

NASA JOHNSON SPACE CENTER ORAL HISTORY PROJECT

ORAL HISTORY 2 TRANSCRIPT

RICHARD O. COVEY
INTERVIEWED BY JENNIFER ROSS-NAZZAL
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ROSS-NAZZAL: Today is November 15th, 2006. This is the oral history with Dick Covey is being conducted for the Johnson Space Center Oral History Project in Houston, Texas. Jennifer Ross-Nazzal is the interviewer, and she is assisted by Rebecca Wright. This is our second session with Colonel Covey.

Thanks again for joining us.

COVEY: Sure.

ROSS-NAZZAL: Appreciate it. Last time we had talked about your first spaceflight, but I wanted to go back and cover a little bit of territory that we didn't talk about, one of which was the fact that your flight had been scrubbed several times before you had the chance to launch. Can you talk to us about why it was scrubbed and the feelings amongst the crew?

COVEY: Sure. We were scheduled to launch in the end of August, and, of course, the end of August is always problematic relative to thunderstorms in the launch area. The very first day we went—I think our launch time was supposed to be around—well, it was early in the morning, because we had to rendezvous, and we had to hit the rendezvous plane on the launch. We went out, and it really was quite nice, but when we got close to the launch time, there were two little rain showers that were out over the water. We could see them; I could see them on the pilot's

side. I could look out over there, and I could see them. There was these two little rain showers. It was clear above us. There weren't any big thunderstorms or anything, but that violated a criteria, and it was interesting to watch how the weather criteria changed, and not necessarily for good reasons, but for reasons.

We already knew that we only had like two days to make our rendezvous window, or if we didn't, for various reasons we wouldn't be able to complete the rendezvous and repair of the LEASAT. So that became very important to us, and then when they called the launch after we had been out on the launch pad for what seemed like a long time, but back then even then we still had relatively small windows because of the rendezvous requirement, they scrubbed the launch, and we had to go back and try again the next day.

So we scrubbed for weather. The next day we went out, and we got a little closer to being ready to launch. At the point where we're supposed to bring the backup flight system computer up, we tried and it failed. We did all the standard things to try to bring it back up, but it didn't. It was a hard failure of the backup flight computer, and so we scrubbed the second day for that.

At that time there were concerns about some of the propellant lines and the insulation around them after you'd gone through two cycles for launch preparation, and so we knew that if we didn't launch on that day that we were going to skip a day before we'd get another opportunity. It probably was going to take that much time to get the backup flight computer replaced and rechecked out and everything anyway, but we were feeling pretty glum, because technically we had lost the opportunity to do the most exciting part of our mission other than launch, which was to do the rendezvous and the EVA [Extravehicular Activity].

So the other thing I remember about that time period is it was Joe [H.] Engle's—oh, I think it may have been his fifty-second birthday or something. But we had a cake on board that we were going to take into orbit for his birthday, but now he was going to have his birthday on the ground, so they wound up unstowing the birthday cake and taking it back to crew quarters, and we had it there instead of on orbit, and celebrated his birthday.

So we scrubbed for weather the first day. We probably would have scrubbed for the computer failure, or we would have had the computer failure on orbit, so that was probably a good deal. The next day we scrubbed for the computer failure, and the next day we took off and waited, and then the weather started getting absolutely horrible. The good news was that the folks back here in Houston figured out that we could still launch on that fourth day and make the rendezvous and had margins to do that. So that was good.

Well, the launch window kept moving forward a half hour or so each day, as it does when you have a rendezvous. So we had gone from being a daylight launch to being, on that fourth day, just after sunrise or just at sunrise. We got up early and everything, and we looked at the weather, and it's pouring down raining, okay? The rain is pouring down.

Now, one of the funny things was—well, when we got back in the crew quarters after that first scrub for weather, John [W.] Young, who was the Chief of the Astronaut Office at the time and also served as the airborne weather caller in the Shuttle Training Aircraft, when we got back in there, the first time I was making some comments about, "I can't believe we scrubbed for those two little showers out there. Anybody with half a lick of sense would have said, 'Let's go. This could be a lot worse.'"

John Young came over and looked at me and he says, “The crew cannot make the call on the weather. They do not know what’s going on. All they can see is out the window. That’s other people’s job.”

I said, “Yes, sir. Okay.”

So here we were at that next day, and it’s before sunrise, and it’s pouring down raining, and we’re sitting there saying, “We’re going to go out there and scrub again. We’ve already done this twice. We’re getting pretty used to it.” So we go out, and—have I told this story already?

ROSS-NAZZAL: No, you haven’t.

COVEY: Okay. [Laughs] Okay, just wanted to make sure. You guys will have to remind me when I start saying things again.

As we’re going out of the suit-up room, they give us yellow slickers; it was either there or when we got to the pad. Maybe it was when we got to the pad they gave us the yellow slickers. We get out onto the crew bus, and it’s pouring down raining, and they take us out to the launch pad. When we get to the launch pad, it’s still pouring, and they give us yellow slickers to put on over our gear, because you get rained on on the launch pad. We get in the elevator and we go up, and as we’re trying to get out on the crew access arm, we had to have that. I still remember seeing some of the videos from the pad showing all of us in these yellow slickers with our hoods up and everything, going out in the rain to the pad. And we’re certain we’re not going to go.

We get strapped in. This was, of course, before *Challenger*, so we didn’t have the launch and entry suits. We just had the flight suits and the helmets, and actually strapping, there weren’t

any parachutes, so the strapping in was relatively easy. As soon as we got everybody strapped in and we got the hatch closed, the next thing I know, “Ox” [James D. A.] van Hoften and Mike [John M.] Lounge are unstrapping so that they can lay down and sleep in the back, knowing we’re not going to launch in the rain.

So we’re all out there, and I’m sleeping. Joe, I don’t know, Joe is probably sleeping, and we’re all just kind of saying, “We’re going to be here and just try not to let our backs get too sore before they tell us we’re going to get out of here.” And next thing I know, they’re starting to—and it’s still dark out, and of course, got all the lights, all the lights around the Orbiter when you’re on the pad, and so it’s hard to see anything other than every once in a while I’d see John Young fly over in the Shuttle Training Aircraft. I’d see the blink of the red lights. But there’s water on the windscreen. I can see all the water on the windscreen, and I’m sitting there, okay.

Well, darned if we don’t get down and come out of the holds pretty much on schedule. Now, at this point we know absolutely this is the last opportunity we have, and the launch control team knows it, and the flight control team knows it, that if we don’t get off today, we’re not going to go do this satellite rescue. We’ll go pump out our communications satellites, which was our primary mission we were going to do. Every time we think we’re going to go into hold or something, we don’t. We just keep on going. About the time it got down to the point where it was go for APU [Auxiliary Power Unit] prestart, all of a sudden van Hoften and Lounge start saying, “What the hell’s going on?”

So they’re back there, and we hear all this grunting and groaning, and they’re trying to get each other strapped in, and we go; we start the APUs. I’m looking, and now I’m seeing sprinkles on the windscreen. He says, “We’re going to launch in the rain, you know.”

I'm sitting there saying, "Nope, the crew cannot say anything about the weather, because we don't know what's going on."

He says, "We're going to launch in the rain."

Well, we did. We wound up going down, and we launched, and the pictures of that launch show—and it's just before sunrise, right at sunrise, but with the clouds it was dark. So the motors lit everything up and we went up, and all the pictures show this column and [imitates sound] disappearing in the clouds. That's what it felt like to us. We were going; it got real bright and everything. It was reflecting off the clouds. The ground and everything is real bright, and all of a sudden [imitates sound]. Man, talk about being in a glowing environment when you're inside the cloud as we flew through the clouds.

We went on, and I'm sitting there saying, "This was pretty amazing." We were pretty amazed. The interesting part of that was later after we had finished the mission and we were in our crew debrief with John Young and the other leaders of the Astronaut Office. We were talking about that, and I was saying, "Yeah," I says, "man, it was raining. I couldn't believe you guys were let us."

"Why didn't you tell us?" [Laughter]

"Okay." I learned my first lessons there. So it was a fun story. But anyway, we launched in the rain. I'm not sure if anybody has actually launched in the rain in the Space Shuttle since then. There's probably been some that have landed through clouds, but I don't know if anybody has flown through the clouds like we did. You go back and you look at the [STS] 51-I launch pictures, and every one of them that shows any distance away from the initial ignition of the solid rocket motors shows this orange glow going into the clouds, and that's it, and we were gone.

So that was how we wound up launching on the fourth attempt, or third attempt.

ROSS-NAZZAL: Tell us about that first day in space. Some people experience space sickness. Did you have any of those experiences?

