-H Read you the same, Vance. We're going to have to make some mods here to our Flight Plan to help out our evaporator situation, which we don't think's a big ditty, but we just want a roll over and point

at the Sun as I mentioned earlier. And also, we're going to try to solve our X-ray problem that we ran into earlier, and it's going to require a little marking if I can have your time.

ACDR Okay. Go ahead. We're ready to copy it, Crip.

CC-H Okay, Tom. There at about 124:55, where we - I mentioned earlier we had "Deactivate primary evaporator," we want to delete that. We also want to delete at about the same time that verb - "VERB 49 maneuver."

ACDR Got them.

CC-H Okay. I'd like at 125:10 to add in a VERB 49 maneuver to 210, 148, 000. And that'll - that'll point the port at the Sun.

ACDR Okay. 25:10: VERB 49 to 210, 148, 000.

CC-H Okay. That's good. I'd like you to drop down about 125:40 under Deke's column. It now calls out for "X-ray ops and EUV ops." I would like to delete those. In the place of them, add an "X-RAY BACKUP PURGE," which is on page 1-23 of the Experiments Checklist.

17 17 33 ACDR Roger. "X-RAY BACKUP PURGE," page 1-23 of the Experiments Checklist.

CC-H Okay. And we need a temporary modification on that thing in that after he finishes up the purge, it tells him to select "X-RAY HIGH VOLTAGE POWER to 1," and we're going use 2 for the next upcoming operations, and wherever you feel's best to put that note - either here in the Flight Plan to call your attention to it, or to go ahead and pull that checklist out and make a note there for temporarily we'll want to use X-RAY HIGH VOLTAGE POWER, number 2.

ACDR We'll put it in both.

CC-H Okay, fine.

CC-H Tom. You still reading okay?

ACDR Loud and clear.

Day 201

CC-H Okay; fine. The ATS angles I have at 125:45, I've got the modified view to a new attitude - I'm sorry, 125:52. That's a pitch of minus 21 and a yaw of 186 for high-gain-antenna angles.

ACDR Okay. With the new VERB 49: pitch of minus 21, yaw of plus 186.

CC-H Okay. Also, Tom, I mentioned that X-RAY BACKUP PURGE. We would like that performed on a time of 125:38.

17 19 14 ACDR Roger. X-RAY BACKUP PURGE, 125:38.

CC-H Okay; fine. That's good. Now if you can call out your X-ray pad for rev 76, we will go ahead and make - we'll make the mods to that pad for time so forth.

ACDR Okay. Stand by just 1 minute.

CMP Okay. Go ahead.

17 19 43 CC-H Okay, Vance. The DET time will be 126:10:09.

CMP Roger. 126:10:09.

CC-H Okay. And I've got a - got a few other mods for that pad I'm going to have to make due to our attitude change and also the fact we need to increase accuracy a little bit on a couple of stars. At a DET time currently of 55, that attitude it calls out - and it says "Verify the attitude" - we will not be there. I would like to modify that DET time to 50 and eliminate the "Verify." That will have to be a maneuver.

CMP Okay. At 55, just change the 55 to 50. Cross out "Verify."

17 20 44 CC-H Okay; fine. And right below that, where it has the "ops," I would like to do at 55 - Add in a DET time of 55. For the "ops," eliminate the "Verify," and I would also like a note to use "HIGH VOLTAGE POWER, number 2."

17 21 15 CMP Okay. The next line down from 50, put 55 in the blank. And cross out "Verify," and add in "HIGH VOLTAGE POWER, number 2" - -

CC-H Okay.

CMP - - for X-ray.

CC-H Okay. And we're almost there. At 10:56, I need to modify that attitude slightly to read 350.40 and 124.50.

CMP Okay. Please repeat those.

CC-H Okay. What we're doing is increasing the pointing accuracy for two stars, which are very faint. We don't think we'll get them otherwise. At 10:56, we need roll of 350.40 and pitch of 124.50.

CMP Okay. Understand. Instead of 350, 350.40. Instead 124, 124.50.

CC-H Okay. And one more, down at 32:35. For roll, want to make that 355.30. For pitch, I want to make that 99.70.

CMP Okay. At 32:35, 355.30 and 99.70.

CC-H Okay. Finally, we got it all through. That's lot of reading. Hope it wasn't too bad on you. And you can go ahead and have your chow.

CMP Okeydoke. Very good.

17 27 30 ACDR Okay. Houston, Apollo.

CC-H Go ahead, Tom.

ACDR Okay. I'm on page 1-23 of the checklist. And it says "X-RAY BACKUP PURGE, OFF." Then it says "Wait 10 minutes." Then "X-RAY HIGH VOLTAGE POWER, 1." What you're saying there is to go right away to X-RAY LOW VOLTAGE, 2 and omit that HIGH VOLTAGE POWER, 1. Right?

CC-H That's after the "Wait 10 minutes" down there at the bottom. Where it says "X-RAY HIGH VOLTAGE POWER to 1," we want to use 2. And that's only going to be for this time, we hope.

ACDR I got you. So I'll circle it.

CC-H Thank you very much, Tom.

CC-H Just a little information. What we've been getting is our counts on that X-ray instrument are just a - above normal what they should be. Also, we're seeing the high voltage running a little bit higher than it should be. And we're not - It almost looks like two separate problems, and we're trying to isolate them out.

ACDR Roger.

CMP Have these been going ever since you first looked at the instrument, or about when did they start?

17 28 46 CC-H It - We first looked - When we first did the powerup, it was basically okay, but when we did that raster scan yesterday, that EUV raster scan, is where we first noted a problem.

