

INTERVIEW OF

ERNIE REYES

JULY 23, 2003

KENNEDY SPACE CENTER ARCHIVES

By

DR. ORVILLE BUTLER

DR. ORVILLE BUTLER: I'm Dr. Orville Butler and we're talking to Raul Ernie Reyes here at the KSC archives. Today is July 23, 2003 and Mr. Reyes has consented to chat with us a little bit about some of the events that occurred during his tenure at the Center. You've had several interviews and so we won't go into all the details of your career here. Those have been covered elsewhere, okay, but I would like to begin by asking you about one of the things you talked about briefly in an interview in 1988 with Sheryl (phonetic) Butler. You talked about the informal name structure and about the development of frogs as a term referring to inspectors – quality control people – you mentioned several other names, and I was wondering if you could tell us a little bit more about, in general, about the informal name structure, and how widespread it was and identify some of those things.

DR. ERNIE REYES: Sure. The first thing I want to say is my experience and everything I tell you today will be relative to the spacecraft operations at Kennedy Space Center. We had capsule operations, or spacecraft operations, relative to the payloads where the crew people flew astronauts, etcetera, and then we had launch vehicles, the launch vehicle people, and then we had the keepers of the rocket range. The people that maintained the commodes and the power and the utilities and cutting the grass and maintaining the building, etcetera. So I will address everything that I have relative to the spacecraft operations. We were referred to as the nose cone guys. The camaraderie between the workers, during my years here and

other places working with KSC, were very similar to what everybody sees in the movies relative to a small group of men, and women nowadays, working toward a project.

You see it in combat, the movies - combat – the war movies, and you get lower in the ranks, you get to the foot shoulders or the (inaudible) and you get a little bit more relaxed and you have a lot of nicknames. I saw that when I was working as a day laborer out in the Southwest and we all had different nicknames. Well, I saw that in college too with the friends that we had. We had a small group of guys – kind of survive engineering school, and we had nicknames for each other. Well, it was no different here at the Kennedy Space Center, that was the camaraderie between the individuals. There was the technicians, and then there was the inspectors and there was the engineers - then the operations people and then the managers.

The spacecraft managers, the launch vehicle managers, complex managers and the whole hierarchy of it was that at the lower levels, we all had names. Nowadays the managers are called 'suits'. The suits – they are the guys with the coat and tie and things like that. In those days we didn't have time to refer to the managers. We were just trying to get our jobs done and we had a whole sea of technicians, was just like the fish in the river. They run in groups, and once in awhile you see someone jump out of the water – mullets. Mullet is a bait fish. So, on a rare opportunity we all had these jobs to get performed so we picked a few people here, there, and everywhere else and one of the supervisors was a big fisherman and he referred to his people as "hey, mullet, get over here". The name mullet became a term for a technician, after awhile. It just spread.

The term for our operations people which on a daily basis, which I later became one of those guys - an assistant engineer, was an operations person, and that person, on a daily basis puts 20 pounds in a 10 pound bag. In other words we scheduled the work in a highly intensified manner because we had to get it done. Those are OP's people and nowadays some of 'em got the OPF, Orbiter Processing Facility. They refer to those people as the "OP's thugs", because they are a pusher. The labor pushers, etcetera. Well, in our term, the OP's guy was a shark. He was always going through the mullets and eating 'em up, and doing this that, and everything else.

Frog is a term that came into being in 1964. We had a couple of hurricanes go through and my wife came out one day and these little frogs jumped on her legs and she went off screaming with her little suction cups-- the little frogs. They were just harmless little things but they scared her and they were a ugly thing that bothered people. Well, one day we were working to put the launch escape tower on a boiler plate 15, a Saturn launch, and we at White Sands had already launched five (5) or six (6) of these things, so we came to work at Kennedy. I was brought here and we working and after three (3) or four (4) days of people standing around doing nothing, I said, listen guys, I like to feel that I'm working for living. My Dad works for a living. My brothers worked for a living and I need to do something, gimme a wrench, we're gonna do this. They said, you know how to do this?, and I said yeah, here's the pictures - this is what we did at White Sands, we've launched these before. Oh, if you know, we'll go with you. So I said okay, first thing is, we're working as a team. So we went off to work and did this and did that, checked the wires, put the bolts in, put in

the ordinance devices... Nothing gets done at the Kennedy Space Center, even today, unless it's in written instruction approved by inspectors. So we had a procedure and we were going off.

In the spacecraft world we had a series of inspectors. We had about eight (8) inspectors that would come look at the work and once they'd seen it they'd stamp the paper, and they had a habit of rotating the guys and I'd say, wait, wait, wait a minute. You started this job, you stay on this job and as soon as we finish, you stamp up to the point that we got and then you can go away. So, we're going along smartly and all of a sudden, we got up in the paper about the quality guys going – the inspector, the NASA inspector. So I went off and I said, well, I gotta find this guy, so I went to get him and they send me somebody else and he didn't know anything about what was going on, so we had to bring him back and hold his hand and everything else. So, that got a little bit old as the shift goes on, and this was on second shift at night. So we pick up and we're going again, and again the guy is gone. I said, oh man, and said, okay guys, and I called the supervisor and the supervisor came up and he had a short little bow tie, and I said, listen, we're trying to work together, we're trying to move, we're trying to do this, we're trying to do that, but the guy is the square wheel on this wagon – he's not helping. He's not bringing anything to the party. We're not getting there because you keep changing them on me and you know, it's very difficult, but you know, the guy's not contributing. He's not contributing anything. He like a frog. All he does is eat and shit. He don't contribute. He don't stamp, he don't do anything. So, this supervisor got irate and he came at me, and I said, aw, this guy's gonna kill me. You know, the

technicians gathered around me, and they said he's gonna get his butt whipped, or Ernie's gonna do something. What's your name? I said, Ernie Reyes – spell it right, every time my name gets thrown in, I get a promotion. I was just being facetious.

But I said, you know, it is work and da da da da da. You called my man, frog, and he's got more time in service than you have in the chow line, and on and on and on. So I said, well, you know what – you're right, he's not a frog, he's a toad. One of these days you'll grow up to be a good little froggy and I walked away from him and let it go. Damn technicians didn't let it lie. Anytime they needed quality, they started calling for a frog. The frog was a NASA quality guy. This was 1964, like I said. Well, it picked up and pretty soon everybody would need a frog and that's a quality guy.

Years later, when I became head of, the Director of Quality, I got phone calls, I got dolls, I got stickers - I got items through the mail with little frogs. The guy that had started it had become..... Now this was synonymous with the command service module. North American word on the Grumman side, it was a little bit different because of what we started – once we had a piece of equipment and it was checked out – instead of putting an integrity seal – the guys put on some clay-like substance that reminded them of pelican crap. They just smeared it one the side so that if anybody tampered with it, it would break off and you would know the area had been violated or had been compromised.

So, all these guys that were inspectors from Grumman, that we're putting this stuff on their equipment, then this was all the equipment at the spacecraft level, we had North American on top. Grumman in the middle. IBM and Douglas and all the

various contractors – all the equipment on the ground with consoles and everything. When they went to secure for the evening, or secured after this pigeon shit, they called it. The technicians called it pigeon shit. The others called it pelican crap or whatever, so they started calling, hey, we need a pelican over here..... They needed a Grumman quality guy. So that became the quality inspector for many years throughout the lunar landing program. Whereas the frogs remains synonymous and after awhile it was like the people calling the police "pigs". In some sectors of the country, the police stations had metal pigs on their desks that they looked at.

I went to see a Supervisor of Quality and I was shocked to see on his desk, was little frogs. He had bought some and after awhile they said, "hey, that's what our call is in life, we're just gonna make the best of it". And they had frog t-shirts and little frogs on their desks and things like that. For a supervisor, the normal working quality guy had a locker. They didn't have a desk and things like that. So, that's how those terms came to be and they stayed a lifetime.

Like I said, I got to be the Director of Quality and one day I'm sitting in my office and I get a call in the afternoon. "Hello, Reyes speaking". Ribbit. "Oh God, go ahead, you're on government time – tell me what you want, what you need". Ribbit. So I hung up. This went on for about a week. The one Friday afternoon, I said okay, I'll play your silly games guys. Ribbit. Ribbit and Ribbit and back and forth a couple of times and then the whole room – you could tell I was on a speaker phone somewhere. They're laughing and carrying on and it was the Deputy Center Director, Mr. George Page and my one-time supervisor, Mr. Chuck Gain (phonetic) and a few other guys

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from the Houston office, and they were making fun that I had started this thing and now I was the chief frog. So he always called me the chief frog in my tenure as Director of Quality at KSC. So that in essence is the story of the frog business and the pelicans. Pelican were technicians, sharks were operation guys and it they were a lot of nick names for a lot of people. They safety guys had names. The supervisors had names. The construction people had names. We had names for everybody, but here it was not out of spitefulness and not out of putting anybody down, it was just the mannerism of a group of people in a highly stressful place, calling each other just nicknames.

They call you Orville, your friends. Other people call you Mr. Butler. I'm sure some guys call you the popcorn man. Or Orville Redenbacher.

DR. ORVILLE BUTLER: No, I'm one of the Wrong brothers though.

MR. ERNIE REYES: (Laughter) So, anyway that's how it was for years and it continues to be. You go out there on the OPF or at the pad and you'll find that these technicians all have nicknames for themselves and things of that sort, which is very different than in Europe.

We went on Spacelab over there and we working with some engineers, Mr. Gary Parsons (phonetic) and myself, we went sent over there to go through the process of what we were going to do at the Kennedy Space Center and we were talking to this guy and this other gentleman. This guy's first name was Utto (phonetic) and his other guy's name was Horse (phonetic), and they were calling him Mr. so and so, what do you think about this? Well, I don't know Mr. so and so, and so one day we said, hey, is he

that formal all the time? Oh yes..... Do you know each other? Oh yeah we drive to work everyday. You drive each other to work everyday? How long have you been doing this? He says, for 10 years. And this is still Mr. so and so and Mr. so and so? He says, oh yes. And Gary says, well, why don't you call him Utto (phonetic) and why doesn't he call you Horse (phonetic), wouldn't that save you a little bit of time? Well he said he never thought about it. Here were -- we had been there less than a week and we were changing their culture by saying, hey why don't you call each other by your first name. This is okay, but when you've been working together for 10 years and you carpool everyday, isn't it time to loosen up a little bit and..... Oh, we did that. We loosened up the place big time. We brought a little bit of America over there and set the culture in motion. Less formality, less restrictive communication loops, etcetera, etcetera. Did I answer the... is that what you were after?

DR. ORVILLE BUTLER: That's what I was after.

MR. ERNIE REYES: Okay.

DR. ORVILLE BUTLER: You have already talked about the fact that you were with spacecraft.

MR. ERNIE REYES: Right.

DR. ORVILLE BUTLER: And that there was spacecraft and launch vehicles and I guess for lack of a better word, grounds. Facilities engineering or whatever. You also had a variety of contractors that worked with you and we like to know a little bit more about the changing relationship between the NASA people and the contractors and then, in particular how NASA people perceived the different

corporate cultures. Or how you perceived the different corporate cultures that you had to interact with.

MR. ERNIE REYES: Okay. When I came here in 64, I had worked at White Sands and I was in an organization called the White Sands Operations under the manned Spacecraft Center. The Manned Spacecraft Center – that was our title. Manned Spacecraft Center (inaudible) Operations.

When I came to Florida it was Manned Spacecraft Center, Florida Operations. We were working the capsules. The capsules at this time were the Gemini capsules, the tail end of the Mercury. The operations on the Gemini, and the follow on the Apollo hardware was going on. We had already launches the Apollo flight hardware trying to satisfy and man rate the parachutes for Apollo and we barely receiving the Gemini capsules here at Kennedy Space Center. So, we were a group of spacecraft people working Florida operations for the Manned Spacecraft Center in Houston, so each element was really driven by their management. (Inaudible name) was our chief and he had a certain thing that said, okay, you're a system engineer, you're mechanical, for example, I want you out on that hardware. I want you knowing where all the nuts and bolts go on that vehicle. Where all the stress points are. What happens if I take this away, what's gonna happen from the system standpoint. Spacecraft operations insisted that their people be on the hardware. We're working out of Hanger S and I think there was about 52 of us at the time, but that's how we were.

Launch vehicle was headed by a guy named Dr. Gruney (phonetic) and all of this, the semblance of the Marshall Space Flight Center rocket engine lab was headed by Dr.

Debus. Well as we go a little bigger, Dr. Debus went on a little bit higher and Dr. Gruney (phonetic) was the launch (inaudible) guy. So each group developed its culture around its leadership. We had a lot of things to do at the pad when we got there. We needed to make the spacecraft, get our cables, run all our test team and then run the simulations with the cables going from our flight hardware through ground support which then tied into the launch vehicle.

The launch vehicle culture was quite different. Many times they'd have various meetings and get together, and that called for the guys, hey, let's sit down and go cut a deal, what do we have to do here. Well, the NASA people aren't here. They're back at the industrial area, Building C, second floor, wherever. They just finished that building. Okay, why can't you guys come out to the pad? You know, we're out here in trailers and we're working the hardware. Every time we need to work something with you guys, you guys are not available, you'll have to come back over here. So as we can understand one thing, I said, well what is it?. Dr. Gruney (phonetic) does not want the NASA engineers on the stack, on the flight hardware or at the complex. So I say, why the hell not? Because if there is anything that goes wrong, he does not want the NASA government people blamed for anything that might go wrong. So, here we are, the (inaudible) guys on the top, working like a bunch of fiends trying to get everything done. The bottom is a no-man's land. It's just like – I called them the tube people. There too bad to fly for fifteen minutes and it was done -- or less.