COVEY: You know, every one of my mission I had some form of space adaptation syndrome. Most of them were pretty repeatable, and I could predict what I was going to have. There's an awful lot of talk about it beforehand, and you talk to the guys that have been there, and so you know sort of what to anticipate, but it's really kind of different when you actually get there. On all of my first three spaceflights, the first day was just extremely busy. That, I think, in itself, it keeps you from feeling a lot of the effects, because you're overpowering anything that your body's telling you by focusing on the job you've got to get done that first day.

We were supposed to deploy, I think—I think we were supposed to deploy a spacecraft a day for three days, and so first day up, we had the RMS [Remote Manipulator System], and we were supposed to get that checked out. We had to deploy one of the spacecraft, and I can't remember if it was ASC [American Satellite Company] or the other one. But one of the things that—well, that's about the first day. But basically, first day; we're talking about space adaptation, so let me get back on that.

First day, my first couple of flights, not a whole lot of problems. I usually didn't sleep very well the first night. When I first started having symptoms that I had to deal with, it was the morning after the first night in space. I say I learned on the first one, and it was repeated pretty much on the others. I didn't know at the time; I knew on my later flights, but I tried to say, "Gee, I'm kind of hungry. I know I ought to eat something or drink something." So I tried to

drink some orange juice and couldn't keep it down. It wasn't like I was even nauseous; it was just that it wouldn't stay in my stomach. So I learned then, okay, second day in space, forget about eating. It's not going to work until you start feeling—and for me it was classic.

Bill [William E.] Thornton, Dr. Bill Thornton was the first one I remember coming back and saying, “Gee, the effects of the shift of your intestines and your organs inside is much like the trauma of someone who's had abdominal surgery,” because it's an impact to it. People who have had abdominal surgery, they say don't eat anything until you start hearing bowel sounds again. So Bill, on his early mission—it may have been STS-8 or—I can't remember.

ROSS-NAZZAL: I think that's right.

COVEY: Yes. Dr. Bill had gone and he had listened to people's bowel sounds, and could correlate that pretty much to the way somebody was feeling. If they felt like they couldn't eat, or might feel nauseous or whatever, they didn't have any bowel sounds. Once they started having bowel sounds, then it was okay. So I'm pretty sure I was classic in that regard, and I learned that. So after time, a period of time, the body adjusts to the fact that all the organs are shifted around, and it's gone through this trauma of not being settled by gravity down in one end or another, and I could start eating and had no problems the rest of the flight, relative to eating and nausea. So that was a day two event for me.

Later missions, I would preplan; take medication. We had some medication that I took; it wasn't very effective, as I remember. Toward at least my last two missions, the most effective counter to it that helped me get going was a drug called phenergan. It was injected, and that was okay when you had a medical doctor injecting it into your hip, but on my third flight I had to

have a Marine do it. [Laughs] Because we didn't have any medical doctor, so he was our crew medic. But anyway, then, while we're on space adaptation, after I got through that day, then the next day I developed pretty significant headaches, primarily driven by fluid shift; again the sustained impact of fluid not draining out of your head as it does on Earth. After two days I started getting headaches. I had to treat those with Advil and other things, and it generally made me pretty uncomfortable on the third day, which was okay on my first missions, but then on my last mission that was rendezvous day. So I had to work through that for the rendezvous, and that was an interesting challenge. So that was my second-day symptom.

My third-day symptom was by the third day I was starting to have lower back pain, again, caused by the fact that the spine wasn't being compressed on a regular basis during the day, so that stretching out of it would cause me pain. So I would have to deal with that by either trying to find some way to compress my spine or to put load on it somehow or another to relieve some of that pain. That would come and go for the rest of the flight, but it was most pronounced like on the third day of a flight.

So my first mission and my last mission were long enough where I got past that and could enjoy and feel good most of the flight. My second one was only four days long, so about the time I started feeling pretty good, we were getting ready to come home. [Laughs] And the same with my third flight, which, we were trying to come home on the fourth day and waved off and came home on the fifth day. So in those early short missions you really just kind of worked through the adaptation, and about that time you came home. So that's pretty much my story on space adaptation.

ROSS-NAZZAL: You had mentioned a first-day story. I wanted to go back to that. You had mentioned we would go back to it. I'm not sure—

COVEY: Yes. Well, our mission on 51-I had been planned for some period of time to deploy three communication satellites. I don't remember at what point it was, but I think it was after we got approval to do the rendezvous, then that's when they added on the RMS. As you remember, that was a compressed time frame. It was four months from the time that the LEASAT failed on orbit until we launched, and it was actually supposed to be about three months.

We threw on the RMS, and then all of a sudden we're doing RMS operations. We're doing EVA training and operations, and in addition we're doing rendezvous training, and all that got added in, as well as the procedures got added in. And somewhere along the way, we didn't get a complete integration of the RMS operations, primarily related to cameras and the PAM operations, Payload Assist Modules, in the two communication satellites we had on those, which had covers. They had these clamshell covers for the PAMs that gave them thermal protection up until the time you deployed the spacecraft. It was all part of the design.

What happened during that first day, and of course, we've got three new guys, first time in space. We've got late procedures; not as much training probably on the total integrated aspects of that day in the actual situation we had; and in positioning the cameras on the RMS, now, to get a better view of the closing of the clamshells, there was a note that Mike Lounge missed about, "Be careful not to move this camera until after you close the clamshells, because it can have interference." And indeed, he had moved it, got it all positioned, tried to close it; it caught on it. It broke the clamshell, okay?

So when that happened, then all of a sudden now we're in a mode of having this spacecraft that we can't protect thermally, and we go into a reaction mode. The decision is made by the ground—I think that that one was to be the second one that we deployed on the next day. The decision was made that we would deploy both of the PAM on the first day. Again, I'm not sure that's ever been done, but we scrambled to get that done so we could get that one that didn't have the protection done, plus the one that we had already planned on. So basically we got the one we planned on, and then we regrouped and got the other one off.

So it made for a very, very busy first day for a bunch of new guys up there. Even Joe Engle had only been on a two-day mission before; I think it was two days when he flew STS-2. Maybe it was longer; I can't remember. But he didn't have a whole lot of time in that environment, and so like I say, we were a bunch of new guys. We had a busy, busy time frame, and we recovered; both spacecraft were deployed successfully. The rest of the mission, instead of having this nice view out the back, where there was this closed clamshell. All the pictures have this clamshell that is a continual reminder to us that we screwed that one up and broke it so that it couldn't be closed, which was interesting. [Laughs]

But anyway, that made our day one a little bit longer than it was supposed to be and a lot more action than there was supposed to be, and like I say, we were terribly busy in that time frame. But at the end of the day we'd deployed two satellites, had one to go, and a rendezvous to go after that.

ROSS-NAZZAL: You were the pilot for this flight. What were some of your basic duties during the mission?

COVEY: The pilot/commander roles are driven a lot by the systems of the Space Shuttle, and then some overall general responsibilities of the commander. So on this mission I had the classic responsibilities for things like the electrical power and the hydraulic power and those things that the systems are located over on my side, pilot side, of the ship, and then backing up the commander for all of the actions that he's required to take during dynamic flight and to assist him in taking those actions in order to make sure we get to the right place at the right time and have everything taken care of.

So it's interesting. The training that the pilot and the commander do, and the mission specialists, too, who's the flight engineer, at least in those early days probably 60 percent of the training that we got was focused on ascent and the things that could go wrong in ascent and how you responded to them. I'll say 60 percent for ascent and entry. So we kind of said, "Gee, by the time we got to orbit, 50 percent or more of our training was behind us." All that training we did was contingency type of training, because there's really very little you have to do on ascent if everything is going right, other than go along for the ride, which is a good thing. So that was it.

So then beyond that in our mission, the roles that I evolved to were a lot of photo TV responsibilities on orbit. For the EVAs, having responsibility as the IV [Intravehicular] crew member, so I was the one following the checklists and doing that; developing those and working them with the EVA crew members relative to that while Mike Lounge was operating the arm, and four of us coordinating what we were doing. Then the commander's job is to make sure the ship's running and pointed in the right direction and doing those things. So those were on-orbit responsibilities. There were some systems responsibilities, obviously, there too.

Then for our mission, Joe Engle gave me the responsibility of flying the rendezvous. We agreed early on that I'd fly it up to the time where the transition went from the front seat, and

working the orbital maneuvering system and making the burns, RCS [Reaction Control System] burns that are required for the rendezvous, all the entries into the guidance and navigation done up front, up to that point where it transitions to the back, where it's an out-the-window deal, and that's where Joe took over.

So I was very lucky in that regard, in picking up those responsibilities for the rendezvous. Most commanders would not do that, because it's just one of those parts of flight that they like to do. In fact, I did the whole rendezvous for the—my next rendezvous on the Hubble [Space Telescope]. I didn't give up that opportunity, and flew to rendezvous and the proximity operations. I allowed the pilot to do the separation maneuver, okay; I did let him do something, but it wasn't like flying the rendezvous itself. So I was lucky in that.