CMP I see.

ACDR Hey, Crip. We ran - we were kind of late finishing up last night and missed the news. Sometime today - I don't know, maybe on the next ATS pass if we got some time - if you could give us some news, we'd appreciate it.

CC-H Oh, I'd love to give you some news. I'm just standing by here in the GO mode.

ACDR Okay; then give us now until we got breaklock.

CC-H We're about to break lock. It's probably a couple of minutes now to LOS, and they need to reconfigure the things. So why don't we wait - try to pick it up on one of the - one of the later ones. We got MILA at about 36 minutes from now. See you there.

17 29 36 ACDR Okay. Real good, Crip.

END OF TAPE

Day 201

TAG Tape 201-10/T-68
Time: 201:18:00 to 201:19:30
Page 1

ASTP AIR-TO-GROUND VOICE TRANSCRIPTION

18 06 01 CC-H Apollo, Houston. We're now AOS through MILA.
ACDR Roger, Crip. Roger. We see we're zipping past Florida pretty fast.
CC-H I'm sorry, Tom. I couldn't copy that.
ACDR Roger. We're seeing the coast of Florida go past pretty fast.
CC-H Rog. That - You should be passing over actually the coast of Mexico there, and Florida should be coming up in just a few minutes.
ACDR Okay. Okay. We thought it was out by the tip there.
CC-H You're - just came over into the Gulf of Mexico.
ACDR Okay.
CMP Hey, Crip. We can see you from here.
CC-H See Houston?
CMP Yeah.
CC-H Very good.

18 06 52 CMP Can see the whole Gulf Coast there from Brownsville up around through Houston and around to New Orleans.
CC-H Great. I haven't had a chance to look outside today. We got pretty weather?
CMP Looks like a nice day from here. I'd say kind of high scattered - -
CC-H Fantastic. Hey, while we're sitting here and got a few minutes, you guys asked about the data a little bit earlier. Like to tell you that the EUV telescope is performing outstanding. It - right now it's approaching right on the state of technology. We couldn't ask for better out of it.

ACDR I think that sounds great, Crip. Sounds great.

18 07 32 CC-H Yeah, and, actually, that little - little deal we went through with the raster scan last night - We ended up doing the raster scan just a couple of degrees off of what we had originally planned to, and we lucked out. We picked up a couple of extra stars that allowed us to determine what the accuracy of the pointing was much more accurately than we would have been able to do without picking those up. So we're looking forward to really getting some great data out of that experiment.

ACDR We're here to give it to you. Just let us know what to do.

CC-H Okeydoke.

ACDR Sometimes you luck out, huh?

CC-H Rog. Well, I don't know - -

ACDR Sometimes you luck out.

CMP Well, we really had that planned.

CC-H That's skill and cunning.

18 08 13 DMP Okay, we're in the middle of your X-ray purge.

CC-H Copy. And we need, down on 230, also, the UP TELEMETRY switch to DIRECT, please.

18 08 31 DMP Okay. You got it.

CC-H Thank you, Deke. Okay. And we've got our command in now and you can go back on that switch to center, UP TELEMETRY.

DMP Okay.

DMP If you go to the Cape tonight, Crip, you got some nice big ones right over Orlando, looks like. Watch out.

CC-H Big bumpers, huh? Well, I haven't got a chance to go flying through them anyhow.

DMP Too bad.

CMP Houston, Apollo.

CC-H Go ahead.

CMP Funny thing, Crip. Looking at thunderstorms down there, they don't look that much below us. We feel like we're really in a low orbit.

CC-H Yeah. You know, Owen - I remember him making a similar comment, especially like at night when they were coming over and there were a lot of lightning and so forth going in them that - look - I guess the appearance is that you're right - right with them.

CMP Okay, you can see the three-dimensional quality of them very well; very big mushrooms.

18 10 52 CC-H Not to change the subject from thunderstorms, but our troops down here have come up with a pretty - pretty good little idea. If it is getting kind of warm there in the command module, one of the suggestions is that we could take that little duct hose that we use in the DM to mix air with the Soyuz and run it back into the command module. Maybe since the air in there is a little bit cooler, it might - might make you a little bit more comfortable or at least move it around a little bit better. Should be able to just take a utility strap and be able to connect it in - for - on one of the stats there in the tunnel.

CMP Sounds like a good idea.

CC-H Would you gents like me to try to throw a little news at you now?

ACDR Sure.

CC-H You know yesterday I told you about that new cocktail. I guess - They're telling me that all - getting almost as much news as that was your piping "Hello, Darling" by Conway Twitty into the Soyuz.

ACDR They kind of like that country and western in (Russian), huh?

18 12 45 CC-H Right. Right. One - one other happening today was President Ford will go to Helsinki, Finland, July the 30th through August the 1st to take part in a 35-nation summit meeting of the European Security Conference. The President is expected to leave Washington by next Saturday on the Helsinki trip, which is understood to be the forerunner of additional stops in Bonn, Warsaw, Bucharest, and Belgrade. Mrs. Ford is expected to accompany the President on the 10-day trip. We got a keyhole coming up here and I'm going to hold up for a moment. I'll come back at you a little bit later.

ACDR Roger, Crip.

CC-H Okay. We're out of the keyhole again. We talked a little bit about the country and western awhile ago. One little bit of sad news from the country and western fans was that country singer Lefty Frizzell died Saturday night from a massive stroke. I remember Lefty was the one that really got famous for like - "If You've Got the Money, Honey, I've Got the Time."

ACDR Yeah, I remember real well. Sorry to hear about it.