We had to work for two (2) weeks or land on the Moon, come back and the whole thing, so our machine had to percolate a heck of a lot longer than that launch

vehicle. It had four (4) engines, two (2) tanks, four (4) wires, you know, I always cut 'em down. Spacecraft – we worked seven (7) days a week, 24 hours a day. There was no Christmas holidays or nothing. We had that much work to do. Launch vehicle worked five (5) to six (6) days a week, 1st shift only, so we would go and meet with them and we'd offer them our headlights so they could stay and work with us. We always made fun over the years that they didn't have headlights and they went home when it got dark, because they didn't have that much to check out on their vehicle. But, the key cultures point was that they were advised by their manager that they were not to be out there where the hardware was. They were to stay in the office and review specs and review problems and write reports and things of that sort. That was the Huntsville culture. That was the Dr. Gruney (phonetic) influence and that was Dr. Debus by way of Marshall Space Flight Center which was VonBraun.

Mind you, we would not have gotten to the Moon if it had not been for VonBraun and Marshall, Dr. Gilruth (phonetic) at Manned Spacecraft Center in Houston and Dr. Debus here at the Kennedy Space Center. So there's a big influence with those three (3) big Centers, but at our cultural level, we did things different in spacecraft than they did in launch vehicle. Our engineers we're on the flight hardware. They were at the office. Eventually the whole thing got created to be the Kennedy Space Center after the Kennedy assassination. We came to be one Center, but the cultures were inbred. Marshall and specifically the Germans did not like Quality. They did not want inspections second guessing engineering. The launch vehicle had one (1) NASA government inspector for the entire launch vehicle. We had seven (7) inspectors per

shift, three (3) shifts a day, on the nose cone. We had men rating it and during everything we did, we were looked at, in every step that we did was stamped on paper and everything else. Whereas the launch vehicles, if we had to do something that brought an inspector from a trailer, he'd come up, looked at what was going on, stamped the paper and go back to his hole. So that was a cultural thing with how the Germans felt. I say the Germans cause it was Von Braun. How they felt they needed to operate verses how MSC, Manned Spacecraft Center, wanted to operate, which was the old Genesis from (inaudible) and etcetera.

Contractors. We had different ideas about our contractors, to the Marshall people, or the launch vehicle people gave a contract and wanted the contractors to do their thing and when it was said and done, they'd get NASA to co-sign this report, this is what we did, etcetera, etcetera.

The spacecraft folks, we worked hand and hand. It was almost like counter weights, or counter level at each step of the way and when we did a test, it was co-authored by NASA and the contractor and it was signed off by both of us. The relationship between the spacecraft people and North American was very close. I mention this before the lunar module came on, so it was very close and it was a very cordial and very interlacing one. You couldn't tell other than looking at the badges when somebody was working out there, who was the NASA and who was the contractor. And it was a well-oiled, well-knit organization that went all the way back. When a problem came in from the outside or from where it gathered, Houston being the contractor NASA would working it together. They'd lay out the schedules together,

we worked out the problems left to us by the astronauts, who didn't like this and who didn't like that, but it was always a joint effort, so there was a culture there.

On the launch vehicle side of the house, it was, well that's a Douglas problem, or that's a Chrysler problem. It was a launch vehicle problem. It was a booster problem. That's not fix the blame, let's fix the problem. That was our motto, you know. Yet we saw (inaudible) boil water – hardly ever mixing. When we got to the Moon, we got orders to decimate the workforce. I don't know I may have shown you the schedules. We're supposed to lay off everybody and send everybody home. We're done, lay everybody off, close the place down. And we went to work with covering up tidy-ism, what we're gonna do with the hardware that we have left and everything else, and it was always a very distinct feeling that you were working as a team here and you were working – men being the contractors on the launch vehicle, government people and the launch vehicle contractors.

In later years when we got to work at the workshop and Douglas, or McDonald Douglas, by the time they got formed, went to do something and we were working together and I remember Jimmy Scoppe (phonetic), one of the managers said, you know, this is really wonderful being able to work with our government counterparts side by side instead of having to present a case, and going to bring to 'em and bringing it back. This is so much easier than to get the work, and get the thing done. So talking to some of the Apollo veterans of the launch vehicle, I think they would have appreciated that more, but they didn't.

Now, I mentioned the three (3) cultures. I mentioned the culture of spacecraft, the culture of launch vehicle, the launch support or design engineering, per se. That was an outcrop of the Corp of Engineers. We were supposed to build and sew these and come up with it, and so, they used the old project engineering concept. You got an office full of folks, you pick one and he's the project engineer on this new facility. He goes and gets the requirement from spacecraft launch vehicle, who is (inaudible), sets it down and you get a contractor from the Corp of Engineers out of Jacksonville or Orlando or Atlanta. They come in, they give us some drawings and we have a 30% review, a 60% and 90% percent design review, before we start pouring concrete, and consequently that project engineer was instituting and causing things to happen. And this is one of the things that make KSC the great Center that it came to be.

We had, as I told Elaine, several things that caused Kennedy to be head and shoulders above the rest of the NASA's. One, you had a lot of super smart and super enthused people that wanted to be here and do the job. Some of us would have paid to be here, but we didn't want to tell that to our bosses. Second is, we sent teams to check out folks -- and we sent them out to St. Louis to check out the Mercury and Gemini capsules and bring them back. Then we sent teams out to California to bring back the command service modules, and then we sent teams to Bethpage, (phonetic) New York to do the same thing. To the point that when the team got into trouble we were asked to take a team out there and check it out and bring it back. So the expertise of the team concept, MSC, Manned Spacecraft Center, KSC as it became, was very, very helpful to all other agencies in progress, and they would go out and look at

the thing and say, oh yeah, we know how to save that. First of all, get this under control now. Second thing is get a crew from KSC to come over here and check it out and take it home. All we did was – then you get a team from KSC to come in and check it out and send it home.

Back to the rocket ranchers and the tenders of the facilities. We had good civil engineers, good managers and very inclusive people and some of the folks on the launch vehicle of spacecraft site, got a little burned out on this three (3) shifts a day, seven (7) days a week and they sort of filled around to other areas. And consequently we populated at this Center with a hybrid of folks that were highly enthused, highly motivated, very smart. I think the youngest and brightest thing is overused, cause a lot of the guys were in their middle forties and fifties. I was just a young kid and that's why all my associates are passing away and I'm still here. I was very young when I was involved with all these guys.

The other key thing is, if you had a room full of people – I'll give you an example, at White Sands the contractor comes in for a rocket development project. The (inaudible) of the project talks to the contractor and then they have a major (inaudible). You never see the GS 13's, 12's and 11's that are doing the hands of a (inaudible). They never get to communicate with the contractor. It was always the (inaudible). At Kennedy we got a level of people and the smartest person was picked to lead the group. The guy who had the most drive or the guy who had the most common sense or the one who could orchestrate and talk to the janitor, talk to the president, manipulate the people. Get them all together and keep them motivated. And that

person didn't have to necessarily be the highest graded individual, so we had teams where the leaders were GS 12's and 13's instead of 14's and 15's. And some of the team members in this group were highly paid individuals. GS 13, 14's and 15's.

We made a mistake a long, long time ago by saying okay, you're an expert at what you do, and you become as GS 11, a 12, a 13, a 14. I remember a 13 or 14, you had to be a supervisor in the scheme of things -- job classifications. And at a 15 you better be a branch senior for somebody hotsy-totsy. Instead of letting that individual continue to expound on his expertise, and get more and wiser in his area, we bloom into managers, and some of these guys fail miserably in managing people. So, at the working level we found out that it was better if you were in instrumentation or in guidance and control or a computer guy -- let you make as much as you want, but you stay working on the computers and we'll go manage the rest of the project.

So NASA at this level on spacecraft operations, picked the sharpest individuals to be the leaders and the other folks they didn't have to be the highest ranked members, which allowed the thing to progress at a great speed. Over the years that changed because they say if you're at this level you have to be this, you have to be that, you have be this.

Okay, so I covered the culture and I think I covered your question as to how we followed our contractors. Spacecraft people, and to this day, payload people work very closely with our contractors. Well, let me say something else. We had spacecraft, we had launch vehicle and we had the support organization. At the end of the Apollo program structurally the launch vehicle guys were rated at much higher grades.

Spacecraft, we were at a lower rate. So when they merged the organizations at the end of the Apollo program to go on with the follow-on Soyuz, and follow-on early shuttle and redoing the facility, they said okay, we got to mix these folks up. So one day there was 15 or 16, GS 15's created on the spacecraft side. Wow, that's a large amount – why? Because they wanted these kids to be the same grade as these other individuals so when the time came to mix them all up, everybody got equal opportunity to be a manager or branch chief or whatever. After that happened they got a little more cultural mixture.

For the shuttle, the powers to be decided when the launch vehicle guys had been so much involved with boosters that we don't want to be just boosters. And all the spacecraft guys have all been spacecraft, it's time to mix them up. So, they assigned payloads to the former launch vehicle people and they assigned the shuttle vehicle, which was more like a booster, to the spacecraft people. Trying to get a mix-match. So you will find today out there, in the surviving work field, you don't see that old cultural line anymore. It's all mixed up now and everybody works with a contractor and everybody supports your contractor and everybody works side by side with the contractors.

In a few years, a few years ago, they starting saying well, we need to pull the NASA people out of the daily business and extract them out and let the contractor manage more of the business operation. It will be cheaper. You can do some of that, but there was hard feelings with some of the system engineers who had grown up with

the shuttle. It was a ship. Now they are being asked to step away and let the contractor do it.

At the same time, if I ask you Orville, to step away from the table you were processing hardware, if you don't ask KSC or Marshall to step away and you still got things in the pot then it becomes a little awkward to the Kennedy people checking out the vehicle. This is a little bit of the culture that was not right. It's continues not to be right. We launched Mercury from the control across the river and you probably toured that place. We didn't need a Manned Spacecraft Center, we could have done it all here, but Lyndon B. Johnson, and we had Speaker of the House, what was his name – the Texas....

DR. ORVILLE BUTLER: Tip O'Neal?

MR. ERNIE REYES: No, not Tip O'Neal, Rayburn. Rayburn was here, Johnson was there and MSC, Manned Spacecraft Center, became in Houston. We didn't need it there, but you got 'em there, okay. Marshall stays Marshall and Kennedy stays Kennedy – now, what is the perceived culture within the NASA? Well, I'll tell you. Dr. Debus was KSC personified. He was tight, he was smart, he was cheap. He had us driving government cars at 50 miles an hour in the 1970's. He did not want the government cars going over 50 miles an hour. He wanted all the lights turned out at night. He was years ahead of his time, but KSC is perceived by NASA headquarters and the other Centers as being dumb, but honest. If we need 10 people, we went and made the appropriation, or we made a presentation that we needed 10 people to do the job. And we built the Apollo facilities and the next program that came along, we

modified the VAB. We modified the pad, we modified the buildings, we made due with what we had. We didn't go expand. We kept our mission of processing flight hardware. We didn't go expand on life sciences, on this, and that and everything else.

Whereas HFC, there was sharpies. They didn't get all the smarts, but they had a lot of people that had a lot of time on their hands. We were processing flight hardware. They were designing and up-designing -- we'd get ready to launch a vehicle, we'd launch a vehicle and here come a flurry of changes they want made. It's too late, it's gone. We had 15,000 people doing a 5,000 people job. What did the people in Houston do? We checked it out. Well, they give us the requirements, okay. Give us the requirements and we'll institute them and work with you. What do you do after you give me your requirements? You play hell trying to keep them out of the kitchen. That's what you do.

So Houston was always helping KFC, whether we needed it or not, to the point that we formed the resident office. But still, if they needed 20 people, they'd ask for 100 and they'd get 60. And they grew and grew and grew. They got a fancy campus there at Rice (?) University. You've been to Houston and you've seen the Taj Mahal of NASA, but you got to ask, what do they do? Well they do research on this and their training astronauts, and they're doing this and doing that. They have the time to expand their tentacles. What is what any good self-servicing NASA center needs to do, is sustain life. So, it went and created things for it to do with new facilities, and new this, and new things at Ellington. I was there so I know what was there. I was there when it was a cow pasture, but anyway, Kennedy was honest. We lived within our

means. We would leave, we would whimper and we were living out the (inaudible) the other Centers were dropping off the table. And now that you think of it. Think of what I'm saying in light of what you've seen and heard. JSC was pretty smart. They needed 20 people they asked for 100, they got 60, and this went on and on. Their budgets increased. They got more people, more dollars and everything, and the people that had to pay the technicians and the engineers for weekend work, and comp. time and overtime and all this stuff to process flight hardware.

We were barely making it. We'd spend the whole cycle of the year doing POP's, (inaudible) operating plans, for money for projects. Constantly refurbishing everything we had. You go look at the Kennedy Space Center, we build the SPF, which is new. We have one or two little hangers down here in the industrial area. But we viewed the facilities that we're laid out for Apollo for every single program this agency has ever had.