But those were my primary roles.

ROSS-NAZZAL: Tell us about the crew relationship. You mentioned you were going to celebrate Engle's birthday on orbit, and he let you fly the rendezvous. Tell us about the relationship between the other crew members.

COVEY: Well, Joe Engle was somebody that I had known of for, gee, since I was probably a cadet at the Air Force Academy [Colorado Springs, Colorado], because of his being one of the few Air Force officers that flew the X-15 and got his Astronaut Wings flying the X-15 before he even joined NASA. He came to NASA in '66, I think, so he had done all that back when he was a baby almost, I guess, you know. Then even before I got to the Astronaut Office, Joe Engle was flying the approach and landing tests on the Shuttle out at Edwards [Air Force Base, California],

coming off the back of a 747. Then when we got there, he was the backup commander for the first flight and was destined to fly the second flight.

So, gee, to me it was almost like flying with history. So that was a great part of it, and Joe is absolutely probably one of the best pilots that has come through the Astronaut Office, from just the standpoint of his abilities, flying abilities. So, I thought I was getting a good deal to get to fly with Joe. And it turned out that that was good, because he also allowed me to do a lot of things that he might not have wanted to do, or wanted to let me do or whatever and that. So it was a good relationship, and it continues today. We still send CDR [Commander] and PLT [Pilot] notes back to each other, e-mails, you know, and as he's gone through his recent hip replacement and is recovering from it, the most recent one. So that was a good one.

Now, Ox van Hoften, I think I may have mentioned that in our—or my early days—our early days and as an astronaut candidates, we were assigned to live in the same room, so he was my first roommate as an astronaut candidate, and that went on for at least five years. So I knew Ox well; knew his family. We had a very strong relationship, and that helped me. In fact, I'm trying to remember at what point he got assigned to the crew, because initially I don't think—at the very first time the crew assignments were made, I don't think he was on it, but then they shifted things around a little bit, and he was added to it. That was a great day for me, because, one, he'd already flown in space. He'd already done EVAs, and he was pretty down to Earth and pretty reasonable in telling you this is what you're going to see and what's going to happen and what you ought to expect, and so that was good.

The other crew members, Bill [William F.] Fisher, of course, was the husband—I knew him first as the husband of Anna [L.] Fisher before he was selected himself as an astronaut, but knew Anna very well because she was a classmate, and of course, had gotten to know Bill then.

Then the fifth crew member was Mike Lounge. Did not know Mike as well going into it, but then wound up flying with Mike on two flights. It's very rare to fly with the same person on two flights, particularly back in the early days. Now I guess there's more people who are flying together twice.

The crew got along very well. There were good—I'll say good rivalries and good memories that went with that. See, Mike Lounge was a Naval Academy graduate, but he was flying in the Air National Guard, as was—van Hoften was a former Navy pilot flying in the Air Force National Guard, the Air National Guard unit. So they were conflicted all the time whether they were Navy guys or Air Force guys. We had this great picture that we got made of all of us in our Air Force uniforms, except for Fisher, who was a civilian. But, it was kind of fun from that regard. It was a good crew.

ROSS-NAZZAL: Did you have much free time on board the mission, or was it pretty packed?

COVEY: It was pretty packed, but at the same time it was long enough so that it felt like we had more free time and everything, a lot more free time.

ROSS-NAZZAL: What did you do when you had some free time?

COVEY: We did silly astronaut tricks and looked out the window; that's primarily what we did with free time. Those were the two things you looked forward to being able to do. In fact, we did one sequence—I think it was Lounge and Fisher that came up with this, and only rookie astronauts first time in space would do this. But they came up with this in-place marching stuff,

where they would get suspended out in the middle of the middeck, and then they would start doing their arms and legs, and they'd start turning in place, and then stop and turn in place, and stop.

So we got this idea, well, we ought to have a drill team doing that, so we got four of us up there, and Engle's trying to do the filming of it; I think he tried to get it. But we're all doing this stuff in place, and that that little scene wound up in *Loaded Weapon [I]*, some people have seen that. I can't remember why it's in *Loaded Weapon*, but it's in *Loaded Weapon*; I'm pretty sure that's the movie that it showed up in. It's just a stupid scene, but it's pretty funny, because we're doing all this, and we try to come to attention, and everybody starts drifting off in different planes and attitudes and stuff. So, like I say, it was stupid astronaut tricks.

That was the first time that I really got a great appreciation for looking out the window. You know, I always tell people—they say, “What's space like?”

“There's two things that you can't replicate easily on Earth, and one is the view that you get, and the other one is being weightless.” I said, “Those two things.” Everything else is actually an artifact of some of that, to some degree, and I still feel that way. As many pictures as I've taken from the Space Shuttle and thought they were the most beautiful pictures ever, and people go, “Oh, wow,” I says, “Yeah, but you don't understand.”

I said, “When I'm looking out the window and I get close to it, this is what I get in the camera, okay? I'm seeing all this.” [Gestures] I see all that, just like we do here. You look; that's a camera view there. Well, that's like that [gestures] and not much. This is—and that's what you remember is just to be able to scan your eyes across all this and see all this. You think, “I've got to take a picture of it,” and you take a picture, and you get a picture of that part of it, and you're really seeing all that. So astronauts get disappointed in their photography sometimes,

and other people are saying it's great, but it's because of what you see and what you record and what you're able then to remember about it.

Sometimes what you remember is what you recorded, and you've got to think back about what it was really like to go and look out and see horizon to horizon and the curvature of the Earth and everything you can see down there. But the views of the Earth were extraordinary. The sunrises, the sunsets, looking into the ocean when the Sun is at different angles and seeing what you can see in the ocean that's not visible to the eye except from that distance and with that angle of the Sun shining on it. I mean, texture that's depth, and understanding that it is. It's not just a surface phenomena, but what you're seeing is maybe forty, fifty, a hundred feet deep, as far as waves and things like that. It is extraordinary.

One of the most significant things that happened in 1985 in the last part of August and the early part of September was a hurricane called Elena. Elena spun into the Gulf, and of course, with our launch time and everything, we were generally coming across the Gulf of Mexico just before sunrise type of deal or right at sunrise. That led to some extraordinary views of this hurricane. Now, I know that there may have been Orbiters over hurricanes before 1985, but the pictures that we took of Elena in the Gulf of Mexico, I still see as kind of—you know, they're showing a picture of a hurricane; this is one they show, because it covered the entire Gulf. You can't even tell it's in the Gulf. I know, because I took the picture, and I know. It was bearing down on my hometown up on the panhandle of Florida, so I was very attuned to it and knew that.

But it's interesting, that was one of those things where that was a picture we took, and it's still one that shows up in a lot of places. I don't think I put it on that—no, we didn't put on that. But even the National Weather Service for a while. It was interesting, when we came back, I

took the whole sequence of them, got the date and time of them, and sent them off to the National Hurricane Center, because I had the time. I didn't have the location, and I asked them if they could give me the location for each of the shots if I gave them the time. Bob [Robert C.] Sheets, who was the Director, and then the guy that's here in Houston and does the weather now, used to be down there.

WRIGHT: Neil Frank?

COVEY: Neil Frank, yes, he came out of the Hurricane Center down in Miami [Florida]. But I sent them down to those guys, and they got real excited about them, and for a long time that's what they used as kind of their—because they didn't have them. Now we've got a zillion pictures and get pictures from the weather satellites and stuff that show all of them. But these were good ones, and so that was one of the things, really the unique things I remember, was tracking that hurricane every day as we came across the Gulf and watching it develop and watching it track and take pictures of it. It was neat.

ROSS-NAZZAL: I read that this mission was shortened. What impact did that have on the crew and the experiments that the crew was doing, if any?

COVEY: I do remember that it was shortened, and I'm trying to think that the reason it was shortened may have been because we took one of the deploy days out of it. You know, we deployed two satellites in one day, and so that basically let us then go and do the rendezvous a day early, get the EVAs done, although as I recall, we had one EVA planned to do everything

and wound up taking two. So somewhere in there we made up another day. It may have been it took us a day less to do the rendezvous. But we got everything done; there wasn't anything left undone that I remember at all.

ROSS-NAZZAL: Why don't you tell us about the day of landing? What are your recollections of that event?

COVEY: That's a good question. I haven't thought much about that landing, other than I think it was, as I recall, it was early in the morning at Edwards. That would have made sense, because we launched early in the morning, so it would have had to have been early in the morning. The standard things of getting ready for the entry the day before; I was always amazed when I got on the Orbiter, even though people had said things. But, you know, the first time you fire one of the large RCS jets and how it feels, because it reverberates through the structure of the Orbiter. People say it feels like sitting next to a howitzer when it fires. Well, I've never done that, so I don't know, but it's a very distinctive, "Fire one jet." [Imitates sound.] It kind of makes that sound, that [imitates sound] type of sound. It's not a boom.