18 14 43 CC-H Little bit of news from down south of here. The - in San Salvador, Miss Finland, Anne - I think the name is pronounced something like Pohtamo, was named Miss Universe 1975 over representatives from 70 other countries in the 24th annual pageant broadcast throughout the world from San Salvador. Runners up included Miss Haiti, Gerthie David; Miss U.S., Summer Bartholomew of Merced, California; Miss Sweden, Catharina Sjudahl; Miss Philippines, Rosemary Singson Brosas.

ACDR Crip, we've got ... echo.

18 15 23 CC-H Okay. Understand, we got the echo. That's caused when we lock up on the ATS, and we've still got you here. We'll clean it up.

CC-H Okay. We sometimes get into a simultaneous uplink coming at you both through the FM and then through the ATS. And I guess the double effect there is - is an echo. I think we got that cleared up now.

Day 201

ACDR Sounds great, now.

CC-H Fact you were coming back at me echoing, too.

ACDR Roger.

18 16 55 CC-H One little item of news to - set your memory, was 6 years ago today at 3:17:40 central daylight time we landed on the Moon. At 9:56, that's when Neil said his famous words about "small step for man, giant leap for mankind."

ACDR Roger. Remember it well.

DMP Say, what day of the week is this, incidentally?

CC-H This happens to be Sunday.

CMP ..., our day off.

CC-H Oh, yeah. We'll get them off after you guys get back. Y'all - y'all are certainly not getting a day off today.

CMP We're not complaining.

CC-H To continue with the news - -

CMP We don't like days off up here.

18 17 52 CC-H (Laughter) Well, I don't know. It - from down here it would - it would appear that we're working you pretty hard, but glad you're enjoying it anyhow. To continue on with the news a little bit, the President intends to veto on Monday a bill rolling back the price of U.S. oil to \$11.30 a barrel, a spokesman announced today. Press Secretary Ron Nessen said that the President believes strongly this piece of legislation is unacceptable and would increase U.S. reliance on foreign imports by as much as 350 000 barrels a day. Optimism grew today that a nationwide postal - postal strike can be avoided, but the postal service prepared plans for use - using troops, if necessary, to move the mails. Postal workers and officials of the postal service met separately today with Federal mediators counseling both sides prior to resuming joint

sessions later in the day. Senate Democratic leaders won the first round today in their efforts to block any delaying tactics against the bill to extend the Voting Rights Act for 10 years. As a result, the Senate will vote Monday on a move to limit debate on the motion to consider the extension. The Voting Rights Act, which under - under which hundreds of thousands of southern blacks have registered over the past decade, expires August the fifth. Senate leaders have said they will stay in session past the August first schedule to start on a month-long recess, if necessary, to ensure the action on the extension. After a delay of more than a year, Senate hearings were - are scheduled later this month on legislation to implement recommendations on how to prevent future Watergates. "Only by acting on this bill can we truly put Watergate behind us," said Senator Abraham Ribicoff, Chairman of the Senate Government Operations Committee.

CMP Roger.

CC-H Okay. I'll go ahead and hold up on any further conversation here for your upcoming pass.

18 20 14 ACDR Okay. We'll maneuver to this X-ray UV attitude at 50 on the DET, just like you said. We've got it loaded in for VERB 49.

CC-H Okaydoke.

18 20 28 ACDR Okay, Dick. I just went to X-RAY HIGH VOLTAGE POWER, 2.

CC-H Okay. Fine. Thank you.

ACDR Thanks for the news.

CC-H Well, wasn't really exciting. You guys are still making most of it.

ACDR Well, we've got some great help from people like you and the rest of them at that center on the ground, too.

CC-H Yeah, these troops down here have been working hard.

18 22 19 ACDR And we're maneuvering to the first attitude.

 CC-H Roger.

 CMP Crip, how should we treat the water boiler after this? Just open it at the regular time or what?

 CC-H No, we want to hold up on activating it. I can walk you through this - this day's ops, but we would like to leave it off for today until we talk to you - look a bit further at it.

 CMP Okay.

 CC-H Would you like me to go through with you and mark them all out?

 CMP Yeah, sure. I can do that right now.

 CC-H Okay. Well, don't want to - don't want to interfere with this operation you're doing.

 CMP Yeah, on second thought, why don't we hold up for a few minutes?

 CC-H Okay. In fact, if you like, we don't have to mark them. We'll just remind you each time, just ahead of time.

 CMP Okay. Main thing then is just the philosophy - when we get a chance.

 CC-H Yeah. We'll leave it off until we - We'll just keep watching it down here, and when we're sure it's squared away, we'll get back with you.

 CMP Right.

18 23 29 CC-H You guys still fairly comfortable as far as temperature goes?

 CMP Strangely enough, it's been pretty good, just lately.

 CMP We kind of thought it'd heat up quite a bit when we didn't have the water boiler going, and we haven't noticed it too much.

 CC-H Well, that's good.

18 24 25 CC-H Apollo, Houston. We're still seeing high counts on that X-ray data, and, if we can, we'd like somebody down in 230 to take the HIGH VOLTAGE POWER switch from the X-RAY to OFF for 10 seconds and then to 1.

ACDR Okay. Deke's working it now.

CC-H Thank you, Tom.

18 25 58 DMP Okay. She's in 1.

CC-H Okay. Thank you, Deke.