So, here's Houston growing and Marshall, they had the elderly statesman. They had VonBraun and they had the rocket lab and they did a few studies and they grew a little bit. They got their building set up, but here again, VonBraun was interesting in the mission and developing the engine and the shuttle and he wanted lower (inaudible) platform and he had his own agenda. So Marshall did not go and put out tentacles until recently, so they stayed about the same, but Houston grew, so that's why you see the tremendous growth. Now the problem is that when you are task with checking this vehicle out and you got a lot of outside help, it becomes a bother, cause you're trying to design and check out at the same time you're getting a lot of help.

The people that we had to work in the Gemini program, we had a piece of paper mission, prep-sheet – MPS, that said here's the title, go fasten four (4) bolts, get a specification, get the lube, get the torque wrench, get certified technicians. Step one, pull it. Step two, look at all the threads. Step three, insert it. Step four, put on the nut and washer. Step five, torque to preliminary range of 30 to 40 ft. pounds. Bring the torque up instrumentally or sequentially so it doesn't overstress it, and torque it to flight. Safety wide, enclose the paper up and you sign it. Two (2) engineers signed that paper. It was ready to go. You put it in the book. The book scheduled it. The job got done. Two (2) signatures on an MPS. Now that's called at TPS – or test prep sheet. It's the same thing. It's the same form, but you need eight (8) to sixteen (16) signatures. The thing that killed us was the paperwork, and the paperwork that killed us was not of Kennedy's own doing, but help from Houston, help from Marshall, help from Lewis, on the unmanned program, or help from Goddard, it was the developmental hardware.

So I've covered where we came from. The cultures and how the different cultures were perceived and how we were perceived within the agency, and we all know it, but nobody said it for years. We didn't need an MSC, we had it here. You don't need all these superfluous people helping. And that's one of the things that we got today. Too many people helping with a project. Too many cooks in the kitchen. There was more projects in future worlds, but in past world, but there was always just one place where you processed it. Headquarters, bless their soul. We've never had a space program. We've had a Murphy project. We had a Gemini project. We had the

Moon program, the Apollo program. After that it was bits and pieces of some shuttle hardware, a telescope, the lunar module. Marshall took it and developed some telescopes to that. The only thing that progressed was the Lewis labs and Goddard had the delta vehicles and the other military boosters with some various payloads on it, was sent to our Center, and those were the unmanned vehicles. But from a manned spacecraft standpoint, the NASA headquarters – we're going to the moon. We got to the moon. Okay, we're processing, we're processing. Okay what's next. And the headquarters people said, well, we got this Apollo application, AAP, and that didn't get funded. There was a few pieces of hardware, so we put together the Skylab. We had an extra booster and Marshall had this and they had an orbital workshop, OBS, adding in Field (phonetic) beach and we outfitted it with some stuff and Houston got into it and we launched the thing to go fly.

But where was the NASA, what's the next follow on program. There was no leadership up there at the NASA to get a cohesive program. So consequently we got to the moon, with all this and it shows we were there, and now we're done, and now what? Well, we should try with the Russians. Okay, so we had an Apollo-Soyuz. Hey we got this thing. Okay, so we got a Skylab. What was the ongoing program? There wasn't any. And then we come up with the shuttle where everybody got involved and that's what we been doing, and then it took a long, long time and we got the elements of the International Space Station going on. I detoured the ONC or the SPFS. You've seen the trusses, you've seen the tanks. You've seen all that stuff and you look at two (2) facilities and you see two (2) half empty or two (2) half full facilities. Depends on

how you want to look at it. But there was no direction from high above. It all came from VonBraun, Gilruth or Debus. Getting together and what do we do next. Well how do we keep the workforce employed. Where do we put the emphasis on, and where do we keep going. They give you more than what you needed but it all came out.

DR. ORVILLE BUTLER: Hey, tell us a little bit about the contractors. How was Rockwell different from Grumman, different from North American and how were they alike?

MR. ERNIE REYES: Okay, the, it all goes back to contracting. We let out a contract for the Apollo program to build so many capsules and so many this and that, with North American aviation and, down in California. They sub-let and the slong (phonetic) the adaptor to hold the lunar module, to Tulsa operations. And that went on and then the contract, and also provide GSE as required, ground support equipment. North American started building and building and building, and there was an open ended checkbook. When it came time to design the lunar module, we had the lunar module designs and we put up proposal and we worked at Houston with the crew members to see.

Initially we wanted to land sitting down, but the crew wanted to land standing up. I made a model. We put the model picture in the proposal. It went off and they got the contract. But in their contract, very specifically, it said you will provide a mock-up, you will provide so many flight modules, and you will provide this piece of equipment and this equipment to check out, and that's it. No more money, that's it. So we went off. They delivered the hardware. We got the first lunar module. It goes

up there and it flies in the earth's orbit on Apollo 9, I believe. Comes back down and the guy says we got a few changes from the astronauts, and we got a few changes. Change this, change this, change this, change that, and Grumman says, out of scope. Nothing out of scope, you're asking us to change a configuration so it's gonna cost you money. So at every step of the game, Grumman would say, out of scope. It's out of scope of our contract. We will make that change, we'll do the best we can but it's gonna charge you NASA, for every change.

You gotta understand one thing about our astronauts. They are no different than our fighter pilots. They all like to customize their cabins. Every flight crew that ever flew on every capsule, on every module, has their own little niches that they wanted built on the airplane, and every time these changes came by, Grumman would say, out of scope. Out of scope. So, the NASA headquarters got a little bit irritated with Grumman. So the money flew to the West coast for capsules and to the East coast for lunar modules. But there was a resentfulness from the Headquarters all the way down to Houston and Kennedy, cause everything we wanted to change a little bit different was – out of scope, gonna cost you more money.

Consequently when the bidding went out for the shuttle, Grumman got the short end of the stick. Those in power remembered (inaudible). Grumman built the nose. Conyers (phonetic) built the body. Somebody else built the doors. Fairchild built the wings. Grumman built part of the tail, but it was mostly Rockwell building the (inaudible) portion of it. Okay, so money-wise Grumman was frowned upon.

Okay, people-wise, North American hired and fired and I saw too many cases where they would let people go. You're 45, you're 50 years old and in another five (5) years we're gonna have to give you a pension. They would let that person go and hire two (2) 25 year old engineers, so they wouldn't have to pay them benefits. So in this respect, North American Aviation, which was later to become Rockwell, was not looked at very well as a contractor. Grumman, on the other hand took care of their people. Took care of their people so that at the end of the program they moved a lot of people back to Bethpage and they formed a company here, Services Incorporated, under Fred Hayes and he took care of their people. McDonald Douglas built Mercury and the Gemini capsules.

At the end of the Gemini program McDac, McDonald, did not fair too well because they did not get any of the Apollo contracts, major contracts. Neither did their booster firm, of which they didn't have yet. So, old man McDonald came down from St. Lewis. He went to the (inaudible) and talked to all the guys. He walked across the street and built the TYCO facility. He built that facility out of company funds to take the entire Gemini/Douglas, McDonald workforce, and put them to work building a dragon missile, refurbishing torpedoes, refurbishing and developing – developing, by the way, what is the missile that launches like a missile and flies like a ship? What do they call that missile? Big thing in Desert Storm. The Ariel torpedoes. It was developed here at TYCO and then given a production contract. The Genesis was the Gemini crew. They took care of their own. Grumman took care of their own. North American did not. As far as business I think Grumman was way sharper with their pixel on the money control

and North American was, at times, a little bit out of control.

McDonald merged with Douglas and became McDac Operations, East and West coast. Gemini (inaudible) days, part of the capsule were built in St. Lewis and the main booster frame would be, although the (inaudible) was built in Seal Beach. On the stack you had, the right top, the Huntsville people, government people. St. Lewis people, Seal Beach people and over on to (inaudible) was NASA civil service. So it was a multi-united nations effort.

IBM really was amazing. They had a small group of people, very smart, and they worked their engineers – you could not tell an engineer from a technician, they would all get their hands dirty. They had the instrument unit on southern side that was about this tall and had all the (inaudible) of the booster in there. As soon as it went into the firing room, when there was going to be pictures taken, or anything to do with public affairs, or anything else, they disappeared and they were back with their white shirts and narrow ties and their IBM jackets that said "IBM" on the back.

North American followed suit and said well if they can do it, we better do it too, so they went and got their VBD jackets. Looked like waiters, and that's why the LCC started getting calls. Everybody wearing their team jackets, per se. But IBM was the ones that were straight and narrow and also, IBM kept a small work force and their contracts were not... they found a home for all their major key players, whereas North American would just cut 'em. They'd just cut 'em, ruthlessly. At full retirement age or anyone, just cut. Grumman did not do that. IBM didn't do that. Those were the three (3) major ones.

Now in the ground operations, there was the other ruthless world, you had laid out by the NASA and then Bendix took over. The engineering drawings and everything else. Then we went to the series, either the Boeing or TWA or EG&G, and their just continually, since the beginning of KSC, every contract re-negotiation, the contractor was given less money, or less benefits or lesser amount of bucks to do the job. The last job was with EG&G out here and it combined the contracts between KSC and here. And they said, oh, we're gonna save lots of bucks. Well they forgot to consider all the jobs that were being done. They went to the Center Director, Mr. (inaudible) and he is of the school that says, well, you got the money, you bid the job, so take it out of your hide. It's a little difficult for somebody to say, hey, I promised to do this job that you gave me the task to do – then you added more task, but you're not giving me more money and I tell you, sorry Orville, take it out of your hide. That's not kosher. That's not right, but, it's the year 2003 and that how things are done. Less money, give you the same product, but I'm going to pay you less. So consequently the support work force has always had what's left. And they do the best that they can, but sometimes they don't have all the dollars. Is that what you were after?

DR. ORVILLE BUTLER: Well that certainly includes.

MR. ERNIE REYES: Yep.

DR. ORVILLE BUTLER: Okay. You were involved with spacecraft processing. Sometimes you went to the factory and were part of the team that helped at the factory. Once you brought a spacecraft to (inaudible) Kennedy. Was it ready to

shoot when it came to Kennedy and if not, what is the process that it goes through in the processing to get it ready to shoot?

MR. ERNIE REYES: The Apollo program, built upon what was already established for the previous other two (2) programs, the Mercury. Mercury was successful because they was a cadre of young, energetic folks that would sit loose and work, day and night for many months to check it out and bring it back. The same thing with – that was Mercury. The same thing with Gemini. And the thing is, you gotta realize, that the capsule, when it gets here, you can put ordinance devices, it might hurt somebody, and you gotta check out all the cables and all the (inaudible). And you gotta check all the systems with the booster to make sure they're all gonna be compatible. So, at the time, we said we want to minimize the processing time at Kennedy. That was always a goal. So we would check out, at the plant, those circuits that we knew were critical. Those circuits that were still available. The hardware that we could still access. Mercury and Gemini capsules were all put together but you could tear the skin all off them, and work on everything else.

The Apollo capsule was a resin enclosed structure with everything buried in the corpse, in the mechanical area around it, or inside and there was no way you could get to it unless you tore it apart. So consequently at the factory we checked out all the critical systems. All the circuits to make sure it worked properly. During those years you would not have a ship and shoot philosophy. This was to be developed later on. A ship and shoot philosophy was one that said, you check this little rascal out and make sure all of it works and make sure you can inject the (inaudible), so when it gets here

all you have to do put in a fresh reel of tape and make sure it's on and off, it works and records. Simple little test and you rate a luncheon. You shipped it and you're ready to shoot it. Stand alone, payloads and components that could be done that way, we tried to do that. Unfortunately, the spacecraft couldn't be done that way because you had a lot of interfaces with the escape systems for the crews, with the emergency detections systems with the launch vehicles, so we had a lot of wires to hook in.

On your Apollo capsule from the capsule to the service module, we had 1,800 wires. Signals that had to get checked in. Once you make those umbilicals, you can run a check and make sure their all working. So we ran those tests and once the vehicle was ready we did some other tests to make sure the wires were all ready. Once we got to the pad, we put them on the launch escape tower and made sure those wires and the logic and the sequence boxes worked for those three motors and the parachutes.

So it was grilled upon, minimize the testing, but test every copper pad, such that we don't launch something and then notice – don't know if this things gonna work or not – so the ship and shoot philosophy got developed after the Apollo program in which we said, okay let's see if we can, once we start getting payloads into orbit, we can minimize their processing. Because commercial and others wanted to minimize the time from the time it got here, their hardware, to the time it was launched. If I got a 376 Hughes (phonetic) satellite and I bring it to the place to check out across the river and process it and then made it with the interfaces and take it to the (inaudible) and that takes three (3) months. That's very expensive for me to have a set of engineers and technicians and inspectors waiting all that time to shoot. Now if I bring it in a

month before and I check it out and I take it to the pad and I launch it, I'm getting very close to ship and shoot. As close as I can.

The capsules that we processed and the shuttles that we processed, takes a long time and then you just divide into two. The capsule had the (inaudible) systems, the parachutes, the rockets systems, the crew equipment there, the ejections seats – things like that could not be checked anywhere except here, and then when we had to mate them, we had to mate the main capsule with the orbital maneuvering system, which was the (inaudible) on the Gemini, and it was the service module on the Apollo.

