RAS 4536

Official Transcript of Proceedings

NUCLEAR REGULATORY COMMISSION

Title: Private Fuel Storage, LLC

Docket Number: 72-22-ISFSI; ASLBP No. 97-732-02-ISFSI

Location: Salt Lake City, Utah

Date: Tuesday, May 14, 2002

Work Order No.: NRC-281 Pages 8413-8691

NEAL R. GROSS AND CO., INC.
Court Reporters and Transcribers
1323 Rhode Island Avenue, N.W.
Washington, D.C. 20005
(202) 234-4433

Template = SECY-032

SECY-02

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

In the Matter of:	)	
PRIVATE FUEL STORAGE, LLC,	)	Docket No. 72-22
(Independent Spent Fuel	)	ASLBP No.
Storage Installation)	)	97-732-02-ISFSI
	)	

U. S. Nuclear Regulatory Commission
Sheraton Hotel, Wasatch Room
Salt Lake City, Utah 84114

On May 14, 2002 the above-entitled matter came on for hearing, pursuant to notice, before:

MICHAEL C. FARRAR, CHAIRMAN
Administrative Judge
U. S. Nuclear Regulatory Commission

DR. JERRY R. KLINE
Administrative Judge
Atomic Safety & Licensing Board Panel

DR. PETER S. LAM
Administrative Judge
Atomic Safety & Licensing Board Panel

A P P E A R A N C E S

FOR THE STATE OF UTAH:
Denise Chancellor, Esq.
Connie Nakahara, Esq.
James L. Soper, Esq.
ASSISTANT ATTORNEYS GENERAL
Office of the Attorney General
160 East 300 South, 5th Floor
P. O. Box 140873
Salt Lake City, Utah 84114

FOR PRIVATE FUEL STORAGE, LLC:
Jay Silberg, Esq.
Paul Gaukler, Esq.
Sean Barnett, Esq.
SHAW PITTMAN
Attorneys at Law
2300 N Street, N.W.
Washington, D.C. 20037

FOR THE U.S. NUCLEAR REGULATORY COMMISSION:
Catherine Marco, Esq.
OFFICE OF THE GENERAL COUNSEL
Mail Stop - 0-15 B18
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

I N D E X

E X A M I N A T I O N

E X H I B I T S

Tuesday, May 14, 2002 9:00 a.m.

P R O C E E D I N G S

JUDGE FARRAR: Good morning. Mr. Soper, I don't think I officially welcomed you back yesterday. We are delighted to see you and Ms. Marco again. If there are no preliminary matters, Mr. Gaukler, you can continue with your cross-examination.

MR. GAUKLER: Thank you, your Honor.

CONTINUED CROSS-EXAMINATION

BY MR. GAUKLER:

Q. Good morning, Lieutenant Colonel Horstman.

A. Good morning, sir.

Q. I'd like to have you turn to Question and Answer 53 of your direct testimony.

A. Okay.

Q. We were talking about cloud cover and whether a pilot could avoid crashing into the PFS facility with respect to cloud cover in that Question and Answer. Correct?

A. That's correct, sir.

Q. And the second line states a cloud ceiling is defined as 50 percent cloud cover. And, again, that should be changed to greater than 50 percent?

A. That's correct, sir.

Q. Now, you say flying in or above a cloud deck or scattered clouds the pilot generally would not be able to see the site. Correct? Just generally, apart from the Question and Answer.

A. That's correct. Generally would not be able to see.

Q. In your little example yesterday with the scattered clouds, 25 percent scattered clouds, isn't it true that you would be able to see -- a pilot would have general situational or positional awareness in that situation?

A. Yes, it is.

Q. The pilot would be able to see, for example, Skull Valley Road, most likely? At least parts of it?

A. Well, certain segments of different roads, yes.

Q. And he would know that -- are you aware that PFS is building or would build a rail line corridor down the western side of the valley to the

proposed PFSF site?

A. I would assume that, but I don't know that.

Q. Well, assuming that they do that --

A. If they built that, would a pilot be aware of it? The answer is yes, I believe they would, sir.

Q. And you would be able to see all or parts of that, correct?

A. No. Parts of it.

Q. Parts of it. So the pilot would have an idea where the PFSF site would be in the situation you described yesterday; is that correct?

A. Generally speaking, that's correct.

Q. In addition, a pilot would have navigational and steer points programmed into his heads-up display; correct?

A. Into the avionics, which some of the information is presented in the heads-up display, yes.

Q. And to the extent that he had facilities in the area or features in the area programmed in to his heads-up display, he would have awareness of where those features were; correct?

A. Whatever you would have programmed into

the heads-up display, you would have a reference -- let me back up. If you program it into your avionics package and navigational system, you would have reference to it in the heads-up display, either directly in front of the airplane or it would be pointing to it. In order to have reference to the PFSF site, you would have to have that programmed in as a reference point.

Q. And if you had that, for example, in Question and Answer 19 of your testimony, you claim that pilots may, in fact, if the PFSF is built, program the facility into their avionics system; correct?

A. I firmly believe that they would use it as a turn point.

Q. And therefore, based on that, they would have that information on their heads-up display even if there was a complete cloud deck below them; correct?

A. If they had it programmed in, yes, sir.

Q. And if they were going to use it as a turning point, they would certainly know where it was; correct?

A. If they have programmed it in --

Q. If they programmed it in.

A. Then they would have route study beforehand, so yes.

Q. So there would be a lot of information that a pilot would have on where the PFSF was located in your little example yesterday; correct?

A. There would be the same as any other turn point. Whether it's a lot or not, there's a reference point.

Q. I guess I was talking more generally now, backing off -- just generally, there would be a lot of information available to the pilot in terms of where he was or where the PFSF was, whether or not he had the PFSF programmed into his avionics system?

A. There would be significantly more information available, yes.

Q. And there would be a lot of information, if there was nothing programmed in, concerning the PFSF into the avionics system; correct?

A. I don't understand the question. I think you missed a couple words.

Q. My point was that assuming -- without having anything programmed in to the avionics system, you still would have situational awareness based upon seeing good portions or parts of Skull

Valley Road, the proposed Low rail line corridor and other features in the area.

A. You would still have general situational awareness if it was not programmed in.

Q. Looking also at -- going back to Question and Answer 53, you're saying that a cloud ceiling would obstruct the pilot's view of the PFS facility, in the second line. Correct?

A. That's correct.

Q. And down below you say in many cases a scattered cloud cover may obstruct the pilot's view. What is the reason for the difference in the words "would" and "may"?

A. Because by definition a cloud ceiling obstructs visibility of the objects on the ground, by the FAA.

Q. And the cloud ceiling would only obstruct the view if you were flying above a complete cloud ceiling; correct?

A. That's correct. Well, it would still -- one cloud over two percent of the sky could still obstruct it. So --

Q. That's "could" you are saying?

A. That's right.

Q. For some small period of time.

A. If I were to read this it says, "In many cases the scattered cloud cover may obstruct a pilot's view."

Q. Above you say it "would obstruct"?

A. Because that is a ceiling, not a scattered deck.

Q. And that would not be true if the pilot was flying below the ceiling?

A. It would depend on where the clouds --

Q. It still would not obstruct the view of the site if you were flying below the ceiling?

A. I don't agree with that at all. If 49 percent of the clouds were at 2000 feet and you were flying at 3000 feet and the other one percent of the cloud was above that, it would obstruct.

Q. I could think of a situation where it would not, if all the clouds were above you. Correct?

A. That's correct. It is entirely situational dependent.

Q. We were also talking yesterday on whether a pilot, a person flying below the clouds, how much time he would have to avoid the site. And you couldn't calculate the -- let me ask you a direct question about your opinion. I think the

hypothetical we were talking about is a pilot is flying at 3000 feet AGL, the cloud deck is at 3500 feet AGL, giving you the minimum clearance, and you are flying at 425 knots. And assume a pilot has an engine failure in which he retains control of the plane. Would the pilot have sufficient time to be able to avoid the site?

A. Again, it is situational-dependent. And the flight leader would probably have more time to avoid it than the wingmen because he would have more situational awareness. But generally speaking, in that circumstance, yes, a pilot would have sufficient time.

Q. Now, in the situation where -- therefore, if a pilot was flying, say, at 4000 feet with a cloud deck at 4500, he generally would have sufficient time to avoid the site?

A. Given the same set of circumstances and the visibility, yes, sir, he would.

Q. Now, if you go back and look at Question and Answer 55, please. The second paragraph. Here you are talking about another situation where the pilot is flying beneath a cloud ceiling; correct?

A. That's correct.

Q. And your assumptions in this case are

that the pilot is flying at 2500 AGL?

A. Yes, sir.

Q. And the cloud deck is 1000 feet above him at 3500 AGL?

A. That's correct.

Q. I don't see a speed -- let's assume he is flying at the same speed, 425 knots.

A. Okay.

Q. Would a pilot in this instance generally have time to avoid the PFS facility?

A. Again, it depends on the circumstances. Generally speaking, with those circumstances, probably.

Q. Well, there's really no difference between this case and the hypothetical I gave you where the pilot was flying at 3000 with the cloud deck of 3500.

A. The lower you get, the less opportunity you would have. The higher you get, the more opportunity you have. This is a lower example.

Q. But you would zoom up to the top of the cloud deck in either case, which would be 3500 AGL; correct?

A. You wouldn't zoom into it. You would zoom -- you actually wouldn't do a precise zoom

maneuver.

Q. But you would zoom up, to the extent you could, to just stay under the clouds; correct?

A. Yes, sir, I would.

Q. And pilots generally would do that; correct?

A. Yes, sir.

Q. And so in both cases you generally would be able to get the plane up to 3500 AGL, correct, just below the cloud deck, both when you assume the pilot is flying at 3000 feet AGL or 2500 AGL with a deck at 3500 feet AGL.

A. The numbers are a little troubling. Instead of zooming, because a zoom is a prescribed maneuver, you would raise the nose of the aircraft to try to gain altitude to trade the potential energy, to gain more potential energy. And you would not go just very close to the cloud. You would want to leave yourself some kind of a buffer zone. Whether it is 500 or 400 feet, I have no idea in the circumstances. You wouldn't measure it. You would climb to do the engine restart, et cetera.

Q. But you would climb from 3000 feet say to approximately 3400 feet, or something like that?

A. Yes. I think that's fair to say.

Q. Or from 2500 feet to 3400 feet?

A. Yes, sir.

Q. If you had sufficient time -- if you generally had sufficient time flying at 3000 feet AGL with a cloud deck at 3500 feet, you generally would have sufficient time also if you were flying at 2500 AGL with a cloud deck at 3500.

A. I would agree most of the time.

Q. And the same way, if you had a cloud deck at 3500 AGL and you were flying at 2000 feet AGL, you generally would have sufficient time to avoid the site; right?

A. You would have less of an opportunity.

Q. But it would be the same situation; you could zoom up to --

A. To a degree and --

Q. Well, you could zoom up to -- in all these cases, you could zoom up to 3400 feet, no matter where I was flying at; right?

A. If the clouds were at 3500 feet, using this example, wherever you started, you would try to climb near the clouds, 3400 feet. That's correct.

Q. And so assume the pilots are at 3500

feet, the altitude you are flying below the clouds would not directly affect your ability to avoid the site in an engine failure where you retain control of the plane?

A. Generically speaking, that's correct. But the lower you are, the more you climb, the more air speed you lose. You don't have the same amount of energy, so it reduces the time factor available.

Q. I take it, you say here in the second paragraph that a pilot would only have seconds. What do you mean by seconds in this paragraph, second paragraph of Question and Answer 55?

A. I think it speaks for itself. You have seconds. I didn't define it exact because it depends on, again, as we discussed yesterday, whether you are carrying external stores, whether it is an insidious engine problem, whether it is an instant engine failure. Every set of circumstances is going to be different and you could calculate a hundred different time frames. So "seconds" is accurate.

Q. But would it be two seconds, twenty seconds, thirty seconds? What is most likely, in your opinion?

A. We would have to get the books out and

find out what the aircraft configuration is and all the parameters. Clearly it is more than two seconds, I guarantee you that. Whether it is more than ten seconds, we could look into each one. But there are, as I said, hundreds of different sets of parameters you would have to look at.

Q. I'd like to turn briefly to Question 58 which we talked about briefly yesterday. A couple follow-up questions on that. In the first sentence, you say that if 96 percent of the time UTTR has weather of at least a 3000 feet ceiling, and three miles visibility, that simply means that 96 percent of the time the cloud cover would be located at 3000 feet or higher. That assumes you have cloud cover. Right? There would be many times you would not have cloud cover and therefore it is not true you would have cloud cover above you 96 percent of the time. Isn't that correct?

A. No. What the question asked is based on a parameter that is given from the weather station. It doesn't assume anything else. It doesn't assume that it is a clear, beautiful day because if you had a ceiling at 4000 feet and 4 miles visibility it would still be in that category. I cannot assume that.

Q. You would assume, in that category that you described there, that there would be some clear beautiful days, correct, with no clouds?

A. That's not what the question asked.

Q. That's what your answer says. Isn't that what the first sentence of your answer says, that there would be no clear, beautiful days because 96 percent of the time you are going to have clouds above you?

A. I'm not sure I understand the question.

Q. It's very simple. You imply that the statement, that if you have a ceiling of 3000 feet, 96 percent of the time -- you say that simply means that 96 percent of the time the cloud cover would be located at 3000 feet or higher. And what I am saying is that there would be many clear, beautiful days where there would be no cloud cover above you and therefore stating that 96 percent of the time there would be cloud cover above you is not correct.

A. Well, I disagree. There would be many days where it would be a beautiful, clear blue sky. But the weather data here is measuring a finite number.

Q. So you would agree that 96 percent of

the time there would not be clouds above you?

A. That 96 percent of the time, if there were clouds, it would be greater than 3000 feet.

Q. If there were clouds.

A. That's correct.

Q. And so there may not be clouds; correct?

A. There might not be a cloud in Utah.

Q. Okay.

JUDGE FARRAR: Mr. Gaukler, is that the answer you took the "not" out of?

MR. GAUKLER: No. That was down below where we -- the third sentence.

JUDGE FARRAR: In that same answer?

MR. GAUKLER: In the same answer. The same answer, but different sentence. You are correct, your Honor.

Q. (By Mr. Gaukler) In Question and Answer 59, you talk about a ceiling at --

JUDGE FARRAR: Let me interrupt you again as I look at that answer. If you have at least a 3000 foot ceiling, that includes the cases in which there's not a cloud in the sky; is that correct?

LT. COL. HORSTMAN: Yes, sir. In this case it also includes the visibility must be

greater than the three miles. So there's two different parts of that.

JUDGE FARRAR: Okay.

Q. (By Mr. Gaukler) Looking at the last sentence on 58 real quick, you say, "It is unlikely that pilots flying below 3000 feet AGL who are prevented from zooming due to cloud cover would have time to steer the aircraft away from the PFS facility." Do you think that somebody -- you know, we were talking about 3500 feet AGL cloud cover before, and we were talking in most situations you thought a pilot would have time to steer it away. Suppose it was at 3000; do you think it would suddenly make it where the pilot would be unlikely to steer it away?

A. Again, it would depend on the set of circumstances and the pilot. There are cases that the pilot would not have the opportunity and there are many more cases that the pilot would have the opportunity.

Q. So therefore, wouldn't -- this last sentence is incorrect, "It is not unlikely that pilots flying below 3000 feet AGL --"

A. It would depend, again. If there was a bird strike, would it be likely?

Q. Let's talk about engine failure that we have been talking about.

A. The answer to Question 58 does not talk about engine failure.

Q. Let's assume engine failure in that example.

A. Then it is avoid answer.

Q. Let's just take the example of engine failure. Assuming that it is engine failure --

A. Then that's not the question that I answered here.

Q. Okay. Assuming that it is engine failure, would it be unlikely that a pilot flying below 3000 feet with a 3000 foot deck lacks time to steer --

A. Again, it depends on a variety of situations and circumstances. There are many pilots who would have the opportunity to avoid and would avoid. There are some pilots, based on a certain set of circumstances, who would not. So whether it is likely or unlikely, I'm not sure how to define it. I would say that if everything was working normally and you had an experienced or any kind of a pilot would try to do that. Given the set of circumstances, they might not have the time

because, as an example, if the ceiling was where we are talking about, that doesn't mean there's no clouds below it or anything else. So it is entirely situational-dependent.

