04 22 38 54	CC	Okay. That's what - the second portion of this really is asking that we do this with the Hasselblad, and again we won't be using the red and blue filters so we have our baseline.
04 22 29 08	LMP	Taking a picture of the earth with the Hasselblad is no big deal because it does swing by the earth now and then. But trying to get the TV and the Hasselblad all pointed to the earth at the same time would really be tough.
04 22 29 21	CC	Roger. I don't think that it's that time-critical, but I'll ask.
04 22 59 15	LMP	Houston, Apollo 8.
04 22 59 18	CC	Go ahead, 8.
04 22 59 26	CC	Go ahead, 8.
04 22 59 29	LMP	We're going to hold up on the LiOH change for about a half an hour. The PCO_2 reading is low, and we don't want to wake up the CDR. It's right by his feet.
04 22 59 40	CC	Good headwork.
04 23 02 46	CC	Apollo 8, Houston.
04 23 02 50	LMP	Go ahead, Houston.
04 23 02 53	CC	Okay, Bill. We are coming up on the P52 and then the P23 sightings, and there is some concern that if we just go directly to P23 attitude that we are liable to overheat quad Charlie. So we would like to have you maneuver to place the minus X-axis towards the sun now. And I have some gimbal angles

here for you. And if we take it over there and point the minus X at the sun between now and the time we have to start into the alignment, then the P23 business - we will tend to coldsoak Charlie, and then we will be able to go through the P23 operations without worrying about the temperatures.

04 23 03 45	LMP	Okay. Give me them.
04 23 03 47	CC	Okay. Roll 183.3, pitch 136.7; yaw 13.5.
04 23 04 27	LMP	Right. 183 roll, 137 pitch, and 14 yaw.
04 23 04 31	CC	Okay.
04 23 04 36	LMP	Actually, we worked out up here on Lovell's slide rule and got 183.25 roll.
04 23 06 15	LMP	Houston, you wanted to go to this coldsoak attitude prior to the P52, did you not?
04 23 06 21	CC	We would like to go to the coldsoak attitude now.
04 23 06 27	LMP	And that was to keep from heating up quad D, was it?
04 23 06 30	CC	Negative. That's quad Charlie.
04 23 06 36	LMP	Okay.

END OF TAPE

APOLLO 8 AIR-TO-GROUND VOICE TRANSCRIPTION

(GOSS NET 1)

04 23 33 52	CC	Apollo 8, Houston.
04 23 33 57	LMP	Roger, Houston. Apollo 8.
04 23 34 00	CC	Roger. The P23 that is coming up next - we will want to do a water dump as soon as we are through with that P23. We'll dump down to 30 percent, and this ought to be the last dump of the mission. Over.
04 23 34 15	LMP	Okay. You think that we will end up generating enough water to fill her up prior to entry.
04 23 34 20	CC	Affirmative.
04 23 34 31	LMP	Okay. We are at that attitude you gave us, so we stopped the roll a little bit short. We're more like 150 degrees roll right now.
04 23 34 39	CC	Okay, Bill. On that water dump, we expect to have 90 percent.
04 23 34 46	LMP	Okay.
04 23 41 54	LMP	Houston, Apollo 8. Over.
04 23 41 57	CC	Apollo 8, Houston. Over.
04 23 42 06	CC	Apollo 8, Houston. Go.
04 23 42 11	LMP	Roger. We are done with the P52 and arranged for the P23. Was there any constraint you wanted, for length of time you wanted to stay in this attitude?
04 23 42 25	CC	Negative, Bill. When you are finished with P23, we will go back into PTC.
04 23 42 35	LMP	Okay. We are going to maneuver for P23 now.

04 23 42 38	CC	Roger. We are watching your tank pressures.
04 23 42 43	LMP	Okay. Thank you. We will do an optical first and then do the P23.
04 23 42 46	CC	Okay.
04 23 44 51	CC	Apollo 8, Houston. We are handing over to Madrid in about 15 seconds. Over.
04 23 45 58	LMP	Roger. And good morning, Jerry, or good afternoon, or whatever it is.
04 23 45 03	CC	Good morning, Jim. It's about 6:30 in the morning.
04 23 45 35	CC	Apollo 8, Houston. How do you read?
04 23 45 40	CMP	Loud and clear. How us?
04 23 45 41	CC	Roger; the same.
05 00 17 49	CC	Apollo 8, Houston.
05 00 17 53	CDR	Go ahead, Houston. Apollo 8.
05 00 17 54	CC	Morning, Frank. Looks like we have lost the transducer on the primary radiator OUT temperature. We are showing an off scale high. The rest of the loop looks real fine, though. When you get a chance, would you take a look at it and see if you're in the same position. Over.
05 00 18 15	CDR	Which one is it?
05 00 18 16	CC	Primary radiator OUT temperature.
05 00 18 22	CDR	Ours is showing 100 off scale high, also.
05 00 18 25	CC	Roger.
05 00 21 57	LMP	Houston, Apollo 8. Over.

05 00 21 59	CC	Apollo 8, Houston. Go.
05 00 22 09	CC	Apollo 8, Houston. Go.
05 00 22 14	LMP	Roger. About this RAD output temp: does your telemetry show that it happened all of a sudden?
05 00 22 20	CC	That's affirmative, Bill.
05 00 22 25	LMP	Okay. I'm on malfunction 23, step 2. It looks to me like there is a small possibility we might be boiling, but I doubt it. So you just want to hop over to step 4 and consider that a closed case.
05 00 22 48	CC	Roger. We consider it closed.
05 00 25 25	CC	Apollo 8, Houston.
05 00 25 31	CDR	Go ahead, Houston.
05 00 25 33	CC	Roger. Frank, all of your primary loop temperature readings look just fine. Your EVAP IN temperatures are normal and indicate you are getting normal mixing.
05 00 25 47	CDR	Okay. Thank you.
05 00 27 44	CC	Apollo 8, Houston.
05 00 27 48	CDR	Go ahead, Houston. Apollo 8.
05 00 27 50	CC	Roger. For the P23 attitude that you are in right now, your quad tank temperatures are better than we expected. We're still monitoring, and it's looking good.
05 00 28 05	CDR	Thank you. After we complete this, do you want us to return to the PTC attitude? Is that correct?

05 00 28 15	CC	That is affirmative, Frank.
05 00 28 19	CDR	Would you have someone get up the gimbal angles for us to point the X-axis at the earth at the TV time, please?
05 00 28 25	CC	Wilco.
05 00 28 59	CDR	Also, Jerry, I would like to know our range and velocity at that time.
05 00 29 05	CC	Roger, Frank. You want the range and velocity at TV time.
05 00 29 11	CDR	Right.
05 00 33 33	CC	Apollo 8, Houston.
05 00 33 36	CDR	Go ahead, Houston. Apollo 8.
05 00 33 39	CC	Roger. At 128 hours, your altitude is 97 413, your velocity is - -
05 00 33 48	CDR	Stand by just a minute.
05 00 33 49	CC	Okay.
05 00 33 53	CDR	At 128 hours, you say?
05 00 33 55	CC	Roger. That's TV time.
05 00 34 01	CDR	Okay.
05 00 34 02	CC	Your altitude is 9 413; velocity is 6072; roll is 1 degree, pitch is 58, yaw 0.
05 00 34 25	CDR	Thank you.
05 00 34 26	CC	You are welcome.
05 00 34 35	CC	I just got a newspaper, Frank. I will go through it and pick out the news items for you.

