

RAS 4410

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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: Wednesday, April 10, 2002

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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
Utah State Capitol
Salt Lake City, Utah 84144

Wednesday, April 10, 2002

The above-entitled matter came on for hearing,
pursuant to notice, at 10:30 a.m. 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

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I N D E X

Witness Panel:

Brigadier General James L. Cole, Jr.
 Major General Wayne O. Jefferson, Jr.
 Colonel Ronald E. Fly
 Mr. Stephen Vigeant

Cross Examination by Mr. Soper Page 3111

E X H I B I T S

No.	MRKD/ADMTD
State's Exhibit 149 "R" Factor of .145 Determination	3213 3247
State's Exhibit 150 State's 150: Page 3-43 from T.O. 1F-16C-1	3247 3254
State's Exhibit 151 Excerpts from USAF Flying Safety Magazine, Sept. 2001	3255
State's Exhibit 152 Chapter 17 from the U.S. Air Force Flight Surgeon's Guide;	3299
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State's Exhibit 153 Air Force News, released April 5, 1999	3326
State's Exhibit 154 F-16 Crash History	3359 and 3374
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State's Exhibit 156 3000 to 4000 Feet Above Ground Level Cross-Section	3412

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1 Wednesday, April 10, 2002

10:30 a.m.

2
3 P R O C E E D I N G S
4

5 JUDGE FARRAR: Good morning, everyone.
6 Appreciate everyone getting here on time and
7 getting everything set up in what will be our
8 courtroom for the next four days.

9 I'd like -- I see Ms. Chancellor isn't
10 here, but I'll extend to her and Ms. Nakahara
11 thanks for helping us get this room when we
12 couldn't find space anywhere else.

13 Mr. Silberg, I hope it's not caused
14 your clients any unnecessary angst to be in this
15 building. We can assure you that while it's a
16 state capitol and the home of the legislature, in
17 ordinary times, as far as we're concerned, it's
18 the same as being in our own courtroom back at
19 headquarters. Again, we extend our thanks to the
20 State for making it available.

21 I see that all the counsel are here and
22 the witnesses from yesterday, General Jefferson,
23 Colonel Fly and General Cole. Mr. Vigeant is not
24 there, he's behind because there are only three
25 seats in front, and most of the attention thus far

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1 is not focused on him.

2 We're a little bit cramped in terms of
3 space and facilities, so we'll just proceed as
4 best we can.

5 One thing came to mind yesterday.
6 Please remember when you give documents to the
7 court reporter or we ask her, as happened
8 yesterday, to read something back, don't start up
9 anything new until she's back, finished her
10 housekeeping and is back with her fingers ready so
11 we don't have to interrupt.

12 Are there any preliminary procedural
13 matters?

14 MR. GAUKLER: Yes. One, your Honor. I
15 have just submitted to the Board and made three
16 copies to give to the court reporter and the
17 parties the Testimony of Jeffrey Johns on Aircraft
18 Crash Hazards at the PFSF Contention Utah
19 K/Confederate Tribes B dated February 19, 2002.
20 It consists of eight pages of testimony with the
21 information that was affected by the Board's order
22 excluding testimony on impacts or -- testimony on
23 consequences that has been excluded. There's a
24 two-page resume. We've agreed with the State and
25 the NRC Staff that we can stipulate that this is

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1 Mr. Johns' testimony, what he would swear and
2 affirm to if he were here, and this can be
3 inserted into the record as such.

4 JUDGE FARRAR: And it has been marked
5 up to eliminate the material we ruled on the other
6 day?

7 MR. GAUKLER: Yes.

8 JUDGE FARRAR: No objection, I take it,
9 then we'll have it bound into the record at this
10 point.

11 MR. GAUKLER: There isn't -- it
12 includes no cross-examination, obviously.

13 JUDGE FARRAR: Right, so we'll take
14 this for what it says as evidence in the case.

15 MR. SOPER: May I -- is this -- I take
16 it this is working?

17 JUDGE FARRAR: Okay, the way the system
18 works here is, we don't have on/off switches. I
19 have a board in front of me here that I can turn
20 off your microphone, but since I don't know when
21 you want me to do that, I'm just going to leave
22 them on. If you need to confer, remember they're
23 always on, and so you have to push it away from
24 you.