Q. Okay. Going to Question and Answer 59, if there were scattered clouds would you zoom?

A. Not into the clouds.

Q. So if you were in an area where there were no clouds in your particular area, you would zoom; and if there were clouds in the area -- if you would zoom into the clouds -- if you could zoom without going into the clouds, you would zoom, most likely. And again, there would be situations --

A. I think an example would probably help. If there were scattered clouds and I lost my engine due to whatever, let's just say that it quit, and I began to climb to trade my air speed for altitude, as you would try to do, if directly in front of me and above there weren't any clouds I would continue to climb. So if there was a cloud directly in front of me, I would halt the climb. If I was able to climb above the scattered deck, now I'm above the scattered deck and I have lost lots of situational awareness because my engine has failed and I'm trying to locate things on the ground and

trying to restart the engine. I'm above the weather, which makes me happy, but it also adds to the disorientation to objects on the ground. So again, it is dependent on the clouds themselves.

Q. Question and Answer 59, here you are assuming a cloud ceiling at 9000 feet MCL, which is 4500 feet AGL. And you say that, "If I was flying below the weather, that at some point I would have to climb above the weather to continue my mission." Now, that would be true only if your mission required you to go above 4500 AGL; correct?

A. That's correct. There are -- the way the Air Force F-16s' missions are organized and assigned at Hill Air Force Base, they no longer fly exclusively low level. There's always a portion of the mission which is medium altitude. So if there's a cloud ceiling at 4500 feet above the ground, you are perfectly legal to fly underneath it down Skull Valley. At some point during the mission you are going to have to climb up. So you are faced with when do I do that and am I legal to do that, does the weather continue all the way south? If I stay at low altitude all the way, then I'm going to detract from another part of the mission because the fuel use at lower altitudes is

higher.

Q. Now, when you are talking about the mission being part low or part intermediate, are you talking just about Skull Valley or the entire mission from the time you take off at Hill Air Force Base, do your activity on the range, and go back to Hill Air Force Base?

A. A typical bombing mission, I would take off, climb to the altitudes we discussed, 7000 to 10,000 feet on the departure. Through Skull Valley 3000 to 4000 feet is normal, though I have gone higher. After the turn to the southwest I would fly up to 20,000 feet, get organized as a formation to save fuel. If we had a low level attack we would descend to the low level and conduct the attack. If it was a medium level attack I would stay at 20,000 feet. If it was a medium altitude dive bomb, I would go from 20,000 feet to 25,000 feet, dive down to the ground, end up at 4000 feet above the ground, climb back up to 25,000 feet, do it again, and then return to Hill. So every mission would be different. There are a variety of altitudes that you would fly based on fuel, targets, tactics, strategy, formation, et cetera.

Q. Two things. First of all, I was

focusing on Skull Valley in my question. I took it from your answer that normally you would go through Skull Valley at the lower altitude and only after Skull Valley might you go up to the higher altitude.

A. Well, that's normal, yes. As I said, I have started Skull Valley before at 3000 to 4000 feet and due to weather or mission we have done our g warmup, climbed right up to 20,000 feet. You wouldn't climb up to above 18,000 feet unless you had radar control, until you got down to the south. So it is normal to climb in Skull Valley from 3000 feet up to 15,000 feet depending on the weather. It is also, conversely, not that abnormal if you are trying to save fuel and you start high, we will say 15,000 feet is high in this example, in Skull Valley. And if there is weather, you might choose, for the particular training portion of the mission, to drop down to 10,000 or 5000 or 6000 feet or so, MSL, in Skull Valley.

Q. If I understand what you are saying, it is really mission-dependent whether you start out below the clouds and go above the clouds later on or start out from the clouds above. So there's no uniform rule, if I understand your testimony. Is

that correct?

A. That's correct. There's no uniform rule.

Q. Also, you were talking about going on to the range and doing these different activities. Given your little demonstration here the other day, how would, say, twenty-five percent scattered clouds affect you doing all this work on the range? Wouldn't that have an adverse effect of you doing all the work on the range if there was scattered clouds like that?

A. If you were supposed to do dive bombs and the scattered clouds were at, say, 10,000 feet MSL, you could still modify your attack to have a higher release altitude, roll under the target, and if you could see the target you can bomb it. Typically what would happen is you would adjust your type of attack to what we call a low show and you would then go in at a low altitude, say 1000 feet, hop to a visually acquired target, and roll on a ten degree pass to stay under the weather the whole time.

JUDGE FARRAR: Mr. Gaukler, with the pause here let me ask a question that I think I asked several weeks ago but I can't quite remember

the answer. Does the Air Force sometimes plan missions or training where clouds are desirable in order to teach the pilots? I mean, if you are in wartime you are not going to have bright blue skies all the time. Is there a purpose in training in even severe clouds just to help you get acclimated to that kind of situation if it comes up in wartime.

LT. COL. HORSTMAN: Yes, there is a purpose. You wouldn't do aggressive combat training inside the clouds, because it is dangerous. On the other hand, weather is always a factor in your mission planning and your execution. So if you were to plan just a training sortie, including the weather, if the weather wasn't there, you wouldn't be able to accomplish that. So what the pilots do every day for -- let's just say there's a four-ship formation going out. You would brief your clear weather plan first. Then you would brief one or two weather alternate plans. Then you would brief what we call the loser plan. As the weather progressively gets worse or two of your four airplanes don't make it through the maintenance or whatever else. So you start with the best objective, which is clear weather. And

then you spend a lot of time planning and briefing the other options. If there's a 20,000 foot cloud layer or 5000 foot cloud layer or if you lose formation members. If there's a solid undercast and you are supposed to do air-to-ground bombing, you revert to your loser plan which would be your backup air-to-air intercept. Not a highly aggressive maneuver but intercepting using radar work, et cetera. So in those cases, you do plan to use the weather if it exists.

JUDGE FARRAR: Okay. Good. Thank you.

Q. I'd like to go to Question and Answer 38 of your testimony. There you are asked if you have an opinion on PFS's assumption in its aircraft crash report that F-16 pilots can maneuver a crashing F-16 aircraft to avoid impact to the proposed PFS site. And you answer saying, "Yes. Based on my experience as an F-16 pilot and F-16 instructor, and from other factors, such as an assumption of able to avoid is unrealistic and unconservative." Lieutenant Colonel Horstman, isn't that question and answer really a broad overstatement of PFS's position with respect to pilot avoidance of the site?

A. Yes, it is.

Q. Because, first of all, PFS only assumes that pilots who would remain in control of the aircraft would take steps to avoid the site; correct?

A. That's debatable. In one case we disagreed on whether the pilot was in control of the aircraft.

Q. Right. But in any event -- there may be a disagreement whether a pilot is in control but the basic assumption of PFS in its analysis is, "We are going to look to whether a pilot would avoid the site in those cases in which a pilot is in control." Correct?

A. That is correct.

Q. And all the other cases where the pilot is not in control, we assume that they just crash randomly; correct?

A. I'm not sure if that's your exact assumption, but you don't assume they have the ability to avoid.

Q. Okay. That's correct. Also now, you say that it's unrealistic and unconservative; just focus on those pilots, therefore, who are in control of the plane. Assume the pilot is in control of the plane. You would agree that's not

unrealistic to assume that a pilot in control of the plane would take steps to avoid the PFSF. Correct?

A. It depends on the circumstances.

Q. But it's not unrealistic to assume that a pilot who, with time and circumstances permitting, I think those are your words some place, would attempt to take actions to avoid the site; correct?

A. Again, depending on the circumstances. If he didn't have the right -- if it wasn't the strip point in the weather blow, it is unrealistic. So I can't give you a categorical answer.

Q. Now, isn't it true that if there's weather below, he still would have situational awareness of certain types?

A. Of certain types. Trying to find a needle in the haystack is difficult if you just know where the haystack is.

Q. But you have also said, in the example we just had where a pilot was flying below the clouds, 3000 feet, going up to 3000 feet AGL, in many situations the pilot would avoid the site.

A. Absolutely. In that case it is very realistic and I completely agree that he would have

the ability to avoid the site.

Q. And again, PFS doesn't assume that in every instance a pilot is in control of the plane he will avoid the site. Right? They don't make an assumption that one hundred percent of the pilots in control will avoid the site?

A. You have reduced it by a factor of percentage.

Q. In Question and Answer 39, you go through some emergency procedures. Are those emergency procedures for any particular type of circumstance or are they always applicable or just for a particular type of failure?

A. Let me review them.

These are air combat command procedures, if you will, that apply to various fighter type aircraft. Each one is different because when I flew the F-111, for example, we would zoom but it was a different maneuver. We never jettisoned the stores because we never carried any. They were carried internally. You would modify by the airplane. So they are generic and they do apply to the F-16.

Q. They apply to the F-16 generically? In other words, let me just give you an example.

Suppose you have a hydraulic failure of System A. Would you necessarily jettison stores in that situation?

A. Give me a moment, please. It's been a couple years. System A, you said, sir?

Q. What was that?

A. System A?

Q. Yes.

A. If you have a System A failure, the check list - this is the expanded version, the pilots don't carry this, they carry a smaller version in the aircraft - would direct you through a series of three steps. And they are to land as soon as practical. System B hydraulic pressure indicator, monitor to be sure you have the backup system on. Fuel balance, monitor.

Q. So in that instance you would not jettison stores; is that correct?

A. That's correct. You would not.

Q. Let's go forward to Question and Answer 45. I don't want to repeat what we discussed previously in this question and answer, I'm focusing on the second paragraph right now. And you say there that pilot is also trained to jettison all stores, for example fuel tanks,

ordnance before ejecting to reduce the aerodynamic drag on the aircraft to aid in the pilot's control. And then you also go on to say, "This also prevents their detonation if they remain on board, and crash as a result of crashing with the aircraft." Now, isn't it true that it's very remote that ordnances would detonate upon crashing?

A. It's very remote if you jettison or if you crash, either way, because the weapons haven't been armed. The pilot has to manually arm the fusing mechanism for the weapons in order for them to go off high order, just a big explosion.

Q. And therefore, that is not a realistic concern, is it, of explosion upon --

A. Well, you are going to have a large explosion, in any case.

Q. Not with respect to the ordnance, though?

A. I wouldn't think so, no.

Q. Also, I'd like to focus in on the first sentence of the last paragraph. There you say, "The pilot's focus on survival will limit or entirely prevent the pilot from evaluating where the aircraft will impact or trying to locate a specific site and maneuvering the crashing aircraft

away from it." Again, you would agree with me that that sentence is a very broad overgeneralization. Correct? It would depend upon the circumstances of the accident. Correct?

A. It would depend upon the circumstances of the accident.

Q. And again, if you broke down and focused on those pilots that were in control the aircraft, you would be talking about an entirely different situation than when pilots are not in control of the aircraft. Isn't that correct?

A. It is a different group. I'm not quite sure. Can you ask that question again?

Q. Well, I guess if you are not in control of the aircraft, and you only have -- because you are not in control of the aircraft, you can't fly it and you are going to crash relatively soon because of that; you are going to get out as quickly as you can. Correct?

A. There is no evaluation whatsoever of where the aircraft is going to impact, or you. You would get out of the aircraft as soon as possible.

Q. And on the flip side of the coin, where we have been talking about your engine failure where you have time to zoom up, time and

circumstances permitting, a pilot would avoid a site on the ground. Correct?

A. Time and circumstances, yes, sir, he would.

Q. Just like we talked about.

A. That's correct.

Q. Now, on Question and Answer 48, to go on -- strike that.

In Question and Answer 46, you refer to the four accidents in which you talked to the pilots which we have already discussed to some extent. Correct?

A. That's correct.

Q. I would like to focus on the last sentence of that answer, where you say, "Thus the available information based on pilots who have actually ejected in emergency situations indicates that their attention during the emergency is riveted on their survival. Correct?

A. That's what it says, yes.

Q. Now, one of the accidents we talked about was Colonel Coots with the F-111 hydraulic failure, and you agreed that he was not in control of the plane, had no choice but to eject. Correct?

A. That's correct.

Q. And therefore, in terms of this case, it really wouldn't be relevant in terms of this last sentence because he didn't have a choice and, therefore, he wouldn't have time to focus on anything other than getting out; correct?

A. It's perfectly relevant, I think. Because he focused on survival.

Q. It's not relevant in terms of what a pilot would do if he was in control of the plane; correct?

A. That's not what we talked about when I interviewed him. So this is based on the discussion I had with him.

Q. So you would agree that that is not relevant, though, in terms -- his experience is not relevant of when a pilot is in control of a plane because it is an entirely different situation like we talked about, the two groups; one side of the coin you are in control and the other side of the coin you are out of control.

A. I can't speculate for him, sir. I'm sorry.

Q. We also talked briefly about the other -- two of the other accidents, the one in Cold Lake, Canada and the one at Hill Air Force

Base with the pilot on the runway?

A. Yes.

Q. We have been able to obtain the accident reports for those and I would like to have you take a look at them.

A. Okay.

Q. I'd like to have these marked as PFS Exhibits 97 and 98. These are the accident reports for accident number two in footnote two of his testimony, the Cold Lake accident of June 21, 2000, and accident 3 of October 17 of 2001.

(EXHIBITS-97 AND 98 WERE MARKED.)

JUDGE FARRAR: The court reporter has marked the two documents as PFS 97 and 98 for identification.

MS. MARCO: Which one was PFS Exhibit 97?

JUDGE FARRAR: 97 is the September 21, 2000 report. And 98 is the February 6, 2002 report.

JUDGE FARRAR: Maybe we could identify those better. 97 deals with the June 21, 2000 accident. And 98 deals with the October 17, 2001 accident. Those are the dates in footnote 2 of the testimony on Answer 46.

Q. Lieutenant Colonel Horstman you are reviewing the Cold Lake accident report?

A. Yes, sir.

Q. I'm going to be focusing my questions -- obviously you need to review the whole thing to the extent you feel you need to. I'm going to be focusing my questions on Page 6 and Page 14.

MR. SOPER: Your Honor, might I suggest if Colonel Horstman is going to be quizzed on this that we might take a five minute break so he could read through it and other people could maybe stretch at the same time?

JUDGE FARRAR: Why don't we do that. It wouldn't interfere with anything and may save time in the long run as a general familiarity rather than having to keep asking for a pause. So --

MR. GAUKLER: And just for your information on the Hill Air Force Base one, I'm going to be focusing on Pages 4, 5, 6, and then there's a statement of opinion at the end on Pages 20 and 21.

JUDGE FARRAR: All right, then --

MR. GAUKLER: And 22. Those are the pages I would be focusing on. So 4-6 and 20-22 for the runway accident.

JUDGE FARRAR: Let's take a ten minute break to give the witness plenty of time and allow him to get a break, also. It is five of. We will be back at five after.

(A break was taken.)

JUDGE FARRAR: We took a little longer break than expected to let the witness review the documents and get his own break. So if the witness is ready, then we will continue.

A. Yes, sir.

Q. Let's focus on the Cold Lake, accident first, Colonel Horstman. And this was the accident where a pelican hit the canopy of the plane and temporarily caused the blindness of the pilot. Correct?

A. Correct.

Q. And if you turn to Page 6, you see that the plane was travelling at this time at 2200 feet AGL and 570 knots true air speed. Correct?

A. That's correct.

Q. And if you look at the Paragraph 14, it describes what happened during the accident; correct? The second paragraph under 11 --

MR. SILBERG: Page 14.