18 35 05 CC-H Apollo, Houston. Our X-ray still is not looking all that great, and we would like to minimize the time that we have the HIGH VOLTAGE POWER on. What we would like you to do is - down - You've got a maneuver coming up at 10:56, and it's a pretty long one. What we'd like you to do is at 10:56, go ahead and turn the HIGH VOLTAGE POWER on the X-RAY to OFF and then at 15:46, when we're back to the data take time, we'd like to turn it back ON - back to 1.

ACDR Okay. HIGH VOLTAGE on the X-RAY off at 10:56 and back on at 15:46.

CC-H That's affirm, Tom. Sorry to keep bugging you around on here, but we're trying to improve the data as good as we can.

ACDR Understand. No problem.

ACDR Houston, Apollo.

CC-H Go ahead, Tom.

18 38 35 ACDR Okay, again reviewing. At 10:56, the HIGH VOLTAGE, OFF and then after we finish the maneuver and at 15:46, the HIGH VOLTAGE back ON, and you want number 1. Right?

CC-H That's affirmative.

18 46 01 CMP Houston, Apollo.

CC-H Go ahead.

Day 201

CMP Crip, how's our hydrogen and oxygen going? We haven't talked about that in all these day. Just curious, redline wise.

18 46 28 CC-H Okay, Vance, we're in good shape. We're running right on on hydrogen, right on what we anticipated - a little bit less, I guess, on oxygen, but we've got a 9-day capability.

CMP Very good.

18 53 07 CC-H Apollo, Houston. We had good data there for about 3 minutes off the X-ray, and now it's gone out on us again. And if we can, we'd like to get that HIGH VOLTAGE once more turned off for 60 seconds and then back on.

ACDR Okay. Vance ...

CMP ... off and on.

18 53 33 CMP Coming off now.

CC-H Okay, Vance. Thank you.

18 54 35 CMP And back on again.

CC-H Okay. Thank you.

19 00 28 CC-H Apollo, Houston. Vance, if you could do it once more for us, we'd like to go down to 230 on that X-RAY power switch - HIGH VOLTAGE POWER and take it to OFF for 60 and then back ON.

CMP Okay. HIGH VOLTAGE, OFF, for 60 and back ON.

CC-H Apollo, Houston. I boo-booed awhile ago and didn't give you your start time for your DET on the next pass coming up, and it's back-to-back. You might want to write that down on the next page.

CMP Okay. That's H - the helium glow scan?

CC-H Yes, sir. Helium glow 76/77. Start time on it is 127:00:55.

CMP 127:00:55, Crip. Got it.

CC-H Okay. Thank you.

19 02 23 CC-H Apollo, Houston. We're about to go AOS [sic] from the ATS. We'll have you again in 12 minutes at Vanguard; that's 126:53 - 126:53.

19 02 34 CMP See you then.

19 14 24 CC-H Apollo, Houston. AOS Vanguard, 7 minutes.

ACDR Okay, Crip.

CC-H Okay. We'd like to relay to you - we would currently like to delete the X-ray ops from this upcoming helium glow scan.

ACDR Roger.

CC-H Apollo, Houston. Copy. We would like to delete X-ray ops from the upcoming helium glow scan at - It's turned on not at the first but over - over on the second page of the thing.

CMP Roger. We understand.

CC-H Okay.

ACDR Say, Crip.

CC-H Go ahead.

ACDR The Sun angle may be working on that boiler. Some big hunks of ice just came off as it came out in the sunlight.

ACDR They're pretty good size pieces of ice.

CC-H Okay. You think those came off of where the - the evaporator port is?

ACDR Yeah, they came off from that side all right.

CC-H Okay.

19 15 45 CC-H Okay. We appreciate that information, Tom. Speaking of ice, you reckon - We're a little bit concerned about that cryo freezer. You know you - we had you

undo it last night, and you had some problems. If Deke or somebody's got some time to go down there and take that cap off for us and wipe off the inside of the plug with some tissues or something and put it back on, make us feel a lot more comfortable for tomorrow.

ACDR Okay. Okay. I'll do it in a little bit.

19 17 17 CC-H You gents might notice over there in the left-hand column you were scheduled for a block update, but it seems like a kind of busy time getting ready for that helium glow scan. We'll give you that sometime later.

CMP Houston, Apollo.

CC-H Go ahead.

19 20 41 CMP Okay, Crip. We mistakenly got the X-ray on also on that one. I'm going to turn it off immediately. Wonder if you want the standard powerdown. I thought I'd check with you first.

CC-H Okay. You can go ahead and do the X-ray powerdown, as we've modified it, of course, leaving LOW VOLTAGE POWER, ON.

CMP Rog.

19 20 52 CC-H Okay. We're 1 minute from LOS. Next station contact, we've got a short one at Goldstone in 15 minutes at 127:14.

19 21 19 CC-H Make sure that we get that door closed on the X-ray before we start our roll maneuver.

END OF TAPE

Day 201

ASTP AIR-TO-GROUND VOICE TRANSCRIPTION

19 36 18 CC-H Apollo, Houston. We're AOS through Goldstone for 2 minutes.

ACDR Okay.

CC-H We are 1 minute from LOS. Next station contact will be Newfoundland, in about 7-1/2 minutes.

ACDR Hey, Crip.

CC-H Rog.

ACDR Hey, I just went up to start our ops just like planned - and our furnace pressure is reading zero. It's supposed to be greater than 4, which means - -

CC-H Copy. Reading zero, supposed to be greater than 4. I'll try to have word on you - on it for you at Newfoundland. Hold up on it.

19 38 03 ACDR Roger.

19 45 32 CC-H Apollo, Houston. We're AOS through Goldstone. Should have you for about 7 minutes.

DMP Okay.