05 00 34 40	CDR	Good. That will be great. We're just eating breakfast.
05 00 34 45	CC	How are you having your eggs this morning?
05 00 34 50	LMP	Bacon. All except Lovell. He's having eggs Benedict.
05 00 34 59	CC	It figures.
05 00 35 05	LMP	That Timber Cove crew, you know, they -
05 00 35 09	CC	That's the gourmet crowd.
05 00 35 17	CMP	Silk-stocking set.
05 00 35 20	CDR	Jerry, in doing these P23's, we were just about over Africa most of the time. At least, it was in view; nice weather over there this time of year.
05 00 35 29	CC	Roger. You want to go down there?
05 00 35 34	CDR	Do a little hunting.
05 00 42 43	CDR	Jerry, Jim Lovell just checked the P30, P21, and says you are right, 97 800 miles.
05 00 42 54	CC	Roger. Thank you, Jim.
05 00 43 00	CC	We ought to have these computers flight qualified in another couple of missions.
05 00 43 08	CDR	Yes.
05 00 43 50	CMP	Houston, Apollo 8.
05 00 43 51	CC	Apollo 8, Houston. Go.
05 00 43 53	CMP	Roger. Was MCC 6 determined for exactly 122 hours, when you came up with that six-tenths of a foot per second?

05 00 44 21	CC	Roger. Jim, at exactly 122 we were figuring 0.5.
05 00 44 27	CMP	Roger. I'll try it again now at the same time using the P37 with MA. The last time we did it, before the last sightings, I got 2 feet per second. I'm going to see what I come up with this time.
05 00 44 39	CC	Roger.

END OF TAPE

05 00 52 59	CC	Apollo 8, Houston.
05 00 53 19	CC	Apollo 8, Houston. Over.
05 00 53 21	CDR	Go ahead, Houston. Apollo 8.
05 00 53 24	CC	Apollo 8, this is Houston. We are ready for you to start your waste water dump anytime now. Could we have a crew status report?
05 00 53 33	CDR	You may, we had a good night sleep. Everyone slept at least 7 hours yesterday, and we have just finished breakfast, drunk a lot of water, and I think we are in very good shape; just used the exerciser.
05 00 53 54	CC	Roger, Frank.
05 00 53 55	CDR	What would you like to know about?
05 00 54 02	CC	That's about it. Are you ready for some morning news?
05 00 54 04	CDR	Yes.
05 00 54 07	CC	Okay. There is really not a whole lot in the news this morning. Things are kind of quiet. I guess the biggest news is the accident rate - the holiday deaths - which is certainly not very pleasant news, but we had 233 people killed nationally, and 9 of them were in Houston on Christmas Eve, and Christmas. In the world news, the families made the news again. This is Associated Press: "The families of Apollo 8 crew sent a Christmas message to Navy Commander Lloyd

Bucher, Captain of the USS Pueblo crew, released this week by North Korea. The message, addressed to Commander and Mrs. Bucher, at San Diego Navy hospital read 'You have been in our thoughts and our prayers. Your reunion has brought great joy into our heart this Christmas day. Our best to you personally and to all of the families under your command'." And it was signed "Families of the crew of Apollo 8." Space officials said that the message had been suggested and written by Mrs. Frank Borman.

05 00 55 15 CDR Thank you.

05 00 55 16 CC Let see. Elsewhere in the national news, the newlyweds, David and Julie Eisenhower, came away from their secret honeymoon hideaway to have Christmas dinner with President-elect Nixon and the family. In New York city, the world's busiest harbor was reduced to almost complete inactivity Christmas day, due to a 5-day old longshoreman strike and a rare hiatus in shipping schedule. No ships arrived or left the harbor. Ferries, running on reduced holiday schedule, provided the only marine activity.

05 00 56 01 CC Here is an interesting little feature item that is kind of good to hear. It seems that up in Ann Arbor, Michigan, they have a new youth gang.

It's called the Gilnet Gang. It roams the streets of Ann Arbor, acting in secret, and sometimes by-passing the law. They call themselves the Guerillas for Good. Some of the things they have done is, painted a bridge that was covered with obscenities. They painted it one night. A condemned house with - it's popular with neighborhood children, but dangerous, was boarded up. Downtown planters unfilled because of a debate over which group was responsible, business or government, were filled with flowers. A hedge, thought to be hampering vision, at busy intersection was trimmed, and the owner was angered. Trash along a portion of the Huron River was picked up. Members of the gang are anonymous teenagers who ask for no individual recognition. Their aim is to slice red tape, to get things - good things in their opinion - done. The organization has a faint religious overtone. It's sort of an ecumenical group, said an assistant professor at the University of Michigan who acts as an informal sounding board for the gang's ideas. The name is from St. Peter, the Fisherman's Net. And it is remote enough not to be identified with any particular church. There is a thread of Robin Hood running through this thing, said their

teacher, who also prefers to remain anonymous. A lot of their activities are extra-legal. When the system bogs down, they directly administer good, rather than go through the red tape channels. The gang is made up of about 55 high-school kids, boys and girls, and there's another 40 or 50 who belonged to the gang before they graduated. The idea for the gang evolved from a trip to Detroit slum area, where a church group - youth group noted the way that street gangs operate. They were impressed with the methods of operation and decided to organize for somewhat different reasons. "It was the chance to do things for the pure sake of giving," said the gang's advisor.

05 00 58 18 CC That is about it as far as the world and national news and the features is concerned. On the sport page, Hank Stram of the Kansas City Chiefs was named as the AFL coach of the year. This is the second time for him in three seasons. The voting was done by an Associated Press panel of 30 sports writers and sportscasters, three from each city. The nearest one to him was Weeb Ewbank. Other coach's that received votes were Sid Gilman of San Diego, and Lou Sabin of Denver. As for the Shriners College All Star game yesterday, the

North cooled the South 3 to 0. Michigan State's Dick Berlinsky booted a 23 yard field goal in the first quarter and it was all the North needed to beat the South Wednesday, in the Shrine's College All Star football game. Let's see, I guess the interesting things about this are that first downs, North 19, South 16; rushing, North 214, South 169; passing was North 96, South 109. So, all in all, it looks like they were evenly matched. Looks like Parseghian and his Notre Damers weren't as strong as ole Howard was worrying about.

05 00 59 52 CDR Roger. We are dumping the water now, Jerry.

05 00 59 54 CC Okay, Frank.

05 00 59 59 CC For the big Astro Blue Bonnet game, the big basketball clasic followed by the Astro Blue Bonnet Bowl in the Dome: SMU and Oklahoma have arrived. They are getting ginned up for the big game. Doesn't say here which are favored. I will look that up and let you know later, if one is favor here. The Davis Cup is underway now, down in Australia, and the US is bidding to recapture that again, and apparently we're favored to recapture the supremecy today. Another item in the news, is O. J. Simpson; he was named player of the year in college football for the second consecutive season by the Walter Camp Football

Foundation. Woody Hayes, as I told you yesterday, was named coach of the year.