Q. Page 14. Sorry about that.

A. Yes, it does.

Q. And it shows that there was a loud thunk, he said he could see the stars? Why don't you read the first sentence.

A. Describes hearing a loud thunk with things getting really, really loud and vision going dark; felt like his eyes were closed so tightly he could see the stars. MP could not tell if he actually closed his eyes.

Q. And he --

JUDGE FARRAR: Mr. Gaukler, it may be a minor point but you and the witness both read that wrong. It wasn't nighttime. He said he could "see stars", not "see the stars". May not matter, but depending on where your examination goes, it may matter.

Q. He could see stars from having a pelican crash into the canopy; correct?

A. That's what it says, sir.

Q. And he lost his vision; correct?

A. Correct.

Q. And it states in the last sentence that his vision returned approximately two minutes after landing on the ground; correct?

A. That's correct.

Q. Does it also tell you -- how far does the plane -- if you go back to page 6, it says that the main aircraft impact site is located approximately two nautical miles northeast of the pilot landing zone.

A. It says that.

Q. So the plane landed about two miles from where the pilot, upon ejecting from the aircraft, landed.

A. That's what it says.

Q. Assuming that the pilot came down directly in a straight line, or close thereto, how long do you think the plane traveled after he ejected before it hit the ground? Can you calculate that?

A. For the --

Q. How much time. Time-wise.

A. Not accurately. I can give you a pretty good guess because when the pilot goes up, you know the rocket motor fires. I don't know what the exact aircraft parameters were, but the wind is going to carry the pilot because of the parachute. But if it is two miles apart, that is consistent with about 15 seconds or so, depending on a variety of things. It could be more and it could be less.

If the aircraft were going straight up, you would expect them to land very close, and yet it might be two minutes before it landed. So without any more information, I would hesitate to hazard a guess.

Q. Now, going back to Page 14, the paragraph we were reading from, it talks about that he reported experiencing confusion and disorientation. The pilot did. That's the third sentence in that middle paragraph.

A. It says here that he was aware of his disorientation and loss of vision. So if he was disoriented, he was aware of it.

Q. Okay. And he was also, the last sentence of that paragraph states that the mishap pilot was able to recall the entire ejection sequence from seat separation to opening parachute's shock. Correct?

A. That's correct.

Q. So despite his disorientation, he was still able to follow the correct procedure to eject from the plane; correct?

A. That's correct.

Q. Now, isn't it true that a blinded pilot -- now, this pilot was blind for two minutes after he landed on the ground, so he couldn't see,

would not be able to avoid a site on the ground in the event of a crash because he could neither see the site or read any of his navigational aids that might assist him in doing so?

A. He would have no ability to avoid the site.

Q. And therefore, if you were to classify this accident according to the categories that PFS did in the report, this would be under the category of able to avoid, this would be a no. Correct? Unable to avoid.

A. That is correct.

Q. And therefore, in terms of relevance in terms of what -- in terms of relevance in determining what a pilot would do for those pilots in control of the airplane, having the potential to avoid, it wouldn't be relevant. Correct?

A. I don't understand the question.

Q. Well, for a pilot, he would not be in control of a plane with any reasonable chance to direct it or anything like that. And it would not be relevant -- this type of accident would not be relevant for a pilot who was in control of the plane and could see the navigational aids in front of him and visually relevant to the extent there

was no cloud cover.

A. I don't understand. Relevance to what?

Q. Because this pilot was blinded, is this really relevant to a situation when a pilot is in control of the plane with his sight where he can see the navigational aids in front of him, whatever they may be, and see the surrounding area, depending upon weather? You would agree with me. Correct?

A. The pilot was in control of the aircraft. He elected to eject. It was a perfectly flyable, controllable flyable aircraft, and he elected to eject. I think that speaks for itself.

Q. Could he fly the plane blind?

A. He wasn't blind. He couldn't see. So if he is going to zoom, at what point is he in control or out of control? And if you gave a set of parameters, we could probably define it further. But there was nothing about the aircraft that was unflyable. The pilot elected to eject because he could not see.

Q. I don't know what you said initially. I thought you said he wasn't blind, but he couldn't see. He was blind for some period of time; correct?

A. Yes. And it states here two minutes after landing on the ground. But when he ejected he did not know that. So I cannot speculate what his thoughts were at the time, other than the aircraft was flyable and he elected to eject.

Q. And he couldn't fly it at the point he elected to eject.

A. He couldn't what?

Q. Fly it when he elected to eject.

A. I don't agree.

Q. Isn't it true he was at 2200 feet, which is close to the recommended eject limit? Correct?

A. I don't see the relevance of that. That's where he was.

Q. He was not up high in the sky and had a lot of time to decide what to do; correct?

A. That's why you zoom.

Q. He had 15 seconds until the plane crashed; correct?

A. No. I said that would be an estimation. If he zoomed, it would be a completely different set of circumstances. We don't know.

Q. Okay. Let me ask you this question. I don't know if I got an answer to it. Is this accident relevant to a pilot who was in control of

the plane who was not blinded, who could see the navigational aids in front of him and the surrounding area to the extent possible because of weather? Yes or no?

A. I have no idea what you are asking.

Q. Is this accident relevant to determining whether a pilot in a flyable airplane, controllable airplane, would be able to avoid a site or would take action to avoid a site where the pilot was able to see, was not blinded, so he could see the navigational aids and the surrounding area? Yes or no?

A. It is perfectly relevant.

Q. Okay. If you were blinded, would you continue to fly the airplane here?

A. It would depend on the circumstances.

Q. And what would those circumstances be?

A. The weather, the air speed, the temperature, the condition that I thought the airplane was in, whether I knew I had hit a bird, whether it was completely unknown that I had hit a bird. When you practice these things in the simulator and everything goes instantly blank, the first thing you do is zoom the aircraft. Upon reading this, I don't know that he zoomed the

aircraft. I don't know.

Q. What would you have done in these circumstances as far as you know from this accident report, reading it, and from talking to the person who was involved?

A. Probably something very, very similar.

Q. I'd like to have you look at the -- does this accident report refer any place to jettisoning of stores? Did you see that, going through it?

A. I did not.

Q. Now, if you look at the wreckage or the impact area where they described the wreckage on Page 6, you see no reference there to jettison stores; correct?

A. In this, if I could go back and look at the whole accident. I don't recall any jettison stores.

Q. Okay. Now, let's go to the PFS Exhibit 98 which is the October 17 accident. Now, this was the accident where the pilot was taking off at Hill Air Force Base and it was found out that the tire blew, and he aborted. Okay?

A. That's correct.

Q. Now, isn't it true, upon reading the accident report, if you look at Page 4, I believe,

and I believe it is on subsequent pages, as well, that the pilot at approximately 1400 feet down the runway, the pilot reported a very loud explosion, saw a column of flame by the left side of his canopy, and experienced a slight deceleration. Correct?

A. That's what it says, yes.

Q. And based on that information that he had at that time in the cockpit, he concluded that he had an engine failure and elected to abort the takeoff for that reason. Correct?

A. That's correct.

Q. And that was a reasonable conclusion, given the information he had at that point in time?

A. It was not unreasonable.

Q. And that's what the accident report concluded; correct?

A. That's correct.

Q. That it was not an unreasonable conclusion or unreasonable action for him to take.

A. That's correct.

Q. Now, I believe you said before -- well, first of all, why is this accident even relevant, since the plane never took off, in terms of whether a pilot flying an aircraft through Skull Valley

would take action to avoid a site on the ground? Why is that even relevant in the first place, since the plane never took off?

A. Because what we were attempting to do when we interviewed these pilots, who were chosen not by us but by Hill Air Force Base officials, for their mental decision process when it came to ejecting and whether or not they had the ability to avoid a site.

Q. You said chosen by Hill Air Force officials. In what respect were they chosen by Hill Air Force officials?

A. I contacted the office of the 388 operations group commander, explained what I wanted to do, and asked if there were any officers that had flown airplanes that had ejected; and if there had been, would they allow me to discuss the ejection part of their accident.

Q. And do you have any documentation concerning that interchange or the interviews?

A. No, I don't.

Q. So you don't have any notes of your interviews with these people?

A. My interview notes, we transcribed into -- I gave them to Connie and we put them into

whatever you read.

Q. Okay. Looking at the accident report, going further down, so the pilot here -- I think you initially said that this was a flyable airplane and therefore the pilot could have taken off and therefore it is really very relevant. Correct? That was -- do you remember stating that?

A. It is. And if you go back and look at what we now know about what the pilot, his decision process, the "Dash 1", the Bible, if you will, talks about aborting. And there's a warning which is a life or death situation. And it says, "Aborting takeoff at high speeds with a blown tire may be more dangerous than continuing with takeoff. For heavy gross weights takeoffs, an abort at high speed with a blown tire is extremely dangerous because braking and directional control are impaired." So if he would have decided that it was a blown tire, he would have taken off normally and landed at a much lighter gross weight.

Q. And he didn't do that here because he thought he had an engine failure; correct?

A. That's correct. He erroneously applied some information.

Q. But it was reasonable information.

A. It is reasonable.

Q. And also, if you look at -- he didn't eject immediately, did he?

A. No, he did not.

Q. As a matter of fact, he only ejected after he began to lose control because of the damage caused by the blown tire and the reverse castoring of the wheel, as they described it?

A. No. I believe he ejected so he could save his life.

Q. He decided to eject -- now, look at the opinion summary on Page 20. It says in the second sentence -- in the second paragraph and the third sentence, it says, "The mishap pilot elected to --"

A. Which page?

Q. On Page 20.

A. Okay?

Q. "The mishap pilot elected to abort the takeoff. There is clear and convincing evidence that he was unable to maintain directional control on the runway due in large part to a phenomenon known as reverse castoring. When it became evident that the aircraft would depart the runway, the pilot successfully ejected." Correct?

A. That's what it says.

Q. Doesn't that show that he ejected only when the aircraft -- when he couldn't control the aircraft and the aircraft began to leave the runway?

A. When you go through your aircraft specific training, one of the things that is commonly discussed --

Q. I would appreciate a yes or no answer first.

A. Please restate the question.

MR. GAUKLER: Please read it back.

(Record was read as follows:

"Doesn't that show that he ejected only when the aircraft -- when he couldn't control the aircraft and the aircraft began to leave the runway?")

A. There's two different questions in there so I can only answer one. One is when he was on the runway and the other is when he lost control. Which one would you like me to answer?

Q. You can't answer that question yes or no?

A. I cannot answer it yes or no.

Q. Give me your answer, then, and we will see why you can't answer it yes or no.

A. The pilots are trained to always stay on a prepared surface. If they are going to depart a prepared surface, meaning a runway, a taxiway, where there's blacktop, and you are going to go into the dirt, if you do that at anything over the speed which you would walk, there's a high probability that the airplane is going to turn over and kill you. So we always said that if you are taxi speed or higher and you depart a prepared surface, you eject. I have taxied an airplane and lost my nose wheel steering and was out of control until I was able to stop the aircraft. I didn't eject. If I had been at 30 miles an hour and gone into the infield where there's ditches and dirt, et cetera, I would have ejected. So exactly which part of that ejection -- in my opinion, he ejected because he was going to depart the prepared surface at a speed faster than a walk.

Q. And he was going to depart the prepared surface because he lost, as it says here, ability to maintain directional control on the runway. Isn't that correct?

A. That's why he was departing the surface.

Q. And if he had maintained directional control of the aircraft, he would not have departed

from the runway; correct?

A. That's an assumption. But I would assume so. I don't know.

Q. So it's correct to say that he ejected when he lost directional control of the aircraft and started to go off the runway. The answer is yes then, isn't it?

A. The answer is no. There's two separate -- you have to look at the timeline. The aircraft, when he aborted, was perfectly controllable for over 2000 feet. Then it became uncontrollable and he decided to do something about it, which was not eject. When he realized the aircraft was not going to remain on the prepared surface, he ejected.

Q. Did this person jettison storage before he ejected?

A. I don't recall. I'd have to read it again, but . . .

Q. I think there's something on page -- I see some stuff on the bottom of Page 9 and top of Page 10 where it talks about stuff like the right fuel tank being partially torn off.

A. The checklist procedures do not direct you to jettison ordnance on an abort because the way they are jettisoned, the front part of the

pylon, which attaches to the wings, explodes first and so the nose of the ordnance or the fuel tank or whatever is in the wing would begin to drop, and then the aft one does. If you do that on the ground, it can cause a number of problems. One is it can collide with the aircraft. If you are trying to do a cable engagement with your tail hook, it would interfere with that. So they don't direct it. And I could go back and read specifically --

Q. You would not have expected him to jettison ordnance in this case?

A. No, sir, I wouldn't.

Q. I think you also -- one of the accidents also concerned Colonel Coots landing that F-111; correct?

A. Yes, sir.

Q. And again, I just heard you tell me that F-111's, you don't eject ordnance because of a different type of system? Is that correct?

A. It depends. If you are carrying all your ordnance internally, you do not jettison your ordnance. If you are carrying the small 25-pound bombs, they are not wired to be jettisoned. If you are carrying long-range external fuel tanks, then

you would jettison those. But you didn't carry the fuel tanks very often.

Q. And you didn't -- the fuel tanks would not be ordnance; correct?

A. Well, they are not a weapon ordnance. They are external stores.

Q. Okay. But you don't carry those --

A. I have a nomenclature problem.

Q. Did you ask Colonel Coots if he jettisoned?

A. I did not ask him that. I quite honestly assume he did not, because it was rare to fly the F-111 with long-range fuel tanks.

Q. Given that, going back to the first paragraph of Answer 46, the third sentence, you say that all four pilots said their thoughts were focused on their own survival and all the pilots said they did not even consider where the aircraft would impact, and did not consider where the jettison stores would impact. Now, isn't it true that at least two of those accidents, as far as you can best tell, did not even involve jettison stores?

A. That's correct.

Q. And therefore that sentence is not

correct, because not all four pilots had to worry about jettison stores; correct?

A. I think you are correct, yes.

Q. I'd like to go on to --

JUDGE FARRAR: Mr. Gaukler, are you leaving this accident?

MR. GAUKLER: Yes, I am.

JUDGE FARRAR: Then let me ask a couple of questions. There was a problem here with the nose wheel. Under what circumstances can you take off and land with landing gear problems? Can you land those with no gear on foam safely?

LT. COL. HORSTMAN: They don't use foam anymore, sir. And I'll -- give me a second and I will give you some specific answers.

In the back of the "Dash 1", the checklist, it gives you a variety of circumstances. The left main landing gear will not extend; do you land or do you not? And it depends on whether or not you have a fuel tank in the left wing. Do you land when the nose gear is not extended? Well, it gives you a whole checklist to follow. You can land the F-16 without either main gear, and it's been done. And it's not necessarily recommended but it can be done and it has been done. So there

are a series of circumstances --

JUDGE FARRAR: And what does the air-field do to prepare for you coming in without your gear?

LT. COL. HORSTMAN: Everybody but the fire department leaves. The fire department is at the approach of the runway, and when you hit they chase you.

JUDGE FARRAR: But there's no foam.

LT. COL. HORSTMAN: No, sir. They don't use that anymore. They found it doesn't do much. One of the things you would do if you were going to land an airplane with a blown nose gear tire or any of the landing gear didn't work or any of that kind of stuff, is reduce your weight to the lightest gross weight possible, and that would obviously depend on whether you would jettison your external stores or keep them or what have you. So because you would land with a low fuel state, that's one of the reasons. They haven't done that for years.

MR. SILBERG: Done what for years?

LT. COL. HORSTMAN: Foam the runways. It is done at some civilian airports, and some it's not. Southwest landed an airplane without a left wing landing gear about three years ago in Ontario,

California. They didn't foam the runway. That's kind of a movie thing.

JUDGE FARRAR: We have had a long history with movies in this proceeding.

LT. COL. HORSTMAN: Does that answer your question, sir?