CC-H I'm sorry. How about Newfoundland?

DMP That sounds better. Is it?

CC-H Yeah, well, I get lost easy.

DMP We've just been looking at Wisconsin through our spotting scope, and across Lake Michigan, where the clouds are getting ...

CC-H Ah-hah! You knew where you were better than I did, then.

CC-H Any chance I could talk one of you gents that isn't too busy into digging out a pad for me? To improve our data a little bit on this upcoming rev 80 for EUV, we would really like to run the - one of the EUV contingency pads - the EUV contingency pad for

rev 80, which is buried down there in Alfa 2. Any chance somebody could sneak under the couch there, and get it?

CMP ... for you.

DMP The furnace, while I got you, Crip -

CC-H Okay. Regarding that furnace, Deke, we have - this kind of sample we got in there. It's a little bit different from what we've been running. And we suspect that it's just outgassing. It's going to take a little while for that pressure to get down. So what we'd like you to do is, just to - wait awhile on it. And go back and check it a little bit later, and see if the pressure's dropped.

19 46 54 DMP Okay. We'll do that. And as far as the freezer is concerned, I've had the cover off of that. There is a lot of frost on the plug. But the problem is - in the process of opening that thing, we've accumulated a lot of frost on the remaining samples and the bottom of the plug, and that's where our binding is occurring. It's back in, and we're in good shape now. So I propose we don't take the lid out any more often than necessary.

CC-H Okay. Understand the frost was forming on the bottom of the plug, or down on the samples themselves?

DMP That's affirm.

CC-H But - I didn't understand whether - -

DMP ... and the plug. And any time you take it out, of course, we've got enough humidity in here to load it up in a hurry.

19 47 41 CC-H I - I didn't - I wasn't quite with you, Deke. It's on - the frost is on the bottom of the plug. Is that correct?

19 49 37 CMP - - Heard your plan. And he'll be with you in a second.

CMP Okay, Crip. Almost got lost under the couches, finding it. But here it is. I'm ready to copy, if you'll give us the page.

CC-H Okay. What we want you to do is to dig out the - under the EUV contingency pads, rev 80, which is page 4-4. And all you've got to do is just pull that one out, and we'll use it to replace the rev 80 pad that we've got in your Flight Plan Supplement.

CMP Okay.

19 50 53 CC-H Since you went to all the problem of digging that book out, you might put it in some easy - more accessible place than A2.

CMP Sounds like you plan to use it some more, maybe.

CC-H Well - I don't. But the people in the backroom might.

CC-H Okay. We're 1 minute from LOS. Next station contact in 3 minutes, through Madrid. That's at 127:33.

CMP Copy.

CMP Okay, Crip. Here I have page 4-4, EUV pad, rev 80, contingency; and replace the one in the book - or, in our Supplement - Flight Plan. I understand.

19 52 16 CC-H Okay, Vance. That's - that's fine. Thank you.

19 55 29 CC-H Apollo, Houston. We are AOS Madrid. We have you for 6 minutes.

ACDR Roger. Understand. There's no ATS voice until 128:57.

CC-H That's affirm. In fact, we've even released the satellite such that you couldn't tune it in if you wanted to.

ACDR Oh, really.

CC-H Yeah. We figured we wouldn't - wasn't going to need it, so we might as well let them - let them relax.

ACDR Okay.

ACDR Will we have it on and off for the rest of the mission?

CC-H Oh, yeah. It's just for this one rev that we've released it.

ACDR Oh, okay.

CC-H No, couldn't give up all this good voice and data.

19 56 13 ACDR Right.

CMP Oh, the satellite has other duties, too, I understand. It divides its attention with us.

CC-H Apollo, Houston. Is the DP available to let me bend his ear for a moment?

DMP Yeah. Go ahead, Crip.

CC-H Yeah, Deke. The - A little bit later, at around a little after 129 hours, we've got a TV camera setup called out for you. And you probably heard us discussing the last couple of days about a camera that's - we're - we were describing as bad; it's, at least, not good. And that currently is the one we've got installed in 871. What we'd like to do is to take the one we've got in 873 and put it in that 871 location for that upcoming TV. And, I'm kind of recommending that what you might do is take a piece of tape or in some way, label that one that you pull out of 871 as - as bad or something, and you can either put it in 873 or you can put it someplace and tuck it out of the road. I believe we'll probably try not to use that one for the remainder of the mission. Also, when you - when you swap it, we want to leave the cables connected as they are - the cables in the U-mount, so you don't need to pull those out.

19 58 06 DMP Okay. Really, you just want to swap around from 871 to 873 and vice versa. Is that correct?

CC-H That'll be fine. However, we're going to be using 873 again a little bit later, and we'll be asking to put one back in it, so it would just require another swap. You can do whatever you would like with that one you pull out of 871 - the best place you think to stow it. If 873's a good place, do that.

DMP Okay.

CC-H And, Deke, when you go back there, you might get another reading on the furnace and let us know how it's coming.

DMP Okay. We'll do that.

CC-H Back there, or up there, whatever way you consider that direction to be.

DMP Any way you want, we'll go it.

19 59 38 DMP Say, Crip, I just went up and checked that, and we're still reading zero on that pressure on the furnace.

CC-H Okay. And, of course, Deke, you can verify for us that the VENT and ISOLATION VALVES are opened to vacuum.

DMP Yep. I've done all that. I checked the caps, and I even got the old shroud cover closed for a change ...

CC-H Okay. We copy all that. And we're trying to make up our mind here what we want to do about it. We'll get back with you.

DMP Okay.