05 01 01 01 CDR Roger.

05 01 01 13 CC Well, I guess that is about it Frank.

05 01 01 17 CDR Thank you, Jerry. I appreciate that.

05 01 01 27 CMP Jerry, this is Jim. We concur on that midcourse 6.2 of a foot per second - is what we get.

05 01 01 33 CC Real fine, Jim.

05 01 01 41 CC Do you just want to turn off your radios and come back without us?

05 01 01 49 LMP No. We can't read out the amazing erasable memory if we have to go into PROGRAM 01 again. (Laughter)

05 01 01 56 CMP I'd tried to get us back on the launch pad a little bit earlier.

05 01 03 55 CC Frank, one other little item in the news here, I thought might be interesting is - . Stand by.

05 01 04 15 CC Apollo 8, Houston.

05 01 04 18 CDR Go ahead. You are loud and clear.

05 01 04 20 CC Okay. I got interrupted there for a minute. Bob Hope is back out in Viet Nam again with his troups, doing a great job as usual. One little name in the news story here is from the USS New Jersey. Bob Hope joked from atop of a hugh gun turret yesterday - or Wednesday - to delight the 1500 men aboard the battle ship New Jersey on its 20th

Christmas entertaining US troops abroad. Hope and his 27 member troop entertained the New Jersey seamen after attending a Christmas mass aboard the carrier Hancock, both off Viet Nam. "This must be the biggest Cris Craft in the world," Hope told the seamen. "It looks like Wake Island with a rudder." "I think it was nice of them to take the ship out of mothballs just to give me a 21-gun salute," he said. Hope joked while standing on one of the ships 16 inch gun turrets. The sailors were particularly impressed by a squad of long legged girls who came aboard with Hope including Actress Ann-Margaret and Miss World.

05 01 05 28	CDR	Did you say that was his 20th trip over there at Christmas time, or overseas at Christmas time?
05 01 05 33	CC	That's right, it's the 20th time he has been over - overseas for Christmas with the troops.
05 01 05 41	CDR	He's as old as Jack Benny.
05 01 05 43	CC	Roger. Hey, you can turn off the water dump now.
05 01 05 44	CDR	We're in the process, or as we say in the aerospace business: that's in work.
05 01 05 58	CC	Roger. You do good work.
05 01 06 17	CC	That other aviator that's going around the world, Max Conrad with his light plane - he spent Christmas day in the Antarctics - at Puento Aranes in Chili; he's waiting for good weather so he can

continue his flight down to the South Pole. He hopes to get around the world. He is going around both Poles, and he's going to fly from Palmer to Byrd, from Byrd to the South Pole, and then return home to the United States by way of New Zealand, Australia, and Hawaii.

05 01 06 50	CDR	Brother. He had better take some No Doze with him.
05 01 06 53	CMP	I tried to talk Frank into the same trip.
05 01 07 21	LMP	You can give him a weather report from Apollo 8. The South Pole was really clobbered - or at least it was the other day.
05 01 07 24	CC	Roger.
05 01 07 44	CC	I don't imagine there are many alternates down there.
05 01 07 49	CDR	No, I don't think so.
05 01 07 52	CDR	We have some pretty clear weather up here.
05 01 07 55	CC	No fog, huh?
05 01 07 59	CDR	Not outside.
05 01 08 06	CDR	Actually, it's snowing outside right now with that waste water dump that Bill just did.
05 01 08 11	CC	Roger. Does it look a little bit like Christmas?
05 01 08 15	CDR	Right.
05 01 08 29	CDR	Jerry, do you have a decision about what we are going to do about this next midcourse?
05 01 08 39	CC	No, Frank. We don't need it.
05 01 08 44	CDR	Okay. I just wanted to make sure officially we'll scrub MCC 6?

05 01 08 49	CC	Affirmative.
05 01 08 53	CDR	I guess - Jim said that was already official. I was sleeping at the time. I didn't hear it.
05 01 08 57	CC	Okay. Frank, by the way, how do you feel about your EMS now? You feel like you've got all the answers to the little funnies you saw earlier?
05 01 09 08	CDR	Yes. The answer is don't turn it into AUTO fast. It seems to be very sensitive to jerks, or separation.
05 01 09 16	CC	Okay, you, you figure it's all pretty much just a switch throwing anomaly and if you play it by the numbers and then slow and deliberate you will be okay?
05 01 09 25	CDR	Yes. Ken, I'm getting razzed up here because I said it was sensitive to jerks.
05 01 09 33	CC	(Laughter) We thought of that, too, down here.
05 01 09 37	CDR	Yes, I figured you did.
05 01 09 39	CMP	I told Ken last night at separation after TLI, when we separated from the S-IVB, we got a nice bang out of the pyros and the EMS jumped over 100 feet per second.
05 01 11 20	CDR	Jerry, do you want to - I've got it in the flight plan to start charging our battery B. Do you want that started at 100 now also?
05 01 11 29	CC	Affirmative, Frank.
05 01 11 33	CDR	Okay.

05 01 11 38	CC	Frank, we expect it will take about 3 or 4 hours.
05 01 11 40	CDR	We're starting it.
05 01 11 44	CC	Okay.
05 01 11 58	CDR	And we're happy to report the earth is getting larger.
05 01 12 01	CC	Roger, that's comforting. Looks like you are going to make earth instead of Venus, huh?
05 01 12 08	CDR	Right.
05 01 13 08	CC	Apollo 8, Houston. Your friendly guidance officer has got a LM vector update for you and a CNC time update. Over.
05 01 13 17	CDR	Okay. We'll go to POO. POO in ACCEPT.
05 01 13 29	CC	Roger.
05 01 19 56	CC	Apollo 8, this is Houston. The updates are complete. The computer is yours. You can go to BLOCK.
05 01 20 05	CDR	Roger; BLOCK.
05 01 20 50	CDR	Houston. We won't transfer that state vector, since we are not going to do that MCC. Is that all right?
05 01 20 58	CC	Okay. Real fine, Frank.
05 01 21 03	CDR	Roger.
05 01 22 53	CDR	Houston, Apollo 8.
05 01 22 56	CC	Apollo 8, Houston. Go.
05 01 23 00	CDR	We are proceeding with the chlorination.
05 01 23 03	CC	Roger.

05 01 56 27	CC	Apollo 8, Houston. BIOMED switch to CENTER, please.
05 01 56 34	CDR	Ten, nine, eight, seven, six, five, four, three, two, one.
05 01 56 40	CDR	MARK.
05 01 56 41	CC	Roger.
05 01 56 45	CMP	Old joke.