JUDGE FARRAR: Yes, it does. The other question, you talked about that the weapons wouldn't explode on impact unless they were armed.

LT. COL. HORSTMAN: Yes.

JUDGE FARRAR: Tell me what "arming" means and why, without arming, they would not explode on impact.

LT. COL. HORSTMAN: The weapons carried by most all of the airplanes in the Air Force are the bomb body, a nose attachment, and a tail attachment. The tail attachment can be guidance fins or regular aerodynamic fins. The nose would contain a fuse.

So inside the bomb, and let's just say that it is tritinol, a high explosive inside the bomb. That is a stable explosive. You can hit it with a hammer and it won't blow up. The fusing mechanism is what causes the bomb to detonate. And the fuse has various settings for upon impact how

long it delays in milliseconds it will blow up, so you can get farther into the dirt or building before it blows up. But the fusing mechanism is both physical and a switch.

When you take off, the fuse in the front of the airplane is wired to the safe position. And then you would arm the weapon so that when the bomb falls off of the aircraft, a wire is then subsequently pulled from the fuse, which arms it. There are electrical ones, as well. But the bombs are designed to not explode unless the fuse is activated. And the fuse is activated by timers or wind or a little propeller in the front, or a variety of things.

When you jettison, you have not armed the munition. Even if you had, on the type that has the wire, there's a solenoid that would release and that wire would no longer stay attached to the aircraft. So there's a couple of fail-safe type mechanisms.

I have jettisoned a number of high explosive bombs due to whether they were hung, a variety of things, and did not arm them on purpose. And they hit the ground just like one filled with concrete would.

JUDGE FARRAR: Okay. Thank you.

Q. (By Mr. Gaukler) I'd like to go to Question and Answer 48. And there the question is, "Explain why a pilot of a crashing F-16 may not have time to maneuver the aircraft to avoid impact to the PFS facility prior to ejecting." And the last sentence to your answer says, "There is often only seconds or no time remaining after required emergency procedures and before ejection to assess and carry out measures that would avoid impact on the PFS facility site."

Now, the question whether a pilot would have time to avoid the PFS site or time to maneuver to avoid the PFS site again would differ depending upon the two categories of accidents we have been talking about; whether he was in control of the plane with the potential ability to avoid, or whether he was not in control of the plane with no ability to avoid. Correct?

A. I don't agree with that.

Q. You don't agree with that? You don't think there would be any difference in the time allowed? In other words, if you are not in control of the plane, you are going to have less time to take the steps, whatever it is --

A. No, not necessarily. And there's a number of examples. The example we just discussed in Cold Lake, he ejected. So this was a minimal amount of time in a controllable aircraft. Again, it would depend on a variety of circumstances. And if the aircraft were out of control, then he might skip everything and jump out, or he might try, as the Atlantic City guard tried, for 30 seconds to keep flying the airplane. So it depends on the set of circumstances.

Q. So it would depend upon whether -- one of the circumstances would be, in part, whether you were in control of the plane or not, because if you were not in control of the plane it would be like you would have less time; isn't that true? As a general matter?

A. I can't generalize like that. That would be a factor.

Q. I think you gave us an example of a situation where you were at -- assuming you were at Tempe Springs and hit a bird and you were able to continue to fly, I think you calculated 17 miles in that instance?

A. Yes, sir.

Q. And how much time was that, about?

A. That would be probably three to four minutes. It's just a guess off the top of my head.

Q. In Question and Answer 52 -- excuse me. Question and Answer 51 I want to go to. There you say or you refer to a Lockheed Martin document which you claim shows that 52 percent of F-16 accidents are caused by pilot error. Do you see that?

A. Yes, sir.

Q. Now, you reviewed the accident reports, the 126 or whatever it is --

A. Yes, sir.

Q. -- accident reports.

A. Yes, sir.

Q. And do you remember the most likely cause of failure in that instance was engine failure; correct?

A. In that database, yes.

Q. And it was approximately or roughly half; correct?

A. That's correct.

Q. And in your review of that database, you agreed that roughly half were engine failures; correct?

A. Yes, sir.

Q. And you would say that most time engine failure does not involve pilot error? The great majority of the time?

A. Yes, sir, I think that is fair to say.

Q. And is it also true to say that you are going to have accidents that occur on the range that may or may not involve pilot error? Strike that.

Isn't it true that you are more likely to have pilot error that might cause an accident when you are doing your high stress maneuvers on the range in air-to-air combat training, for example, or something like that?

A. I don't know for a fact.

Q. But you are under more aggressive maneuvering and stress and have to respond much more quickly than you do when you are flying down Skull Valley, for example. You wouldn't do any dogfighting on the range.

A. You are flying much more aggressively. I'm not sure I understand the question. You clearly are performing, the aircraft and your body, in a very stressful environment.

Q. And you are going at -- a stressful environment with less time to react, et cetera,

given the speeds and the circumstances, generally speaking when you are --

A. Not generally speaking. There are specific times, pulling out of a dive bomb pass for example, that you would want to be very accurate. There are other times it is a very routine -- I would say that as a general characterization, over 80 percent of the time on the bombing range is straight and level, or a 30-degree bank turn. Very generic. So categorizing on a bombing range versus doing some high performance activity, you have to delineate both.

Q. And let's focus on the high performance activity. You would agree that in your high performance stressful activity, just the situation would be less forgiving of pilot errors that might cause an accident; correct?

A. I agree with that, yes, sir.

Q. Going on to Question and Answer 53. Excuse me. To 61. You say there, the question there, "Are there factors other than weather that could prevent a pilot from locating the proposed PFS site?" And you say that if an accident -- "If accident circumstances do not require an immediate ejection, a pilot will lift the nose of the

aircraft during an emergency procedure which limits the pilot's visibility." I thought, for example in the example you gave of your hypothetical at Tempe Springs, that at some point in your example you pushed the nose over. You zoom initially, for example, on the engine failure and then you push the nose over and you kind of glide downward. Correct?

A. That is correct.

Q. And so in that instance the nose would not prevent your seeing everything, things in front of you; correct?

A. On the contrary, it would for a period of time. And again, for a period of time it would not. So there are a number of factors. And that's one of them. For a certain period of time your nose is going to be climbing up to 30 degrees, so you can't see any of the ground in front of you which would eliminate your ability to locate anything.

Q. That being the zooming process when you are zooming up?

A. In that case, yes.

Q. And then when you turn over, after you get done zooming up and you turn down, turn your

nose down to glide, that would no longer be the case?

A. You point the nose down. You turn it left and right.

Q. Okay.

A. But when you begin your glide descent, if it is a clear, beautiful day, then your vision would be restricted to below your flight path. Things are under the nose of the aircraft and you would avoid those because you would overfly them.

Let me expand. I see a question mark. If there was a road intersection that you did not see in your glide, and you were gliding directly towards it, based on the previous testimony of Col. Fly and myself, you would overfly that before you impacted. So you would have limited visibility of your flight path but you would overfly that object.

Q. You would overfly the object that you would have limited visibility of before you would impact the ground?

A. Yes, sir.

Q. And so it's -- looking at the last sentence, based on what you just described to me, view of the ground is not blocked for the entire distance the aircraft would glide, as you state

there then. Isn't that correct?

A. No. It is very true. If you were going to head long to the PFS site, say a couple miles long, you would never see it.

Q. You would have overflown it then, in that hypothetical. You just told me a mile --

A. The question asks whether it would prevent a pilot from locating the PFS site. And in that case it would prevent you from locating the site. It doesn't ask whether or not I would impact the site.

Q. But in that case where you wouldn't see it, you would have overflown the site before you would have impacted it, correct?

A. In that example, yes.

Q. Let's go on to Question and Answer number 62. You say there, the question there is, "In its crash report PFS states that if the proposed PFS site is not visible, the pilot would use navigation instruments or radio to locate the site. Is that correct?" And you say, "No, it's not correct. First of all, the pilot would have available navigational aids that would provide him with situational and positional awareness." Correct?

A. Correct.

Q. And whether or not it precisely located the PFS site or not would depend upon whether or not you had it programmed into your heads-up display. Correct?

A. Whether that was a programmed turn point? The avionics would give you information towards that. You don't program your heads-up display.

Q. I'm sorry about the terminology.

A. That's okay.

Q. So in some circumstances it would be correct that you could or you would see it on your avionics, and other circumstances you would have the avionics to provide you with a general situational and positional awareness; correct?

A. It depends. And let me expand. In the examples we have used before, you go from that knoll or the peak or the ranch that is about 10 miles north, east of the PFS site. If that was a steer point and then the downtrack was another steer point and you were the wingman flying on the right, your navigation instruments would be a secondary tool to you. Your first tool to navigate is your flight leader. And your instruments would

provide you with very little useful information. You would know that you would be right of course, and you would be five degrees or eight degrees or ten degrees right of course. And you would know the distance to the next steer point, which would provide you with, if you were a normal person, essentially no information with respect to a detailed location of the PFS site.

Q. Now, you are assuming in that instance that the pilot has no familiarity with the area but having flown in Skull Valley several times you would be familiar with where the PFS site was generally located in terms of your steer point; correct?

A. The question I'm trying to answer is whether or not the navigation aids, instruments, or the radio on the aircraft are going to help the pilot locate the site. And they will not in this case.

Q. Well, you said they would give you where you are in terms of steer point, so you'd know where you were in terms of steer points. And if you know where the PFS site was in terms of steer point, that would give you situational awareness; correct?

A. Basic situational awareness would probably be easier to obtain by looking east towards the mountains. Because if you were to assume that each of these sites -- let's take the PFS site for example. Every second the radial and the DME from the next steer point changes, and you never measure what that is so you have no accurate information to provide you with any useful information, whether it is a 360 for 18 DME, or 350 for 17 DME, it's of no use to you because you are trying to triangulate and you only have one leg of the triangle built.

Q. You are talking about a wingman, in this instance, as opposed to the leader?

A. In that case. And if it was the leader, he would know whether or not he was on course and whether or not they were or the distance remaining to the next steer point. And if they were doing a g warmup turn, he would only know that he was, in this case, west of his course. How far west is in degrees, so if you are going to do the math, at 18 miles how far is 10 degrees? It is not something that a pilot does. He worries about the next story point.

Q. Now, you say here in Question and Answer

62, if the engine fails, the precision in the navigation system is reduced. The instruments work on and off for short periods of time as the electrical system switches the backup systems, so the pilot cannot rely on them. You remember that this question of the backup came up in Col. Fly's testimony.

A. Yes, sir. And I also don't know the exact number of seconds, but it flickers for a while.

Q. You would take my representation that the exhibit that we introduced as I think PFS Exhibit -- one of the exhibits, I won't try to go from memory, said that it would come up in two seconds?

A. It could be two seconds or longer, depending on how long the secondary power bus took to power up.

Q. I would like you to take a look at -- I'm going to show you PFS Exhibit OOO. May I approach?

I'm showing the witness PFS Exhibit OOO which is a page from the "Dash 1", and I'm going to ask him to look at the paragraph that says EPU operation, and in particular the last sentence.

And tell me what it says in terms of the time for the, the approximate time for the EPU to come up to speed?

A. The EPU is the emergency power unit. And the sentence is, "After receiving any start command the EPU requires approximately two seconds to come up to speed." And what happens is that the aircraft loses electrical power, the engine seizes, no more generator, whatever the case. The EPU receives a signal and says, "We need power," and it fires up and it takes up to two seconds to come up to speed. Once it has come up to speed, then it powers the emergency bus. And every simulator I have had, the amount of time it takes to power that bus and provide me with information varies. It is not instantaneous. And when it does provide me with information, it provides me with a lot less information than it did before.

For example, if I was aiming at a road intersection or the PFS site and I had my TD box, the target designator box that we discussed, that means that I'm in a bombing mode, a simulated bombing mode to improve the accuracy of the avionics. And I have the target designator box out in front of me, and hopefully it will be right

around the intersection or PFS site or whatever point on the ground I have selected.

When I lose electricity, and the emergency bus becomes powered, my bombing mode goes away so the target designator box is no longer there. You lose your employment capability, which is your air-to-air and your air-to-ground and your radar. And so all of the things that you are used to seeing are no longer available as useful pieces of information. There is steer point information available. But all of the normal HUD indications, which would provide you with a lot of awareness, are gone.

So whether it takes two seconds or four seconds, you have lost your engine in this case, and you are trying to figure out where you are. And what you look at in front of you in the heads-up display is not what you expect to see. So you are trying to orient yourself with information that is unfamiliar for a period of time.

What a pilot would then do, if he or she was trying to precisely locate where they were, is to go back to the navigation mode, which requires some switchology. And at the same time you are competing for what the checklist requires you to do

for zooming, jettisoning your stores, restarting the engines, doing all those kinds of things. And in that period of time, where you are is completely irrelevant. So there's a period of time where your navigation instruments do not provide you with any assistance.

Q. And it's true that your heads-up display will still continue to display your steer points once the EPU comes back on line; correct?

A. It would. But they don't come up immediately. The first thing that comes up is the pitch ladders. And as the avionics and navigation systems begin to turn on into the heads-up display, then you would see them, yes. They do eventually come on. The exact amount of time, I don't remember.

Q. Now, let's go on further, I think, in this question and answer. You say that a pilot would not call Clover Control to locate the proposed PFS facility when time is critical in an emergency. Now, isn't it true that in some of the accident reports, we see instances where pilots who may not see the ground because of cloud cover call air traffic or call their control and get directed away from an area to avoid a site or populated area

or some area on the ground?

A. Yes, there are instances. Clover Control can't see you when you are in Sevier B MOA. So if you are above Sevier B MOA, you could ask them for help if you had the time and energy or if your flight leader or wingman had the time or the forethought to do that. But in Sevier B they are of little use. And then in your descent, they would not be able to provide you any information once you went down behind the mountains.

Q. Let me ask how do you square your answer there with the answer, Question and Answer 28, where you claim that pilots can and do fly through Sevier B MOA under IFR. IFR is Instrument Flight Rules?

A. It is.

Q. And in Instrument Flight Rules you are under control from Clover Control. Correct?

A. No, sir. Instrument Flight Rules are the rules set for which you are flying under, the weather condition would be VMC. When you take off at a Hill Air Force Base --

JUDGE FARRAR: Weather condition would be what?

LT. COL. HORSTMAN: There's a rule set

and a condition --

JUDGE FARRAR: No, no. You used an acronym.

LT. COL. HORSTMAN: VMC, visual meteorological conditions.

When you take off from Hill Air Force Base, the routine procedure is to file an IFR flight plan and take off under an IFR flight plan and then proceed with that IFR flight plan through the flight. You can cancel your IFR flight plan and you can pick it back up. Whether you are in the clouds or out of the clouds is a flight condition, not the set of flight rules.

Q. I guess my question was, the Question and Answer 28 is, "Are all flights in the Sevier B MOA flown under visual flight rules?" And the answer is, "No. Pilots can and do fly F-16s through the Sevier B MOA under Instrument Flight Rules as well as Visual Flight Rules." So I take it there you are saying that pilots can fly through the Sevier B MOA under Instrument Flight Rules, first of all; correct?

A. You can fly under both. They can't see you on the radar, but you have procedural service. They pick you up when you exit down to the south.

Q. Now, so you are saying -- doesn't Clover Control provide a minimum en route altitude for flying Instrument Flight Rules?

A. They do.

Q. And the minimum en route altitude is something that you are supposed to fly above; correct?

A. If you are operating under that, yes. You can say, "We are going to descend," and they give you procedural service.

Q. And isn't minimum altitude, en route altitude in Sevier B above 9500 feet MSL?

A. For most of it, yes.

Q. And so wouldn't that preclude you from flying IFR in --

A. No. You can keep your IFR clearance and fly under a procedural service and you tell them where you are. And they say, "Fine. Call us when you get out."

Q. I asked you something like this in your July, 2001 deposition. If you will turn to that on Page 46, please.

JUDGE FARRAR: Mr. Gaukler, is this still on the same subject?