CC-H Okay. We are 1 minute from LOS. Our next station contact will be through Orroral in about 40 minutes. That's at 128:18 - 128:18.

ACDR Okay.

CMP Incidentally, I just has an opportunity to use the new binder proposed for Shuttle, I think, in the Supplementary Flight Plan, and we'll have a couple of comments on that a little later.

CC-H Okay. We would appreciate it.

20 01 10 CC-H Apollo, Houston. You got a GO to continue furnace operations.

20 01 14 ACDR Okay. We're going ...

20 47 43 CC-H Apollo, Houston. We are AOS through Vanguard for 5 minutes.

ACDR Roger, Crip. We're progressing right on schedule.

CC-H Very good.

CC-H A little information for future planning. We're going to end up modifying what we've got planned for this next X-ray pad, and I'll be giving you that when I see you at Goldstone just after you finish this helium glow.

20 48 13 ACDR ... off.

ACDR Hello, Houston. How do you read?

CC-H Reading you kind of weak, but clear. Go ahead.

ACDR Okay, to copy this data down at Goldstone - is that **the one that Vance got out of A-2 on 4-4?**

20 48 56 CC-H Negative, negative. What we're going to do is - we're just going to do another backup purge on the X-ray unit - if that - where we've got time scheduled for that pass, and we're not going to do any - any pass. I'll be talking about - about that a little bit more at Goldstone. We're going to save that one he pulled out - 80, and do it at 80.

ACDR Okay.

CC-H For your information, for Deke, I guess; the - on that furnace, we're looking at data now, and the temperature looks good and we think everything's squared away, and it was just that particular sample that was the reason we couldn't get the pressure down.

20 49 32 DMP Okay. Well, I was reading 1.3 when I put it in, but it's back down to zero again now.

CC-H Copy.

DMP Incidentally, Crip, I started that thing on 127:50.

Day 201

TAG Tape 201-11/T-69
Page 7

CC-H 127:50. Thank you, Deke. Appreciate that. Kind of helps us know what's going on down here when we get those little updates.

DMP Okay.

CC-H Okay, guys. We're 1 minute from LOS, and our next station contact will be through Goldstone at 14 minutes from now, and that's about 128:26 - I'm sorry, about 128:44.

20 52 21 ACDR Okay.

END OF TAPE

Day 201

ASTP AIR-TO-GROUND VOICE TRANSCRIPTION

21 06 23 CC-H Apollo, Houston. We're AOS through Goldstone for 6 minutes.

ACDR Okay. Roger. We're coming up - just about to finish the helium glow scan.

CC-H Okay. When you finish that up give me a holler, Tom, and I'll give you a VERB 49 maneuver for where we want you to go next.

21 08 06 CC-H Apollo, Houston. We see that you're back in POO now, and if you could give us ACCEPT, we'll go ahead and load you a state vector, and when you're ready to copy, I can give you the roll, pitch, and yaw for a VERB 49.

ACDR Ready to copy. Go ahead.

CC-H Okay. For a roll of 110 - I say again, roll is 110, pitch of 129, yaw of 000. When we finish your uplink here you're - got a GO to go ahead and perform that maneuver.

ACDR Roger. Roll, 110; pitch, 129; yaw, 000; on the VERB 49.

CC-H Okay. That's fine.

CC-H And the ATS angles that we got down below are still going to be good for picking that up.

ACDR Okay.

CC-H And if you're still copying, I'd like to tell you what we want to do over here on this X-ray pass at 129:07.

CMP Go ahead.

21 09 17 CC-H Okay. What we'd like to do is to perform an X-ray backup purge, similar to what we did while ago. It's on the Experiments Checklist, page 1-23. And where it calls for it for 5 minutes for the purge to go, we want to do - do it for 15 minutes instead of 5 - that's before you turn it off.

CMP Okay. After we get the attitude I - I suppose on your key, we'll do an X-ray backup purge at page 1-23, Experiments Checklist, do a 15-minute purge instead of 5 minutes.

21 10 00 CC-H That's affirm. We want to do it at - do it at 129:08, which will be sunset. And at the conclusion of that purge, instead of turning your HIGH VOLTAGE POWER, on, as called for, we want you just go ahead and close the door on the - close the cover on the X-ray experiment.

CMP Okay. Understand. The backup purge will be performed at 129:08, and at the completion of the backup purge, we do nothing more than close the cover on the X-ray.

CC-H That's affirm. The current checklist does call for you to go ahead and turn HIGH VOLTAGE POWER, on, but we don't want to do that in this particular case. Okay. The - we completed our load and the DSKY belongs to you guys again, so you can go ahead and do that maneuver at your leisure.

21 11 17 CMP Okay. Starting the maneuver, Crip.

CC-H Okay. That - that's fine. Vance, one item I need to clarify. Awhile ago when I told you about slipping in that rev 80 pad, I might have fouled you up a little bit, in that the rev 79 pad was on the opposite side of that, and we are still going to need that one, in case you did pull it out of the book, or anything.

CMP Okay. Understand.

CC-H We're about 30 seconds from LOS and we'll have you again at Newfoundland in 6 minutes.

CMP Okay.

21 12 59 CC-H Okay. We copy that you did not do a rewind on the DSE and we need that.

21 18 11 CC-H Apollo, Houston. We're AOS through Newfoundland. Should be with you for about - oh, 52 minutes with the - with the ATS.

ACDR Okay, Crip. we'll be ready at the time that you suggested.