END OF TAPE

05 02 30 56	CDR	Houston, Apollo 8. How do you read?
05 02 31 00	CC	Apollo 8, Houston. Loud and clear.
05 02 31 03	CDR	Okay, thank you, we are starting the P23.
05 02 31 09	CC	Roger, Frank.
05 02 32 41	CC	Apollo 8, Houston.
05 02 32 44	CDR	Go ahead.
05 02 32 45	CC	Apollo 8, this is Houston. We have lost all CNC data on you. The last data we had showed a high and middle gimbal angle. Over.
05 02 32 56	CDR	No. I'm fine. How come you lost those CNC data.
05 02 33 01	CC	I think maybe it was just your movement - movement out of PTC.
05 02 33 07	CDR	I see, fine. Thank you, it was high. I was watching it though.
05 02 33 11	CC	Okay. We have data now.
05 02 50 33	CDR	Houston, Apollo 8.
05 02 50 36	CC	Apollo 8, Houston.
05 02 50 39	CDR	We are noticing our quad A helium tank is starting to go up again. You got any ideas on that.
05 02 50 45	CC	Yes. We are watching it to, Frank. So far, it's still okay and we are talking about it.
05 02 50 54	CDR	Okay.
05 02 51 26	CC	Apollo 8, Houston.
05 02 51 30	CDR	Go ahead.
05 02 51 31	CC	Roger, Frank, this helium tank in quad A - it looks like we may have bothered you up unnecessarily on

this thing. It appears to be no problem as best as we can tell. We got a few of the minds together talking about it, and it's been down rated quite a bit. Also there - the folks down here monitoring the P23 suspect that Jim is shooting on star number 22 rather 02, so he may be having some problems.

05 02 52 01	CMP	Oh no. We've changed; we are on star 02 on the moon.
05 02 52 07	CC	Okay.
05 02 52 25	CC	Frank, I may have to add some names to my chicken list.
05 02 52 31	CDR	About what?
05 02 52 33	CC	Helium tank A, quad A.
05 02 52 37	CDR	Roger. I just don't want to be the one that proves the fracture mechanics people are right.
05 02 52 45	CC	Roger, Frank.
05 02 52 54	CDR	This attitude is going to have us right square into the sun, too.
05 02 53 00	CC	Roger.
05 03 22 08	CC	Apollo 8, Houston.
05 03 22 13	CDR	Go ahead.
05 03 22 14	CC	Apollo 8, Houston. We are going to need some data from your past P23 marks. We missed some items, and so don't put it away and when you finish this next P23 we'll get it all together.

05 03 22 27	CDR	Okay.
05 03 22 28	CC	Roger. Got some information for you on this PTC that we'll be going to right after this next P23 exercise. We'd like you this time to try the nose north attitude, that's pitch of 180, and a yaw of 315, and also we'd like to give another look at this mode free type of PTC and we think maybe we'll get a little bit of spin stabilization if we try it at 0.3 degrees per second on the roll rate rather than 0.1. So if you figure on doing that at 124:30 we'll see what kind of information we can get out of it.
05 03 23 14	CDR	Okay. You know what I think of that, don't you? I'll be happy to do it, but I think it's playing games.
05 03 23 22	CC	Roger, Frank, you're burning right now 1.4 pounds per hour with attitude hold in pitch and yaw. We're kind of interested to see if 0.3 degrees per second will reduce your RCS usage due to spin stabilization.
05 03 23 40	CDR	Yes, I know. I predict that it will not.
05 03 23 45	CC	Okay.
05 03 23 48	CDR	Jerry, I'm a little concerned about the temperature. We're getting kind of warm in here, and also the evaporator outlet temperature is up around 45 degrees. Do you have any trend that

we're getting less efficient operation of the radiators?

05 03 24 15 CC Frank, EECOM says everything looks nominal down here. You might try a change in your cabin temperature heat exchanger there.

05 03 24 26 CDR No, we don't have the fans on, but what we have done is put up a window shade. That seems to help it. We've been getting a lot more sun in the cabin this way.

05 03 24 35 CC Roger. We'll keep a sharp eye on things and keep you posted.

05 03 24 40 CDR Roger. I don't mind playing games because you guys have been very nice in the five and a half days. If you want to play games in the next half hour, we'll play.

05 03 24 48 CC Roger, Frank.

05 03 25 09 CDR Jim is trying this set with the eye relief optics so we can give you some information on that.

05 03 25 15 CC Okay.

05 03 25 49 CDR I think it would be very difficult to extrapolate anything that you are getting out of this bit business to a LM-command module combination, because the spacecraft handles quite a bit different just with the change of fuel load, including the difference in drifting off and roll.

05 03 26 07	CC	Roger, Frank. We just got finished discussing that, too. We agree with your point of view on that one. I think this is more of a curiosity thing than anything at all.
05 03 26 18	CMP	I think it's fine. No sweat. We don't have anything else to do here for about another 10 hours.
05 03 26 20	CC	Okay.
05 03 26 27	CMP	Jerry, what I'm kind of curious about is the fuel usage. Now with P23 and what we were doing, we have a lot more fuel.
05 03 26 57	CC	Jim, we'll take a look at that fuel usage bit. Right now, the trend looks like it is getting better as we would expect with a lighter weight.
05 03 27 10	CC	We'll try to get a little more definitive for you here.
05 03 27 14	CMP	Okay.
05 03 27 15	CDR	We really - we shouldn't complain about the fuel usage on that SPS engine though, because we're sure getting a lot of miles per gallon out of it.
05 03 27 27	CC	Roger, Frank. Frank, we'll enter you in the Shell road test on that.
05 03 27 29	CDR	Yes, we don't have any TCP in it, or what is that, TCP? Yes. That's the problem. If we'd had that, we would have probably used only half the fuel.

05 03 27 47	CC	Oh, you mean Platformate?
05 03 27 50	CDR	That's right, Platformate.
05 03 28 02	CDR	If you will get the people to spread out one of those banners around the target area, we'll try to break it, you know, and coast through it.
05 03 28 11	CC	Okay. We'll call some of the paper companies and see if they can find a roll big enough.
05 03 28 17	CDR	It won't take a big roll, just about 30 feet.
05 03 28 21	CC	Roger.
05 03 28 26	CMP	Onboard NAV.
05 03 28 36	CDR	Tell the doctors that we put William to sleep.
05 03 28 41	CC	Roger. You won't leave any scars will you?
05 03 28 47	CDR	No. No, he's got his tape recorder with him.
05 03 29 10	CDR	Bill said to call Valerie and have her to rewind the tape recorder - his tape recorder at home.
05 03 30 55	CC	Apollo 8, Houston.
05 03 30 57	CDR	Go ahead.
05 03 30 58	CC	I hate to tell you this, Frank, because Jim probably won't even be able to wear his COMM carrier anymore, but that last set of marks put your state vector right on top of the MSFN state vector.
05 03 31 10	CMP	Come off that, Jerry. Come on; you promised.
05 03 31 14	CMP	I'll get you that bottle of brandy when I get home, Jerry.

05 03 31 19	CDR	Maybe we can get him to go to PROGRAM 01 again today, too.
05 03 31 24	CC	Roger. That sounds good.
05 03 32 04	CC	Apollo 8, Houston. Also, on the flight plan for 124:30, we would like for you to run an O_2 purge on the fuel cells.
05 03 32 17	CDR	Okay.
05 03 33 24	CDR	Hey, Jerry. We were going over the checklist on entry here, you know?
05 03 33 28	CC	Roger, Frank.
05 03 33 30	CDR	I've got a question. Is John Harpold around?
05 03 33 40	CC	Roger. He is listening.
05 03 33 44	CDR	John, I can't remember. Is the lift vector up head-down or - -
05 03 33 59	CMP	Jerry, I'm beginning to worry up here.
05 03 34 03	CC	Roger. It depends on which way your nose is pointing.
05 03 34 08	CDR	Touché.
05 03 34 16	CDR	You might note for the people at MIT that the next series of stars will be shot by the master navigator with a space helmet on and long eye relief eyepieces.
05 03 34 32	CC	Roger. That ought to cut his speed down a little bit.
05 03 34 36	CDR	Right.