25 MR. SOPER: Thank you, your Honor.

1 Just to make sure it's clear: The State
2 is stipulating to the fact that if Mr. Johns were
3 here, he would swear that this is his testimony.
4 We're not stipulating to the truth of it but only
5 the fact that he would claim this as his
6 testimony. And we are offering no
7 cross-examination. To the extent it may be
8 disputed by other evidence, then it is. In other
9 words, we're not agreeing to the factual substance
10 of this, only that it is his evidence.

11 JUDGE FARRAR: Okay, let me make sure I
12 understand it. You're agreeing that he would
13 testify this way. You wouldn't cross-examine him.
14 This evidence would come on and I can take it that
15 this is what he said and he believes to be true,
16 but if you have other evidence that goes another
17 way, we could when we write our decision choose
18 that other evidence as establishing a fact, rather
19 than the facts that he says are true?

20 MR. SOPER: That's correct.

21 JUDGE FARRAR: Mr. Gaukler, is that
22 your understanding?

23 MR. GAUKLER: That is my understanding
24 of the agreement.

25 JUDGE FARRAR: Staff have any --

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February 19, 2002

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

In the Matter of)	
)	
PRIVATE FUEL STORAGE L.L.C.)	Docket No. 72-22
)	
(Private Fuel Storage Facility))	ASLBP No. 97-732-02-ISFSI

**TESTIMONY OF JEFFREY JOHNS
ON AIRCRAFT CRASH HAZARDS AT THE PFSF—
CONTENTION UTAH K/CONFEDERATED TRIBES B**

I. BACKGROUND--WITNESS

Q1. Please state your full name.

A1. Jeffrey Robert Johns

Q2. By whom are you employed and what is your position?

A2. I am a Licensing Engineer for Stone & Webster, Inc.

Q3. Please summarize your educational and professional qualifications.

A3. My professional and educational experience is summarized in the curriculum vitae attached to this testimony. I have 26 years of experience in the nuclear power industry and 10 years of experience with the licensing of independent spent fuel storage installations (ISFSIs). I have experience in performing accident analyses for nuclear power plants and ISFSIs. For the PFS project, I was responsible for the preparation of portions of the PFSF Safety Analysis Report (SAR), including sections dealing with accident analyses and radiation protection for the PFSF. As such, I am familiar with the shielding design provisions of the HI-STORM 100 storage system, confinement design provisions of the canister, and the protection afforded the canister by the rugged HI-STORM 100 storage overpack from postulated events such as tornado-driven missiles and explosions. I am responsible for amendments to the PFSF SAR to keep it up-to-date. I am knowledgeable of

the design and operation of the PFSF and the spent fuel casks that will be used there. ~~I am knowledgeable of the means of calculating whether an impacting object would penetrate a spent fuel storage cask.~~ I am ~~also~~ knowledgeable of the means of calculating whether the overpressure produced by an explosion would damage a spent fuel storage cask or a building at the PFSF.

Q4. What is the purpose of your testimony?

A4. The purpose of my testimony is to respond to the allegation in Contention Utah K/Confederated Tribes B ("Utah K") that:

The Applicant has inadequately considered credible accidents caused by external events and facilities affecting the ISFSI, including the cumulative effects of military testing facilities in the vicinity.

Q5. To what will you testify?

A5. ~~I will testify regarding the capability of the side and the top of a HI-STORM 100 spent fuel storage cask to resist penetration by the engine of a crashing F-16 aircraft, based on the results of a calculation that I performed to assess this postulated event.~~ I will ~~also~~ testify to the overpressure limits used to evaluate the susceptibility of the spent fuel storage casks and the Canister Transfer Building at the PFSF to nearby explosions of ordnance carried on crashing military aircraft.