Then you get the motion from it, but then the structure kind of goes like this [gestures] until it damps out. Then you fire it again, and the whole—and you go, "Wow." So, not like being on a piece of steel or something. The structure of the Orbiter would do that, and all these little things break loose that may be stuck against a vent or something, or stuck somewhere in a corner, but when you start firing the reaction control jets, then it all comes loose, because you're still weightless in zero-G, and then those things shake out, and so you get stuff kind of floating

around. You hope it all winds up on the screens again, the things that you've lost. You know, they come loose.

So during the rendezvous we got to feel that. Then we do the RCS checkout and the APU checkout. The other thing that also is like that reverberates through that, which just still amazed me, was you get the hydraulic system up and running, and then through the computers you would pop ports in the hydraulic system. That was a protective type of reaction to protect the hydraulic system and the flight controls. Well, popping those ports was also an event that shook the whole spacecraft. Not expecting that. It was kind of interesting to do that.

So I was getting ready for entry. We didn't do as much fluid loading on that first flight as we started doing on later flights. Didn't have the launch and entry suits, so basically it was jump in your flight suit, go and sit up in the seat, and at the right time put your little clamshell helmet on, and you were ready to go. We were not particularly high, but the deorbit burn and everything was pretty nominal.

Our entire entry path, almost the entire entry path, was flown in the dark, and that was pretty amazing. Now, we had heard about these people that have seen these flashes out the overhead windows, and nobody was real sure what they were. We were still debating what they were. As it turns out, it was what you might think it is. It was just a matter of some plasma kind of moving around and hitting the air as you're going through the hypersonic parts of the entry. But I know that Ox and Mike Lounge were trying to figure out how to get mirrors to be able to look out and see that and figure out what it was, and we were doing that.

But since the whole entry was at night, then, of course, we got to see the progression of the plasma growth around the Orbiter, and how it starts out kind of as just little fingers along the bottoms of the windows that you can see over here, and maybe kind of orange. But then as you

get into the thickest, hottest regions, turning into this complete sheath of white over all the windows that you're looking at. So you're sitting out here, looking. "Wow, it looks really hot out there. It's right there, too; it's right outside the window."

Of course, I saw it on every flight, but, I mean, on that first one, you kind of get bits of, "Oh, so that's what they were talking about. Now I understand what they were talking about."

As I recall, since we were up above the ground, and even though it was right at sunrise, we got into the Sun a lot earlier. As we came, we slowed down; a big left-hand turn at Edwards to land on the lakebed. It just looked like we were in the trainer, coming around there and going around and watching Joe fly it down to a landing. Back then we didn't have drag chutes and stuff, so all I had to do was lower the landing gear at the right time, and Joe did the rest. Rolled out on the lakebed, and I was familiar with Edwards, and it was great.

ROSS-NAZZAL: Tell us about some of your PR [Public Relations] trips that you took after this mission.

COVEY: Some of them, yes. Now, let's see, after that mission—I'm trying to think. I'm trying to think if we did anything really unique. I remember going to the contractor facilities. It wasn't anything particularly noteworthy about those, other than that when we went out to see the Hughes guys, we had a pretty nice celebration relative to the success of the repair and redeployment of their satellite. I know we spent some time with the National Guard Association in Louisville, Kentucky, because of our two National Guardsmen that were on board, and got some recognition there. I'm trying to think of any other PR things. As a crew, I just don't remember us doing that many things together as a crew, other than the standard stuff, to go

around to other contractors that we had supported and then the Shuttle contractors, and kind of do a “gee, whiz.”

But in the fall of 1985 one of the things, and they let us do it back then, but one of the things that I had asked to be flown in the orbital flight kit was a football for the Air Force Academy football team. The coach, Fisher DeBerry, actually was relatively new. He’d been an assistant but he was the coach to the team, and I had gotten to know him, and got the ball from him, and I flew that. So let the Academy know, and the Academy wanted me to present the ball back to them at halftime of a football game.

The football game they picked was when Air Force was going to play [University of] Notre Dame, [Notre Dame, Indiana] 1985. Going into that game, Air Force had beaten Notre Dame three times in a row. It’s almost unprecedented by any team. They weren’t favored to win. I remember the game, because it was a wonderful game. Air Force got behind, and then blocked a field goal and ran it back for a touchdown. Wound up winning the game. Beat Notre Dame four years in a row. You can probably go and look and find there’s not too many teams that have ever done that, but Air Force did, and it was the game that I presented the flown football back to the Air Force Academy from our flight. That was the best postflight that I did, that I remember; there’s probably some others. I just don’t remember them.

ROSS-NAZZAL: What are your memories of receiving your Air Force Astronaut Wings?

COVEY: They showed up in the mail. [Laughs]

ROSS-NAZZAL: Really. Okay, there’s no ceremony?

COVEY: Not that I recall, no. No. Somewhere along the line the Astronaut Office gave me a gold pin that was flown on a mission to signify going from the unflown to the flown astronaut, silver to gold. But I don't remember if it was anything other than maybe at an Astronaut Office Monday morning meeting and, you know, "Here's your pin. Congratulations." But relative to anything with the Air Force and the Astronaut Wings, I'm not sure we did anything special.

We did go up to Air Force Headquarters [Pentagon, Washington, D.C.]. We did meet with the Vice Chief of Staff at the time, and maybe he did pin them on us at that time. Now I'm remembering, because van Hoften and Lounge were there, and I do remember we were all in uniform. I don't know if they gave us a medal or if he gave us our Astronaut Wings, which had flown on the mission. That may have been what it was. That was a long time ago. I've forgot it.

ROSS-NAZZAL: Sure.

COVEY: But that may have been—I've got pictures of that. Now I'm thinking about those pictures and saying, "Okay, what was it? What was it that he was pinning on me? Was it a medal or was it the Astronaut Wings?" Probably it was the wings; I doubt that they had the medals squared away by then. So it was a visit back to the Pentagon—it may have been only the second time in my life I had ever been in the Pentagon—and got them squared away. That must have been it. Joe Engle probably arranged that.

ROSS-NAZZAL: That's nice of him. After this flight you ended up being CapCom [Capsule Communicator] for three more flights. Do you want to talk about the first two, [STS] 61-B and [STS] 61-C? Anything stand out from those two flights?

COVEY: Yes. Of course, I'd been an ascent CapCom, and so when they asked me to go back over and do the CapCom thing, that was good. That was a good place to go and do that. At the time the ascent CapCom was Fred [Frederick D.] Gregory. The way that we did this is they had changed it a little bit from when I had first been an ascent CapCom, and they basically had two folks that were in the control room during ascent, and one of them was the weather coordinator. So he was the ascent weather CapCom.

That's actually what I did on the first two of those missions, 61-B and 61-C. I was training, again, in the simulations and stuff, to be the prime CapCom, but for those I was basically sitting next to Fred and backing him up and communicating with the astronauts that were at the TAL [Transatlantic Abort Landing] sites and with the weather aircraft. The focus there was not on launch weather so much as it was landing weather, because the launch weather is the domain of the launch control team. The landing weather, whether it's at [Kennedy Space Center] Florida for an RTLS [Return to Launch Site] or one of the other abort sites or whatever, is the domain of the flight control team in Houston, and so that was what that second CapCom position did.

Mostly I remember a lot of the hoopla around Bill [Clarence William] Nelson flying on 61-C. I honestly don't remember much about whether we had on-time launches or not for those missions. If there were issues relative to the weather, I just don't remember, but I know that's

what my job was was there, and there wasn't anything special or exceptional that happened on those flights.

ROSS-NAZZAL: Well, let's talk about the next mission for which you were CapCom, which was the *Challenger* accident.

COVEY: Sure.

ROSS-NAZZAL: Talk to us about that morning. How long had you been on console before the launch was to take place?

COVEY: Let's see. First, you go back, you know, and of course, like I said, there was two CapComs, the weather guy and the prime guy, and so it had been planned for some time that [STS] 51-L would be—I'd be in the prime seat for that and be the guy talking to them. All the simulations that we did were there. And actually, I was really excited about the mission, because Jay [H.] Greene was the ascent Flight Director. He had been the ascent Flight Director on STS-6 when I had been his CapCom. That was his first ascent Flight Director stint, and my first ascent CapCom one. Then he had been the lead Flight Director for 51-I, so I don't think he did ascent, or he did all the on-orbit stuff as the lead Flight Director, and got to work with him real well.

So I was really excited about getting to work with Jay again in the control center as his CapCom. So there was a little bit of history between the two of us going into that. We had a lot of trust. We had worked together before, and so, to me, that was a very positive aspect of going into that.