05 03 35 25	CC	Frank, while you are talking about the entry checklist, this cold soak - have you decided exactly where you want to do it there prior to entry?
05 03 35 37	CDR	Well, I understood that EECOM talked that over with Bill, and we do it 1 hour prior to entry. We'll do it wherever you say is the best.
05 03 35 43	CC	Okay. One hour is fine. It's just a matter of finding time in the time line to do it.
05 03 35 50	CDR	I think we can initiate it 1 hour before SEP.
05 03 35 53	CC	Okay. Fine. Sounds like a winner.
05 03 37 06	CMP	Really got all zeroes with that helmet on.
05 03 37 09	CC	Roger. We just noticed that.
05 03 37 32	CDR	Jim's going to leave the helmet off now for the rest of them, I think; it gets a little anoxic in there. These helmets don't have face plates, and we have a difficult time breathing with that on.
05 03 37 44	CC	Roger.

END OF TAPE

05 04 02 26	CDR	Okay. Jerry, that completes the P23. Did you have something else you want us to do now? You wanted to check on something from the last SEP.
05 04 02 37	CC	Roger, Frank. We need to get some numbers that we weren't able to copy down here. Stand by just one. Frank, on your first P23, we missed three marks on star number 2. We missed mark number 3 trunnion.
05 04 03 07	CDR	Okay. Three trunnion is 05650.
05 04 03 11	CC	Okay, 05650. Then star number 1, mark 2. We need the trunnion on that one, too.
05 04 03 21	CDR	04216.
05 04 03 25	CC	And on star number 1, mark 3, the DELTA-R and DELTA-V.
05 04 03 31	CDR	DELTA-R is 00006, DELTA-V 00001.
05 04 03 38	CC	Roger. Four balls 6 and four balls 1. Okay. Frank, your PTC attitude is pitch 180, yaw 315, and roll rate 0.3 degrees per second. The reason for wanting to point it north is not because we are concerned at all about any changes due to venting, there's been, as we can tell, no effects on your trajectory by venting. We just want to try out that direction on it.
05 04 04 16	CDR	That's fine. We are going to stay in for about two more seconds while Jim takes the pictures through the sextant for the optics people.

05 04 04 24	CC	Okay, Frank. And then, also, we are looking for a fuel cell O_2 purge when you get a chance.
05 04 04 30	CDR	That's right. At - I got the word now; it's supposed to be at 124:30.
05 04 04 37	CC	Right.
05 04 04 39	CDR	Okay. We'll do it.
05 04 11 14	CC	Apollo 8, Houston.
05 04 11 17	CDR	Go ahead.
05 04 11 18	CC	Roger. For your P37 that's coming up that you are going to run, use a midcourse 7 time of 144:46. Also just a little note here, the trajectory is looking so good, it looks like you can make the corridor without even making a midcourse 7.
05 04 11 37	CDR	Roger. 144:46 for the P37.
05 04 11 44	CC	Affirmative.
05 04 11 47	CDR	Thank you.
05 04 13 40	CMP	Jerry, this is Jim.
05 04 13 43	CC	Go ahead, Jim.
05 04 13 46	CMP	We are going to set this up for the normal PTC mode for a few minutes until Frank gets through with the - another step of the call.
05 04 14 01	CC	Roger, Jim. When the time is auspicious, would you shift the BIOMED switch over to left side?
05 04 14 09	CMP	I think we ought to shift it over right now.
05 04 14 12	CC	Okay. No, they say hold it up for a little while.

05 04 14 15	CMP	... so you can see, the same data that Dr. Berry got on me in Gemini VII is also good for Frank on Apollo 8.
05 04 14 33	CC	Roger. He heard that.
05 04 19 25	CMP	Houston, Apollo 8. - -
05 04 19 28	CC	Apollo 8, Houston.
05 04 19 31	CMP	Do you see that PROGRAM ALARM we got when we went through P37, 1302?
05 04 19 35	CC	Affirmative.
05 04 19 39	CMP	I'll run through it again and see what happens here.
05 04 19 41	CC	Roger. We're monitoring.
05 04 21 23	CC	Apollo 8, Houston.
05 04 21 36	CMP	Go ahead.
05 04 21 37	CC	Looks like you loaded the wrong time in P37. You should load 144:46 for your midcourse time; looks like you loaded 146:46.
05 04 21 46	CMP	Okay. I'm sorry. Yes, I have it here. I wrote it down, 146:46. Okay.
05 04 21 55	CC	Roger.
05 04 21 57	CMP	I guess the best way to terminate this is by going back to POO, is that right?
05 04 22 00	CC	Affirmative.
05 04 28 02	CMP	Houston, Apollo 8. It looks like a plus 2.8 foot per second correction at midcourse 7.
05 04 28 11	CC	Roger, Jim.

05 04 41 25	CDR	Houston, Apollo 8.
05 04 41 30	CC	Apollo 8, Houston. Go.
05 04 41 33	CDR	Started the fuel cell purge, and I'm going to 183:15, and I'll start that three-tenths of a degree per second roll stabilization test for you.
05 04 41 42	CC	Roger, Frank. Thanks.
05 04 41 55	CDR	Okay. There we are, and we are going to start rolling now.
05 04 41 57	CC	Roger.
05 04 42 16	CC	Frank, on this free pitch and yaw, if either one of them gets outside of 15 degrees from the nominal values, we'll call it off.
05 04 42 32	CDR	Okay.
05 04 45 00	CC	Apollo 8, Houston. I would like to have the BIOMED switch left now, if you can.
05 04 45 09	CDR	Roger, it's LEFT.
05 04 47 39	CMP	The fuel cell purged to complete, O_2.
05 04 47 47	CC	Say again, Apollo 8.
05 04 47 51	CMP	O_2 fuel cell purge complete.
05 04 47 53	CC	Roger, thanks.
05 04 50 50	CC	Apollo 8, Houston.
05 04 50 55	CDR	Go ahead, Houston. Apollo 8.
05 04 50 58	CC	Looks like you've exceeded your 15 degrees offset PTC attitude, so you can go to attitude HOLD in pitch and yaw.

05 04 51 05	CDR	Okay. I'll go back to the attitude. We didn't even get around once, did we?
05 04 51 09	CC	Doesn't look like it. So much for spin stabilization.
05 04 51 15	CDR	Well, we tried that last night several times 0.5 to 0.2 degree per second.
05 04 51 51	CDR	I think there is the phenomena known as inertial coupling that has something to do with that, huh?
05 04 51 57	CC	Roger. That could be.
05 04 52 01	LMP	Put a bigger rudder on it.
05 04 52 05	CC	Need some feathers, Frank.
05 04 52 08	CDR	(Laughter)
05 04 52 35	CC	Apollo 8, Houston. On the P37 comparison; using the MSFN vectors, we get a minus 1.4 on that midcourse, compared to your 2.8. We ran your solutions through our computer and we also get a 2.8, so your P37 looks good. We are busy still fiddling with the vectors and comparing them and we'll keep an eye on the difference.
05 04 53 03	CMP	Roger. It looks like we came up with a plus 2.8 though, and you say you came out with a minus 2. something.
05 04 53 10	CC	Affirmative.
05 04 53 28	CC	Jim, that 4 feet per second difference is worth 0.28 degrees on the flight path angle.
05 04 53 35	CMP	Roger. Thank you.
05 05 07 10	CC	Apollo 8, Houston.