MR. GAUKLER: Yes.

JUDGE FARRAR: Tell me when you are leaving it because I have a follow-up question to ask to something that you asked.

A. What page?

Q. Bottom of Page 45 and top of Page 46. We were talking about IFR in Skull Valley. And you say, "I think technically," and I'm reading from 46, the second sentence, "I think technically they could control you for a brief period of time because of the radar line of sight down that low. But if you are going to go through there under Instrument Flight Rules, in my experience most of us would fly in the higher altitude above the MOA."

A. That's correct.

Q. So what you are saying is that even if technically you might be able to fly in the MOA -- strike that.

Even if you could technically fly IFR within the Sevier MOA, you generally would not do that?

A. I generally would not.

Q. Okay. I'm ready to go on to the next question.

JUDGE FARRAR: Let me follow up with Answer 62 on Page 26. Mr. Gaukler asked you about

this. I could read the last two sentences of that as indicating that the PFS facility is so small or so lacks significance in an emergency that you wouldn't call, you just wouldn't bother to ask about it. But that's not what I thought I heard you answer a few minutes ago. You gave an answer that sounded different from that. So can you reconcile your answer of a few minutes ago with the implication I could draw from reading the answer or the last two sentences of Answer 62.

LT. COL. HORSTMAN: Yes, sir. There are many times, most of the time you wouldn't call for help anywhere. You are in a military operating area. There's generally very little in the area or in cities, et cetera. Clover Control is -- what's a polite way to say this? They offer little utility in directions unless you are going to encroach upon the range air space. They have a radar. The information they have on you is historical data. If you turn 30 or 45 degrees they don't know it until the next radar sweep, the next interpretation, sometimes up to 45 seconds to a minute. They offer you very little support to providing accurate navigation. If you were at 30,000 feet and heading east you would say, "I have

a lot of time." If you are with clover they saw you approaching the eastern edge of the boundary. They would tell you that.

If you asked where Salt Lake City is, they would tell you "east". It is not marked on their map. They have no reference information for where this site is. Whether they would put it on their displays, I don't know. But they would offer you very little utility. And more importantly the pilot in military operating area historically isn't going to ask.

Now, if you were flying in a semi-populated area and thought about it, had the time and the situation and you did, then it would not be Clover Control. It would be Salt Lake Approach Control. And they would be probably much more in tuned to where stuff was. Does that help?

JUDGE FARRAR: Yes. Salt Lake Approach Control is civilian operation or is that part --

LT. COL. HORSTMAN: Yeah. Well, it is federal, but it is civilian, yes.

JUDGE FARRAR: I mean civilian as opposed to the military. The FAA runs that.

LT. COL. HORSTMAN: Yes, sir. Just like the Phoenix Approach Control. It is for

controlling all the airplanes, but it is primarily for the civilian traffic.

JUDGE FARRAR: Thank you. Just to follow up on another subject you were discussing, what powers the EPU? Is that a battery deal or --

LT. COL. HORSTMAN: No.

JUDGE FARRAR: -- airplane speed?

LT. COL. HORSTMAN: A chemical called hydrozyne which, about one part per million will kill you, apparently. It's real dangerous stuff and very volatile.

JUDGE LAM: Judge Farrar, are you done with the Colonel? Okay. Colonel Horstman, where is Clover Control located?

LT. COL. HORSTMAN: A couple of different locations, depending whether they are deployed. They normally set up at Hill Air Force Base in a building at the Air Force base.

JUDGE LAM: What are their general capabilities? In your testimony you say they may or may not be able to locate the aircraft.

LT. COL. HORSTMAN: They have radar line of sight throughout the primary UTTR and going from the UTTR. In the south end of the UTTR, the lower you go, the less they can help you because they

lose their radar line of sight. So their capabilities in the northern UTTR are very good for a radar control agency. In the south UTTR it is very good for all of it except for the southern fringes of lower altitudes. And then when you get over to the far west, you lose some. In Skull Valley, because of the mountains to the west, they don't have line of sight to the mountains. So that is more of their line of sight geographical capability. They use a radar that they can -- use just a regular radar or your IFF sqwauk, your electronic transmitter. And they provide you with air space control, et cetera.

JUDGE FARRAR: Mr. Gaukler, thanks for allowing the interruption. We wanted to clarify that at the same point in the record that your questions appeared.

Q. (By Mr. Gaukler) Question 65 asks, "Are you aware of any published authorities or articles in military or industrial journals that suggest that the success rate of F-16 pilots in avoiding aircraft crash impacts to a specific site can be predicted or quantified?" And your answer is no. Correct?

A. That's correct.

Q. You were here during the redirect testimony of Gen. Cole, Gen. Jefferson, and Col. Fly; correct?

A. That's correct.

Q. And do you recall their reference to an English study in which there was a study of the pilot's ability to avoid a site when they were in control of the plane?

A. I remember the discussion about it. I don't consider them an authority.

Q. You don't consider them an authority?

A. No.

Q. Okay. I'd like to go on to Question and Answer --

JUDGE FARRAR: Wait. "Them" meaning --

LT. COL. HORSTMAN: The authors of that.

JUDGE FARRAR: The authors of the study?

Q. (By Mr. Gaukler) Do you know the authors of the study?

A. No, I do not.

Q. How do you know they are not authoritative, then?

A. I don't consider them an authority.

Q. You don't consider them an authority even though you don't know who they are?

A. You have to prove to me that they are an authority as opposed to me assuming that they are an authority.

Q. Okay. And you haven't reviewed the study yourself, or the article?

A. I have read excerpts from it and there's -- I have read excerpts, not the whole thing. Not the methodology.

Q. Okay. You referred, in Questions 66 through 70, you referred to the Air Force accident reports and the process of preparing them; correct?

A. Yes, sir.

Q. And you mentioned in Question and Answer 67 that you served as the interim president of a safety investigation board convened to investigate an F-16 crash.

A. Yes, sir.

Q. That was just one crash; correct?

A. That's correct. Just one.

Q. And isn't it true that an interim president is basically a caretaker of the site and information at the crash site until a formal person from the Board is appointed?

A. That's correct, sir.

Q. And that process before the formal

president would be appointed would be several days, a week at most, approximately?

A. Probably several days. I think a week is on the long side.

Q. So you were in charge for several days until the person was appointed?

A. Yes, sir.

Q. And that's the only formal experience you have with being part of or preparing a crash investigation report, crash accident report?

A. Yes, sir. But the interim safety board does not prepare the report.

Q. Okay. Going to Question and Answer 71, that's where you are asked, "Do the Air Force accident reports reviewed by PFS provide a basis to predict whether pilots of crashing F-16s would successfully avoid an impact to the PFS facility." In the second paragraph of that answer, you say, and this is based upon your review, I take it, "In fact, none of the 126 reports over the ten-year period reviewed by PFS discloses a situation where a pilot will hit a specific ground feature such as the PFS facility and took action to avoid impacting it." Do you see that sentence?

A. I do.

Q. You were here, weren't you, when Colonel Cosby gave his testimony over the phone?

A. I was.

Q. And it's true that Colonel Cosby's accident, that Colonel Cosby was involved in one of the 126 accidents in the group that were reviewed by you and Gen. Cole, et cetera?

A. Yes.

Q. And you would acknowledge, would you not, that he took action to avoid an apartment building right in front of him? I think he said, I forget the degree turn but it was a very sharp turn; correct?

A. He made a large turn and I don't recall if he said it was an apartment complex before or after. I don't remember his specific consideration. I think the accident board discussed the whole area. But based on the accident reports, I didn't see any specific ground site.

Q. The accident -- I think it is PFS Exhibit 79. I'm going to give you a copy of it. This is PFS Exhibit 79 which is the accident report involving Colonel Cosby. And I'd like to have you focus on the last part of the third page into the

document. And the Bates number on the bottom of the page is 57619.

A. I have turned to that.

Q. And there, in the middle of that last paragraph on that page, it talks about one minute and 16 seconds into the flight. About the middle of the paragraph it says, "Noticing a residential area in," and then something is blanked out, "flight path," and then something is blanked out, "made a 2g left turn towards Southridge." Doesn't that show he made a turn? Isn't that a reference in the accident report to showing that action was taken to avoid the residential area?

A. It does say he maneuvered from a residential area. It doesn't say a specific ground feature, which was in the answer. I grew up in southern California. My residential neighborhood was 20 miles by 10 miles. I have no idea exactly what was in front of him. It doesn't say in the accident report. Subsequently we find out that it was a residential area with an apartment complex.

Q. Okay. But the accident report shows that he took action to avoid a residential area; correct?

A. Very correct. Yes, sir.

Q. And you are saying that is not the same as taking action to avoid a specific ground feature? Is that what you are saying?

A. That's exactly what I'm saying. Which house was he trying to avoid? Which intersection was he trying to avoid? How big was the residential area? Ten miles by ten miles? One city block? I have no idea on that report.

Q. Excuse me, Lieutenant Colonel Horstman. Isn't that pretty much similar to saying, for a pilot coming down in Skull Valley, saying, "I see 4000 casks over here. I'm going to avoid those 4000 casks." And then responding, "Well, he didn't say which particular cask he was going to avoid." Isn't that a similar type answer to what you just gave me?

A. No, sir, it's not.

Q. I'd like to go on to the next area.

JUDGE FARRAR: Mr. Gaukler, before you do that, had you wanted that marked?

MR. GAUKLER: That's already PFS Exhibit 79. My co-counsel has reminded me I do want to move into evidence PFS Exhibits 97 and 98, which are the two accident reports we discussed earlier in the testimony.

JUDGE FARRAR: Mr. Soper, any objection on the --

MS. MARCO: No objection.

JUDGE FARRAR: -- two accident reports?

MR. SOPER: No objection.

JUDGE FARRAR: Then we will have those be admitted.

(EXHIBITS-97 AND 98 WERE ADMITTED.)

Q. (By Mr. Gaukler) I'd like to go on to the last section of your testimony, Section 6, where you talk about the PFS analysis of F-16 accident reports. In the first Question and Answer 79, you were asked, "Is the PFS analysis of F-16 accident reports found at Tab H of the crash report useful in determining the risk impact to the proposed PFS facility from aircraft?" About the third sentence into your answer, the one that begins, "Even if." "Even if the analysis correctly identified those accidents with an increment of time available to the pilot, that time would most likely be used on tasks related to pilot survival and not on attempting to locate and avoid the PFS facility site."

Again, isn't that an overly broad generalization based upon what you said previously;

that pilots with time and circumstances permitting would take actions to avoid a site on the ground?

A. Again, it depends on the particular circumstances and the amount of time available.

Q. So it is an overly broad generalization, isn't it?

A. I guess you would have to define "overly broad generalization".

Q. It's not true in the sense that you are saying that most likely it would be based on or it would be tied up in tasks related to pilot survival, not on attempting to locate and avoid the PFS facility site.

A. Is that a question?

Q. Well, I will make my question very clear. Let's take a case of engine failure which we have talked about in Skull Valley, you have actually given examples, where a pilot would have time even under a cloud deck, would get a chance to zoom that high, would have time and he would avoid the site; correct?

A. He would avoid the site, yes.

Q. And therefore, in view of that and in view of the fact that engine failure is one of the most likely causes of failure in Skull Valley, at

least in terms of purposes of our analysis here, isn't the question or isn't the statement that most likely the time would be used on tasks related to pilot survival, not on attempting to locate and avoid the PFS facility site is not true with respect to a large category of the accidents that would be relevant to our determination here.

A. Again, it depends on the circumstances. I do agree that there's a large body that they would be able to; there's also a body which they would not be able to.

Q. And therefore, I take it that you would agree that with that category that we have just been discussing, the words "most likely" would not apply.

A. You have categorized an engine failure and --

Q. Like I said, with engine failure the words "most likely" wouldn't apply?

A. When I answered this question I wasn't doing engine failures.

Q. I understand. I'm asking now with respect to engine failures, which we have identified as one of the typical things that would cause failure in Skull Valley, the words "most

likely" would not apply. Wholly apart from this answer here, the words would not apply?

A. Again, it depends on the circumstances to include the weather, et cetera.

Q. I'd like to go on to Question and Answer 80. There you take issue with the fact, you say that the question there -- excuse me. I got mixed up, reading the wrong lines.

The question there is, "Does the PFS analysis at Tab H of the crash report correctly determine the probability of crashes in Skull Valley where the pilot would remain in control of the aircraft and have time to avoid the facility?" And you say no. And one of the major reasons, you say, is because PFS has only evaluated accident reports over a ten-year period, not for the entire accident history of the F-16. You see that?

A. I do.

Q. Now, wouldn't the issue be whether or not PFS has evaluated a sufficiently large sample group of F-16s, not necessarily every single F-16 accident that occurred in history?

A. I'm not a statistical expert, as I have discussed before. It just seems logical to me that you would want to look at all the accidents before

you selectively choose which accidents to use.

Q. Well, do you have any indication that PFS selectively chose the accidents it was looking at?

A. Yes. Starting with the year group.

Q. Just other than picking up the last ten years of the time they did their analysis. Did they selectively choose --

A. No, not after that.

Q. So they just chose the last ten years. That's what your understanding is; correct?

A. That's my understanding.

Q. And you don't have any idea whether the number of accidents in that group is sufficient for statistical or statistically significant study or not, do you?

A. I do not know.

Q. And so therefore, in terms of -- from an analytical viewpoint, you have no opinion whether the ten years of the report is sufficient or not sufficient?

A. As I stated, it would appear more logical to use all the accidents in the body.

Q. But you have no statistical basis to make that determination?

A. That is correct.

Q. And you also say that or you also refer to the fact that, "PFS has not obtained and reviewed accident reports for 18 of the 139 (13 percent) F-16s that were destroyed in this period." Now, again, it is your understanding that those were just random accidents that the Air Force did not have available to provide to us?

A. I have no understanding. They were not there.

Q. No understanding whatsoever?

A. They are not there.

Q. And that's all -- and do you make any assumption in terms of what they would show or would not show?

A. I don't know what is in them.

Q. Okay. So that doesn't affect your answer, again, in terms of whether or not this -- so it comes down to whether or not this is a statistically significant sample, the 121 we have?

A. You are beyond my -- I don't understand.

Q. I think I asked you this the first time around. Just to make sure, I'll just repeat this one question with respect to Question and Answer 81 where you take issue whether PFS correctly

categorized the various accidents by assessing the phase of flight. In other words, did they correctly categorize it as normal or some other phase of flight? To the extent that you disagreed with PFS's assessment of the phase of flight, that would be reflected in PFS Exhibit X which is the Table 1 that you marked up at the deposition?

A. That is correct.

Q. Then we don't need to go any further into that. Question and Answer 82, you are asked there to explain how PFS excluded F-16 accident reports by incorrectly assessing Skull Valley-type events and Sevier B MOA conditions. And you list several things there. And I kind of marched through them one by one to make sure I understand what you are saying and to what extent they have been covered by what we talked about before or have not been covered by what we talked about before. You first say that PFS incorrectly excluded accidents that occurred at altitudes higher than 5000 feet AGL. That's what you first state. That's the first thing you state they improperly excluded?

A. That's correct.

Q. Now, you understand that the review

category for Sevier B only went up to 5000 feet AGL; correct?

A. That's correct.

Q. And, therefore, for that category, they did not look at flights above 5000 AGL?

A. That's correct.

Q. Just for the Sevier B flight conditions; correct?

A. That's correct.

Q. But there was no similar altitude restriction on Skull Valley-type events; correct?

A. That's correct.

Q. And with respect to Skull Valley-type events, this statement would not apply to Skull Valley-type events; correct?

A. The category that we discussed yesterday was what I was referring to.

Q. So in other words, just so the record is clear, there's no altitude restriction on PFS's category Skull Valley-type events in the table which has been identified as PFS Exhibit X.