The lunar module came in two (2) boxes, two (2) big wooden boxes. One was the accent stage, one was the dissent stage. Accent stage came in one a box, dissent came in a box and when they did, man, it was farewell. Electrical components went in there, you still had to put the legs on it. You still had to put the lunar landing craft. The lunar landing craft came in and here's a copy with the lunar module sun-roof here. Here's the dissent stage and the legs haven't been installed on it yet. Here's the accent stage. We would check all the systems and then we would connect them to these systems and we would check the accent and dissent stages. Then we would install the landing gear. Then we would cycle the landing gear and make sure it would work. These kinds of things you couldn't get done anywhere else except here. Installing the engine bill on the main engine, you couldn't get that done because of the shipment and once it was there you took it over, down to the other end of the building and insert that inside the connector side and on top of that was for the commander service module.

The commander service module came in like this from California on a shipping

dolly. We lifted it up, we took the covers off and we checked the wires off the umbilical. We checked the separation points. We put it on the service module and we waited for the lunar module to get done and get installed before we took the stack out.

So all these miscellaneous tests had to be done, including the build up of the rovers, we poured a lot of preparation on all of the flight hardware. Things that were not possible, we do at the factory and then ship it all (inaudible). Be like trying to ship and assemble the side of the upper stages. And to do that you had these large walls in the LCC, where we had integrated schedule, where the booster vehicle, the spacecraft bits and pieces seem to play on a large board at the bottom part of the boards that support that was required.

The top part of the scheduled had all the integrated dates, such as that we said, okay next Tuesday at 2:00 o'clock we're gonna make this segment to that segment, so you folks finish everything you need to do that, cause that's what gonna happen. We would agree on these certain milestone dates and then everybody would meet, would work towards those dates, and everyday we'd meet at 1:00 o'clock to see how they were doing. If we had to move a milestone, we could go on a schedule either way. We're we trying to hold still on a launch stage because we had so many insertions dates for a lunar Tran injection. So we had to have certain dates firm, but there on we would negotiate and work with – so everybody would try to work to these master schedules to make sure that their sub-servient schedules could meet all the activities required.

DR. ORVILLE BAKER: So this is very similar to the perk schedule that they had for flight activation?

MR. ERNIE REYES: Perk schedule was a critical path and we used (inaudible) charts more than perk charts, because there was a multiplicity of activities. There wasn't enough paper and perk charts that would get it all done. We used perk, a form thereof for facilities, and we used a critical perk, you might say. You say, okay, we must make this day, and we must have roll out because on this day we're meeting and meeting all those stacks at the VAB. That was a critical day. We would roll out and we would have a test on this day and that's a very critical. We would allow a week for servicing fuel and oxidizers and then we'll have a countdown demonstration test on this date and we'll have this day as the launch and we'll have a few days in between for, what do you say, for contingency. It was similar. It was a critical path manager, it seemed. This is a critical path. The critical path here is not the booster, but the rover. The critical path is the dissent stage on lunar module. The critical stage here is the lunar module, the nuclear power plant that we're sending to the moon, cause we install it on the ship you must have 50 degree heat on it or it will melt and we'll have to send the signal there. So that's a critical path – those few milestones. So those came out on a launch chart and everybody, that was the law. You understand ship and shoot verses the assembly?

DR. ORVILLE BUTLER: Yes.

MR. ERNIE REYES: Okay.

DR. ORVILLE BUTLER: I'd like to jump down, actually jump back and ask something about the ship and KSC culture and outlook in the transition from Apollo to Shuttle and during Mercury, Gemini and Apollo, you had a growing shift from the in-

house NASA hands on, on the hardware, to an increase NASA supervisor and contractor verses the hands on? You talked about that a little bit. To what extent... when did that transition really come about?

MR. ERNIE REYES: I don't think it ever has, to tell you the truth.

DR. ORVILLE BUTLER: Okay, explain.

MR. ERNIE REYES: We -- certain factions in the government say why don't we just let you, NASA, operate like other elements in the government where you just send a contractor off, he does a job, her returns the products and it's done. So we say, yeah, we can try that and unfortunately in the quest to get to that stage it was not very easy to do. For example, we're launching the shuttle and we had four (4) airplanes, we had three (3) airplanes and then we were going to pick the time, but the problem was that here is a contractor trying to work at KSC and all of a sudden the airplane lands – the shuttle lands, okay?

We pull the three (3) engines off, we pull the computer off, we pull the tires off. We stripped it and put it on the next vehicle and now before we had the system totally accepted to fly again, you had modifications come in from Houston or from Marshall and you had to have government approval on those. So even though we said, okay let's try to let the contractor process this flight hardware, there was still too many federal fingers in the pie for the people who process the shuttle, so we minimize that by assigning the system expertise to that vehicle. Each vehicle that came in had drivers from Marshall. Hey we want to this to the engines and the people at Stenos (phonetic) now – we got to test these engines and find a propeller so we want to take your

engines apart and we want to measure to see if there is any wear and tear on this segment. Holy chihuahua! So the engines get torked cause Stenos (phonetic) wants to take a look, because Marshall says they want to take a look.

All of a sudden we've flown the boosters. They came down but Marshall says, you know, the skirts are cracking and we need some further tests and we want to do some more analysis because the whole shuttle sits there with the external tank, the two (2) solid rocket motors, the orbiter – or the hood ornament – or whatever you want to call it, hanging on there. And what is all this hanging out on the pad on. One, two, three, four bolts on the skirt is what the whole stack is leaning on. Next time you watch a film of that thing, notice that the thing lights up, at five (5) seconds the main engines go on the shuttle, and the thing leans over that way, then it twangs and when it get to about this position, the solid motor light up and it separates.

All these sequential things happen, but the whole load is on the skirts. The skirt does not have a three point factor safety. So, Marshall always wanted to do more tests, more requirements. So all of a sudden, when you're the contractor, you turn that shuttle around as fast as you can and try to do it with your own resources and now we got to put some hurdles in front of you. I want to pull the three (3) engines because I need to do this and I'm gonna pull all the brakes assemblies because we're gonna send the tires to right field and check the brakes, and we want to put new flight control panels on the inside. So it was very difficult to let the contractor do it, because it was too much involvement.

The prime example I'm recalling is the first one, STS1. They almost got it ready to ship. Time is lagging - time is lagging, and their just wasting money. People were wasting money, not getting anything done. So they decided to ship it to Kennedy, we'll finish it at Kennedy. Here's poor Columbia. Comes in, and with Columbia she brought all of her innards. The tile job was not finished. Some of the systems were not finished. So now the Houston organization, under Mr. Chris Craft, is gonna finish the building of the shuttle at the hanger - the OPF. And the manufacturing organization in California is going to finish under the direction of KSC, building this airplane. At the same time now, we had the KSC workforce under Mr. George Page checking it out and getting it ready for launch.

You got the North American aviation, under Mr. T.J. O'Malley (phonetic), trying to finish it, check it out and launch it. Seems to me like we got two (2) teams trying to do something on one (1) piece of hardware, and then as a continuing drama that is continued to this day, in the last, early 90's, we got direction, let's pull the NASA people away. Let the contractor do as much of this as they could. They were trying to. They were trying to do that. In the meantime you got to go back to the early 70's on the payload side of the house, because we were getting so many young engineers that didn't know a stapler from a tape recorder or a wire from whatever. That is payload operations. Then NASA decided to get some civil service young engineers, put them to do their own hands-on work called Level Four. You had NASA engineers playing in your sandbox. Assembling wires, building spacecraft, checking out, so you had part of the KSC house trying to extract NASA system engineers off the shuttle processing and on

the payload side of the house you had the payload community that was infusing more of the hands-on. Never were we gonna meet. So half of the house was saying, let's turn over some of these tasks to our contractor and on this side of the payload - what goes in the orbiter is the payload bay - we had people saying we need to gain the expertise of the NASA, get their hands dirty so we're gonna bring in these young engineers, and that's the culture they got today. SFPF, ONC, you got NASA people that like to get their hands dirty. Five (5) miles away, you got some NASA folks that are a little but disgruntled cause you're turning everything over to USA.

All right, this accident is gonna put all that upside down, one more time. Because we move so many inspections points away. We moved too many critical operations - some people say. We moved away from and we let the contractor, and we don't have a double set of eyes. And obviously there's gonna be some management looked at as far as how do we do business.

DR. ORVILLE BUTLER: By this accident, you mean the Columbia?

MR. ERNIE REYES: The Columbia. The Columbia fiasco, yes. So I'm saying it was tried and the word on the street was that we were going to bid this series of years on a contractor, and industry going off and processing the orbiter without any NASA intervention, okay. And I think it's well on it's way, but I think the Columbia, I mean the Challenger stopped that and now this Columbia episode is driving a nail on that.

This is a very complex system, and I don't think the NASA is willing to take the heat. We send one more into the water and the program's over. The American public

doesn't mind seeing people killed in war, on the highways or anything else, but when you do it spectacularly, like we did on the shuttle, the American people don't have the stomach for that, and they will cancel the program. So, I don't think we'll see that at Kennedy anytime in the near future as far as letting the contractor take it and give us a product and then the NASA just does an overview and oversight, and do it.

On the unmanned vehicle side of the thing, we've done that for years. We assign one (1) inspector. I had one (1) inspector on a California, the West coast, and down here, and we checked on the process check-out of that booster, check-out of the payload, and we let the contractor do the work and we did an oversight function and at the end we reviewed the final goal for flight readiness and we told Lewis labs, or Goddard, wherever the responsibility design agency was – she's ready to fly – these are the problems we had, these are the fixes, she's under control, you can fly it. That is what they'd like to do on the shuttle side of the house. It was simple enough on payloads and boosters and you saw one of those the other day, but not on the shuttle. It's too complex. We're very.....

DR. ORVILLE BUTLER: Culturally, what you see as the major changes in Kennedy between the end of Apollo and beginning of shuttle and what role did ASTP (not clear) and Spacelab have in those changes? How did they affect Kennedy?

MR. ERNIE REYES: I think the culture, post-Apollo, we went to the moon and then they started sending us to school. They'd send us to charm school and workmanship schools and we started going to meetings, on sight and off sight, launch vehicle people and spacecraft people and we started intermixing, and finding out the

conditions of each others moccasins. These folks didn't know what we were up against on a daily basis and even though they appeared to be a simple structure, I think they had some very complex stations too. So the cultural thing that I saw after the Apollo program is the working level people got sent to school and started more communications between each other, such as we started respecting each others work and really for the first time, finding out what the other guys really did. We were too busy doing our own thing, getting to the Moon. We got to the Moon and got back and then the clouds cleared, then we say there was other folks doing other things at the Center.

I told you how the workforce was mixed after Apollo and a large group of guys went to work on payloads. The spacecraft guys went to work on the best airplane in the world, called the orbiter. So there was a lot of cross mixing of the cultures from the various communities that existed here at Kennedy and we started working toward, as a community, fixing the problems instead of fixing the blame. There was no more sandbagging on schedules. Sandbagging was, I'm okay, I'm under control, I'm gonna make my day – how about you? – Oh yeah, we're all gonna make our day, no problem. We go back – Oh we got some problems here. I don't know if we can make that. Everybody was sandbagging, they're waiting for somebody to lift the umbrella and say hey, we got a problem, we're gonna need four (4) days. And the other group would say, whew! – we could sure use those four (4) or five (5) days to catch up and get back online and meet each other. So there was no sandbagging of information. I will say

stonewalling, I call it sandbagging cause nobody was willing to admit they were having problems and were in jeopardy of not making it.

There was more of an openness to work amongst each other and start... before the senior managers had talked. After Apollo the middle manager and the bottom spacecraft and launch vehicle guys and whatever, since we were all one school, we started cross-communicating more and consequently I think we started working closer as a team than ever before. And since we're now all working on one vehicle, everybody pulled together and the culture became one of – let's get it right and right the first time – and obviously we were always, always trying to process at a minimum cost.

The other big, big, big thing is, after the Apollo we went into it and we remodified all of our facilities to accommodate the shuttle. We took the elevators off of the MRP's, mobile launch towers. And put them in place at the OPF, so we could use those elevators there. We used the structure, the mobile platform and we shortened the umbilical. We worked with each other on the escape system, the escape dollies. One the vehicles that didn't have to change was the tracks, the crawler transporter, which was an outstanding pieces of equipment so let things lay that didn't need fixing, but we modified the VAB for platforms and locations for the shuttle rocket motor build-up's and for the shuttle manning for the OPF. We built one OPF and we had a resurrection city where we all worked out of trailers until we justified we needed an OPF and a building for our engine as to house there themselves.

So that's how we got the orbital processing, that's the OSP, Orbiter Support Building. Whatever, the building next to the..... As such we worked closer together to

work with what we had, modify the facilities we had and the same thing with the ONC. It got modified so many times there to process hardware and then I think the only new building we built was the SSPF for the large pieces of the workshop that was coming up. And that was built at minimum cost. That facility is not brick and mortar. It's girders with pre-fab inserts. It probably won't last as long as the ONC or Headquarters building cause it's not military specifications, but it did the job. So, everybody just came afterwards and I think that was the big cultural change.