05 05 07 13	CDR	Go ahead, Houston.
05 05 07 15	CC	Roger, Frank. How is your cabin temperature looking now?
05 05 07 20	CDR	It's getting cooler, thank you. We put those shades up, and that really helps.
05 05 07 22	CC	Okay. The primary loop down here still looks real good, so it looks like you are in fine shape. Your battery B charge ought to be done by about 127 hours, and we think you shouldn't even try to charge battery A, since it looks like, at entry interface, it is going to have 38 amp-hours on it.
05 05 07 45	CDR	I'll tell Bill that.
05 05 07 47	CC	Okay.
05 05 08 48	CDR	How is the weather down there, Jerry?
05 05 08 52	CC	That's loud and clear.
05 05 08 55	CDR	Cold?
05 05 08 57	CC	No, it's pretty balmy around here today.
05 05 09 13	CC	Yes, the temperature is about in the 70's here. It's a real nice day.
05 05 09 22	CDR	Fine.
05 05 09 54	CDR	Say, Jerry, last night, Jim was saying something about turning on VHF Simplex A about 20 000 miles out. I wrote it down, but I can't seem - I can't remember where I put it. ...
05 05 10 11	CC	Roger, Frank. We've got it in the checklist here as right around 4 minutes - 4 hours before EI,

right after your nominal P23, P37 onboard comparisons, KG-1, page E-1.

05 05 30 00	CC	Apollo 8, Houston.
05 05 30 04	CDR	Go ahead.
05 05 30 07	CC	Roger. We're showing some garbage on your computer. If you will hit ERROR RESET, we can clear that PROGRAM ALARM so the next one can be identified. Over.
05 05 30 15	CDR	We don't have any PROGRAM ALARM.
05 05 30 18	CC	I think this - this is a carryover from your last PROGRAM ALARM there on that P37.
05 05 30 23	CDR	Okay. ERROR RESET. Thank you.

END OF TAPE

05 05 30 38	CDR	That do it?
05 05 30 41	CC	Stand by. Okay. Thank you, Frank. That did it.
05 05 30 49	CDR	Roger.
05 06 38 28	CC	Apollo 8, Houston.
05 06 38 31	CDR	Go ahead, Houston. Apollo 8.
05 06 38 33	CC	Roger. Your battery is full; you can terminate charging. You've got 40 amp-hours on it now, and we've got a couple of requests for data here.
05 06 38 41	CDR	Roger.
05 06 38 42	CC	- - requests.
05 06 38 45	CDR	Okay. We were just talking about that. I tell Bill stop. Okay. What are your requests?
05 06 38 52	CC	The first one is - the first time somebody is down in the equipment bay, we would like to get another reading on your RCS temperatures - those six temp meter readings - -
05 06 39 00	CDR	Okay.
05 06 39 02	CC	- - and the other one is of the boys in the back - -
05 06 39 04	CDR	We just read them again.
05 06 39 05	CC	Beg your pardon?
05 06 39 06	CDR	We just read the RCS thruster temperatures again, and they are all pegged high.
05 06 39 14	CC	Okay. Good deal, Frank. The other one is - the boys in the back room would like some time when

everybody is awake - if you would fire up both cabin fans for about 5 minutes, they would like to see what the DELTA temperature is on the telemetry when you get the stagnation broken down and get some flow going over it. So if you can see your way clear to do that, we would like to see it some time when everybody is up.

05 06 39 43	CMP	We had that running before in the flight. Did they check it then?
05 06 39 49	CC	You mean early in the game, when you were cool?
05 06 39 52	CDR	Yes. When we were cool. Right.
05 06 39 55	CC	Yes. They got that data, and they were kind of interested in seeing what it looks like when the cabin is nice and warm and the temperature indicator is reading on the high side, to see how the DELTA works in the other direction.
05 06 40 07	CDR	Okay. Coming on.
05 06 40 08	CC	Okay. Thank you.
05 06 40 22	CDR	What else, Jerry?
05 06 40 25	CC	That's it, Frank.
05 06 40 30	CC	Another thing, Frank, is we just want to remind you that there is no charge needed on A battery.
05 06 40 36	CDR	Hey, listen, these cabin fans - one of them sounds like it's got a bad bearing. We are going to turn it off. It's got a real squeal to it.
05 06 40 42	CC	Okay, Frank.

05 06 40 45	CDR	Sounds like it's got something in it.
05 06 40 50	CC	That must be Bill's teddy bear.
05 06 40 54	CDR	Say again.
05 06 40 55	CC	That must be Bill's teddy bear.
05 06 40 59	CDR	I don't know, but there is something in there.
05 06 41 46	CDR	We will try them again, one at a time, and see if we can determine which one's got the noise.
05 06 41 50	CC	Roger.
05 06 42 15	CDR	Number 2 is really bad. It's got a bad bearing, and it whines like mad, so we are not going to turn it on.
05 06 42 22	CC	Roger. Thank you.
05 06 42 26	CDR	We are not going to try number 1 either; there may have - something might have got in both of them, Jerry.
05 06 42 31	CC	Okay, Frank. That's fine.
05 06 42 46	CDR	Sounds like that MG starter of yours.
05 06 42 55	CC	I'm afraid to turn my starter on now. It's been so long.

END OF TAPE

APOLLO 8 AIR-TO-GROUND VOICE TRANSCRIPTION

(GOSS NET 1)

05 07 14 36	CDR	Houston, Apollo 8.
05 07 14 39	CC	Apollo 8, Houston. Go.
05 07 14 42	CDR	Roger. We would leave the PTC long enough to go orient toward the earth for a TV shot to see if this TV thing is going off on 128.
05 07 15 20	CC	Roger, Frank. That is fine. Do you have the gimbal angles you need?
05 07 15 26	CDR	Yes, thank you. I got them earlier today.
05 07 15 29	CC	Okay.
05 07 15 43	CDR	I'd like to keep this one kind of short because we're trying to get some sleep earlier than yesterday.
05 07 15 52	CC	Say again, Frank. You are getting pretty garbled.
05 07 16 03	CDR	How is that antenna?
05 07 16 05	CC	Loud and clear, Frank.
05 07 16 07	CDR	I said, will this be a short one? We are trying to hurry things up a little bit to see if we can get as much sleep as possible.
05 07 16 15	CC	Roger.
05 07 16 38	CC	Apollo 8, Houston. Would you put the BIOMED switch on the right side now, please?
05 07 16 44	CDR	Roger.
05 07 16 50	CC	Frank, do you intend to start your TV before 128?
05 07 17 02	CDR	Negative; no.