A. I believe there is. And I don't know what altitude bounds they used, but they excluded a 30,000 foot, or something, because it was high altitude. The definition says high altitude and

lower speed, et cetera. Since it wasn't defined, I'm assuming we have excluded it based on that.

Q. Is that the only example that you know of?

A. It's the only one off the top of my head, yes.

Q. And the only question, I think when we talked about this yesterday, was that one paragraph that talked about or we had issue with in terms of definition of Skull Valley-type event was that paragraph where it talked about some Able to Avoid accidents at high altitudes or something similar to that.

A. Well, I don't know the exact definition of Skull Valley-type events because it has never been defined.

Q. Well, it was defined. You read the definition yesterday.

A. The parameters are not specifically defined.

Q. We talked about this yesterday and there's no need to go back over it; correct? Do you have anything to change from your testimony yesterday with respect to Skull Valley-type events?

A. I do not.

Q. Then you say that the PFS incorrectly excluded accidents while under Instrument Flight Rules. Are you aware of any accidents that PFS excluded under Instrument Flight Rules?

A. Off the top of my head, I do not have an example.

Q. And to the extent any such accidents were identified by you, they would be identified in this markup of Table 1 in PFS Exhibit X?

A. That's correct.

Q. Now, you also say that PFS incorrectly excluded accidents caused by mid-air collisions. And you discuss, in fact, one of those mid-air collisions in Question and Answer 83. Other than the September 16, 1997 accident discussed in Question and Answer 83, are you aware of any other mid-air collisions from the group of accident reports reviewed by PFS where they improperly excluded a mid-air collision?

A. Off the top of my head, again, no.

Q. And again, to the extent you had any such or took issue with any such accident evaluation, that would be in your markup of Table 1, which is PFS Exhibit X; correct?

A. Yes, that's correct.

Q. Okay. So then we talked about -- you say that PFS incorrectly excluded accidents caused by g-induced loss of consciousness; correct?

A. Correct.

Q. And then you have in Question and Answer 84, the May 25, 1990 accident which you claim was caused by g-induced loss of consciousness which we talked about at length before, which I don't plan to go through. Correct?

A. Correct.

Q. Now, other than that accident which you claim was caused by g-induced loss of consciousness, is there any other accident that you claim that PFS improperly excluded that was a g-induced loss of consciousness accident?

A. No, sir. Only what we marked up in the table.

Q. So anything would be in the table again; correct?

A. Yes, sir.

Q. Are there any other ones in the table that you are not aware of?

A. No, sir.

Q. Are you saying there are no other ones in the table, or are you saying you don't know off

the top of your head whether there are any other ones in the table?

A. I'm saying that we addressed that one in the table. And as far as I know, there are no other g-induced loss of consciousness that would apply.

Q. So this is the only accident where the issue of g-induced loss of consciousness would be an issue?

A. That's correct.

Q. Again, then you talk about bird strikes being another category which you claim that PFS improperly excluded. And again, I think you referred to an accident in Question and Answer 85 which involved bird strikes which we have already discussed at length. I don't want to go back into the details. Other than that accident involving bird strikes, are there any other bird strike accidents that you claim PFS improperly excluded?

A. No, sir.

Q. You then claim that PFS improperly excluded accidents involving lightning strikes. What accidents do you claim that involved lightning strikes do you claim PFS improperly excluded?

A. Give me one moment. The accident on 31

July, 1992 which we have marked up in Table 1.

Q. So it is included in Table 1, first of all?

A. Yes, sir.

Q. And have you read the testimony of Gen. Cole, Gen. Jefferson, and Col. Fly on that accident?

A. I have.

Q. And they have concluded that that accident was not caused by lightning; correct?

A. They have. And I thought long and hard about that.

Q. I just asked you -- I don't want to get into a long decision. They determined it was not caused by lightning; correct?

A. That's correct.

Q. And isn't it correct that they excluded the accident for reasons other than what you claim was lightning? In other words, they thought the accident was inapplicable to Skull Valley for reasons other than what you claim was the lightning. Let me strike that.

They did not exclude it from Skull Valley-type events because of any lightning being involved.

MR. SOPER: Object as to foundation.

JUDGE FARRAR: Mr. Gaukler?

Q. Is it your understanding, let me just ask it this way, is it your understanding that they did not exclude the event from Skull Valley because of a determination that it was caused by lightning?

A. I don't believe the reason for the crash is on Table 1. It's the ACRAM phase, Skull Valley flight conditions, Skull Valley-type events. They considered it a takeoff. I considered it a normal en route, which would lead to whether or not it is included in the database. The cause of the accident is not really relevant to that discussion.

Q. Okay. And are you aware or did you see any accident reports where PFS, in fact, did include accident caused by lightning in their evaluation?

A. Can you restate that? I missed the first part.

Q. Did any of the accident reports that PFS did include as a Skull Valley-type event in their analysis, did any of those accidents include accidents involving what PFS determined to be lightning?

A. No, I do not believe so.

Q. You don't believe so?

A. No.

Q. Now, going back to --

JUDGE FARRAR: Mr. Gaukler, it's been a while since we had a break. Let me ask you how much longer you have.

MR. GAUKLER: Roughly a half hour.

JUDGE FARRAR: And then Mr. Soper, you have what?

MR. SILBERG: You are forgetting the Staff.

MS. MARCO: I have ten to twenty, give or take a few.

JUDGE FARRAR: Okay. And then Mr. Soper, you have how long, so far?

MR. SOPER: I'm going to say 30 minutes.

JUDGE FARRAR: Okay. Why don't we take a quick break now, come back, and maybe, Mr. Gaukler, you could finish by lunch. Then we could -- that would give the other parties a chance to think about it during lunch and finish up this witness right after lunch. And let's take no longer than ten minutes right now. It is quarter of. Let's be back promptly at five of.

(A break was taken.)

JUDGE FARRAR: It is five of. Let's see if we can finish the cross of Colonel Horstman before lunch.

Q. Lieutenant Colonel Horstman, I have one follow-up question with respect to Question and Answer 71. And that's where I asked you whether there was any reports that showed a pilot took action to avoid a site on the ground. Let me ask you the converse question. In your review of the accident reports, did you see any report where a pilot in control of an aircraft did not take steps to attempt to minimize damage to sites on the ground?

A. None, sir.

JUDGE FARRAR: There were too many negatives there. Would you read that back, Diana.

(The record was read as follows:

Lieutenant Colonel Horstman, I have one follow-up question with respect to Question and Answer 71. And that's where I asked you whether there was any reports that showed a pilot took action to avoid a site on the ground. Let me ask you the converse question. In your review of the accident reports, did you see any report where a pilot in control of an

aircraft did not take steps to attempt to minimize damage to sites on the ground.")

JUDGE FARRAR: So there were no reports where the pilot did not take action to avoid sites that he could have? Forget the negatives. You tell us in your own words what you think you just said.

LT. COL. HORSTMAN: The accident reports, that is not really part of it unless it becomes there's damage or something. The one we discussed in Florida, he thought he could land. Turns out he was wrong, so he ended up near a neighborhood. So he chose poorly, but it wasn't that he didn't try to avoid something. He had no opportunity at that point to avoid anything. There are no cases in this database where it's written down that the pilot did not avoid a ground site.

JUDGE FARRAR: Okay.

Q. (By Mr. Gaukler) A couple of follow-ups on the question of Instrument Flight Rules. I asked you about flying IFR through the Sevier B.

A. Yes.

Q. We talked about minimum en route altitudes. Now, what's the purpose of minimum en route altitude?

A. That's the lowest altitude that they can safely control you. They won't control you actively below that.

Q. And what's the purpose of that?

A. Safety.

Q. So it is to keep pilots safe from the ground and obstructions on the ground?

A. Yes. Because the controllers have a responsibility to aid the pilot to do that. When you go below that line, their ability to aid you goes away.

Q. And if I understand your testimony correctly, you said that pilots may legally operate Instrument Flight Rules below the minimum en route altitude using the procedural control you mentioned earlier?

A. That's correct.

Q. And another quick question, is it true that pilots may fly in weather while operating IFR, under Instrument Flight Rules?

A. In the weather, Instrument Flight Rules? You have to be under Instrument Flight Rules when you are in the weather.

Q. If you are flying in clouds?

A. That's correct.

Q. I think we were going through the items on Question and Answer 82. And I think we have one left. Now, you claim that PFS did not include in assessing or include in its category of Skull Valley-type events accidents involving poor visibility due to cloud cover which could occur in Skull Valley?

A. That's what it says, yes.

Q. Now, focusing on the Skull Valley-type events, which is the broadest the category used in the Gen. Cole, Gen. Jefferson, and Col. Fly analysis of flights applicable to assessing the hazard at Skull Valley. Can you identify for me any accident reports that were not included in the category of Skull Valley-type events because of poor visibility due to cloud cover?

A. Off the top of my head, I cannot.

Q. So you can't think of any right now?

A. That's correct.

Q. And if there were any such accidents, they would be reflected in your markup of Table 1, which is PFS Exhibit X. Is that correct?

A. That's correct.

Q. If you can't think of any, how can you say that we incorrectly excluded them?

A. I don't know what the visibility requirements were, based on the definitions.

Q. Based on what definitions?

A. The definitions of Skull Valley events. It discusses weather. If you point it out to me I will get it out and read that part. I can't locate the ACRAM definitions. I don't remember what document they are in.

Q. Tab H.

A. There we go. The discussion on Page 15 of Tab H talks about, "This 'Skull Valley-Type Events' category captures accidents caused by events which could reasonably happen in Skull Valley transit. This includes not only accidents which actually did happen in a flight environment substantially like that in Skull Valley." And I don't know what the definition of that is weather-wise.

Q. But in any event, any disagreement you had you would have marked it up --

A. That's correct.

Q. -- in the results on Table 1, which is PFS Exhibit X. Correct?

A. That's correct. Sir.

Q. Okay. A few questions on number of

flights through Skull Valley. In Question and Answer 31, you say that PFS should use the sortie count for fiscal year 2000 and increase for the additional F-16s at Hill Air Force Base rather than using the average for 1999 and 2000. Is that correct?

A. That's correct.

Q. Didn't you say in your July, 2001 deposition, albeit not directly in response to this type of question, that taking the average of the fiscal year 1999 and fiscal year 2000 counts increased for the additional F-16s at Hill appears to be a logical, sound way to do that?

A. It does. And in the year 2000 they flew more sorties that year because they desired to fly more sorties. So they scheduled more sorties in the increased rate that was previously discussed. If they had the capacity to fly at an increased rate, it would appear that they would be logical to use that capacity because it is potentially going to happen.

Q. Didn't you say at your deposition it was logical to use the average of the two years?

A. At that time it was, yes.

Q. This was -- you are saying it was

logical at the time of your deposition?

A. I was unaware that the year 2000 rate was increased by desire. They flew more sorties per airplane because that's what they wanted to do. The tasking from the command, the ability to generate sorties, if that is increased because there were outside inputs that the wing has no control over, and they have the ability to support those sorties, why is it not logical, then, to assume that they can continue to produce the same amount of work which generates that higher number of sorties?

Q. And by the same token, there could be events in the future that would lead to a decrease or desire not to fly as many sorties; correct?

A. That is correct, sir.

Q. So, therefore, it would still remain logical to get an average.

A. It could remain logical to use a variety of different numbers.

MR. SOPER: Could we have a reference to the deposition?

MR. GAUKLER: It's Page 15 of the July.

JUDGE FARRAR: July which?

MR. GAUKLER: July, 2001. I don't

intend to go there, given the answer.

Q. (By Mr. Gaukler) Now, you would agree that -- your Question and Answer 31 would add the sorties for the B and D MOAs; correct?

A. I need to review it. I don't recall.

Q. It's 30. I'm looking at Question 30, your Honor.

A. That's correct.

Q. Now, isn't it true that some of the flights identified as Sevier B and D flights would be flights that do not go through Skull Valley --

A. That do not go through Skull Valley?

Q. Strike that. Would you agree with me that some of the flights identified in the MOA usage reports for Sevier B and Severe D would be for flights that go through part of the MOAs that are not or is not Skull Valley?

A. That's a fair assumption, but they don't track where they are.

Q. And there's some routes that go through the southern part of those MOAs that are nowhere near Skull Valley; correct?

A. I believe all the preplanned routes go through Skull Valley to enter, but there are sorties that do not go through Skull Valley and

enter.

Q. Aren't there some routes from other Air Force bases that come from the south? For example isn't there IR Route 310 which comes from Nellis Air Force Base in Nevada where flights following that route would go through part of Sevier B down in the southern part?

A. Yes, sir. That is true.

Q. And they would be included in that count for Sevier B and D in the MOA usage counts? Do you know?

A. I don't actually know. I think they would be, but I don't know.

Q. Okay. And I noticed, looking at this question and answer Number 30, you say at the bottom of that Question and Answer, "As I have testified, I have flown many times above both MOAs while transiting Skull Valley." You see that?

A. Yes, sir.

Q. I believe that -- didn't we just discuss in the April hearing, and I asked you whether you would fly above the MOAs where you would have to be under control in a culvert, and you said that was unusual?

A. It is unusual. But nonetheless I have

still done it a number of times.

Q. Many times?

A. More than three.

Q. Going on to a few miscellaneous points. On Question 11, now, in the April hearing you mentioned how north of -- in Skull Valley, approximately north of Dugway village, the minimum altitude was 1000 feet?

A. That's the minimum of flight restrictions. The MOA starts at a hundred feet above the ground.

Q. Okay. So the actual, in terms of Skull Valley area, the minimum flight restriction would be a 1000 feet even though the MOA --

A. Today that is correct. If the Air Force desired, they could change it tomorrow to 500 feet like the rest, or 100 feet or 200 feet.

Q. Or 2000 feet?

A. Or they could tell us not to fly there.

Q. Now I'd like to direct your attention to -- well, the Aircraft Crash Report at Page 21. There the report talks about the F-16 flight control computer that will hold the aircraft on the flight path set by the pilot even after he ejects. Do you see that?

A. I see that.

Q. And you agree with that; correct?

A. To a degree. I think that the previous telephone testimony was a better definition because if you were to eject at a five degree angle of bank, the five degree angle of bank would stay there and the same angle would actually generate a turn. It is going to function that way. And whether the aircraft goes perfectly straight or wanders one way or the other is random and unknown.

Q. Now, I'd like to have you turn to Page 210 of your December 11 deposition. Now, you see there on the bottom of Page 209 to the top of page 210 I refer you to that section of the report and I ask you, "Page 21 of the report talking about the F-16 flight control computer which keeps the plane on track once the pilot ejects." And you agree with that and your response is?

A. My response is. "Yeah."

Q. Would you read the rest of it?

A. Especially in the Skull Valley something, you bet. Yeah."

Q. And also, we were talking about the fact that a pilot ejecting -- well, "A pilot in that type of situation would have to move the plane only

a small degree of the turning radius to avoid PFS site." And you agreed with that, as well.

A. Yes. If he was initially pointed directly at it, you would have to move a little amount. And if he wasn't pointed directly at it and he moved that same amount, he might be pointed directly at.

Q. But if he was pointed at it --

A. Directly at it, it would be a small amount. Assuming the aircraft was on that track, if you will. There's a random scatter pattern with it.

Q. Do you know what that is?

A. It is random.

Q. Have you evaluated what you claim to be the scatter pattern?

A. Not formally, no.

JUDGE FARRAR: Mr. Gaukler, are you finished with that immediate subject?

MR. GAUKLER: I think so, yes.

JUDGE FARRAR: Then let me ask a question about the turn. In the situation you just described, you turn the plane and I think you said earlier when you turn an airplane you don't change where you point the nose. You, in fact, bank to

turn? Is that correct.

LT. COL. HORSTMAN: In simplistic terms, that's correct. It's more involved. But you turn the bank to turn the airplane.

JUDGE FARRAR: Okay. Am I also correct from what you said a long time ago in this proceeding that all other things being equal, you are safer ejecting in level flight than in any other configuration.