As the ascent CapCom you work so much with the crew that you have a lot of—in the training periods and stuff, not only do you sit over in the control center while they're doing ascents and talk to them, but you also go and work with them on other things. I remember that the last night the crew was in quarantine here at JSC before they went down to Florida, the Flight Directors and the CapComs all went over to sit down with them one more time and go through any questions and stuff.

So we got to go over and spend an hour or two in the crew quarters with them. Spent most of my time with Mike [Michael J.] Smith and Ellison [S.] Onizuka, who was, as we talked earlier, my longtime friend from Test Pilot School. They were excited, and they were raunchy, as you would expect, and we had a lot of fun and a lot of good laughs. It was neat to go do that. So that was the last time that I got to physically go and sit with the crew and talk about the mission and the ascent and what to expect there.

So with that, then they went off, and then we sort of waited until we got down to launch day, and, boy, it seems to me that the ascent team, flight control team, shows up well before the crew goes to the launch pad. I can't remember exactly, but we're in there quite a while, because we're looking at the weather, and we're looking at anything else that's going on. We're making sure that we're following what they're doing; got everything greased by the time they get strapped in so we can do our com [communication] checks with them and that. From the control center standpoint, I don't remember anything that was unusual or extraordinary that we were working or talking about.

ROSS-NAZZAL: So there was no concern about launching that morning at the Mission Control Center?

COVEY: There wasn't anything that I was aware of, and of course, time may have made—I haven't had to think about that. But, no. I mean, it wasn't something where we knew that someone was making a decision and how they were making that decision, okay? We just flat didn't have that insight. Didn't know what was going on. Did not. It was pretty much just everything's like a sim [simulation] as we're sitting there getting ready to go.

ROSS-NAZZAL: Tell us about the liftoff and then the events that occurred afterwards.

COVEY: One of the things is that they'd just started putting televisions in the control center. In my earlier flights, if anybody had one, it was maybe INCO [Instrumentation and Communication Officer] or somebody down in the front, but there wasn't any that people could see that I recall in the Flight Control Room, the idea being you shouldn't be looking at pictures. You should be looking at your data, okay? So that's how we trained. Since the last time I'd been in the control center, they'd started putting—I knew that we had one down here, and because I'd sat as the weather guy, and once the launch happens, you know, I kind of look at the data, but I look over there at the TV. It's down a row lower and kind of out over this way from Flight Director, CapCom, it's kind of down over that way.

So, looking at all that and everything, start the launch, and I go heads down on my display, because whatever I'm supposed to be watching there, I want to make sure I'm looking at it and don't miss it and that. So everything, all the calls, I don't remember anything unusual; the calls went. The first indication I had that something was wrong is that Fred is watching the video and sees the explosion, and he goes, "Wha—? What was that?"

Of course, I'm looking at my data, and the data freezes up pretty much. It just stopped. We all missed the ms or whatever it was; it was missing. So I look over and could not make heads or tails of what I was seeing, because I didn't see it from a Shuttle to a fireball. All I saw was a fireball. I had no idea what I was looking at. And Fred said, "It blew up," something like that. So I know their dadgum camera guy, amazingly, he's still—he was sitting there just cranking along in the control center while this was happening. Didn't miss a beat, because I've seen too many film footages of me looking in disbelief at this television monitor trying to figure out what the hell it was I was seeing.

So off loop, there was a dialogue that started ensuing between Jay and myself, and Jay, he's trying to get confirmation on anything from anybody, if they have any data, and what they think has happened, what the status of the Orbiter is. All we could get is the solid rocket boosters are separated. Don't know what else. I'm asking questions, because I want to tell the crew what to do.

That's what the ascent CapComs are trained to do is tell them what to do so they don't have to go—if we know something that they don't, or we can figure it out faster, tell them so they can go and do whatever they need to do to recover or save themselves. There was not one piece of information that came forward; I was asking. I didn't do it over the loop, so I did this between Jay and some of the other people that could hear, "Are we in a contingency abort? If so, what type of contingency abort? Can we confirm they're off the SRBs [Solid Rocket Boosters]?" Trying to see if there was anything I should say to the crew.

Amongst all the confusion and everything else, there was never anything that anybody indicated, "Well, we ought to try to contact the crew." We didn't have any com. We knew that. That was pretty clear to me, so the only transmissions that I could have made would have been

over a UHF [Ultrahigh Frequency], but if I didn't have anything to say to them, why call them? So we went through that for several minutes until, and so if you go and look at it, I don't think there was any—there was never a transmission that I made after “*Challenger*, you're go [at] throttle up.” That was the last one, and there wasn't another one.

Then, after that flurry of trying to figure out is there something that we can do or something we can tell the crew or whatever, I remember Jay finally saying, “Okay, lock the doors. Everybody, no communications out. Lock the doors and go into our contingency modes of collecting data.” I think that was—when he did that, I finally realized that—I went from being in this mode of, “What can we do? How do we figure out what we can do? What can we tell the crew? We've got to save them. We've got to help them save themselves. We've got to do something,” to the realization that my friends had just died.

Then given that, then you're in there and, “Okay, get all your notes together and write your notes and stuff,” and I'm going, “Wow!” I don't think I did a very good job of taking notes. Of course, Fred and I were there together, which helped, because so many of the *Challenger* crew were our classmates, and so we were sharing that together, a special time that I'll always remember being with Fred was there in the control center for that.

But that was it. Had no idea what had happened, other than this big explosion. We didn't know if it was an SRB that exploded. We didn't know if—I mean, that was what we thought. We always thought SRBs would explode like that, not a big fireball from the external tank propellants coming together. So then that set off a period then of just trying to deal with that and the fact that we had a whole bunch of spouses and families that had lost loved ones and trying to figure out how to deal with that.

ROSS-NAZZAL: What did you do after you left mission control that day? Did you go to the Onizukas or the Smith family and—

COVEY: Yes, you know, the families were in Florida, and I remember, of course, the first thing I wanted to do was go spend a little time with my family, and we did that. But then we knew the families were coming back from Florida and out to Ellington [Field, Houston], so a lot of us went out there to just be there when they came back in. I remember it was raining. Generally they were keeping them isolated, but a big crowd of us waiting for them, they loaded them up to come home. Then over the next several days most of the time we spent was trying to help the Onizukas in some way; being around. Helping them with their family as the families flew in and stuff like that.

ROSS-NAZZAL: What impact do you think the accident had on the astronaut corps?

COVEY: It made the astronaut corps very conservative, and the reason it did that was because, well, as things played out, it made them conservative. It made them very I'll say distrustful that the system would make the right kinds of decisions to protect them. I wouldn't say it was a bunker mentality, but it was close to that. You know, the idea that, as it played out, that there were decisions made and information that may not have been fully considered, and as you can see from all of it, a relatively limited involvement of any astronauts or flight crew people in the decision that led up to the launch, very little, if any.

So that led to some changes that have evolved over time where there are more and more astronauts that have been involved in that decision-making process at the highest levels, either

within the Space Shuttle Program or in the related activities, where before it was like, “Yeah, those guys will make the right decision, and we’ll go fly.” That’s probably the biggest effect that I think came out of it.

ROSS-NAZZAL: Did you ever consider leaving NASA as a result of the *Challenger* accident?

COVEY: No. No. I’m trying to think if that was ever a consideration, and I don’t recollect it as being something—I was mostly concerned about how soon we’d get flying again.

ROSS-NAZZAL: What were some of your duties after the accident until you flew on STS-26?

COVEY: Oh, well, initially I didn’t think they were going to let me be involved in any of the investigative and data collection activities, because I was on the flight control team. That gave way, and I actually was able to be part of a video reconstruction team and participate in that. So we were some of the earliest folks to actually get to the camera views that showed the effects of the leak from the SRB joint and how it progressed into the penetration of the external tank and the ensuing activity.

So initially that, but that didn’t last. I mean, that was kind of, okay, there was that data. We were still training crews, and so I was still doing ascent CapCom stuff, as I recall, as we trained, because nobody knew how long it was going to be before we flew again, so we continued some level of training. Once we realized that it was going to be a redesign and a lengthy period of time, it seems like we backed off of that a little bit, but I don’t remember exactly when.

So I had been working with Rick [Frederick H.] Hauck and his crew as the ascent CapCom in some of their training. I probably could reconstruct the timing of this, but Rick had a crew of four, and they were supposed to fly the first Centaur mission, so it was Mike—Mike Lounge was on that mission; Dave [David C.] Hilmers was, and Roy [D.] Bridges [Jr.] was the pilot.

Somewhere in there after the *Challenger* accident, the Air Force came back and asked Roy if he would go back out to Edwards Air Force Base and command a test wing out there, and he elected to do that rather than wait to fly again. So that was in '86 sometime; I don't remember when. I'm pretty sure it was '86, may have been early '87. So he left.