We saw what was ahead and we marshaled out forces and the managers in charge, at the various levels made due with what we had, which was always what we said we were. We were honest and we did it with minimum bucks, and from an operational standpoint, way, way before the Mr. Golden Quicker- Faster- Cheaper concept, we always said we wanted the most bang for the buck. That was our saying down here for years and years and years. When he came in, he was quite a duck. Called us all in, wanted to talk to all the young engineers. We went into the auditorium and we went up to the conference room and he said, I want to talk to the young engineers and everybody that has been with NASA more than five (5) years or more than 10 years, please leave the room. I said, c'mon guys we've been kicked out of better meetings than this before. We left.

Afterwards the young engineers all came to the office and said well, what did you do Reyes – write a speech for them? Why? Well, he wants us to work better, be happy in your work, give the most effort that you can and let's get the most out of our federal dollars, da da. The same thing you guys we been preaching. I said, well, what

earth shaking things did he have to tell you? How's that? He wanted them to do the best he could with what they had and make NASA look good. But for that he didn't have to kick us out, I mean we all heard things like that before. And that was Mr. Golden and then he got rid of the NASA emblem – that's no good, get rid of it. Several years later right before he left office, he went back from the NASA run to the old NASA emblem, which had pride and meaning for the workforce. Nobody ever liked the NASA (inaudible), but that was his thing. Agency spent a lot of money to get the NASA (worm-inaudible) and then to find out after awhile that it was never accepted. It's still a little thing there, but it's, you know. I want to vote on what our emblem should be before we marched off to war. If we're going off to war and somebody gives you a phony peanut on a flag, and said you got to defend and die over that, I mean, I don't know. Can we make it a peanut butter and jelly or something... (laughter) Let's be realistic guys. The NASA run -- it never, never flew.

DR. ORVILLE BUTLER: Let's go to the first shuttle. You were involved in tile work. I believe you were tile chief, when the first shuttle came down here. Can you tell us about Columbia – the tile problem and how the tile problem was resolved?

MR. ERNIE REYES: Absolutely. Got enough tape there.

DR. ORVILLE BUTLER: Well, this is a digital and it will get us through another half hour.

MR. ERNIE REYES: Okay. The shuttle came from California and it had a lot of opportunity when it got here and as soon as we started working some of the guys were smart enough to know that we were in serious trouble. The guys, one of

the guys who was a leader of the group and it's George Page. He said well, you know we got a lot of talented people here but we're not using them to the best of our ability. So they came out with a plan. The (inaudible) designator is a shuttle processing, the CO is Cargo Operations. So what they said was, okay, we need to pick some people, so the powers to be picked 20 people out of organizations that were not supporting the shuttle and we were picked to go do certain jobs.

DR. ORVILLE BUTLER: I see your listed there as tiles (inaudible)?

DR. ERNIE REYES: That's what I was assigned as, and I was supposed to report to Mr. Carl O'Hara (phonetic), who was the head of this corp or relations, but in essence I was reporting directly to Mr. Page, who was the leader of the Free world then. This was the engineering people, and these were the operations people, and they were supposed to report to various key guys in the engineering side of the house. These guys would side as mechanical engineers, hydraulic engineers on the engine, floatation engineers, flight controls. All kinds of jobs that we were supposed to go do. Our chief test conductor was to be a test director and help close out some of the..... **(Interview interrupted by ringing telephone)**

DR. ORVILLE BUTLER: Okay we're back.

DR. ERNIE REYES: We're back. The year is 1980 and we have a orbiter that has been brought to the Kennedy Space Center and it was in the best shape the North America, Rockwell and Houston had at the time. Unfortunately, it was not complete in a lot of sense of the word. The tile was not finished on the outside. They had picked the cherries – they had picked flood areas and they had done various

tiles, a large amount of tiles on the flight surfaces that they had not done any of the complex compound curvatures that needed tile. They did not have any of the (inaudible) surfaces that had to open or close the tile in place, and a large number of the tiles that were installed were not distinct. We did some tests and found out the tiles just popped off, because the material was very similar in strength to styrofoam, so that was the big tile problem.

The problem was, here we were trying to check out an orbiter craft that was covered with this layer of tiles and it presented a lot of operational work arounds. For example, the hydraulic people in the airplanes I did this afternoon, they would attempt to run the hydraulics to move the (inaudible) on the airplane up and down. Well, we have got to install some tiles on there and these tiles need to put in place and pressure applied. So consequently, you can't have two things happening on the same surface.

Now if they don't do this hydraulic things then they can't check the reservoir, they can't check their accumulators, you can't, you know, if we can't get the orbiter tiled and on the training engines of that El-a-von (phonetic), then we can't finish the whole surface. So it drilled meticulously difficult and excruciating schedules and (inaudible) and each other. The problem was one that you had Houston and California trying to finish building it and then you had KSC and NASA and North American contractor trying to check it out and get it ready for launch.

In between, Mr. Page said, here's your opportunity. You will be the tile guy so your job is to make sure that all the damn tiles are installed on the vehicle before we launch. Whatever you think has to be done, we need to go do it. I said, okay. So I

moved my satchel. I resisted at first because I said, look George, I'm working Payload Operations. The bottom line was that, you know, if the shuttle doesn't fly we don't need any payloads. I said, I understand. Where do you want me to report. So I went to work and the first thing I did is I tried to see what was going on, and it was a feverish space, looked like a beehive. You know, we had young people.

By the way these people were hired for several months and they lasted for two and a half (2 1/2) years. People who were hired and they were in high school - not high school, college age kids. Some folks that had worked as teachers, homemakers, barkeepers, whatever. They was just an over-abundance of people of all walks of life and they were all getting trained how to do it. You got the tile – you prep the area on the vehicle – you got the tile, you carry it around in a tote box and you primed it and you got ready for insertion. So all these kids were walking around and when there was a cavity and the vehicle was right, they went in and installed it, so it was like a bunch of bees working around, moving around with their little tote boxes and their little tiles – 36,000 tiles, approximately needed to get installed so it could fly. I venture to say a third of them we not on yet.

While this was going on we found out that the tiles were coming off at an alarming rate. The airplane was designed such that certain areas there are some hot areas that really need to be looked at make sure they are on secure, cause that's what gonna take the heat. Right behind the leading edge of the LCC panels are reinforced carbon-carbon and on the cove on the airplane, where the heat really takes it in when you start climbing toward the wind. So what we found was that you had a layer of,

where the felt was glued on to the felt around the side of this cavity, and this felt glued on with a common RTV localizing material, just like you buy at the ACE hardware store for putting around your sink. The same RTV that hardens it at room temperature. On the edged where it was glued on where we put the surface, to provide a suction, it just broke off at this interface.

So the problem facing us was that we had to get the material to be more dense to provide more strength so working with the people in Sanibel, California which were the initial providers of the tile, and working with the Houston people and working with the local folks, we came up with a solution, a grayish mix which was like, I would say the consistency of epoxy and you brushed it on. You brushed it on one direction and you brushed it on another direction and you let it dry and what it had was this solution that went into the pours of the white powdery material, throughout that 3M and it got more (inaudible). So all of a sudden it was like a light consistent cement. Thick.

So we put that on and we ran several tests on some tests, and then we found that it was so good that when we put the whole tile on and applied pressure, we were taking the face off of the tile. We were ripping the glazed finish off the tile, instead of putting a whole tile on. So that's what it took to fix that. We had to remove our host of tile, densify it, that is try it and put it back up without (inaudible), but it was just that we had to get it more dense. So when the solution was provided to launch director, Mr. Page and Mr. Sessoms (phonetic), the engineer in charge, and the (inaudible) engineering and the Houston engineering and everybody else and George said, well, keep it simple. And I like to keep things as simple as I can. He says, what

did you do? Says, well George, the bricks, the mud was too soft so we needed to make them stronger. So what did you do? We added more straw. He says you what?

(laughter) We made it more dense. Same as adding straw to an adobe, you make a stronger adobe block. It's the same principal. You just added more material to the pores where you had the base. So that worked and it works today, that's what it's still done.

Well, we still had a tremendous job to do so what we did, we found, I say we, because I was assigned to work with a retired air force colonel, with a North American point of contact and I was a NASA guy, and we had about 700 workers on a daily basis. So early morning, starting at 5:30 we had a status with the lower team and then we had a team for each wing. Then we had a team for the forward nose and a team for the aft location, including the vertical stabilizer. So these five (5) teams all reported where they worked, where they were going, where they needed help and we proceeded to schedule accordingly so we could make an interface with the folks.

The biggest problem, non-technical problem, was everybody was used to statusing the tile every morning. They wanted to know how many tiles were put on, how many got pulled off, how many got stuck for flight and it was an excessive number of people doing this so I went to Mr. Page and I said, I can't do this. I got to do something with my morning and I can't just be doing this, and I don't want anybody else wasting their time doing that. So, I called a guy named Mr. Dan Germany in headquarters who was working for the Chief of Operations up there - would be the project engineer on Mercury was - Yardley. Mr. Yardley, associate ministry for NASA.

And I said Hey, Dan Germany, if I give you one count, the count and the amount – how many we installed, how many we got left to do, da da da da, once a day, would that satisfy you? Yep. Now, do you get this? He says, I get a report from Houston. I got a report from Marty. I get a report from those NASA headquarters people that are down there. I said, you got too many people, I counted them and there's 17 people that status tiles everyday. So we can't have that, we got to have one (1) group, we give you one (1) number and that's it. What if I call you every morning and give you an amount. He says that will satisfy me, and I don't need to listen to anybody else.

So, I went to Mr. Page, I said, we're gonna do this, so you're gonna have a lot of flack, so you do whatever it takes. He says, you got it. So the first thing I said, okay, no more status on tiles. I will use status on the telephone morning report and that's the numbers we call to headquarters and that's it. Let's concentrate on getting the job done and quit statusing and counting and this and that. Let's quit counting bodies. Let's just get it done. Oh my God, the world was gonna end for about 17 people, but I gotta have this number. For who, for what. No, you don't. I cleared that for you already. Take care of the (inaudible) pal, find another job. Get a job. Get a life. We went on.

There was a lot of fields that needed working, and it was up to me to take the lead from the government standpoint and it was up to the guy to help me, the contractor. We put out a plan and we redid the whole methodology of how we did things. Instead of having people crawling around with tote boxes full of tiles and we said, okay and this is going to be our target. I'm gonna work with our spacecraft folks

so if they need access for flats or wings or whatever, we're gonna work with whatever they had and based on what's available, then we will figure out what we can install when.

One of the things I did, I eliminated NASA quality and engineering I was looking at various things and doing various things. Where there was an empty hole, it's an empty cavity. I didn't need a contract to tell me it's empty. I don't need a NASA guy to say, yeah, it's empty – two stamps. Okay, let's prep it for clearing. We prepped the area. We pour a piece of plastic (first taped ended) like saran wrap and we're gonna go fill it in there. Now you the contractor are working with a technician and yourself, I don't need the NASA guy to look other than to give the once clear, and that's it. So instead of have millions, just one from here, and so they say this isn't any good.

Now when the proposal changed to Mr. Page and Mr. Sessoms (phonetic) and Mr. Bovic (phonetic) and a few others, he wants the proposed plan of operation. So I say, what do you want to do that for? Because I find it I'm not getting anything from all these people doing all these little jobs. And then I explained QE's – you don't have QE's signing the paper anymore. I said, no sir. I took a whole bunch of papers and I said, let's get this thing under a QE's signature. I followed that paper all day. It went from this building here, all the way to the pad where there was a trailer with a QE, and at night when he came in, the guy signed the paper.

We got it back the next morning and then it was ready to go look at – when can we do this work. We find out that the guy just signed a paper like this because I put the on the signature page and said, look at this – this is the paper that was signed two

(2) days ago. Here are all the things that are to be reviewed and the guy just went like this and signed all the papers. How can you say that? Well he signed two (2) blank sheets of paper here. The guy was just signing paper to get it out of his way. He was not doing an analysis. He was not reviewing. He was adding no value. So I did that when everything was required and kept signatures. Kept the cycle, kept the time and we streamlined out methodology for getting the tiles installed.

So we densified the tile and took care of the problem. We need a method analysis to see where all it went, and try and minimize the handling of all the tile. Then we formed teams and once we had all these teams under control in the middle of the day we would sit down and look at. I built a little model, it's still at the house, and I'd say, okay all these are done. These areas are done, these areas are done, these areas are done, now what area do we need done? Well, we need done... a Ray so and so came in – and sheet of people came in from the coast. Where is that at? I don't know. So we'd get the drawing, we'd identify who it was. We'd see where it was on the airplane. Can we reach it now? Yes. What can we not reach when we go vertical and let's kill those things first. So we worked smarter.

It got to the point of rolling out, and we had a knock down, drag down argument like I've never seen before. The associate administrator of NASA was there and here was Mr. Chris Craft (phonetic) from Houston. He was with Mr. Gess (phonetic) from North American. Here was Mr. Page, here was Mr. Tom O'Malley of KSC and they are going at each other. These folks want to roll out, put it on the stack, go to the pad and launch. These folks want to keep it in there and work on it some more. So it got to the

name calling, screaming and yelling between these two (2) and Mr. O'Malley, and this was Mr. Chris Craft (phonetic) and Mr. Page going at each other. I'm listening with nothing but big 'ol Chris Works. Mr. O'Malley said, hey listen, let's let the kid know – he's been doing it – they always called me The Kid, and I said well, we got this open work, it's in this area and this area. We feel that when we go vertical we can still reach it. The day before Christmas we were at the VAB with vertical and we got the last requirement to install another array (?) and we went and we saw it could be done, so we said we can do it.