05 07 17 04	CC	Roger.
05 07 17 05	CDR	That is what you wanted, isn't it? I thought that is what it was all squared away for.
05 07 17 10	CC	Affirmative.
05 07 18 22	CC	Apollo 8, Houston. Are you planning on using the wide angle lens?
05 07 18 28	CDR	I think that would be best.
05 07 18 31	CC	Okay. Jack says you want to be sure and use the red filter and the filter holder for that one. It takes a little darker filter.
05 07 18 40	CDR	Okay.
05 07 18 57	CDR	Do you want to take both red filters on there or just the one for the filter holder?
05 07 19 10	CC	He thinks just the red one on the filter holder will do, but might not hurt to have the other one ready, just in case.
05 07 19 38	CDR	How about if we use the telephoto? It will be a little harder to focus, but it might end up a better picture.
05 07 19 52	CC	Roger, Frank. If you want to use the telephoto lens, you ought to use the same combination you used going out, the 25A.
05 07 20 02	CDR	Okay.
05 07 22 12	CDR	Hey, Jerry.
05 07 22 17	CC	Roger, Frank.
05 07 22 19	CDR	Ask your EECOM how many gallons of fuel we burned for TEI, will you?

05 07 22 24	CC	Roger. In work, he's breaking out his sathometer now.
05 07 23 04	CC	Apollo 8, Houston. We will be handing over to Goldstone in 2 minutes. Over.
05 07 23 14	CDR	Roger, Jerry.
05 07 23 58	CC	Frank, the doctors say they are not getting anything on Bill yet. Apparently, he is not plugged up.
05 07 24 07	CDR	He is down underneath the couch getting some stuff out; he doesn't have his umbilical on.
05 07 24 12	CC	Okay.
05 07 24 17	CDR	Tell them to look at the stuff they got yesterday. He hasn't changed at all, just as mean as ever.
05 07 24 30	CC	Roger.
05 07 24 43	CC	Hey, Frank, this simulation has really been great. What do you say after these photos we recycle back to TLI again?
05 07 24 54	CDR	That's fine. Bring on the backup crew.
05 07 24 57	CMP	Hey, Jerry, yesterday I tried to cycle back to the pass and 01 was lunar.
05 07 25 05	CC	Jim, we missed that. Say it again when you get a better antenna.
05 07 25 14	CDR	Don't blame your antenna problems on us ...
05 07 25 29	CC	Apollo 8, Houston. We are not reading you; stand by one.

05 07 26 50	CDR	Houston, do you read now?
05 07 26 51	CC	Roger. Loud and clear.
05 07 26 57	CDR	I say, Bill will be ready in a minute; he is cycling back and forth under the couch trying to get the TV stuff out.
05 07 27 01	CC	Okay.
05 07 27 06	CC	Backup crew says they are ready to go.
05 07 27 12	CDR	Great. A most fantastic voyage.
05 07 27 24	CC	Sure was.
05 07 27 27	CDR	We're not through yet. We've still got 100 000 miles to go. You know, we kind of feel like it was all over with TEI, but we're still a long way.
05 07 27 40	CMP	Jerry, what I was saying before: I tried to hurry up the voyage home by calling up PROGRAM 01 to get us back on the PAD, but it didn't work.
05 07 27 54	CC	Well, that's the best excuse I've heard so far, Jim.
05 07 27 59	CDR	The best of many.
05 07 39 35	CC	Apollo 8, Houston.
05 07 39 39	CDR	Go ahead, Houston. Apollo 8.
05 07 39 41	CC	Roger, Frank. On TEI, you burned 1480 gallons.
05 07 39 47	CDR	Thank you.
05 07 40 31	CC	Frank, are you going to need Jim's slide rule for that calculation?

05 07 40 36	CDR	I got 162.
05 07 41 30	CMP	Houston, Apollo 8.
05 07 41 32	CC	Apollo 8, Houston. Go.
05 07 41 35	CMP	Roger. This is one of those rare occasions where Bill left his seat and I am now sitting in it, and for the first time, I can see the earth. I'm looking through his monocular; it's pretty nice.
05 07 41 54	CC	Roger.
05 07 41 55	CMP	You had a little weather today it appears.
05 07 41 57	CC	Last word from the weather guys here was that it was clear.
05 07 42 06	CMP	Well, we could see South America and Florida and through the lower part of the U.S. Looks like there is a weather front going over into the central part of the United States, lot of clouds over the northwest area. Florida is clear; it looks like the east coast is pretty clear.
05 07 42 24	CC	Roger. Clear but cold.
05 07 42 30	CMP	Lot of clouds up in Canada.
05 07 42 35	CC	Maybe the geese will go home.
05 07 43 30	CDR	Jerry, we are going to turn it on and see how the picture is.
05 07 43 33	CC	Roger.
05 07 43 56	CC	Nothing yet, Frank.
05 07 44 00	CDR	Takes a while to warm up, I think.

05 07 45 03	CDR	Any luck yet, Jerry.
05 07 45 05	CC	Not yet, Frank.
05 07 45 33	CC	We got a picture now, Frank. It's twitching.
05 07 46 00	CC	The earth is on now, Frank.
05 07 46 04	CDR	How's it look?
05 07 46 06	CC	We are seeing about half of it. You moved in the wrong direction. Okay. It's coming back, a little more. Good, now a shade toward the terminator.
05 07 46 30	CC	A little bit more toward the terminator and in the same direction you were moving it before. Right; you have got it centered right in the middle.
05 07 47 01	CC	Now move it away from the terminator just a bit.
05 07 47 11	CC	Good picture.
05 07 47 15	CDR	Okay. You want us to wait until 128, right?
05 07 47 19	CC	Affirmative. Frank, move your camera to the right; I want to see which way the earth moves on my screen.
05 07 47 30	CC	Okay. Moving your camera to the right moves the earth to the left on our screen. On our screen, the terminator is almost parallel to the horizontal direction, and the dark part is on the top.
05 07 47 52	CDR	Okay. We will turn it back on at 128, then.
05 07 47 55	CC	Okay, Frank.

05 07 48 02	CC	Apollo 8, Houston. Are you on a high-gain antenna?
05 07 48 05	CDR	Roger.
05 07 48 07	CDR	Roger.
05 07 48 14	CC	What beam width are you on, Apollo 8?
05 07 48 19	CDR	NARROW.
05 07 48 21	CC	Roger. NARROW.
05 07 49 16	LMP	This is Apollo 8. Do you read?
05 07 49 18	CC	Apollo 8, Houston. Loud and clear.
05 07 49 22	LMP	Roger. Radio check.
05 07 49 24	CC	Roger.
05 07 49 34	LMP	Houston, Apollo 8. How do you read now? Over.
05 07 49 37	CC	Apollo 8, Houston. Loud and clear.
05 07 49 40	LMP	Roger. We're just trying something - -
05 07 52 59	CC	Apollo 8, Houston. You are in the scan limit right now on the high-gain antenna; although you may have NARROW beam width selected, you are in WIDE. To improve the situation would take a pitch down and a yaw left, and we will have FAO check it and give you some angles if we need to change it.
05 07 53 22	CDR	We just got out of the scan limit by pitching up and yawing right.
05 07 53 40	CC	Roger. You are right, Frank.
05 07 53 45	CDR	Are we still in wide band, or are we in narrow band now?
05 07 53 49	CC	We are checking.