Once he had elected to leave, he left relatively quickly, and Rick still had his crew together and asked me to come and train with them. When they did their training, they needed a pilot, and he knew I was relatively current because I was an ascent CapCom, and I'd been on a mission not too long ago. So I started training with Rick and those guys. That was all by Rick's design. Somewhere along the line Rick figured out he was still going to fly the next flight. I don't think the Centaur mission was going to be the next one after the *Challenger* accident, but it was pretty close thereafter. But he figured out he was going to fly the first flight and I think at that point started lobbying to get me on, added onto the crew as his pilot.

ROSS-NAZZAL: When did you find out you were going to fly the return-to-flight mission?

COVEY: I can't remember the date. [Laughter] I remember getting called over to George [W. S.] Abbey's office, though, and as I recollect, Rick was there, as was—I can't remember if it was

Dan [Daniel C.] Brandenstein or John Young, but they were all over there and kind of said, “Well, would you be willing to do this?”

“Well, yeah, I’d do it.” [Laughs] I said, “I’ve got to fly with him?” [Laughs]

I honestly don’t remember when it was, but at that time they formalized me coming on to the crew and “Pinky” [George D.] Nelson being added, and they said okay. That’s when they came out and said, “This is the return-to-flight crew of STS-26.” I’m not even sure we were calling it STS-26 then; it was just the return-to-flight crew, and then once they figured out they didn’t want to do the 51-Is and 51-Ls and stuff like that anymore, they changed it back to a number. So it was something like that.

Anyway, I was tickled, because as we talked earlier, I was the last guy in our class to fly, and all of a sudden now I’m going to get to fly again before a whole lot of other people do. [Laughs] That was good. It always worked out good.

ROSS-NAZZAL: What did your family think of the decision?

COVEY: I think they were a little bit concerned. They were excited for me, a little bit concerned, but convinced by me and others that there probably wasn’t going to be a safer flight. When I went through all the things that were going to be done before we flew again that were better than the last time I flew, it was easier for them to accept that. But terribly frightening, more so for them than it was for the crew as you go through that.

It was interesting, you know, the attention on STS-26. Most people don’t even remember what our payload was or what we were flying for. The focus was on the crew and the changes that had been made to overcome the *Challenger* accident from a systems standpoint, so that was

a big part of it. That was different than any of my other missions; there was so much focus on the crew. It happened again here for STS-114, too, you know. I think that's a natural thing when people die, then those that follow behind them receive a lot more attention doing the same thing that other people have done and will do. So it's interesting.

ROSS-NAZZAL: You mentioned the attention that you received for this flight. I understand that *48 Hours* came down here and filmed a segment about the mission itself. What do you recall about that program or the media interest in the mission?

COVEY: Well, like I say, it was unprecedented, the attention that we got. I mean, artists would come and take pictures, and then they'd go paint pictures of us doing different things. Some of them are over in Space Center Houston now. I see them when I go upstairs, and I've got some photos of artwork that guys did, and so that type of attention was weird. The *New York Times* wanted to do a whole insert, kind of, on us, and so whatever their weekend magazine is, it starts out there's this picture of one of the guys—I'm pretty sure that was it—getting into an EVA suit or something like that. I still have a copy of that down in my archives, you know. [Laughs]

Just a lot of national, high national-level interest. That *48 Hours* is obviously focused not just on the crew, but on the things that have been done to overcome the *Challenger* accident, technically, and looking a little bit back into the Rogers Commission and saying, "This is what the Rogers Commission said happened, how do we know it's not going to happen again?" type of thing. So it was very much different.

Now, we knew, because from the time we were named as the crew, it was still a year or so out, and we all knew that there was nothing like being a prime crew for that length of time. I

mean, you get everything. When we [wanted] to go fly the Shuttle Training Aircraft on these days and these times, yes, we got it. We want the simulator, we got it. We want to go do this, yes, we got it. So we got everything we wanted.

There's nothing like being prime crew, and when you're prime crew that long, you really probably get a lot of—you have a lot of due to people for it, because the other astronauts suffer from that, to a large degree. They don't get that priority. Then the next crew is only a month or so behind you, and so they're only prime crew for a month. We were prime crew for eighteen months, two years or something. It was ridiculous.

But, we got invited to participate in anything that had to do with return to flight, whether it was a test of the solid rocket motors, the changes in the booster joints; go out to Utah and see them fire these motors. We'd go wherever, and of course, we also got to be involved in a lot of the crew escape development.

Boy, I remember the first time I think it was “Sonny” [Manley L.] Carter [Jr.] kind of sat us down and went through this bailout scenario type of deal and what might be possible for a partial-pressure suit following the trajectory that the *Challenger* crew compartment had gone through and things like that. If you had a pressure suit, a partial-pressure suit, then you'd probably be able to survive this, and then if you could get to the door, you could have this parachute and bail out. And we're all going, “Wow.” [Laughs] So being involved in those types of things that other astronauts were lead for and doing for us, following for us, but bringing all the right information to us so that we're totally informed and comfortable with what was happening was really neat.

ROSS-NAZZAL: Had the training changed at all since your first mission? Did you notice any differences?

COVEY: Well, no, not substantially. We overtrained because we trained for so long. Our mission was so simple, to fly up; first day, kick out an IUS [Inertial Upper Stage]; take some pictures; do some middeck experiments or whatever; and then come home. You know, it was basically it. It was a test flight, and a very simple one from the standpoint of the payload that we had. So we probably overtrained.

Where we had new training was in the fact that we had new life support gear. Now we had parachutes, so, well, okay, now we had to go train how to parachute into the water and get our little life raft blown up and crawl into it with all this gear on, this funny gear that we hadn't had before. We had to learn how to crawl out of the Orbiter with all that gear on and rappel down. We had to do a lot of things that we hadn't done before because of the change in that. So most of the training differences focused around the new crew survival gear.

Most of the changes to the systems that made them safer were things that we didn't have much effect over relative to the way we train, like the change to the SRB. Well, okay, we're still going to launch just like we always had, and the changes are going to make it so we don't wind up blowing up, but we didn't have to learn anything different. There wasn't anything we could do relative—or that how that change would affect our response. So I don't remember anything other than the normal continued refinement of our ascent contingency abort procedures as we continued to get smarter and smarter about what you could do with the Orbiter and at what times. But that was always—that's still going on, you know; that's still going on.

There probably were some software changes, but they were relatively minor, so it wasn't a lot of different type of training other than that, which is another story, okay? So did we talk about the color of the suits?

ROSS-NAZZAL: No.

COVEY: Okay. As they developed this idea of bailout and of using these partial-pressure suits, they went and the first suits that they got were dark blue, the life rafts were black or dark blue, you know, like you're going to war or something. We kept saying, "Hey, we bail out of the Orbiter and we're floating around in this dinghy a hundred miles offshore, who the hell is going to find us? How are they going to find us?"

So we're sitting there one day, and they're talking about, "Well, we're not going to use the blue life rafts. We're going to use orange ones."

I says, "Well, if we're going to do that, why are we going to have blue suits? Why don't we have orange suits?"

So that's how we came to have the orange launch and entry suits, because everybody went, "Is there any reason these can't be orange? I mean, if we're going to look stupid in them anyway might as well look orange." [Ross-Nazzal laughs.] So that was an evolution of the crew being involved with the people developing the systems and dealing with the issues, the real issues of, "Okay, yeah, so we bail out and we're floating around. What can we do to make sure we get found?"

I said, "Well, if the life raft is orange, why not make the suit orange?" So I don't know if I get credit for that or not, but that was the way that that evolved.

ROSS-NAZZAL: You definitely stand out.

COVEY: Yes. Yes. Yes. So I think all of the blue training suits may be gone, but if you look back at the pictures of the STS-26 crew and some later crews doing their training over in the water, they're in blue suits. That's because the early ones that were developed were made out of that blue material, then they became the training suits when they went to the orange ones, and by the time we flew, we were in orange ones. That's what we flew.

ROSS-NAZZAL: We'll have to go back and look at some of the digital pictures and see what we can find.

COVEY: Yes, you go back and look at the STS-26 crew training. Even some of the artwork that I see has us in those blue suits, because that's what we started out in is training in those things.

ROSS-NAZZAL: Interesting. Well, we need to take a break for a second to change our tape.

COVEY: Okay.

[Tape change]

ROSS-NAZZAL: What was the mood like at JSC as you were preparing for your flight?

COVEY: Well, everybody was reacting basically to two things. One was the fact that they had lost a Space Shuttle and lost a crew, and two, the Rogers Commission was extremely critical, and in many cases, rightfully so, about the way the decision-making processes had evolved and the culture had evolved.

So those two things together are hard for any institution to accept, because this was still a largely predominant workforce that had come through the Apollo era in to the Shuttle era, and had been immensely successful in dealing with the issues that had come through both those programs to that point. So to be told that the culture was broken was hard to deal with, and that's because culture doesn't change overnight, and there was a lot of people that didn't believe that that was an accurate depiction of the situation and environment that existed within the agency, particularly at the Johnson Space Center.