II. CALCULATIONS

~~A. F-16 Impact into a Spent Fuel Storage Cask~~

Q6. How did you calculate whether a crashing F-16 could penetrate a spent fuel storage cask at the PFSF?

A6. I applied the formulas recommended for analyzing steel and concrete penetration in U.S. Department of Energy, Accident Analysis for Aircraft Crash into Hazardous Facilities, DOE-STD-3014-96 (Oct. 1996), to calculate the impact velocities necessary for an F-16 engine to penetrate the side and the top of the HI-STORM 100 spent fuel storage cask that will be used at the PFSF. These are the same formulas that were applied in P.R. Davis, D.L. Strenge, and J. Mishima, "Accident Analysis for Continued Storage," (Oct. 1998), to evaluate impact velocities and thicknesses of steel and concrete barriers that could be penetrated by aircraft engines (including the F-16) postulated to impact steel dry storage casks contain-

ing commercial spent nuclear fuel that are enclosed within concrete storage modules. This methodology is described in section XI of "Private Fuel Storage, Aircraft Crash Impact Hazard at the Private Fuel Storage Facility," Revision 4 (August 10, 2000) ("Aircraft Report"), which is identified as PFS Exhibit N. Relevant pages from the document by P.R. Davis, et. al., are included in Tab N of the Report.

The HI-STORM 100 storage cask sidewall consists of a steel outer shell, a thick concrete sidewall, and a steel inner cask liner. The lid on top of the HI-STORM 100 storage cask consists of a thick steel upper plate that extends across the top of the cask sidewalls, with a concrete plug attached to the bottom of the upper plate that fits in the cask cavity above the spent fuel canister.

The calculation (PFS Calculation 05996.02-P-003, Revision 1, identified as PFS Exhibit Z) conservatively determines the initial velocity of an F-16 aircraft engine needed to penetrate the storage cask sidewall, such that its kinetic energy is expended before it can begin to penetrate the steel wall of the canister. The aircraft is assumed to have a horizontal trajectory with the engine impacting perpendicular to the cask sidewall. In addition, the calculation conservatively determines the initial velocity of an F-16 aircraft engine needed to penetrate the steel upper plate of the storage cask lid, such that its kinetic energy is expended before it can begin to impact the canister. The aircraft is assumed to have a vertical trajectory with the engine impacting perpendicular to the cask lid.¹

It is appropriate to evaluate the penetration capability of the engine because according to the Department of Energy standard for evaluating aircraft crashes into hazardous facilities, the bounding object when calculating whether an aircraft crash would penetrate a structure is the aircraft engine. U.S. Department of Energy, Accident Analysis for Aircraft Crash into Hazardous Facilities, DOE-STD-3014-96 (Oct. 1996) at 58. This is further supported by full-scale aircraft crash test results that show that the aircraft jet engine rotors are the parts of the aircraft

¹ This calculation is a revision of the calculation that is included in the Aircraft Report at Tab N. The revision accounts for the change since the issuance of the Aircraft Report in the strength of concrete to be used in the HI-STORM 100 spent fuel storage casks at the PFSF (See PFSF SAR pp. 8.2-32 to -32b) and the fact that a jet engine is a deformable missile. U.S. Department of Energy, Accident Analysis for Aircraft Crash into Hazardous Facilities, DOE-STD-3014-96 (Oct. 1996) at 61 and 67.

that would penetrate the farthest into concrete. W.A. von Rieseemann et al., "Full-Scale Aircraft Impact Test for Evaluation of Impact Forces," Transactions of the 10th International Conference on Structural Mechanics in Reactor Technology, 14-18 August 1989, Anaheim, California, USA, J-285, -287 (1989).

Q7. What did the calculation show?

A7. PFS Calculation 05996.02-P-003, Revision 1 (PFS Exhibit Z), determines that an F-16 engine would need to impact the sides of the HI-STORM 100 storage cask at a speed of 400 knots in order to just penetrate the cask sidewall, but not begin to penetrate the canister shell. The calculation also determines that an F-16 engine would need to impact the top of the HI-STORM 100 storage cask at a speed of 459 knots in order to just penetrate the lid's steel top plate, but not begin to impact the canister. The calculation conservatively assumes in both cases that the aircraft impact is perpendicular to the cask surface, and that the kinetic energy from the F-16 engine is expended in penetrating the cask with no energy taken up by movement of the cask.