05 07 55 05	CC	Apollo 8, Houston. EECOM says you are in good shape now.
05 07 55 09	CDR	Okay.
05 07 56 52	CC	Apollo 8, Houston. COMM check.
05 07 56 55	CDR	Loud and clear.
05 07 56 56	CC	Roger.
05 08 01 13	CC	Apollo 8, Houston. We're getting television.
05 08 01 16	CDR	Roger. How's the picture?
05 08 01 21	CC	Roger. The picture is on the lower right hand of our screen.
05 08 01 30	CC	Camera should go down away from the terminator and to the right.
05 08 01 50	CC	Still down and about the same place; a little worse; now it's coming in.
05 08 01 59	CMP	Are you getting it now, Jerry?
05 08 02 01	CC	Roger. We've got most of it; keep moving off to the right. Good. You have it centered right now.
05 08 02 11	CMP	Well, the earth looks a little bigger to us today, not much, but it's somewhat bigger. I'm sitting over in the right hand seat now; Bill has got the TV camera; Frank is helping him out aiming it directly to hit the earth. I hope we have a good picture. Can you see the clouds?
05 08 02 28	CC	Affirmative. We sure can. Move it up toward the terminator - correction, away from the terminator just a shade.

05 08 02 38	CMP	At the tip of South America, there is a great swirl of clouds down there. It looks like a great storm. I wonder if you can see it.
05 08 02 45	CC	Roger. We see a large swirl just south of the terminator.
05 08 02 52	CMP	Roger. And then up to the left hand side, or towards the north, we can see the light waters around the West Indies, and we can actually see Florida. I'm looking through Bill's monocular, and I can see the various land masses, South America and the central part and southern part of the United States.
04 08 03 11	CC	Roger. Move a little bit away from the terminator now, a little left with the camera and a little further from the terminator.
05 08 03 27	CMP	Say it again, Jerry.
05 08 03 30	CC	Okay. You're moving it toward the center of the screen now, and the earth is off on the left side of our screen.
05 08 03 40	CC	Real fine. That's good. Hold it right there.
05 08 03 56	CMP	What we're thinking about right now, Jerry, is hitting that wedge angle, about 2 degrees their limit. When we come back, the earth looks pretty small right from here.
05 08 04 06	CC	Roger.
05 08 04 10	CMP	You got it, Bill.

05 08 04 22	LMP	As I look down on the earth here from so far out in space, I think I must have the feeling that the travelers in the old sailing ships used to have: going on a very long voyage away from home, and now we're headed back, and I have that feeling of being proud of the trip, but still - still happy to be going back home and back to our home port. And that's - that's what you're seeing right here.
05 08 04 50	CC	Roger, Bill. We'll sure be glad to get you back, too.
05 08 04 59	CDR	This is Frank Borman. We've enjoyed the television shows, and we'd like you to stay tuned in in the future because there'll be flights and rendezvous and earth orbit, and then, of course, there'll be television from the lunar surface itself in the not too far distant future. So, until then, I guess this is the Apollo 8 crew signing off, and we'll see you back on that good earth very soon.
05 08 05 27	CC	Roger, Frank. Adios.
05 08 06 53	CC	Apollo 8, Houston.
05 08 06 57	CMP	Go ahead.
05 08 06 58	CC	We'd like you to go back to PTC. Pick either attitude that's easiest to fly to.
05 08 07 06	CMP	Roger. In work.

05 08 11 26	CC	Apollo 8, Houston.
05 08 11 28	CDR	Go ahead, Houston. Apollo 8.
05 08 11 30	CC	Roger. Your PTC attitude ought to be either a 1045 or a 18315. We'd recommend 18315. That will keep your windows out of the sun.
05 08 11 42	CDR	180, that's right. I got them mixed up, didn't I? It's 18315.
05 08 11 46	CC	Roger.
05 08 17 03	CDR	Okay, Jerry ...
05 08 17 15	CC	Apollo 8, this is Houston. You're unreadable due to background noise. Over.
05 08 17 23	CDR	How now, Jerry?
05 08 17 25	CC	Loud and clear.
05 08 17 27	CDR	I say we're starting to stow the spacecraft and get all squared away and then be sleeping and eating. We'll be all thinking about entry from now on.
05 08 17 34	CC	Roger, Frank. And now that Bill's up, we'd like to get a redundant components check.
05 08 17 40	CDR	Alright. He's putting helmets in the food boxes. Just a minute, I'll get him to do it for you.
05 08 17 45	CC	Roger. There is no great hurry, Frank. We're - -
05 08 17 47	CDR	Roger.
05 08 17 49	CC	We're mostly interested in looking at the secondary loop.

05 08 17 54	CDR	That's what I was going to say. I can't see any reason to check anything other than the secondary loop, can you?
05 08 17 58	CC	That's affirmative.
05 08 18 08	CDR	Now in that cabin cold soak, we won't have any cabin fans.
05 08 18 13	CC	Roger. I understand.
05 08 19 52	CMP	Jerry, this is Apollo 8.
05 08 19 54	CC	Apollo 8, go.
05 08 19 57	CMP	Roger. I just got on the sextant and now looking at Texas, and the weather man is right, it looks like a pretty good day. Full of clouds down there, but not bad.
05 08 20 06	CC	Real fine, Jim. Can you see the kids out in the yard waving?
05 08 20 14	CMP	Would you tell Pete Conrad to get his kids off my roof?
05 08 20 16	CCWilco.	
05 08 20 22	CC	Jim, do you see the bright spot out in the Pacific Ocean through the sextant?
05 08 20 31	CMP	I'll try. We saw it, of course, through the windows and through the monocular. I'll see if I can spot it.
05 08 20 37	CC	Roger.
05 08 21 32	CMP	Yes, Jerry, I can see the bright spot. It's - I guess it's the subsolar point. It's off of South America, it appears to me. It is a grayish

spot compared to the blue waters surrounding it. It's undefined in diameter, though, I mean, it's not a clear round spot at all; it's just a raggedy one.

05 08 21 53	CC	Roger. That showed up real well on the TV's picture.
05 08 22 12	CC	Apollo 8, Houston. We'd like to delay that request for a secondary loop check to a little better point as far as thrusting is concerned.
05 08 22 22	CDR	Fine. We can wait for a long time on that.
05 08 22 27	CC	Okay.
05 08 24 10	CC	Apollo 8, Houston.
05 08 24 13	CMP	Go ahead, Houston.
05 08 24 14	CC	Roger. Jim, we've got some bird watchers in the viewing room.
05 08 24 20	CMP	Bird watchers, huh?
05 08 24 21	CC	Roger.
05 08 24 22	CMP	Sounds good. Who are they?
05 08 24 26	CC	Marilyn.
05 08 24 28	CMP	Oh, well, good. Say hello to her for me.
05 08 24 31	CC	Yes, and she's got a few troops with her, too.
05 08 24 38	CMP	Did she see the TV, I wonder?
05 08 24 41	CC	Affirmative. Barbara and Jay are with her.
05 08 24 45	CMP	Good.