LT. COL. HORSTMAN: Yes. That's correct. Pointed up, very slow.

JUDGE FARRAR: Okay. So the turn -- now you are at 2000 feet in my hypothetical. You are 2000 feet which is the minimum safe ejection, or maybe you are a little below it. Minimum safe ejection altitude. You now have two things, two conceivable things within the scope of this proceeding on your mind; your survival and perhaps avoiding the PFS site. Does banking to avoid the PFS site have a possible impact on your survival because of the different configuration in which you are ejecting?

LT. COL. HORSTMAN: It does, but if you were to calculate it, it would be absolutely minuscule because you have the altitude safety

barrier already built in. When you are descending and you reach 2000 feet and you magically level off just at that, as was previously discussed, you then want to slow down to the slowest possible speed. And as you do that, the airplane at some speed will decide, "No more. You are going to start descending." So you slow down to 100 or so knots and in that time your nose goes higher and higher before you eject. And when you are doing that, your ability to look out in front of you at the horizon is restricted by the nose of the aircraft. So you look left and right for your horizon, or at the heads-up display. And whether you are in truly level flight or ten degrees abank, it is not relevant towards your safety. It would be hard to determine what the angle of safety would be.

JUDGE FARRAR: So if you thought about it and if you were inclined to do so, you would bank to avoid the site, if you knew where it was and if you cared about it, without, to any significant respect, jeopardizing your survival.

LT. COL. HORSTMAN: To a degree, yes, you could, sir.

JUDGE FARRAR: Okay. Let me just add to that. And that's in the circumstances you

described where you were in control. It sounded like almost, the way you described it, you were fully in control because you were descending and pointing the nose up the way you want it.

LT. COL. HORSTMAN: That's correct. And the weather was perfect and all of these things were working out for you.

JUDGE FARRAR: And your answer might differ if you were nearly out of control, had some control but you were nearly out of control and now you are only at a 1000 feet. Would your answer change?

LT. COL. HORSTMAN: It would be slightly different but fundamentally, even at 1000 feet, you are pretty comfortable with your ejection seat and your ability to survive. We noted what is interesting is while you are supposed to jump out at 2000 feet, a significant portion of the accidents we looked at, the pilots were ejecting well below that 2000 feet. And the closer you get to the ground, the more distracted you get by the ground.

JUDGE FARRAR: Suppose you are at 1000 feet and you are really in trouble and now you see the site right in front of you. Now, do you go and

do a hard bank, again referring to the movies, like we see in the movies? And now you are ejecting horizontally instead of vertically.

LT. COL. HORSTMAN: It wouldn't do any good because when you go into a lot of bank you have to have the air speed, the air flow over the wing surfaces. The lift is not pointing horizontal to turn the aircraft. Now we are talking we are only going a hundred miles an hour when it is barely flyable, and you go like this (indicating) and jump out and the airplane is still heading that way. It is going to turn a slight amount because it is trying to maintain that angle of attack through the wind, but it is going to start slicing down because it doesn't have a turn input. It has the roll input and then, as Colonel Cosby said, it may turn a little but it is going to fall to the earth. So it would be futile, basically.

JUDGE FARRAR: Futile to try to avoid --

LT. COL. HORSTMAN: It wouldn't do any good.

JUDGE FARRAR: Meanwhile, if you did do it, what happens to you ejecting horizontally rather than vertically?

LT. COL. HORSTMAN: I would worry

greatly about that. The ejection seat, according to all or everything we have, would work just fine. But now you are getting into -- while you are still in the ejection envelope your risk increases dramatically.

JUDGE FARRAR: Because part of the ejection principle is that it is going to shoot you up and give your parachute longer to open.

LT. COL. HORSTMAN: That's correct. You can eject upside down. Could you do it at 1000 feet? Yes. Would you live? I could look it up. The answer is doubtful. You are into an area where your survival becomes very questionable.

JUDGE FARRAR: Okay. Thank you.

Q. (By Mr. Gaukler) I just want to go back to a couple things, just to close up. First of all, you referred, in your testimony in April, to a conversation that you said you had with the commander of Air Combat Command concerning the May 25, 1990 g-LOC accident. Correct?

A. Correct.

Q. And the person you initially identified as a four-star general. Correct?

A. That's correct. He was the DO at the time.

Q. He was a two-star at the time?

A. That's correct.

Q. And that was General Ryan?

A. It was.

Q. General Ryan never was and never became commander of Air Combat Command, was he?

A. No. He was director of operations. He became the chief of staff of the Air Force.

Q. So when he became a four-star, he was in a different position?

A. That is correct.

Q. Now, you said also -- so you never had a conversation with the commander of Air Combat Command?

A. I have had many conversations with the commander of --

Q. On this accident.

A. That's correct.

Q. Now, you said that, I believe, at the time you were -- what position were you at the time?

A. I was on the Staff.

Q. And you were executive officer to one of the generals at the time?

A. Or executive officer of the composite

wing program. One of the two. I forget which I was doing.

Q. Do you know which it was?

A. I do not. I believe I was executive officer but I'm not specifically -- it was ten years ago or eleven years ago.

Q. And would you have been more likely to have been in a position to have a conversation depending upon which of those positions you were in?

A. No. My job as the composite wing program manager, I spoke with essentially all of the operational Air Combat Command on a regular basis.

Q. Now, who did you work for when you were an executive officer?

A. General Tom Griffith and general Marcus Hurly.

Q. And in that circumstance, you were working for a general officer then?

A. I was.

Q. And in your position as a program commander, program manager who you were working for?

A. I worked for a colonel that worked for

the general.

Q. So you wouldn't have been working for a general officer then?

A. Everybody works for the general officer.

Q. But your position, you were working for a general officer in this situation?

A. My reporting official was a Colonel. Because of the nature of my duties, I had a great deal of interface, we were building the first ever composite wing or the first -- we were building a composite wing at Mountain Home Air Force Base, Idaho. I was the project officer for the Air Force to do that.

Q. I'd like to have you look at Page 4291 of your transcript where you talk about your position at that time. Look at the hearing transcript. I handed out a book to you yesterday of the hearing transcript.

A. Which page?

Q. 4291. And on the bottom of that page --

A. I don't have it.

Q. Sorry.

JUDGE FARRAR: Mr. Gaukler, you said 4291?

MR. GAUKLER: Yes.

JUDGE FARRAR: And it has a Page 22 on the top?

Q. Yes. Friday evening, April 13, 2002.

A. I found it.

Q. And if you look at the last answer on that page, you say, "In the normal course of my responsibilities at combat command I have worked directly for a general officer and I was in contact with a number of general officers on a regular basis as his executive officer." So I take it you are referring to the period of time you were executive officer as opposed to assistant program manager?

A. That's correct.

Q. Now, I'm going to hand out your resume which is an exhibit, which I forget the exact state exhibit number so I will just hand it out to you. It shows that you were in the executive officer position from May 1991 through May 1992?

A. It does.

Q. And it shows you were the program manager from April 1989 to May 1991.

A. August of 89 to May of '91.

Q. Excuse me. And therefore, in the spring and summer of 1990 you would have been in the

program manager position, not the executive officer position?

A. That's correct.

Q. And if you look at the accident report, you knew when the accident investigation board meeting was for which accident?

A. I'm sorry.

Q. Do you know when the accident investigation meeting was for that accident?

A. I don't know what accident you are talking about.

Q. The g-LOC. May 25, 1990 g-LOC.

A. Not off the top of my head but it would have been probably late April.

Q. I'm going to bring up to you PFS Exhibit 80 which is the accident report.

JUDGE FARRAR: This accident occurred when?

Q. May 25, 1990. And PFS Exhibit 80 is the copy of the accident report which I'm going to show the witness. Doesn't it say in the first paragraph of PFS Exhibit 80 that the accident was conducted from 20 June, 1990 to 20 July, 1990?

A. The investigation was.

Q. And wouldn't normally the Board

procedures and accident reports be issued within three to four months after they conducted the investigation?

A. Yes, sir, they would.

Q. And that would put you into the fall of 1990. Correct?

A. That's correct.

Q. And at that point in time, you would have still been program manager and not the executive officer?

A. That's correct.

Q. Yesterday when you were giving your little demonstration here in terms of the cloud cover --

MR. SOPER: Object to the characterization of it. I thought it was quite nice.

JUDGE FARRAR: Mr. Soper you once called an animation a cartoon, so now we are even.

MR. GAUKLER: I won't do it anymore if you won't.

MR. SOPER: Touche'.

Q. (By Mr. Gaukler) I remembered your tutorial in April where you were informing the Board about flying down Skull Valley. You remember

we had the maps, the corporation board with the maps up and you were talking about the Board on a typical flight down Skull Valley. Correct?

A. Yes, sir, I recall that.

Q. And you talked about flying down with or taking a two-wing formation as an example and how you would fly with one of the wingmen kind of over that small knoll at elevation 6048 feet. Do you recall that? That was kind of the northern tip of the Stansburies.

A. In the morning I would do that.

Q. Yes. In the morning you would do that. And if I recall correctly, you said that you would start your g-awareness turns, typically start them approximately seven nautical miles south of the knoll, roughly?

A. I believe so, yes.

Q. And then would you do your g-awareness turn?

A. That's what I said.

Q. And if I remember correctly, you were asked where in the process of the g-awareness turn, where it would put you in terms of the site. And you said, "At some point in g-awareness turn you would be directly over the site."

A. I don't recall those words. I would point directly at the site.

Q. Okay. And you said generally speaking this is where you would do your g-awareness turns, going down Skull Valley as a general rule, time permitting, assuming this wasn't something different?

A. Generally speaking that's where I did my g-awareness turns.

Q. Now, you had also talked about g-awareness turns in your December 11, 2000 deposition. Correct?

A. I believe so.

Q. And didn't you say there - I'm going to hand out and I'd like to have marked as PFS Exhibit 99 some excerpts from that deposition.

(EXHIBIT-99 WAS MARKED.)

Q. If you look --

JUDGE FARRAR: The reporter has marked excerpts from the December 11 transcript script as PFS 99 for identification. Go ahead, Mr. Gaukler.

Q. On Page 58 and 59 of the deposition we were talking about where you do warmup turns and g-awareness turns. Do you see that?

A. Just a moment please. Okay.

Q. And the bottom of Page 58, and going to the top of Page 59, you say where you would do your g-awareness turns would depend upon a lot of circumstances. Correct?

A. Correct.

Q. And you would agree with that; right?

A. That's correct.

Q. And you go on to say one reason for doing the g-awareness turns further down the MOA is you may have less field and therefore it would be easier to do g-awareness turns.

A. Yes. If you are carrying two external fuel tanks and two 2000-pound bombs or 6500 pound bombs, the landing would give you a better g-awareness turn.

Q. And you say or you refer, going down south of Dugway, some people would go down south of Dugway to do the g-awareness turns. Right?

A. It says I know some that would go down south of Dugway where it was wider. So some did.

Q. So you didn't identify any particular place in this answer where you would do g-awareness turns. Correct?

A. No, I did not.

Q. Now, if you go down -- I'd like to have

you go to Page 105, which is the second page. And there we were asking you or I was asking you about to what extent you may be pointing at the site while you were travelling down Skull Valley. Remember that?

A. I don't remember it but --

Q. Look at Page 104, Page 105.

A. I see it.

Q. Do you remember one of the issues you had raised was your claim that when flying down Skull Valley the planes would be pointed at the site for some point of time in their transiting Skull Valley. Correct?

A. That's correct.

Q. And I asked you on Page 105 in that respect at Line 5, "Are you talking about g-awareness maneuvers?" Isn't it true you say, "Generally the g-awareness maneuver would come after you pass south of the proposed site. As I mentioned before, maneuvers such as tactical turning, maneuvering, getting your aircraft on turning down to the south after a turn." So didn't you say there that g-awareness turns are generally done south of the proposed site?

A. That's what it says, yes.

Q. I don't have any other questions.

JUDGE FARRAR: All right. In order to help the parties prepare their questions, the Board has just a few questions we will do now so you can use your lunch hour to best advantage. Dr. Kline?

JUDGE KLINE: I would like to have you take a look at your answer 19.

LT. COL. HORSTMAN: Which document, sir.

JUDGE KLINE: Your prefiled testimony.

JUDGE KLINE: On the question of using the PFS site as a steering point, isn't this something that would be subject to Air Force command? Couldn't some commander somewhere just say, "Don't do that."

LT. COL. HORSTMAN: I have never known an instance where any commander said, "You will not use a turn point." What you do when selecting turn points is try to select something that is a viable turn point. And in Germany we use nuclear power plants for turn points because you can fly over them.

JUDGE KLINE: Really?

LT. COL. HORSTMAN: So I have never heard of anybody saying not to use a point.

JUDGE KLINE: And were you present when

we spoke to Colonel Bernard?

LT. COL. HORSTMAN: Yes, sir.

JUDGE KLINE: In the prior hearings.

LT. COL. HORSTMAN: Yes, sir.

JUDGE KLINE: He was questioned about the point of being able to avoid a site like PFS. And this is in the April 12 transcript at 3906 and 3907. And in response to a question there, let's see, at 3908 he is asked if an airplane could divert around the site and he answers, "Actually, if there was a nuclear storage facility there, I don't think they would run down Skull Valley." So on the one hand we have someone telling us that they wouldn't even fly in Skull Valley, and I don't know how true that is. But on the other hand we have you telling us that they not only fly there, but they would zero in on it. And so I guess I'd like to have you reconcile these views.

LT. COL. HORSTMAN: The Air Force has this training area. And if there were a -- in other areas where there are nuclear facilities you have a no fly zone at I believe 1000 feet. Possibly 1500 feet. And that's the only restriction there is. And as I said, in Germany we used to use those as turn points because they had

all of the features desired for a turn point; vertical development, heat development, light source, 90 degree angles. All of these things which are good for your sensors.

So while I appreciate the fact that he didn't believe we would fly down Skull Valley at all, I believe the Air Force's position, long-standing, is this is our training area and we'd like to use it. If there will be some kind of restriction, don't build the restriction. But to not use it as a turning point has never, in my knowledge, been done.

JUDGE KLINE: Okay. That's all.

JUDGE FARRAR: Judge Lam?

JUDGE LAM: Colonel Horstman, in your prefiled testimony you had raised numerous issues and numerous deficiencies that you consider that the Applicant had in their application and in their analysis about aircraft hazards. May I ask you to take a step back and tell us what are the most glaring deficiencies that you have seen? Give us several compelling examples.

LT. COL. HORSTMAN: The most compelling example, I believe, is the weather; clouds, obstructions to visibility. I don't believe that

locating the PFS site on the ground is as easy as has been discussed. I believe in many cases it is impossible. In many cases it is very easy. But the weather is a significant factor in flying fighter aircraft. Much more so than civilian, because you have other members that you are looking out for and visually need to see. Your ability to navigate and precisely identify things which are not targets in the bombing range, if you don't have it programmed in, you are liable to just have a general awareness of where the haystack is, but not the needle.

The assumption that pilots will always know where it is and always be able to avoid it, I don't agree with being able to locate it. I firmly believe if a pilot saw it and had the ability and time, they would avoid it, as previous testimony from every Air Force and Navy and Marine Corps pilot would indicate. But you have to find it and then you have to take steps to avoid it. And I don't knowledge that it's as easy as we all kind of want to believe.

JUDGE LAM: Another example, Colonel Horstman?

LT. COL. HORSTMAN: If the aircraft is

not in control, the pilot's ability to avoid the site is zero. If he is 500 miles away, he is not going to hit it. But if he is aiming at it, his ability to avoid it is zero. There are mid-air crashes in routine phases of flight. There are all kinds of mitigating circumstances that can happen when flying. And they change every single day, based on the pilot's mental attitude, based on whether he slept properly last night, based on the weather, based on his aircraft performance and the aircraft configuration with bombs and fuel, based on the mission, if it is air-to-air or air-to-ground. All of these things go into the decision-making process of the pilot.