CC-H Okay, fine. One other item I might suggest in trying to look ahead, here, and seeing where you are in the Flight Plan, since the activities you have on this X-ray purge aren't going to be too busy. We've got called out for some leg volume measurements over at about 131:30. And I guess Deke and Tom might think about trying to get - get those out a little bit early, here, in some of this time, if it looks like it might be a little bit easier to do, and spread that out a little bit.

DMP Okay.

ACDR ...

CMP Seems that's a really a good idea - avoid these real jammed periods.

CC-H Yeah. If we can spread out some of these activities and make it a little bit easier. That's the way to go.

CC-H One other item I'd like to get in sometime, if - if it's convenient for somebody to get out the Updates Book, I can go ahead and give you a rev 108 block data.

CMP Stand by. We'll get the book.

21 19 41 CC-H I'm also going to need, on panel 230, the UP TELEMETRY switch to RELAY, and you might as well stand by there, when you get it.

CMP Okay. Go ahead. We're ready to copy.

CC-H Okay. We're switching over here on the ATS. I want to make sure you read me okay.

CMP All right.

CC-H Understand you copy me good. Vance, you're cutting out a little bit.

CMP I'm hearing you fine.

21 21 40 CC-H Okay, fine. Here I come at you - rev 108, NOUN 33, 176:57:24; minus 194.1, plus all balls, plus 018.3; all balls, 329, 359; 176.9; 00:07; 197, 1568.7,

25756, 25:52; 27:09, down range error's NA; 056/314, 32:48, 35:36. Before I continue on, I need to verify on 230, and get the UP TELEMETRY switch to RELAY, please.

CC-H Okay. Continuing on my read. Starting with latitude, it's plus 22.00, longitude, a minus 163.00. Standing by for your readback.

CMP You cut out on the latitude.

CC-H Okay. Latitude is plus 22.00. Longitude is minus 163.00.

(Music)

CMP Okay. Readback block data: rev 108, 176:57:24; minus 194.1, plus all balls, plus 018.3; 000, 329, 359; 176.9; 00:07; 197, 1568.7, 25756, 25:52; 270 - 27:09, NA; 056/314, 32:48, 35:36; plus 22.00, minus 163.00.

21 24 22 CC-H Okay. That's a good readback. And I've got four remarks for you. Number 1 is for command module/FM sep. Yaw left at ... Copy 314.

CMP Copy 314 left for sep.

CC-H Roger. Number 2: NOUN 48, your pitch trim is minus 0.23, yaw trim is minus 0.85. Your CSM weight is 25 853, your docking module weight is 4500. Over.

CMP Rog. Pitch trim minus 2 - 0.23, yaw trim minus 0.85, weight CSM 25 853, the DM 4500.

CC-H That's a good readback, Vance. Thanks a lot.

21 25 29 CMP You bet.

CC-H And, Vance, on that - we keep chasing you around, after this X-ray instrument, to let you know we have got some good data back from it, so it's not being completely lost. We're still trying to correct the problem. That's why we're doing the long purge, of course. We think it to be correlatable with temperature of the instrument, and that when it's real cold, if we're not - not getting good data, we're still trying to understand that. Also a little bit of information for you. The helium glow is working real well, so on the EUV and the helium glow we're getting excellent data.

CMP Okay. That's really great. Hope we can get the X-ray fixed up.

21 26 10 CC-H Okay. We're going to keep after it.

CMP And we'll be doing that backup purge in a little less than 4 minutes.

CC-H Okay. Copy. Also, Vance, if you've still got the Flight Plan out working with it, following this purge, there is - following this X-ray purge and X-ray pass there was a callout under the DP column to activate the primary evaporator. We would like to still leave that deactivated and be interested in hearing how the temperature situation's going now. How do you feel?

CMP Roger on leave it deactivated. We don't need it too badly right now. Strangely enough, temperature's going very well. Been getting apparently better ever since we undocked.

21 26 57 CC-H Yes, that - that's amazing and that's good to hear. Did I understand you earlier to say that you'd been running the cabin fan some or was that - is that correct?

CMP That's right. From time to time, when it got uncomfortably warm, we would run it particularly because circulation tends - tends to make it feel better.

CC-H Rog. Did you gents ever rig up that hose coming from the DM into the CM? Or if you do, we would like to know when you do it.

CMP Okay, we haven't done it yet, because right now it's fairly comfortable, and periodically we turn on the fan if we need it. But, we - we're kind of holding that in our pocket, in case - especially for tonight.

CC-H Okay, you might do that right now, we are considering, since it would slow down your metabolic rate, that the thing shouldn't be heating up, and we're considering leaving the evaporator deactivated.

21 28 58 CMP Okay, very good.

CC-H Apollo, Houston. While we're sitting here and we're looking at the purge - or that - or the ex - exercise

that the AC's got coming up here, we suggest to try to get as close to the end of the DM as we can. That - we used the longest comm umbilical, which should be the one for the right-hand couch, normally Deke's.

CMP Okay, I'll pass that on to him. He's up there right now.

21 32 59 CC-H Okay. Also, Vance, he's got a TV prep coming up, and we would appreciate verifying after he does that prep - that particular camera light comes on, to make sure that it is operative.

CMP Okay. I think the prep's probably done now, I'll check.

CC-H Okay.

21 35 30 ACDR Houston, Apollo.

CC-H Rog. Go ahead.

CMP Okay. The camera's set up. The prep is like I said, it has been completed. But we had a question. During Tom's exercise period, why do you think you would need a comm cable?

CC-H This is the one that we're supposed to do on biomed. It's noted out for - got him under - to don the OBS there at about 129:45 or so.

CMP Okay.

CC-H One a day.