We started seeing a lot of personnel changes in that time period in leadership positions. I think they were a matter of timing and other things, but George Abbey had been the Director of Flight Crew Operations for a long time, and somewhere in there George left that position. Don [Donald R.] Puddy came in as the Director of Flight Crew Operations, and that sat poorly with a lot of people, because he wasn't out of Flight Crew Operations; he was a Flight Director. So that was something that a lot of people just had a hard time accepting.

John Young left from being Chief of the Astronaut Office, and Dan Brandenstein came into that position. I'm trying to remember what happened in Mission Operations, but somewhere I there Gene [Eugene F.] Kranz left; I can't remember when, and I'm not sure when in that spectrum of things that he did. So there were changes there.

The Center Director changed immediately after the *Challenger* accident, but we had a new Center Director, also, and changes were rampant at [NASA] Headquarters [Washington,

D.C.]. So, basically, there was a restructuring of the leadership team from the Administrator on down, but much of it was still people who had been part of the system and so it was not as difficult as if there had been a lot of outsiders that would have been coming in. Dick [Richard H.] Truly was up at that time running whatever we called Code M in those days, but old Code M, and Jim [James C.] Fletcher came back as the Administrator. Aaron Cohen had stepped in as the Center Director here, I believe, or was it—no, who was it? I can't remember who came in.

ROSS-NAZZAL: Jesse [W.] Moore was here for a while, wasn't he?

COVEY: Yes, but he was gone within months. He had just showed up, and then he was gone right after the *Challenger* accident. I don't remember the progression of when Aaron came in there. It may have been in that time frame, '86. I just can't remember if there was somebody else that was there or not; I don't remember.

So a lot of leadership changed. That did a lot of different things relative to—but one thing was now we had an astronaut that was leading Code M. I think that was the time frame that Bob [Robert L.] Crippen became the Shuttle Program Manager, or somewhere in there. That may have been when Bob went down to Florida, and all of a sudden we had an astronaut now that was starting to be involved in what was going on down in Florida, and that was something that kept on going. So you had a program position down there.

So all of that started changing the Astronaut Office's perspective of the people that were making the decisions, but I say, it was very distrustful and trying to figure out who we can trust and how do we know that the crew's voice and mind is being represented appropriately. And those were the types of things that helped a whole bunch to do that.

But, as JSC does, once they got past the grief and got past the disappointment of failure and acceptance of their role relative to the decision-making process, they jumped in and said, “Okay, our job is flying. Let’s go figure out how we’re going to fly again.” That was the focus, and as JSC can do when it is focused on something, they did an extraordinary job of getting ready for that flight, both from the standpoint of looking at the mission operations, but all the engineering required to support the activities.

The Orbiter engineering, of course, is primarily led through JSC, so all the changes that were made to the Orbiter. From the program standpoint, the guys having to stay with the Marshall [Space Flight Center, Huntsville, Alabama] folks that were getting the changes made to the solid rocket boosters, you know, the evolution of the escape systems, all of that; all JSC stuff. They did a wonderful job in doing that.

ROSS-NAZZAL: Let’s talk about this crew. This crew was an all-veteran crew. How did that differ from your first flight?

COVEY: It makes a big difference when you have all veterans. One, you’re not having to always kind of keep people focused on what it’s going to be like, and you know they’re not going to be “gee, whizzed” by the first time they get there. So it makes a difference. I’ve flown on two flights that were all-veteran flights, and I’ve flown on two flights where three new guys. You approach them a little bit differently.

From a crew member’s standpoint, again, it makes it easier for people to accept and focus on their roles, because they understand what it’s like for the other person and for them, and you lose all of that first-time stuff. People can get—they can make the wrong decisions for the

wrong reasons sometimes, and when you don't have the experience of having flown, you're more prone to do that. History will show that. [Laughs] So that was a big difference.

ROSS-NAZZAL: I understand that Ronald [W.] Reagan came down while you guys were in quarantine. Can you talk about that event, your memories?

COVEY: Yes, I don't think we were in quarantine when he came. I think it was actually prior to that. That was extraordinary. Well, first, one of the most extraordinary moments was when he came down for the *Challenger* memorial service. That in itself was such a memorable event, and, he just had such a way with people and a way of presenting himself, and the best speechwriters in the whole world, and he could deliver on those. I still look back at that. I look at the words he said and the things he said, and it was extraordinary.

Presidents coming to JSC just didn't ever happen, and he'd come for that. Now he was coming back in a preflight, getting ready to go fly, this same mode. He's coming back basically to get the troops fired up, and to show the support of the nation and his support for the things they've been doing. Of course, the crew gets to be kind of that focal on that.

But what a great week. I still remember they had the big stage set up over at Building 9 and had it so they could do it kind of indoors-outdoors and get a bunch of people out there. They'd set up some things, and they offered us an opportunity to meet with him before the event, and for our families to meet him. My girls were young, and I remember we all stood in a kind of a semicircle with the crew member in their flight suit and their spouse and their kids. He went around and shook every hand; stood with every family; had his picture made. My kids still look

at those pictures and, you know, “Golly, that was me with the President of the United States, you know, and I was ten.” [Laughs]

So it was a wonderful event, and again he did just that. He just always had the ability to say the right things, and I think he meant them. He was an actor, but I think he—[laughs]. So that was a real boost for the team for a President to come down for something other than a funeral, and so we appreciated that a lot. It was a great day. Got great pictures of it. [Laughter]

ROSS-NAZZAL: Why don't we talk about the launch? I understand that you guys had to wait for about an hour and a half until you officially launched. What was going on in the crew cabin at that time?

COVEY: Well, we did have a long launch window, because we didn't have a rendezvous, so we had a relatively long launch window, which is good and bad. It's bad for the crew. It's bad when you've got—particularly, we had these new space suits; not comfortable. As I remember, I don't think we were wearing the diapers then. We were still using the urine collection devices, and those aren't particularly comfortable or easy to use. When you're on your back for four hours out there, as the pilot and commander are if you go to an hour and a half into your launch window, because we normally go out two and a half before, then it's a long time. It's uncomfortable.

By the time we got out there, we had long gotten past—and it's typical, I think, of astronauts and test pilots and stuff. If you're going to go do something that's dangerous, then you have already rationalized the danger to something that you can accept, and you feel confident in your ability to respond to those things to keep something bad from becoming worse.

If you didn't feel that, then you would never go to the launch pad. You'd be too scared, because it's frightening enough.

So we had long gone through this mantra, and believed it, that this was the safest Shuttle flight that's ever going to fly. [Laughs] So, my recollection is, as with every launch, I'm more worried about doing something that makes me or the crew look bad than I am about the absolute dangers that we're facing. You know, it's one of those things. [Laughs] I can die okay, but I don't want to screw up and then die. [Laughter]

So it's an acceptance that you have in that regard, and you're very much performance focused, performance focused, as a crew, as an individual, thinking all the time, okay? Looking at the procedures. This is what's going to happen. This is what's going to happen. That's what I've got to do if that doesn't happen. I mean, it's that type of thought process.

I get on the launch pad, and I go to bed. [Laughs] I don't think there's been a flight I've been on that I didn't go to sleep on the launch pad for some period of time. It may be five minutes, ten minutes, but you have to relax, and so, you know, in relaxing, I'll go to sleep. I don't miss anything critical. They talk to me, I wake up. But I know that I can sleep on the launch pad, and I attribute that to the fact that it is such a high-adrenaline type of thing that if you really can relax, then your body just kind of goes [demonstrates] really quick.

But then I could do that—I've been able to do that a long time. I can sleep in weird places, and I'm not alone in that. Lots of people will say, yes, they can take a catnap on the pad, particularly when you get in, pilot or commander first, two and a half hours before launch, you know, for an hour strapping all the other guys in and stuff, so it's an easy time just to go to sleep there before you have to start doing checks on anything. It's just a matter of—I think.

So we were out there. I don't remember much about waiting to launch. I don't remember. We just wanted to go.

ROSS-NAZZAL: Any memories of launch itself?

COVEY: Yes. My first launch had been into the rain and the cloud. This was into clear blue sky. It was a lot different. [Laughs] It felt different, I think, just, you know, the first time you're just overpowered by the sensations. The second time, the test pilot in you kicks in, and you start saying, "Okay. Oh yeah, that's what I'm feeling there. That's what that is. Okay, and this is going to happen. Yes, I'm ready for that." Those types of things, anticipation; it seems to take much longer.

Not a hold-your-breath type of deal, but, you know, going through eighty-eight seconds, we're all kind of thinking about what happened the last time the Space Shuttle had gotten to that point. Then when the solid rocket boosters come off, that was definitely a big-relief moment for us; always has been and always will be, but had special meaning for us on that flight when we got past that point. And then, it was rocket into orbit. I think we probably had a lot of yahoos, and it felt good to be leading the Space Shuttle back into service.