The cask also would not be penetrated by higher speed impacts which may impact the side or top of the cask at an angle. The calculated speeds necessary to penetrate the cask presume an impact perpendicular to the surface, with the engine (and particularly the jet engine rotor) travelling toward the cask centerline. Since the sides of the HI-STORM 100 storage cask are vertical, the incoming aircraft would need to have a horizontal trajectory prior to impact with a storage cask, and impact perpendicular to the cask surface, to achieve the calculated sidewall penetration. Likewise, an F-16 engine impacting the lid on top of the storage cask would produce the calculated penetration only if it struck perpendicular to the lid, that is, assuming a vertical trajectory.

If it were postulated that an aircraft crashed into the PFSF, a crashing aircraft would most likely impact the site at an angle with the horizontal, which would reduce the velocity component perpendicular to the side of the cask and hence reduce the sidewall horizontal penetration distance. For example, an aircraft impacting the side of a cask at an angle of 30 degrees from the vertical would have a horizontal velocity component half that of an aircraft traveling at the same speed impacting perpendicular to the side of the cask ($\sin(30^\circ) = 0.5$). Furthermore, because of the cylindrical shape of the storage cask, an aircraft engine travelling

~~horizontally that impacts a cask at an angle away from the perpendicular could deflect and deliver a glancing blow, producing little penetration damage.~~

~~The protection provided by the cask sidewall and top significantly reduce the already extremely low risk to the PFSF from potential high-speed F-16 crashes.~~

B. Nearby Explosion Overpressure Limits

Q8. What values were used for assessing the susceptibility of the spent fuel casks at the PFSF and the Canister Transfer Building to potential nearby explosions of ordnance?

A8. As set forth in Section X.D of the Aircraft Report, pp. 83b-83c, PFS used a value of 10 psi for the spent fuel storage casks and 1.5 psi for the Canister Transfer Building (CTB) to evaluate the susceptibility of the PFSF to the overpressure created by the explosion of ordnance.

Q9. How did you determine the overpressure limits applicable to the spent fuel storage casks at the PFSF?

A9. The value for the spent fuel storage casks (10 psi) is from the Final Safety Analysis Report ("FSAR") for the Holtec HI-STORM-100 spent fuel storage cask, Table 2.2.1 and pp. 3.4-65 to -68, which specifically analyzes the susceptibility of a cask to a nearby explosion. The analysis demonstrates that a HI-STORM 100 storage cask will not begin to tip when exposed to a 10 psi transient overpressure having a duration of 1.0 second from a postulated explosion. The spent fuel canister is designed to withstand an external pressure loading from a postulated accident of 60 psig (HI-STORM 100 FSAR, Table 2.2.1), so its integrity will not be challenged by the 10 psi explosion overpressure. The HI-STORM 100 cask design has been approved by the NRC under 10 C.F.R. Part 72. PFS recognizes that it used a conservative standard of 1.0 psi to evaluate the susceptibility of the PFSF to potential explosions at the Tekoi Rocket Engine Test Facility (now defunct) and potential explosions of propane gas at the PFSF. See PFSF SAR pp. 8.2-23b to -23p. Nevertheless, PFS believes that the 10 psi limit for the spent fuel casks remains appropriate because of the robust nature of their construction and the specific explosion analysis contained in the HI-STORM 100 FSAR, approved by the NRC under 10 C.F.R. Part 72.

Q10. How did you determine the overpressure limits applicable to the Canister Transfer Building?