CMP Terrific. Yeah. Okay.

CC-H One a day. And this is his day.

CC-H For your information, Vance, tomorrow's your turn in the barrel.

21 36 52 CMP Oh, okay. I'm looking forward to it, Crip.

CC-H Okay. We'll just spread it around here.

21 54 17 CC-H Apollo, Houston for the CP. Vance, we still got, oh, 18 more minutes of night here, but we assumed that you should have finished up with that purge about now, and we just wanted to make sure that we got the cover closed on it before we go out in the sunlight.

CMP I'm still - after turning the purge switch, waiting 10 minutes, and I sort of assumed that that was for the case of when you turn on the high voltage power, but not being sure, I thought I'd wait 10 minutes anyway. Guess I could have asked. Okay to close it now, I assume?

CC-H It's okay to go ahead and close it, and I - you assumed correct about the - the wait there. One other item, whenever you get a chance to it, after you do that, I have the updates for the DET times for rev 79 and 80 when you can get the Supplement out.

21 55 16 CMP Okay, stand by one. I'll close this cover first.

CC-H Okay, no rush.

CMP Okay, ready to copy.

CMP Houston, Apollo.

CC-H If I could talk on the right loop, I could get up to you. For the DET time for rev 79, Vance, it's 130:36:36. And we are planning on doing that X-ray pad and seeing how our data looks.

CC-H Apollo, Houston. Did you copy that time, Vance?

CMP Roger; I did. Yeah, excuse me a minute, but what do you mean by DEB [sic] time there? I guess I just don't find the right spot or it doesn't - -

CC-H Okay, I'm - it's the time that we set the DET counting up to - up there at the top, which is your sunset time.

CMP Oh, okay. I thought you said - very good, I thought you said DEB. Very good, I got it. And we'll go ahead with it.

CC-H Okay, fine. Also, now the time for the EUV pad, and this is that rev 80 contingency pad I had you dig out while ago. I'll wait until you get that out.

CMP Right.

CC-H Okay. It's 1 - 132:05:27.

21 58 20 CMP Okay. Got it. 132:05:27.

CC-H Okay, Vance, then - -

CMP The first - -

CC-H Sorry, go ahead.

CMP And the first one was 130:36:36.

21 58 33 CC-H That's right, 130:36:36. That - that is correct. Vance, one item here I ought to remind - I was just thinking about - looking at all these pads. As much as we're running this DSE, and we're not around you, just like to remind you that, of course, everything you say on intercomm, we're managing to be able to get ahold of since it's recorded on the DSE for us.

CMP Okay, thanks for the reminder. We'd probably forget.

CC-H I know I would.

ACDR Crip, how do you read me?

CC-H Loud and clear, Tom. Go ahead.

22 03 07 ACDR All right.

CC-H AC, Houston. We're reading you loud and clear. Go ahead.

CC-H Apollo, Houston. Do you read, Tom?

ACDR Loud and clear, Crip. Real loud and clear.

CC-H Okay. We're with you any time you want to talk to us. Still got you for about - oh, 6 more minutes here.

ACDR Okay. I've got this biomed on and I'll start doing some exercise.

CC-H Oh boy, I bet that's fun.

ACDR I've waited all of 5 days for this.

CC-H (Laughter) Okay. I'm glad you're finally getting to it.

ACDR Not the excer - not the exercise. I'm putting on that wonderful harness.

CC-H I suspected that was what you were talking about.

22 04 26 CC-H Okay. And for a reminder on that. We - we're not looking at live data now, Tom, and we will need the DSE on to - to record that.

ACDR DSE on - you mean the VTR, the DSE or what?

CC-H Tape recorder.

CC-H Apollo, Houston. Tom, I'm informed that we've got a little show and tell scheduled there, so - and unfortunately, with our data recording plan and dropping it, we're going to need you - need you to delay starting that exercise, and we'll have to get it on DSE and VTR as what - as planned right now, after we leave Hawaii, and that's not going to be until about, oh - 0.5, almost 30 minutes from now.

ACDR Beautiful. It's all right, Crip.

CC-H I thought you would appreciate that.

ACDR Every little thing helps, Crip. (Laughter) Look like Alley Oop and swing through the trees - a-a-ah!

CC-H (Laughter) If you say so.

22 08 40 CC-H Apollo, Houston. We are about to lose you here through the ATS, and one item we need is on the UP TELEMETRY switch on panel 230. We need to go back to center UP TELEMETRY position, please, and we'll see you in about 2-1/2 minutes at Orroral.

22 08 55 ACDR Okay.

22 13 54 CC-H Apollo, Houston. We're talking on VHF at you through
Orroral. It's only a little over a minute here, and
our next station contact is going to be at Hawaii in
15 minutes, at 130:07.

ACDR Okay, Crip.

CMP Okay. And Tom would like to know when he should
start the exercise? Right - I'd presume, as scheduled
at 130:15. Is that right?

CC-H That's approximately correct. We're going to be re-
winding the DSE when we go over the hill at Hawaii,
and you're going to have to wait until it's rewound
by looking at the talkback, and then when that happens,
you can have at it.

CMP Okay. When the DSE talkback's barberpoled, he'll
have at it.

22 14 36 CC-H That's affirm.

22 29 35 CC-H Apollo, Houston. AOS through Hawaii for 6 minutes.

ACDR Okay, Crip.

CMP Okay, Crip.

ACDR Okay. I'm exercising away up here in the docking
module, Crip. How long do you want it?

22 29 51 CC-H Oh, I'm afraid that I loused you up there, because
what I was - -

END OF TAPE