When you have an emergency, your attention gets diverted from all routine phases of flight to solving the emergency. In the emergencies I have had, I landed out of all of them. I have lost an engine before in two-engine airplane and it took a significantly longer amount of time than I expected it to. It is not an easy thing. And when you are alone, by yourself in a multi-million dollar airplane, that's your cocoon and it is very comfortable. And that's why we see people ejecting very, very low and very, very late.

So we have seen a significant number of mistakes in all of these accidents that we have evaluated. Most of them didn't do what they were supposed to do. Not most. A number of them did not do what the rule books said they were supposed to do. So mistakes are being made all of the time. And to assume that you are going to be able to perform perfectly when you have that high stress emergency, I don't think that's a fair statement.

JUDGE LAM: Colonel Horstman, within the first week of this proceeding we heard extensive testimony from Gen. Jefferson, Gen. Cole, and Col. Fly on the pilot's ability to avoid a land target. And they had assessed a success probability of 95 percent. Among many reasons they cite to support this assessment were three reasons: One, the training of the U.S. Air Force pilot; two, the visibility of the PFS facility; three, the sufficient time available for the pilot to take action. If I were to ask you to critique that theory, what would you say?

LT. COL. HORSTMAN: Your Honor, I would say that their discussion on training is exactly correct. The Air Force does a magnificent job of training their pilots. In all the training I have

ever been to, the finest flight training, beyond a shadow of a doubt, was the F-16 training. They are highly trained pilots and yet we still see a number of significant mistakes that cause crashes and cause people to eject below where they are supposed to.

In high stress situations, the training is a great back bone and provides you with wonderful procedures. But it also focuses your attention on things which allow you to go below the altitude where you are supposed to eject. In high stress environments you make a lot more mistakes.

As far as the visibility, the weather is not always beautiful in Skull Valley. And if there's clouds between me and the site, I can't see it. And we don't know exactly what the weather is every day out there because they only measure it in certain categories. I have flown through the Skull Valley many, many times and never seen the ground. I have flown through Skull Valley many, many times and never seen a cloud in the sky. Those are two very, very different sets of circumstances.

And finally, with respect to time, it depends on the accident and it depends on whether -- in an engine failure situation, whether

it's instantaneous or very insidious, whether you hit a bird, whether your hydraulic failure quits. Remember, time is not only good, it is also bad. If you are over the Great Salt Lake and you have engine problems, as previous testimony from Col. Fly said, you are going to Michaels Army Air Field and call a cab and go back to Hill Air Force Base. You are going to point at the sitem and you have time.

If your engine subsequently fails, you have lost some of that time. You still have a certain amount of time, but it differs in every different situation. The weather impacts that. Whether your engine has seized impacts that. Whether your canopy is broken. If you had a g-induced loss of consciousness, time doesn't matter. You still hit the ground. So there are a number of set of circumstances when time is good, and yet it doesn't always help you. And you get temporal distortion when you have an emergency and you focus your attention on a couple of small things.

The Air Force teaches you to aviate first and then navigate and then communicate. Those are the three big what to do in an emergency.

Other than flying the aircraft, maintain aircraft control, which we have talked about. Navigation is secondary. And communication is tertiary. So your number one primary responsibility is flying the airplane. It doesn't say we are to look at sites on the ground. One small blurb in the "Dash 1" says to avoid a populated area. There are probably 10,000 pages of procedures and directives and education on how the airplane works that talk about how to do all the things an F-16 does, and one little blurb about avoiding a populated area. So having the time may or may not be all that important.

Temporal distortion will take a 30 second time frame and make it a completely second time frame when you go back and review. The accident we just looked at, the individual that hit a bird seems to remember everything that happened. That whole sequence of events probably took one second. He remembers it all. It happens both ways. You remember nothing, you remember everything. So having time may in fact help you. But it doesn't always solve the problem.

JUDGE LAM: Colonel Horstman. Let me ask you one more question. You took issue with the

Applicant's analysis of the 121 F-16 accident reports. The Applicant's analyses indicated roughly 97 to 100 percent of the time the pilot would have time and control. You seem to dispute that assessment. Now, I have two questions. One is to what level of detail have you conducted your analysis of these 121 accident reports? Two, what type of number were you able to determine as to the fractions of the time the pilot would remain in control and had sufficient time?

LT. COL. HORSTMAN: I reviewed each of the accidents provided to me, a couple of different times. Once just to get a general review, and then to categorize it I read it a second time to see if it fit into the four finite categories that PFS has offered. So I have reviewed them thoroughly. I have very little expertise in coming up with a factor or percentage. My objective, sir, was to, as I discussed before, to try to see if the categories were appropriate for the applicable accidents. In many cases we found that three different categories could be appropriate for an individual accident. So my intent was to try to figure out whether or not they were correctly categorized. And as far as what percentage, I have

never really run a calculation. The only calculations that I ran were if you just add up the whole column, for example, 40-something percent of the aircraft were out of control or in control. Just simple math. That's all I did.

JUDGE LAM: Thank you, Colonel Horstman.

JUDGE FARRAR: But you made a statement this morning earlier that indicated some difficulty you were having with the small universe of accidents that they eventually relied on. But yet when Judge Lam asked you a few minutes ago what were the major deficiencies you saw in the case, you did not include that as one of them.

LT. COL. HORSTMAN: That's correct.

JUDGE FARRAR: Okay. Can you reconcile those two? You said it was a problem but you did not re-urge it a few minutes ago.

LT. COL. HORSTMAN: I think it is troubling that we don't have all the accidents for the whole history of the F-16. I don't know statistically what it would do. So to say it is a major problem, I can't take that leap of faith. I don't know that it is.

JUDGE FARRAR: So you were talking about having all the F-16 accidents, not about the

statistical analysis of the ones that we do have?

LT. COL. HORSTMAN: That's correct, sir.

JUDGE FARRAR: Okay. I think that concludes the Board's questions. It's almost one o'clock. Let's come back at 2:00 for the Staff's cross and the State's redirect. And then our step after that, Mr. Gaukler, is you would want to put on the former military officer panel as rebuttal?

MR. GAUKLER: That's correct.

JUDGE FARRAR: And how long will that take?

MR. GAUKLER: My colleague is working on that right now downstairs. I don't know.

JUDGE FARRAR: But our time constraint is the State wants to have with them Colonel Horstman during that entire exercise?

MR. GAUKLER: That's my understanding.

JUDGE FARRAR: Let's figure out what we are going to do that today. Speaking of lunch, our intention is at this point that Friday after lunch we will announce our decision orally on Utah SS. Mr. Gaukler, you will be here; Ms. Marco, you may want to have Mr. Turk here; Mr. Wiseman cannot be here. And Mr. Soper, you can -- well, I don't know what we will be trying Friday. You may let Ms.

Chancellor and Mr. Stewart know that that's what we are now planning. That would be after lunch on Friday. See you at two o'clock.

(Noon recess.)

JUDGE FARRAR: All right. Before we get started this afternoon, Mr. Gaukler?

MR. GAUKLER: Yes. I'd like to move for the admission of PFS Exhibit 99, which is the excerpt from the December 11th, 2000 Horstman deposition, the one we just talked about before lunch.

JUDGE FARRAR: Any objection to that?

MS. MARCO: No objection.

MR. SOPER: No objection.

JUDGE FARRAR: That will be admitted.

(APPLICANT'S EXHIBIT-99 WAS RECEIVED.)

We were then going to start the Staff cross-examination of Col. Horstman. Go ahead, Ms. Marco.

MS. MARCO: Thank you.

CROSS-EXAMINATION

BY MS. MARCO:

Q. Good afternoon.

A. Good afternoon, ma'am.

Q. Hi. I'm Catherine Marco. I'm attorney for the NRC Staff. I'd like to start with conversations you had with F-16 pilots who have ejected. You state that Col. Coots ejected from an F-111 on September 16th, 1982 in the United Kingdom. Did you ask him where he was flying at at the time of the accident?

A. He was stationed in one of the two air force bases over in England flying F-111's.

Q. Was that Lecheyers (phonetic) base in Scotland?

A. No, it's called Leuchars, ma'am. And that is the base where he was doing a low approach. Leuchars is an RAF base, Royal Air Force, and he was stationed at Lakenheath, RAF Lakenheath, which is a U.S. Air Force base about 200 miles south of there.

Q. But during the accident was he flying towards the Leuchars base?

A. Yes, ma'am, he was.

Q. All right. Did he tell you what was underneath him at 150 feet AGL when he had the hydraulic failure?

A. He didn't need to. It's the ocean.

Q. In question 33 of your testimony you

consider the service length of an aircraft such as the F-16. You state that any estimate of future crash rates must approximate the service life of the F-16. Do you recall that testimony?

A. Not those specific words, but yes, the concept.

Q. Do you know when the F-16 was initially put in service?

A. I can look it up for you. It was late 70's. I don't have the exact date off the top of my head.

MS. MARCO: May I approach the witness?

JUDGE FARRAR: Yes, you may.

Q. (By Ms. Marco) I have placed a thing in front of you. Can you identify what it is?

A. It's a very large book. It's called The Great Book of Modern War Planes with over 800 full-color illustrations.

Q. Are you familiar with this book?

A. I've seen it before, yes.

Q. Will you please turn to page 184 of this book.

A. Okay.

Q. The first full paragraph -- I guess it's the second full paragraph. What does that say in

the first sentence?

A. "The USAF accepted its first production of F-16's on August 17th, 1978, and the first delivery to an operational unit followed on January 6th, 1979."

Q. And the second sentence, what does that say?

A. "First unit to be equipped was the 388th Tactical Fighter Wing at Hill Air Force Base, Utah, which built up its full strength of 102 Fighting Falcons by the end 1980 and trained air crews for tack and export customers."

Q. Isn't it true that the U.S. Air Force gets F-16 aircraft in blocks?

A. When they produce aircraft, every -- after a certain amount of time for an upgrade they would go from the block 10 to the block 15. There's also an A model and C model delineation. They're currently flying up through the block 50 for the United States Air Force and the block 60 for foreign air forces.

Q. And isn't it true that the F-16 aircraft are regularly maintained in these blocks?

A. Yes, ma'am.

Q. Shouldn't the service life begin to be

counted from the time that the aircraft is first delivered to the U.S. Air Force for use?

A. The service life?

Q. Yes.

A. That would be one way to calculate it, by the first delivery. Another one would be by the first operational squadron.

Q. But you would have us calculate from manufacturing of the prototype, correct?

A. As I said, that would be one way to do that.

Q. And developing of the prototype?

A. The production aircraft, there are test aircraft and there are production aircraft. The test aircraft would never be anywhere for any other purpose than flight tests and things like that. They would not ever go to a base like Hill or Moody Air Force Base, Georgia.

Q. So when you consider that, why should that be considered in a data base to determine what the impact would be here in this case?

A. The best way to do it is by aircraft coding, I believe. By coding the first delivery of the training aircraft or combat coded aircraft, you would then get a non, what I'll call unique

aircraft. The first F-22 was a one-of-a-kind airplane. The second F-22 was a one-of-a-kind airplane. So the service life starts when the airplane starts and it ends when the airplane ends, because it's an F-16 or it's an F-22. Where you calculate the operational service life would depend on whether it's training or operational.

Does that answer your question?

Q. And when was the first training aircraft delivered to the U.S. Air Force?

A. It doesn't say here, but it's reasonable to assume that it was in 1979.

Q. In answer 39 of your testimony you state that you have performed emergency procedures while flying both F-16's and F-111's because of engine hydraulic and electric failure. Do you recall that testimony?

A. Yes.

Q. Did you perform these procedures in response to actual emergency, or was this in a training exercise?

A. They were a response to actual emergencies.

Q. And are engine hydraulic and electrical failures the types of problems that a pilot of a

crashing F-16 would encounter?

A. They are some of them, yes.

Q. And so although you were busy with these procedures in dealing with this, you were still able to land the plane each time, correct?

A. That's correct. None of the emergencies that I had required me to eject from the aircraft.

Q. You state that if time allows after all these procedures are completed, the pilot, and I believe you say can only then assess whether there are any populated or built-up areas to avoid. Is that right? If I understand your testimony in question and answer 39.

A. When I say can only then assess, your first action is to perform the emergency procedure checklist, and that takes up all of your time. So as soon as you accomplish that, you will then be worried about navigation, because it's aviate, navigate, communicate.

So your first order of business is to try to solve the problem at hand. The problem at hand is not landing the airplane, identifying any of the ground unless it's an obstruction to your flight path, for example, a mountain. So if you don't have one of those then you try to solve the

problems, and if you solve the problem you go about your business and land somewhere.

If you don't solve the problem then you begin the next series of the next checklist, if you will, because sometimes there's multiple checklists, or you would look out in front, navigate, talk on the radio. You would do all of those kinds of things in accordance with not only the checklist but common aviation sense.

Q. Okay. But I was looking at your procedures in question and answer 39. I'll ask you to look at that.

A. Okay.

Q. So as I understand what you said, you're not saying that avoidance is impossible, though?

A. Oh, clearly not, no. As a matter of fact, it is very possible.

Q. So are you saying it's last on this list?

A. It's item 4 on the list, but the last item just talks about when you need to eject. But in this kind of typical scenario, yes. Where the airplane goes would be the last item that I would be concerned about.

Q. So all these procedures are required to

be followed in every emergency?

A. No, ma'am. As a previous question, if we lost a system, a hydraulic problem, I wouldn't follow all of those. If I lost my radio, I would be in an emergency by definitions from the FAA. I wouldn't follow those. If I lost an engine then I would follow those kinds of steps, and I would refer through my checklist to make sure that I got all of the exact steps accomplished to restart the engine or eject or whatever else.

Q. In step 5, let's look at step 5 a second. You state that if the pilot must eject, the pilot will assess the ejection scenario. Does this mean assessing features of the terrain below?

A. Yes, ma'am, and it also means assessing the weather. If you penetrated into the weather, say, from above, you were gliding down and you thought you were 5,000 feet above the ground and you entered the clouds, you're no longer in a controlled environment because you no longer really know what's in front of you.

Q. But one element of that is assessing the terrain below, correct?

A. That is correct.

Q. And the pilot will look for a large,

flat landing area?

A. I would.

Q. And from negative features like lights?

A. I would look for the landing area where I had the best probability to not get injured, which includes those, or, as the previous testimony was, I believe it was a Beauty Rest mattress.

Q. Do you recall the approximate number of times that any of the F-16's flying in Skull Valley sustained lightning strikes?

A. I don't recall any.

Q. How many times have you flown in Skull Valley in lightning conditions?

A. Many, many times. And I don't have an answer. I've flown well over a hundred times in Skull Valley, and anytime there's a thunderstorm within ten nautical miles you're in lightning conditions.

Q. In an F-16?

A. Yes, ma'am.

Q. Answer 19, you state that many pilots will use the facility as a turning or a navigation point. Isn't the use of a facility as a turning point strictly a matter of convenience?

A. No, it's not strictly a matter of

convenience. You're required to choose turn points so that you're going to have a route of flight and you're going to be able to judge your fuel. And the Air Force won't let their young pilots just go wander around. You have to have a road map for where you're going to go.

Q. But that facility, use of that facility would be a matter of convenience?

A. Yes. And I think if you look at that facility, every time a pilot or a flight lead in an F-16 formation is going to choose a point to turn, he goes through an evaluation process which includes all of those types of things which would make a good turn point or a bad turn point: vertical development, infrared development, lighting potentially for a night turn point, color contrast, depth perception, sun angle. If it's cloudy you'd be able to see it anyway. Whether it has a radar reflectivity. All of those kinds of things from the various sensors on the aircraft.

So the more of the categories that you can say yes to that have these characteristics, that would lead you more towards choosing a particular point as a turn point. And in Skull Valley there are currently no definitive turn