A10. The value for the CTB is from the PFSF SAR, p. 8.2-23c, which states that the CTB is designed to withstand extreme winds, pressure drops of 1.5 psi, and missiles associated with the design tornado. The 1.5 psi tornado pressure drop limit for the building was selected as the explosion overpressure limit used in the Aircraft Report. This is conservative since the building is designed to withstand higher differential pressures. PFSF SAR, p. 4.7-6c states: "Out of plane pressures on the exterior walls due to tornado loads are caused by the 240 mph wind velocity and the 1.5 psi pressure drop. The worst pressure is outward on the side walls and is equal to $0.00256 (240)^2 (0.7) + 1.5 \text{ psi} (144 \text{ in}^2/\text{ft}^2) = 319 \text{ psf}$."² This 319 psf tornado pressure equates to 2.2 psi. The size and configuration of steel reinforcement ("rebar") in the concrete will be identical on both the inner and outer faces of the CTB walls. As a result of this reinforcement design, the walls will have the capability to withstand either an outward force due to a negative external pressure (which can be produced by a tornado) or an inward force due to a positive external pressure (which can be produced by an explosion) equally well. Therefore, the design of the CTB walls will enable them to withstand a 2.2 psi differential pressure, which exceeds the 1.5 psi overpressure limit set forth in Section X.D of the Aircraft Report for postulated explosions of ordnance. Although it used a conservative standard of 1.0 psi to evaluate the susceptibility of the PFSF to potential explosions at the Tekoi facility and potential explosions of propane gas at the PFSF, the 1.5 psi limit for the CTB in the Aircraft Report is itself conservative, as demonstrated in the above discussion and by the fact that a short transient overpressure wave produced by an explosion is less damaging to a structure than a longer transient pressure drop produced by the design basis tornado. See HI-STORM 100 FSAR, p. 3.4-66 (use of a steady state force to calculate the effects of an explosion is very conservative).

Q11. How were the overpressure limits used in determining the susceptibility of the spent fuel storage casks and the Canister Transfer Building to nearby ordnance explosions?

A11. The limits were used to calculate the explosive radius of the ordnance, r_e , i.e., the distance from the explosion at which the overpressure would exceed the cask's or

² The design of the Canister Transfer Building walls is actually governed by seismic stress limits. "The out of plane seismic inertia load, based on a typical horizontal acceleration of 0.9 g results in an equivalent pressure for a 2 ft. thick wall of $2'(150 \text{ pcf})(0.9) = 270 \text{ psf}$. Although the pressure due to tornado is slightly higher than that due to seismic loads, the shear in the walls due to seismic are much greater and seismic loads will govern the design." PFSF SAR, p. 4.7-6c.

the building's limit. See Aircraft Report at pp. 83d, 83g-83h. From that information, PFS calculated the probability that ordnance would land and explode close enough to a cask or the building to damage them.

Q12. Although you have stated above that the overpressure limit of 1.5 psi for the building is appropriate, given that PFS had assumed a 1.0 psi limit to evaluate the susceptibility of the PFSF to potential explosions at the Tekoi facility and potential explosions of propane gas, what would be the effect of assuming a 1.0 psi limit for the CTB here?

A12. Even if one were to use 1.0 psi as a conservative limit for the CTB, the results of the analysis would be the same—the hazard posed by potential nearby explosions of ordnance would be insignificant. The effect of using a 1.0 psi limit for the CTB instead of a 1.5 psi limit would be to increase the explosive radius of the ordnance, r_e , i.e., the distance from the explosion at which the overpressure would exceed the CTB's limit. See Aircraft Report at pp. 83d, 83g-83h. The effect on the hazard is calculated by substituting the new r_e into the equations set forth in the report.

This effect is shown in the Revised Addendum to the Aircraft Report, pp. 32-34.³ The probability that unarmed live ordnance carried aboard a crashing aircraft would explode and damage a spent fuel storage cask (using the limit of 10 psi) in the cask storage area at the PFSF is equal to 7.2×10^{-12} . (This calculation and the other probability calculations discussed here were based on the number of F-16s that transited Skull Valley in FY 98 and the fraction of them that carried explosive ordnance) The probability that unarmed live ordnance carried aboard a crashing aircraft would explode and damage the CTB, using the limit of 1.0 psi, is equal to 2.102×10^{-11} . Thus, the cumulative probability that a unarmed live bomb onboard a crashing aircraft would impact nearby and explode and damage a spent fuel storage cask or the CTB is equal to $7.20 \times 10^{-12} + 2.102 \times 10^{-11} = 2.822 \times 10^{-11}$.