We did that, we rolled to the pad after the first of the year. Were out at the pad and everyday we'd get twixes with a (inaudible) soak and you reach this and we want you to do this to this one and this to that one, and this to this one. So we would address what was needed and we go built scaffolds in the sky and work the thing. One particular day, we're looking at the latest drawings that came in that wants us to do something, and by this time we were down to a small cadre of workers on this thing, and I said I don't know if we can reach that or not, we're gonna have to look.

At about that time the telephone rings and here's one of the guys we've been working with us, a NASA engineer, he had climbed to the top of the stack. He had ropes around him. He was leaning out into the sky and he got the numbers and he was looking at the area and he said, we can reach it. We can look at it, come on up here. The shop guys are saying, Oh God, he's crazy. So the chief shop steward, or shop supervisor, myself and another operations guy was there from North American, we all went out there and here's the guy leaning out on some ropes hanging out in the middle

of nowhere, touching it and saying, it's right here, we can work it. The shop guy is saying, Jesus Christ. Can you call that guy Ernie, you need to get him back. He's gonna get us in trouble. The high ranking people went out there and they built some scaffolds and they tied some boards and they some us some batter boards, they called 'em, and they made us an access. XYZ out in the middle of the sky with nothing beneath us, nothing around, and we removed and we replaced, and we put some heat lamps and we finished the cure and we're set to go. So, we finished our job, which was to get all the tiles on before launch and successfully launch.

So that was the thing. We had motivated people. We worked out various methods to work smarter. We streamlined a lot of superfluous things. We took off the no batty-ratty (?) steps. I was the leader of the thing, and I was the instigator of a lot of it, but it was team effort by all of us. Once we densified the tile and once we had gotten up there to do that, we would forget in April of '81, when she finally took off. As soon as she took off it goes into orbit and guess what happens? The tile pops off the hole. Not one of the ones we had, but evidently it was not glue on, cause we didn't pull all of them off, and I think there was nothing on there cause there was a flight tile, which was a low heat tile.

So after that I was involved with tile for the first turn around when it came back. A lot of it was in great shape and there was no major damage per se. Then I went back to Payload Operations. So I was cleared to go back to my normal work once the operation was going. And all these three (3) guys, these are the heroes that got pulled off, to go help the STS1 vehicle get back to flight. And I guess this is the only place I

got to show somebody, it says, were you with tiles? Yeah, I was the tile guy. I didn't think that tile ever suited me. Did that satisfy the bill?

DR. ORVILLE BUTLER: Oh yes, it sure did.

DR. ERNIE REYES: Okay.

DR. ORVILLE BUTLER: I think you've already done a pretty good job of talking about the KSC contractor/astronaut relationship. I don't know whether you want to add anything to that specifically with Columbia or not.

DR. ERNIE REYES: The relationship we've had with flight crew members has always been the kind of relationship you have with a good chief and a pilot, you know. It our ship, we're gonna let them fly it, and we'll take care of it and we'll treat 'em good, and we want them to participate in all the processing at Kennedy. That was started early on. We wanted them to climb in and throw switches and get familiar with it and anytime they were in town, and they wanted to, we encouraged them to come in and throw switches and sit with us and we critiqued whatever they needed to the make the flight easier. They were gonna have to fly and operate it in orbit and in space and walk on the Moon, not us, so it had to be to their satisfaction and to their likes and dislikes or whatever.

We developed a tremendous rapport with them. They would fly beer to us from Houston. We couldn't get Coors beer or they would fly it on the bottom of their jets and invite us to have a beer with them, while we reviewed the prints and stuff. On occasion we went out with them and played softball. Fun games and we took our families. I got pictures of all my kids with the Apollo 15, Apollo 16 crew members, you

know, hanging out with the kids. Holding the girls. My girls are all in the 30's, my oldest is 40, and she remembers playing ball and having sodas and enjoying the crew.

I have had various crew members at my house, enjoying my wife's Mexican cuisine. They'd say, is there any place where we can get some good Mexican food? I said, yeah, at my restaurant. You have a restaurant? No, it's my home but my wife enjoys cooking. But it was that same way with anybody and everybody. We went out of our way to make sure they were satisfied with the product that we were producing, which was the capsule.

Now mind you, they all had little idiosyncrasies, like McDivitt, he insisted on having this little thing that the Pope gave him and he flew it on his capsules, so he wanted it to fly on his Apollo capsule. Dave Scott wanted the little jelly thing from the cap in his seat, emerald green, he just wanted it. They didn't come in emerald green. They were metal colored, but we customized.

Schirra and Grissom had a different kind of netting. We had a prime crew and a back-up crew in the Apollo and after that anytime you put in a crew, you made sure that their preferences were on the ship. As a matter of fact, because there was so much friction between primary and back-up crews, Houston invested a job for a third person. FCDR, Flight Crew Director Representative. He was the spokesman for that mission and would take the likes and dislikes of the crew and he would integrate the prime crew and the back-up crew so we, the crew that was putting it together and assembling it, wouldn't have to get into their individual mayhem. I worked 1, 2 and 4. I worked with Gus and Ed White and Chaffee and I also had to tolerate Schirra and his

back-up crew and satisfy them as to what went inside the cabin. It was me trying break the bread between the two of them, so after the fire they decided they needed the third person to break the ties between the flight crew themselves.

We always had a good rapport with them and Ellison (inaudible) shows up one day at the office and says, hey I'm so and so. I said, Hi. And I talked to Rick, he said I could climb in and throw switches under (inaudible). I said, well, we're doing this test today. I didn't know what to tell him. He said, well Rick said, yeah. Uh, can I ask what's your position? He says, well, let me say it. I'm one of the new astronauts. I said, ok, crew member. Why the hell didn't you say so? Yeah. This is the test that we're doing. This is when their gonna need somebody in there to throw switches. This is the procedure, you might want to get with Skip (inaudible), why don't you guys get together. The same ground rules we got for anybody, you got. You go in there, you work to your convenience and if you're not available, we'll put in a guy to throw switches for you. We had guys that were assigned to stations and they knew where all the switches were. But since they had a trainer in Houston and a trainer here - this was training on flight hardware.

Ellison was one of the guys that I got in real close because he was a little - had time on his hands, and he liked music and I said, you got some time? He said, yeah. I said, let me clean up - bring your flight suit, I want to show you something. The great school where my daughter was going to school was having a shuttle mania at Jackson Union High, so we went in there, we went in through the front office, and we got introduced to the principal and he had him address the students on the speaker, and

then they showed up and showed us everything they were doing in class. They landscaped the outside with a shuttle and they had a picture of meals. And everything was shuttle related. And he went in there and he said I'm interested in the jazz band, I said, well, I happen to be the Godfather to the first child to my band director Mr. Randy Yeoman's (phonetic) here. So I introduced Mr. Yeoman's to Ellison. I said he used to play a mean something or other. He said, I played a sax. Do you mind if I come by once in awhile. He said, no, you're free to come by anytime. So we said our goodbyes and we came back to work and he said, you know, I feel good. I feel good about working with kids. I said, well Ellison we went in my primed Volkswagen, but if you got a better car and you got some time, feel free to go see Ron. So he took it upon himself, when he had a little bit of time. He would go to the band room with the kids, and he had some pictures made with a bunch of kids and when the yearbooks came out that Spring, he went to the school and signed yearbooks for the kids. You know, middle school, little books, but he signed them and they had pictures taken with all of his kids.

Years later, when we had the Challenger incident, I got a call from Texas Tech and TCU out in West Texas and a girl got on the phone, Mr. Reyes, this is Stephanie. I said, Hi Stephanie, how are you? Oh was that our Mr. Ellison that was in the accident? I said, yes baby, I'm afraid it was. The kids remember the guy, but he liked to have fun and he was real tight with some of us and we were close and we always had a rapport. Whether it was playing ball, taking them to the band room or having dinner at the house, it was – just one of the guys. Hey Orville, c'mon, if you're not doing

anything tonight – come on to the house. We'll talk about your favorite subject, writing book, interviewing people or whatever the hell you got. Whatever's got a bee under your bonnet, we'll talk about it. It didn't have to be space biz, and they enjoyed that. Cause all of them were away from their families, their kids, so they enjoyed just being in an environment where there were not in a glass bowl.

DR. ORVILLE BUTLER: Could you talk a little bit about, first of all, it's called the Shuttle Processing Disaster, and how that changed shuttle processing?

MR. ERNIE REYES: I guess the shuttle disaster is the Challenger. That's the thing that happened. It changed a lot of things, the way we did business. It really brought the agency to its knees in many fashions. It helped us and hindered us, quite a bit. First of all the accident happened because we got burned through from the O-rings on the stages, and it burned a side and it blew up, but Marshall engineers, disassembled the rocket motors that hang the (inaudible) the O-rings. They kept all their notes and notebooks, and they had known about burn through for awhile but they weren't sharing with KSC. They were not sharing with the project office. They were not sharing with the managers.

Orville, your running a classroom and your trying to teach a subject and there's something going on in the back where there's a window open, and there's a bunch of hot air coming in, and it's really miserable on five (5) of your students in the back. As you continue the process of teaching whatever you were teaching there, everybody is giving you feedback, except these five (5) people back there that are sweltering and trying.... But nobody's saying anything, and as long as you don't hear them

complaining, or saying anything, you continue on and you felt like, I presented the material and they stayed pretty active and I think I got some response, and I'm okay. Well, we were okay, but the Marshall people who knew that there was burn through the O-rings, but since we, Kennedy, we're not a prior to that process, we never knew. We were in the dark.

One of the things that happened as a result of that accident is Kennedy got involved in all the operations. Our inspectors got involved in looking at the O-rings. Our inspectors got involved in looking at the cracks and the skirts that I talked about. Our inspectors got involved in areas that they hadn't been involved before. Marshall had a SLV processing facility on the south side of the VAB, and you go to a place and that is Marshall processing where they work on skirts and they build up the F-skirts and they built up the thrusters and everything else that goes there. But that was their operation. They didn't want any Kennedy people involved to the point that they had wire fences, with bobbed-wire, and we didn't go in there. We were not allowed to go in their area. Even after the accident you still had to go through the Marshall office to get to the processing area. Here we are, NASA processing shuttles and the Kennedy Space Center, but we could not get into the Marshall Space Flight Center Operations. It seems after the accident, because we got access badges - although we still had to go ask to see what their doing, but it changed because after each flight we got involved in the inspection of the SRB's. We had not been involved in that, so we got more involved.

Now what else happened as a result of the accident? Oh My God. The thing happened, and we didn't know what happened. It all happened in front of our eyes. The launch vehicle people saw it, excuse me, the facilities people thought that the swing arms had gone and bounced back and slit the paint. The orbiter people thought there had been a wind sheer and twisted the wing off. The payload community - we thought that since we're flying an IUS and a (inaudible) that one of the large around fittings has busted loose and thing had gone. Everybody thought that their peeve had caused the tragedy until we found later on what had happened. But anyway, what happened is, everybody descended on Kennedy with more requirements. More inspections, more to do, more details before you do this – you have to this, this, this, this. Where before we had 500 things to do, now we had 1,500 things to do. And said Oh my God, how are we ever gonna get done with something like this.

So, the powers to be established some paper teams to look at various prospects of what we had done. All of these were looking at various operations where JSC, Marshall, NASA headquarters, Goddard, Lewis. Everybody was asking us to do something else. And we looked at that and we thought, we won't be able to launch again – ever again. Were not gonna be able to launch. So we starting looking at all these requirements and all these conditions and everything we had to do, and we said how in the world are we gonna do this? So, we had to start looking at and questioning, you want me to do this – what does that add, did I not just do that by step one here and step four here? We had to argue with the other Centers to try and let us get our job done. It was extremely difficult, cause we got a lot more requirements added.

Which in effect changed the way we do business. Some of us come out of our box and were very frank about what was going on.

Consequently some of us we're recognized for better jobs or bigger jobs and more responsibilities. Mr. Uttsman (phonetic) who was the associate administrator for NASA at the time, who had been here at KSC, came up after work and said, hey, it's time for you to do something different. I said, hey Tom, I'm here to do whatever it takes. I'm here to help the process. You guys decide what you want me to do and I'm gonna help you do it. He says, I'll remember that. Well, after the tragedy, I was selected to become the senior executive and give them the director of quality assurance, which was to go out there and pull together all the core organizations to work the same. To get our requirements at Houston and Marshall all satisfied, and at the same time to try and eliminate some of this superfluous and useless things that they wanted us to do.

You got to work for us and you got Monday through Friday and you want to do the most cost effective work that you can, and you can't do it if somebody is second guessing you – and you take one step forward and two steps backwards. So the faces of -- after the Challenger everybody came out of the woodwork to cover their ass. Sorry, but to give us more things to do here at the Kennedy Space Center, so it took us a long time to get back the STS26, which would return to flight and still process without having everybody on top of you. In the old days we sat in a room like this, with each system engineer and we said, okay, we're ready to roll out, we've reviewed all the open paper – Orville, are you ready to go? You're the mechanical engineer. Yeah, we got all

these things done – we must have these things done and we must have up to step three (3) on this document before we're ready and once we get that done, we're ready. Wonderful. We'll put that on the constraints list, we'll work the constraints list and when your work is done, as well as the electrical and everything else, we'll roll out.