ROSS-NAZZAL: I've seen some clips of your flight, and one of the clips that I always enjoy, and I think they show it at Space Center Houston [Houston, Texas], is the clip of you in your Hawaiian shirts. Can you talk to us about how you got the Hawaiian shirts, and how you decided to wear those on flight?

COVEY: Sure. In one of many visits that we made to Florida, there was one in particular where we went as a crew to the Orbiter Processing Facility [OPF] to go and see *Discovery* in there before it rolled out, and to basically do a hurrah type of event with the folks that had been working on that dadgum Orbiter for three years almost. I still remember when they drove us up from the Shuttle Landing Facility. They picked us up, and they drove it. We drove up to the north end of the OPF over on the OPF-2 side.

All these people are out there, and they're in the craziest clothes you have ever seen. Hawaiian shirts and plaid pants or shorts, and above them was a big sign that said, "Loud and Proud." That was their deal, loud and proud. In the course of the ceremony they pulled out these five shirts. Some of them are the most god-awful shirts that exist. In fact, the one that I gave the Space Center Houston on the mannequin over there—

ROSS-NAZZAL: Okay, I thought that was your's.

COVEY: —is a pretty ugly one, and I was glad to get rid of it. [Laughs]

But they gave them to us, and we wore them around over our flight suits while we were there, and then we took them back and we said, "What are some of the things we can do to help recognize people that were so instrumental in getting the Shuttle system back flying?" We came up with the idea of flying those shirts, and just taking a picture of the crew with those shirts on, and bringing it back and giving it to everybody over there as part of the "loud and proud" crew. So that was the genesis of it. We got them put into our crew clothing.

One of the other things for that mission is that we had gone away, finally, or for the first time, from having to only have for the shirts that we wore on orbit to be shirts that were the

standard—they had kind of a standard navy blue short-sleeved shirt with a big patch on it, and we actually got to go and pick Lands’ End shirts that we would wear, that would be our shirts on orbit, personalized, even. I still have mine. We were the first ones, and you got a shirt a day or whatever. I remember we picked one red, one white, one blue. Everybody got the same red, white, and blue shirts.

So those were the first nonstandard shirts that flew on the Shuttle. Before then everybody flew the same type of shirts. Now they fly a zillion different types, which is wonderful, and they’ve finally figured out that you don’t have to certify some particular shirt to go and be okay in the crew compartment or anything. It’s cheaper, too. [Laughs] So we did that.

But we had those shirts, and so when we had time—we had a lot of time after we deployed the TDRS [Tracking and Data Relay Satellite]; the next couple of days we had time—then we put those shirts on and put our sunglasses on and took some self-portraits, and that’s the genesis of them. Came back, and those were the “loud and proud” shirts, and that’s where they came from. They came from the OPF at KSC [Kennedy Space Center] on one of our preflight visits.

ROSS-NAZZAL: One of the other things that your crew did is pay homage to the *Challenger* crew. Can you talk to us about that tribute, and who was responsible for the idea, and how it came about?

COVEY: I don’t remember specifically who said we ought to do something, but it was something that everybody bought into immediately, and then it was just a matter of what were the right ways for us to recognize, so we took a picture of them; we took a patch. We said a few words

and did things. But we felt that it was appropriate to recognize the sacrifice that they had made and the fact that through their deaths the whole Space Shuttle Program was more strong and better, and that they would have wanted us to be right where we were. Never would have been any doubt in any of them's mind about whether we should have flown again or not. I don't think there was any question.

But, you know, for Rick Hauck and Pinky and me, it was particularly—well, you know, [four] of our classmates were on the *Challenger*. One of Mike Lounge's and Dave Hilmers' classmates, Mike Smith, was on board, so between the five of us, we all shared a loss, a personal loss in the class and personal loss of friends across those classes, so it was an easy thing to do.

ROSS-NAZZAL: I understand you also did some Earth Obs [Observations] during the mission itself.

COVEY: We did, but I don't remember anything particularly unique about the Earth observations, other than, you know, we had more time to do it on others because we didn't have a whole lot of things we had to do after we deployed the TDRS. After we got to orbit, the biggest part of the flight, the test flight, was over, and so there just remained to do that. So we had lots of opportunities to take pictures. I have to go back and look sometime, and see if there's anything unique that we took.

ROSS-NAZZAL: Why don't you tell us about landing? Did this landing stand out in any way to you?

COVEY: Very similar to the first landing. Of course, we landed again at Edwards. I was fortunate to fly with two great commanders, who just did a good job of flying the Orbiter around and landing it. One of the things about entries is that the most remarkable parts of them are actually flying down and touching down, and then coming through the high-heating regions of the atmosphere and the trajectory. But from one flight to the next, they're pretty much the same; not a whole lot of difference in those.

It was a bright, clear day at Edwards. There weren't a lot of clouds or anything like that. When we talk about the landings of my other missions, there will be a different story, different scenario. It was different then. Maybe it was because I was flying. [Laughs] But maybe not. But as a pilot, watching a guy fly and putting the landing gear down and rolling out on the lakebed, we were just ready to high-five each other and go see our families and celebrate a great return to flight.

ROSS-NAZZAL: It's almost five, but I had a couple more questions for you. Can I go ahead and ask, or would you prefer that we wait till next time?

COVEY: If you think that we'll get to a good breaking point on STS-26, we can go ahead a little bit.

ROSS-NAZZAL: Okay. I understand that Fletcher and Vice President [George H. W.] Bush were there when you stepped out. Did you know that they were going to be there?

COVEY: We did not. We did not know that they were, and actually, on the lakebed itself, Fletcher kind of stayed back, and we got the word that we'd have a special visitor to receive us. I believe we had precoordinated—not knowing that was necessarily going to happen, but precoordinated with the closeout crew to bring a U.S. flag on board for us, because we wanted to come down the stairs with a flag. They had done that, and so when we came out, I think Rick had the flag, and we all came down with the flag and, “Oh, there's the Vice President.” [Laughs] Then we all stood around with the Vice President and the flag and everything; that was kind of neat.

But my kids tell the best story about the Vice President, because he was there before we landed, and they got to go have lunch with him, and lunch was hot dogs or something like this. So they still talk about sitting around having hot dogs with George Bush. [Laughs] It was funny. “The Vice President is here; we're going to have hot dogs for lunch.”

But anyway, that was neat. That was a wonderful return to flight. A lot of interest in the landing and then a lot of postflight interest, too.

ROSS-NAZZAL: How were you welcomed back at JSC?

COVEY: Well, by a huge crowd, as I recall. When we—can't remember the time of day—flew back from Edwards with our families and got back in, and I did not remember big crew return ceremonies or events prior to that, but we had a ton of friends and families. When I came around in my house, there were flags, little American flags, lining the street. The neighbors were all waiting. It was great. It was great; a lot of fun. Actually a lot of focus on the crew on that mission, so it was fun to be a part of that.

ROSS-NAZZAL: I understand that you were invited to the White House [Washington, D.C.] after the flight.

COVEY: We were. As I recall, there hadn't been any visits to the White House by crews for a while. Hadn't flown for a while, but even before the *Challenger*. You know, 51- I, we didn't get invited to the White House. I don't think the crews in '85 were going to the White House. So to get the opportunity to go, again, particularly, since Reagan had come down to Houston, was great.

I believe that when we went, I don't believe our wives were invited to that. It was the crew and a smaller group of people. But my first time to the White House, first time in the Oval Office, Ronald Reagan, a hero to me. [Laughs] It was great. It was a great experience. Best visit that I had had at that time to the White House, only surpassed by the one that I had after STS-38 with George Bush and Barbara Bush, and we'll talk about that one, too; a neat story.

But it was pretty perfunctory, with the STS-26 return-of-flight crew going into the White House and meeting the President and getting some pictures made. He was very gracious and very nice, but it was a short visit.

ROSS-NAZZAL: I've also read that the crew testified in front of the House and Senate committees that oversaw NASA.

COVEY: We did. We did. We also made a visit to the House while they were in session, and they awarded us or gave us a whatever they call them. They passed a little recognition thing

signed by the majority and minority leaders and stuff, and gave it to us, and recognized us in the House and presented that to us. But we did testify before the Science Committees, I believe is what we did. That was pretty easy. What could we do wrong? We showed them pictures and movies and talked about our flight, and they asked some questions. Mostly it was a congratulatory type of event. Go back to the Hill.

ROSS-NAZZAL: Is there anything else you think we should talk about about this flight? I think we tried to cover as much as we could. There's probably a lot more that could be said.

COVEY: That's probably as much as I can think of right now. We may come back or something if I think of something.

ROSS-NAZZAL: Okay. Well, thank you very much. I truly enjoyed it.

COVEY: Okay.

[End of interview]