Similarly, the probability that jettisoned unarmed live ordnance would impact nearby and explode and damage a spent fuel storage cask in the cask storage area at the PFSF is equal to 1.09×10^{-10} . The probability that jettisoned unarmed live ordnance would impact nearby and explode and damage the CTB (assuming a 1.0 psi limit) is equal to 1.88×10^{-10} . Thus, the cumulative probability that a jetti-

³ Revised Addendum to Aircraft Crash Impact Hazard at the Private Fuel Storage Facility (July 20, 2001) (identified as PFS Exhibit O).

soned unarmed live bomb would impact nearby and explode and damage a spent fuel storage cask or the CTB is equal to $1.09 \times 10^{-10} + 1.88 \times 10^{-10} = 2.97 \times 10^{-10}$.

Therefore, if one used a conservative blast overpressure limit of 1.0 psi for the CTB instead of the 1.5 psi used in the Report (and one based the calculation on the number of F-16s that transited Skull Valley in FY 98 and the fraction of them that carried explosive ordnance), the cumulative probability that unarmed live ordnance either carried aboard a crashing aircraft or jettisoned from an aircraft would impact nearby and explode and damage a spent fuel storage cask or the CTB at the PFSF is equal to sum of the probabilities calculated above: $2.822 \times 10^{-11} + 2.97 \times 10^{-10} = 3.25 \times 10^{-10}$. This remains far less than the probability that a crashing aircraft or jettisoned ordnance would impact the site directly.

**Resume of
Jeffrey R. Johns**

JEFFREY R. JOHNS

Licensing Engineer

EXPERIENCE SUMMARY

Mr. Johns has 21 years of experience in the nuclear power industry, including 4 years as an officer in the U.S. Naval Nuclear Power Program and 17 years in nuclear licensing-engineering at Public Service Company of Colorado's (PSCo) Fort St. Vrain (FSV) nuclear power plant and ISFSI. He has been actively involved with ISFSI licensing work since plans were first formulated to license and construct the FSV ISFSI in 1990. Mr. Johns joined Stone & Webster recently as a permanent employee to assist in the licensing effort for the Private Fuel Storage Facility ISFSI

Mr. Johns was Supervisor of PSCo Nuclear Licensing from 1981 to 1991. He was responsible for the performance of 10 CFR Part 50.59 safety evaluations, for maintaining the FSV plant SAR up-to-date to reflect plant modifications and the current safety basis, and preparing amendments to the facility technical specifications. He was instrumental in helping PSCo comply with major regulatory changes, such as those stemming from the accident at Three Mile Island and the environmental qualification and fire protection rules. Mr. Johns developed acceptance criteria specific to FSV and interfaced with the NRC to obtain their approval.

He was responsible for directing the reactor vendor in accident analyses, which were necessary to license major modifications and determine compliance with new regulations. Mr. Johns received a \$1,000 award for providing the analytical basis for the FSV plant symptom-oriented emergency operating procedures. He assisted in accident analyses for the ISFSI, was responsible for determining event classification of accidents assessed in the ISFSI SAR, and helped to prepare ISFSI emergency procedures.

Mr. Johns was PSCo's lead in developing the FSV decommissioning accident analyses and preparing major portions of the decommissioning plan (licensing basis for decommissioning). He chaired the Hazards Analysis Review of Decommissioning Committee, consisting of personnel with expertise in the areas of construction, nuclear safety, health physics and industrial safety. Mr. Johns served on the team appointed to revise station procedures to make the FSV ISFSI a "stand-alone" facility, in preparation for termination of the Part 50 license.

RELEVANT PROJECT EXPERIENCE

Private Fuel Storage Facility, Private Fuel Storage, LLC - As Licensing Engineer, responsible for the preparation of the Safety Analysis Report (SAR), including accident analysis and radiation protection involving both of the selected storage system vendors.