On Challenger, after Challenger on S26R, we had a room full of people twice as big including the Center Director. They sat in there and they wanted to be a part of the process. I mean, you know, senior managers can only set their tentacles so far. So we had our Center Director sitting in on a roll-out constraints review, where we were asking people to give us their constraints to roll out. And it was okay if they want to be there but I certainly thought they had better things to do. Give me what you want done – give me my marching orders and let me go do 'em, and then I'll come back and tell you what's happening, but they wanted to be part of the process, so it was extremely difficult to get back to return to flight because of all the additional work tasks that they assigned us to do – either on paper or in summary form in inspections or something else.

I think what has happened since 26R, up to this last thing, is those things got done and we got smarter and we still satisfied everybody's requirements and we were able to get up and start walking and start jogging a little bit. I don't think we ever got into run mode cause there was still a lot of things to be worked out, but we were certainly getting there with Space Station built up and everything else going on.

The episode on Columbia happening, that's going to be a little more difficult now because what happens is my retirement. The powers to be decided to decimate the

Quality world. They tore it all apart and they gave a little bit of Quality to all of branch outfits, and the clout of Quality and Safety was not there. Not that that had anything to do with it, but it certainly had lived a better quality job on the foam of the tank at the places where it came off – what a tremendous tragedy.

DR. ORVILLE BUTLER: When did this change in Quality come? Was that a part of KSC 2000, or...

MR. ERNIE REYES: We got a lot of phony things going on here at the Center now. That's my words. We were here – we are here to process flight hardware and to make sure we can launch it. That being to satisfied all the requirements of all the various Centers. We are here to launch effectively and not hurt anybody, not hurt any equipment that could damage these launch facilities and obviously to launch and recover the flight vehicle in the same condition. When we start putting out all these VPP's, fiction plans and ISO (phonetic) certifications and KSC 2000 and KSC – there are a lot of things where people are off building little kingdoms that don't add to the mission of the Center.

I went to get a haircut the other day, and my barber says, Eddie, aren't you gonna put a little cream and get the razor and trim around the ears, you know I like a tapered haircut. He says, I can't use razors anymore. I said, why? Well VPP got together. I said, what? You know the protection plan and they got a few folks and they went through the barber shop and I have to change my mats on my chairs because they were not up to spec and things, but because of the airborne housings and the possibility of blood, we can not use razors on your haircut anymore, and pretty

soon I'll be wearing latex gloves and a face shield to give you a haircut. I said, what? That's the VPP program as KSC, the protection plan is with OSHA because we want to get OSHA certifications. We can't use razors in the barber shop. What the hell does that got to do with processing the flight orbiter? If I knew I had to have OSHA certification...

I know the guy doing the VPP leadership. He used to be a quality inspector who worked for me before he retired in 1995. Well he wears a suit and a tie now and he's in charge of the VPP at KSC and he caught me one morning while I was having breakfast, going out to fly my airplane and he's telling me all about the VPP and I said to him, what does that got to do with the mission of KSC? The mission of the Kennedy Space Center is to process flight hardware. That's the only reason for all of us being here. There's the archive office, there's the support here and everywhere else. Whatever it takes to get the mission done, but I feel like mission 2000, whatever that is - does that have anything to do with the processing of flight hardware? If it does, then it's time to use the resources that we have to work better and to satisfy deficiencies rather than creating all these superfluous... That's my limited - thank you I don't have the sentence so I can't tell you that we gotta look political and we got have the flavor of the month. I'm more interested in keeping the workforce gladly employed and safely processing hardware.

Did we cover what we started out to cover?

DR. ORVILLE BUTLER: I think we did.

MR. ERNIE REYES: Okay.

DR. ORVILLE BUTLER: We've got one more question and that is, I've looked over your career history and I know that you won several awards for your equal employment advocacy. Can you tell us a little bit about the issues that were involved for you at this (inaudible – Mr. Reyes coughed), and more generally the changing role that women and minorities played here at KSC?

MR. ERNIE REYES: Let's see, your backing into equal opportunity. You want to talk about equal opportunity, the changes in that area. Equal opportunity – not without occasion to think about it or worry about it in the earlier years until one year, one evening during the Apollo processing my biog boss, Mr. John Williams is walking down the hall and he was walking with Mr. George Page and with my Division Chief. I was walking by and he said, don't worry, we took care of Ernie. And George said, yeah, we did. So I let it fly and then later on that evening or the next day I said, George, you and John were walking by last night and you said you could count me or I was one with... What was that all about? He says, oh they got a new program now where we got to account for, how many of this or that we got. Of this or that, what do you mean? Well, you know, we got a Spanish speaking program and they want to know how many we have and how many Blacks and how many women, and how many this and how many that. I said, oh, okay. I forget, it was in the late 60's.

At that time, I let it slide. I didn't worry about equal opportunity. The only thing about equal opportunity, or lack of opportunity, is on a Sunday night, the day before Thanksgiving, on a Christmas Eve or New Years Day or whatever it is, when your working a problem out there with a engineer, a technician or two, and a quality guy and

you need hardware, and you need someone in logistics to give you the parts, you look to the person next to you cause you want to get that job done, and from my standpoint, and from our viewpoint, we didn't care if that guy was Black, or that guy may be a gal. We didn't have too many gals in that time frame. I'll explain that a little bit later. We had guys from California, guys from New York, guys from the Mid-West and they came in all sizes and shapes and colors. So I didn't see it as any particular thing to be forced on, but as I climbed the ladder to Branch Chief, we had so many co-op's, how many males, how many females, how many Blacks, how many of this, how many of that. I was personally involved because at the time I was one (1) of four (4) Hispanics. There was four (4) Hispanics at the Kennedy Space Center and I was one (1) of those four (4).

I got to know one of the guys in instrumentation and he was Fernandez, and I got to meet a couple of different other guys but I said, we're so busy working to get our missions accomplished of going to moon and coming back, that I didn't get too involved. But then they changed the Spanish speaking program and this one friend of mine, Mark Pecos (phonetic) was a quality inspector and he always came to me with a letter or two that he wanted translated and I always had to take it home to my wife. She was more fluent in the written language. He would get letter from Spain, written to him in Spanish and he couldn't decipherer them, so my wife would translate them and I'd bring them home and back to work for him to read. So they changed the Spanish speaking program, he advised me, because all the people with Hispanic friends couldn't speak the language. So they went to the Spanish surname program.

I mean it was a little bit ridiculous cause here we are, a federal agency, we're trying to do space biz and we went from a Spanish speaking to a Spanish surname to the Hispanic, I guess, I don't remember. Anyway that was my initial involvement to know that it was happening and after awhile there would be an accounting and people say well, we got this guy and he's gonna tell us about equal opportunity programs. So we started being herded, like given a shot in the arm of equal opportunity and released to go do our work.

Now that I think about it, historically and in perspective, some of us always wanted to give everybody an equal opportunity. I wanted everybody working with me or for me to have an opportunity to work weekends, twelve hours back to back, so some of us could have some days off. I wanted people to have an opportunity to go out to the pad and work at heights and smell the hydrazine. I wanted people to have an equal opportunity to go travel TDY to California or New York and check out vehicles. So everybody got an equal shot.

There was one gal who worked for us. Her name was Ann Montgomery and you got to understand that from that prospective, we were all at the stone age at KSC. There wasn't that many women and we hired a University of Florida math graduate and she went to work flight crew equipment. I inherited that group of engineers because it just happened that we were working and they said we need 12 people and Mr. Page asked me, and I said we could do it with four (4) and we did it with four (4). One of those four (4) persons was a lady, Ann Montgomery. And she went on to become a Director here at KSC, Quality Director, but in the time that we were talking about, she

was a flight system engineer. Annie was of average build and features and she wore normal clothing except when she went to do the work she wore Levi's and a sweatshirt, etcetera.

So I sent her out to the pad one day and Security called from the pad and said we can't let this person in, she's a woman. I said, so what? He says well, we're not allowed to let women inside Complex 39. Here's a Saturn V and we need to store equipment and she had all the storage containers and she was leading the effort to get (inaudible). I said, well listen, who am I talking to? Patrolman so and so, and this is Mr. Reyes, and so and so. Look at that person standing in front of you. Let me describe her - tennis shoes, Levi's, sweatshirt, right? Yep. She's not wearing high heels, she's not wearing a shirt. She's not a woman, she's a NASA engineer. You let her in or give me the name of your officer of the day or commanding officer and I'll call him next, if you can't let her in. Well you know, I said, she's an engineer and she's there to do a job. Now you let her in right now or tell me who to call in the chain of command. And I know who to call. Oh no, Mr. Reyes, we're gonna let her in. So they let her in. She went up there and did her business at the station and then later she went down and I said, well Annie how was it? She said, it's an experience, but it was nothing.

Later on in the years she would tell us that she went down and she had to do some private business and there was no ladies room. So one of the guys had to stand outside while she went in and did her business and came out, because there was only a mens room. Now there were relief ports on the whole structure, the mobile service

structure, where guys could just lean up and do it into the wind, but you now had a mixed workforce cause she showed up. She was the only lady ever to go to the pad to do storage. There were other ladies that came and went, but in Spacecraft Operations, there was her, there was another lady in the software computer business. I guess you become familiar and you see certain things, and you don't like `em but there's nothing you can do about it.

There was a discussion on promotions and a lady was up for promotion, as were several other guys, but the Director at the time said no, let's give that promotion to so and so. He's very good and she's done a damn good job, and she certainly deserving of it, but she's married and her husband works and you know, they don't need it. That to me didn't wash, cause this lady was doing the same job and in more need of a promotion and a boost for her job. Well, she lasted a couple years and then she went to the industry somewhere, because of that attitude. You know, hey, she's married, she doesn't need that promotion.

I didn't delve into equal opportunity programs until later on when I noticed I was always the champion of, let's this get (inaudible). So they came up with numbers and I questioned the numbers because Brevard County didn't have the Blacks. And the equal opportunity at KSC was run by the Blacks and they thought, they still think, that the only minority is Black. The minority is male or female, handicapped, and certainly women and certainly the Pacific Islanders and all the various things. But at that time, and today, it's still seem like the Blacks ran the minority programs and that's how it was.

What I saw, I saw a need for a little bit more diverse things happening, so I saw a need and I was nominated to go help with a recruitment. We had enough Blacks, but we weren't keeping them, because we didn't have a cultural center like Atlanta. There was no centers of Black activities in Central Florida. They wanted more Hispanics.

Then they had been going, the personnel office - had been going to Porto Rico, to bring Hispanics and they would work for approximately three (3) months to a year and a half, and then they would leave. So we would spend a lot of time and energy trying to get them onboard and they would (whistles) peter out. So they sent me on a recruiting trip and I went and I talked and I told them how it was. I said it's the same except it's the Spanish language. Porto Rico had English books. Classes were in English and everything else, but once outside the University, everything was Hispanic. It was like being in South America.

So I went to the office of personnel and said, we're missing the boat. We're going to Porto Rico, we're bringing people over here. They're not lasting here very long and then they dissipate. They go back to the islands. They didn't like the environment. Why don't we go to the West? You got (inaudible) Texas, El Paso, you got New Mexico State University, where I went. You got the University of Mexico Lobos, you got Texas Tech, you got all these schools. They said, doesn't that belong to Houston? I said who says that it belongs to Houston? These kids like to launch rockets, otherwise they wouldn't be working at White Sands doing the same job. So I convinced them and we started going to the Southwest to bring Hispanics from the Southwest. Not necessarily to Porto Rico, where we would lose them.

I guess the next big thing that happened is, here's the program, it's called Asian Pacific week. Anyway, there's a program in the auditorium, so I went and there was a few things going on the stage, and there was about 12 people in the audience. I said, hmmm. Then they had another celebration and there was a dance group on stage and there was about 18 people in the auditorium and I said, something's not being done right around here. So I went and talked to the Equal Opportunity officer and said, what's going on? He said, well we get money so we bring in diverse groups and we celebrate that culture group in that time frame. I said, well you know what? I think we should do things a little bit different. Well, you want to do things different Ernie - so why don't we invite you to some of these things. So I went to the Equal Opportunity, I don't know what they called it at the time, but I said, you know what? This is a very passive group and if we're going to do anything, you gotta deliver and be more vocal and be more proactive.

So instead of Equal Opportunity Advisory Group that you have here for the Center, where there were diverse groups of people, I suggest we follow the Equal Opportunity Action Committee, EOAC. Let's do something. I'm not the vulture on the tree. I'm hungry. Hell, let's go kill something, let's eat something. Let's not just talk about it, because people get tired of talking. So for starters, why don't we gather all the money that we're putting away for all you guys group and let's just have one event. Were multi-cultured by having all these various things on the stage or whatever, and we'll make it like a picnic. So the people agreed. They went all the way to (inaudible) and yeah, okay, we can try it. So we had our first EOAC, Equal Opportunity Action

Committee, who sponsored the multi-cultural picnic. KSC picnic and what we had is - we had dancers, singers, Slovak dance group, Middle East cultural dancers. We had guitar players and we had tap dancers. We had every kind of group that they had got before and put them all on the stage at the same time. We offered the various ethnic groups an opportunity to bring their ethnic foods and that how the first KSC picnic was. We had a person fly jump. I talked to sky divers in Titusville and they jumped and we opened it up and we had a band and we had a really good time. We stayed within the budget and (inaudible) Fitch wrote me a letter said it was absolutely wonderful. He said, you laid out a plan, you stayed in budget, and we all enjoyed it. We should try to make this a yearly thing. Instead of having the week, monthly – just one celebration for everybody's culture, and they said, Ernie, how did you get away with it? Cause of the Middle Eastern culture dancers, do you know what that is?