Fort St. Vrain ISFSI, Public Service Company of Colorado - The FSV ISFSI is a Foster-Wheeler storage vault system. Mr. Johns assisted in licensing the FSV ISFSI under 10 CFR Part 72. He interfaced with the NRC on the ISFSI accident analysis, specifically resolving a licensing issue related to the source term and consequences of the ISFSI Maximum Credible Accident, postulated breach of a fuel storage container.

He was responsible for ISFSI SAR updates to maintain the ISFSI licensing basis up-to-date. He substantially revised the SAR to incorporate results of new analyses for reduced decay heat removal, following the occurrence of a natural convection cooling flow path blockage event in 1992 that exceeded the design basis.

He was also responsible for the performance of safety evaluations (per 10 CFR Part 72.48) on ISFSI design modifications, and prepared a safety evaluation concerning modifications which make the ISFSI cask load/unload port compatible with new spent fuel shipping casks. Mr. Johns had the lead role in licensing the new spent fuel shipping casks, designed by Transnuclear Inc., to transport loaded fuel storage containers from the ISFSI without the need for transfer of fuel elements into a special cask liner.

He developed two amendment packages to the FSV ISFSI license. The first permitted installation of pipelines in the vicinity of the ISFSI that supply natural gas at high pressures to the combustion turbines used to repower the FSV plant. Mr. Johns directed analyses to determine natural gas plume dispersion under various meteorological conditions, pressures at the ISFSI resulting from postulated detonation of the natural gas cloud, and structural effects on the ISFSI. The second amendment permitted storage of low-level radioactive waste and radioactive sources for instrument calibration at the ISFSI. Mr. Johns prepared the safety analyses for both amendment packages. The safety analyses were reviewed and accepted by the NRC and their contractor without questions, and the NRC issued the license amendments.

Mr. Johns provided assistance to the FSV Emergency Planning Coordinator with ISFSI emergency procedures, event classification, and in creating realistic drill scenarios for the annual examinations of emergency preparedness, observed by the NRC.

EDUCATION

B.S., Biological Science - Stanford University

LICENSES AND REGISTRATIONS

Professional Engineer - Colorado

1 MS. MARCO: That's acceptable to the
2 Staff, your Honor.

3 JUDGE FARRAR: All right, then let's
4 resume. Gentlemen, you still consider yourselves
5 still under oath.

6 Mr. Soper, go ahead.

7 MR. SOPER: Thank you, your Honor.

8

9 CROSS-EXAMINATION (Continued)

10 BY MR. SOPER:

11 Q. General Jefferson, if we might pick up
12 with State Exhibit 148 that we were looking at
13 when we adjourned yesterday, and we were noting
14 the effect of the modification that you have made
15 to the NUREG 800 formula and the significance of
16 it, finding that PFS has come within the threshold
17 probability. Do you recall our discussion on
18 that, sir?

19 GEN. JEFFERSON: Yes, I do.

20 Q. There is no reference in NUREG 800
21 itself, is there, with respect to this formula?

22 GEN. JEFFERSON: Formula with the R,
23 there is not.

24 Q. And there is no reference in NUREG 800
25 to the concept of reducing the impact probability

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1 due to the pilot being able to avoid a ground
2 site?

3 GEN. JEFFERSON: Not directly.

4 Q. I'm sorry?

5 GEN. JEFFERSON: Not directly.

6 Q. Indirectly is there a reference?

7 GEN. JEFFERSON: There is a reference
8 that the specifics ought to be considered when
9 you're looking at an accident, and that the
10 formula is not the only way to do this.

11 Q. I see. So to the extent specific means
12 a pilot's able to avoid a site, it's referred to?

13 GEN. JEFFERSON: No, not that specific.

14 Q. It doesn't mention anything about a
15 pilot's ability to avoid specifically?

16 GEN. JEFFERSON: No, it does not do
17 that.

18 Q. You have, sir, in addition to the NUREG
19 800, I'm holding up a portion of it here, it just
20 deals with aircraft crash. You've also revealed
21 -- excuse me, reviewed the DOE standard accident
22 analysis for aircraft crash into hazardous
23 facilities. You've reviewed this document, have
24 you not, sir?