DR. ORVILLE BUTLER: No.

MR. ERNIE REYES: Belly dancers. (laughter) All these goodie-two-shoes and then I went to this School of Dance here on Merritt Island and they had belly dancers and I said, well you know, we can't be too risqué, but at the same time I wanted to get a little – the music. And make sure that we all enjoyed everybody else's culture. We really enjoyed it. So that continues today. That was one of the things that I wanted, representation from everybody and I let everybody make a contribution.

They elected me chief of the, what do you call it, the committee, United Way. So instead of going out and harassing everybody, we had an auditorium and I went to the various key people. I went to this one guy, with a polish last name, and he had had his

kids arrested by some medication, and done some work at the University of Florida and supported by United Way. So I asked him to stand up and tell a personal story. I asked a Black guy to talk about how he got educated by way of the minority schools that were available in Atlanta, where he got educated, where he came from. So I had each one present a story with some slides about where they came from and how United Way had personally affected them. They liked it so I guess they still continue that kind of thing. So I worked the Equal Opportunity programs as a viable part of the nominal things going on.

If I saw somebody that was of a minority, and he was being sheltered and kept in a specific place, I pulled him out and got his some public speaking experience, or got him to the forefront so he would add more to the process. And then when I got elected, or selected to be the Director of Quality, I got a call from this Harriett Jenkins, who was the Equal Opportunity Officer for NASA headquarters and she said, Mr. Reyes, I want you to go tell your Center Director tomorrow. I said, why do I have to tell him. Why don't you call him and tell him? Said I want you to tell him that I'm assigning you to work with the Presidential Task Force on women, minorities and the handicapped in the Federal workforce.

So I became a member of a Presidential Task Force for two (2) years in which we went and had hearings all over the country, because we, as one of the technical agencies in this country, need more educated people. Engineers, scientists, researchers, whatever. This whole country needs more of them, but we need a more educated populous in this country.

We're faced with World War IV, which is the social economics of the Far East and the European communities. Everybody's going out for business. So we need more economics from both sides of the frontier, and the only way we're going to compete is to get a smarter work force. We have tapped the white male for all it's worth. Now we need to go to the areas which haven't been tapped, which is the under-represented minorities, the handicapped and the women. They get more graduates into the technical communities across the US of A. So that was our Task Force. We put together a report on education. The caucus was going on for president so you got a copy of the report. All the presidential candidates got copies of all reports which we were stretched in roll models and live models and education, and every president ever since has wanted to be in some form or another, the educational president - or okay, got that, oh, that came from our particular report.

But I came back and I started instituting various things at Kennedy through my little Equal Opportunity Action Committee to help the whole Center march, not just once a year, you tabulate the numbers and everything else, but you go out and you enrich and you challenge people and you bring it up continually. Continually turn it over. And I guess with those efforts I was given the Agency's Equal Opportunity Award one year and I was given the Equal Opportunity KSC award another year, and those kinds of commonsensical things, which was to take the Equal Opportunity Advisory Group and turn it to the Equal Opportunity Action Committee. I wanted action. I wanted some representations from the men and the women that worked so hard and not necessarily by whether they were married or not, but - cause I remember that. That stayed in my

mind. The gal that should have gotten the promotion - never got it because the guys in charge, the good 'ol boys that said, she's a woman for God sakes, she's married. So what? You say that in today's environment (whistles). You get the black pearl, you get the black spot.

So anyway, that was my involvement in Equal Opportunity programs. The last time we got together, three (3) of the surviving four (4) Hispanics, I think we had 174 or some odd number of Hispanics and they came from Porto Rico. They came from Arizona. They came from Texas. They came from New Jersey. They came from all over the place. Not just from one set location. But I was after more cost effective organization. We couldn't afford to train people and then let them go. I remember I was weak with these guys and they wanted to speak Spanish. They want to stay in their own little arena and they were jabbering away and I pulled them out one by one, as the time went on, and I instituted a program where I gave each one of them a tape recorder to practice public speaking in front of the mirror. Talk about their girlfriend or music, their homes or whatever, but speak in English and tell us a story once a week. And that's when I got, well, Ernie why did I have to do that? I said, it's a very simple thing.

The whole process of working at the Kennedy Space Center is you bringing your ideas and transmitting them to the guys across the board and convince them that you have a good idea and then going from there. And if you can't speak the language or present the material, you will grow up to be a GS 7, 9, maybe 11 tops, and you won't go anywhere else. If you get your language skills under control, work a little bit on

your presentation methodology, you can put on a suit and tie and be a manager yourself. It's all on how much money you want to make, or you can sit together and speak Spanish by yourselves and never go anywhere. You'll just be an outcast and you'll be frowned on and looked at.

Now one day we were walking by a German delegation and they were jabbering away in "Spanish" ... **(reporter note: Mr. Reyes said the word "Spanish", but he meant "German")**

...and I would always say, speak English guys, so we can all hear it. And this guy comes to me, a Hispanic and says, when they speak in German like that, you don't know what the hell their saying. And I said Hey, Fernando, how the hell do you think they feel when you're jabbering away in Spanish and they walk by and they don't know what you're saying. He says, Oh My God , you know I never realized. I said, you know everybody is not bi-lingual at the house and some of these people that we have seen here are German, Japanese or whatever, but we owe it to our own team members to all speak the same language. That way there's no suspicion.

Well, needless to say they tape recorder experiment went good. They all dissipated. They all grew up with their own little (inaudible). And one of my earlier acquisitions, a guy from Huntsville, Miguel Rodriquez (phonetic), I think he's an SCS'r now and he is second in command at the Stenos (phonetic). So we did very well, but you needed someone to keep pushing them and I guess I was... I worked every job I had equally, with the same... So that's. I think that's the equal opportunity

involvement that I had. I enjoyed myself. I learned a lot from the Presidential Task Force, but I learned a lot in dealings with the people here.

There was one supervisor I went to see and DE, Design Engineering, and he had a co-op from Porto Rico and the guy was a little timid and he came to me one day and I said, Ernesto, ta da ta da da. I said ,whoa – every job they give you, regardless of how small it is, you give it your best effort and they'll give you more. Once they trust you, they'll give you more. He says, but all the guy has me doing is running a copy machine and making coffee and running the time cards at the machine, and they won't let me do anything else. So I went to see the guy and I said, you know this kid, (inaudible) he's about to graduate as a civil engineer. He wanted to work in DE. We at spacecraft don't have any room for civil engineers, but, and your guys have him doing time cards and making coffee? C'mon now, what kind of start are you gonna give him to take back to the university, when he goes back.

I had co-op's fighting to work in our groups because we kept them busy. We gave them challenging things, but on the other side of the house, everybody at KSC was allocated so many co-op's and they would keep them and not let them go. These guys were slowly filtering out and going back to where we kept them gainfully employed. So we had a talk with personnel and those supervisors and we said, look you either keep them gainfully employed or you give up those slots. Usually in any federal organization, you got a little bit of butter, you spread it across all the things.

Well there was no sense in us keeping these kids that are already handicapped to some extent in their language skills, and having them burn time cards and making

coffee - an engineering student! That's wasteful. That's wasteful for my federal dollars and everything else. So we cleared that up and they started giving them assignments and I have several good friends in DE that came in for the co-op and gone on to bigger and better things. So, I can't recall every specific case, and things like that, but the hiring that we, as a group, as an individual did in general to help the process, and I get some of these stories and activities, it went all the way up and down to the top and someone wrote me up for the Agency award.

I also put in play a lot of programs for recognition for work at the Kennedy Space Center from the Quality standpoint. The KSC Award of Excellence for performing (inaudible) jobs and we had criteria, and we had establishment of various things and you had to say, look you're going to have inspections and you're gonna have to have quality standards. There's a way you can do it by just telling them or you say you're gonna have this and we're gonna have quotas and we're gonna have this. But we're gonna have benchmarks and if you guys do good at this, you're gonna obtain rewards and recognition and some pats on the back. So you have to do a little bit of sugar water politics involvement to get the job done.

Nobody wants just another inspector to hang over your shoulder and stamp your paper, but if you say, hey, once we do this and run some random checks and find out that you're meeting or excelling the requirements, and going above and beyond, you'll get recognized. You'll get awards. You get pins and here at Kennedy, we will sell our souls for a mission pin or a mission emblem or a patch. We'll work for pins and patches. We're dumb but honest. We really are.

DR. ORVILLE BUTLER: Well, I've taken up an awful lot of your time, though I think it's been quite worthwhile. I'd like to thank you for spending some time with us today and telling us your story.

MR. ERNIE REYES: Well, there's a lot to be said and I'm sure that you'll be talking to a lot of our people. You're talking to Tipper Colon (phonetic) . You're talking to (inaudible). You're talking to a few others, I'm sure. Between hearing all the various stories, you will put together a story that says, I guess there was some more of this and less of this and the thing is, when you listen to any story, these guys have a perception. The guys have a deeper perception here and then you got the guys who saw it all happen and various things, and I was fortunate enough that I could run the whole gambit.

Because of my job I was able to sit down and talk to a buddy of mine who came down here one day. Everybody was amazed. I had been on the Presidential Task Force. We go see the Department of Interior and the Department of Interior, a gentleman comes in and he addresses us and he's trying to do his best and it happens to be Manny Lou Hung (phonetic). He's from New Mexico, and I went to school in New Mexico. He and (inaudible) and afterwards I chatted with him a little bit and we carried on a little bit of a conversation and it was over and done. And he's we're hosting a meeting on the fourth floor and the Secretary of the Interior is coming because this is a wild life refuge, and it's managed by his kingdom. And all the guys are around, and he walks into the room and we're all sitting there. He comes around, hey Manny, how you been babe, (Mr. Reyes speaks Spanish) - how you doing? You know this guy? Said,

oh yeah, Manny and I date back when I was on the Presidential Task Force and we kidded around a little bit about New Mexico and KSC work and rocketeering and things in general. We were asking for money and we were seeing if the Department of Interior would kick in a little bit since they owned part of this rocket ranch here. And so, we were doing it very quietly and everything else and I leaned over to Manny and said, hey Manny, we need some money. He says, I don't have any. I said, we don't want the money, we just want our part of the plates. To them, it's the plates. Man it's all we need for a little while, jut a little while. He chuckled on.

We're laughing and later on the Center Director asked him, three (3) or four (4) of us were having coffee, and the Center Director's office. And I said, Manny you're ok. Manny, you take care of yourself. Take care of that Department of yours. See ya. You guys got really good stuff. Adios. And I took off. That's my style, I'm a people person, I like to deal with people, and I'll deal with the janitor. I'll deal with the middle manager or I'll deal with the very top.

It's just happens that President Kennedy went to the White Sands two (2) weeks before he was assassinated and he talked to everybody and we were, very few of us from NASA there - six (6) of us and I asked the General if I could get up there with my camera next to the press core and he said, why sure son, get up there, you know. So, I get up there and took pictures of President Kennedy on the podium – excellent. I got those at home. And after it was all said and done, I got my little tower camera, single millimeter and the President and his entourage goes over there, and everybody was around President Kennedy, and this guys standing over here and he said, Oh, excuse

me sir, from one fellow Texan to another, you mind if I take your picture, sir? Why of course son. Mind stepping back a little bit, I got a telephoto lens, sir. You bet, so he accommodated me, and I took his picture, Lyndon Johnson. I thanked him and said who I was and that I appreciated what he had done for the program, etcetera, and we left.

After President Kennedy was assassinated, and FBI agent comes up to the house. Here's my roll of slides and I got pictures of President Kennedy, President Johnson, the helicopter, the entourage, the whole thing and he said, why were you able to get so close? Their concern was that I was very close to the Vice-President and President. So after the assassination, and I mean this was a picture, Orville, from here up to here. I was right on top of the guy. They wanted to know how did I get occasion to get so close. And I explained the circumstances of where I worked. I showed them the camera and said this is my job and da da da da da, and they said okay. I was stationed in El Paso at the time, but they wanted to see, you know.

Like I said, I didn't mind talking to the Vice-President. Poor guy, everybody was paying attention to Kennedy over here and here's a guy just standing in the dirt there. It's all I could do expose some film for him, make him feel better. We still love you, even if you're the Vice-President, but anyway, I think you'll do good and listen to the guys.

DR. ORVILLE BUTLER: They told us some great stories. It's has a great history.

MR. ERNIE REYES: There is a lot of history. I think what's been written before the ins and outs of various things that happened, but I don't think they covered, or will ever cover, the working levels of what went on. The undertone, the sub-cultures you've never heard about that I'm telling you about. We've all known it, but nobody's ever asked. If you put that history together, you'll want to know, how was it, how was the fire, what happened after the fire, and all this good stuff, but never the overtones or undertones of what has always happened with the workforce.

DR. ORVILLE BUTLER: Okay, well again, thank you very much.

Thereupon the interview ended.