25 GEN. JEFFERSON: Yes, I have.

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1 Q. And this is the Department of Energy's
2 publication. In fact, to identify it for the
3 record, it's the DOE Standard 3014-96 published in
4 October of 1996. Are we --

5 GEN. JEFFERSON: Yes.

6 Q. -- on track there?

7 GEN JEFFERSON: It's the one I got.

8 Q. And you've also reviewed, sir, have you
9 not, the data development technical support
10 document for the aircraft crash risk assessment
11 methodology standard?

12 GEN. JEFFERSON: Yes.

13 Q. And this is a document that has on the
14 front Lawrence Livermore National Lab. Would that
15 be correct, sir?

16 GEN. JEFFERSON: I don't have it in
17 front of me, but I believe that's correct.

18 Q. And for the record, the technical
19 number appears to be UCRL-ID-124837, and that the
20 document was published in August of 1996. Does
21 that sound correct?

22 GEN. JEFFERSON: Yes. Yes, it does.

23 Q. So this is a stack of documents, it
24 looks to be a couple of inches thick, consisting
25 of hundreds of pages devoted to the subject

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1 specifically. Do you find any reference to the
2 formula you used in these documents, sir?

3 GEN. JEFFERSON: No, I have not seen
4 that formula in there.

5 Q. In fact, these documents, each of them
6 actually address the crash rate for various
7 aircraft under various conditions, do they not?

8 GEN. JEFFERSON: Yes.

9 Q. In fact, the data development technical
10 support document has specific crash rates for
11 aircraft including specifically the F-16 fighter,
12 does it not?

13 GEN. JEFFERSON: Yes, up through '93.

14 Q. And also -- that's '75 to '93, so
15 about 18 years of history?

16 GEN. JEFFERSON: Yes.

17 Q. And it talks about specifically the
18 crash rate for various F-16 modes of flight
19 including takeoff; is that right?

20 GEN. JEFFERSON: Correct.

21 Q. Special operations?

22 GEN. JEFFERSON: Correct.

23 Q. And normal flight?

24 GEN. JEFFERSON: That's correct.

25 Q. And in all this discussion of the F-16

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1 crash rate, is there any mention of a pilot's
2 ability to avoid as affecting the crash rate?

3 GEN. JEFFERSON: No, that's not in
4 there.

5 Q. Do you think, sir, that all these
6 authorities published in 1996 were unaware of the
7 fact that aircraft had pilots that might be able
8 to reduce the probability of impact?

9 GEN. JEFFERSON: They probably were. I
10 don't know that.

11 Q. They certainly didn't mention it, did
12 they?

13 GEN. JEFFERSON: No, they did not.

14 Q. As far as you know, this is the very
15 first time that this formula with an R factor has
16 been used. Isn't that right?

17 GEN. JEFFERSON: Yes, that's the first
18 time that's been used.

19 Q. So we're plowing new ground here, so to
20 speak. Would that be fair?

21 GEN. JEFFERSON: Yes.

22 Q. And there are -- I think you've already
23 told me this, but there are no published studies
24 on the ability of a pilot to avoid a specific
25 ground site in an injection situation, are there

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1 not?

2 GEN. JEFFERSON: I did find one last
3 night.

4 Q. You found a study on that specifically?

5 GEN. JEFFERSON: A reference to a
6 study.

7 Q. And you found it last night?

8 GEN. JEFFERSON: Yes.

9 Q. So you did not use it in preparing your
10 calculations?

11 GEN. JEFFERSON: No, I did not. But it
12 has been done.

13 Q. Would you mind giving me the reference
14 to that, sir?

15 GEN. JEFFERSON: Yeah. It was one of
16 the documents that the state gave. It's a safety
17 and reliability directorate publication for the
18 United Kingdom, and it is called "A Method for the
19 Site-Specific Assessment of Aircraft Crash
20 Hazards."

21 Q. This is for the United Kingdom?

22 GEN. JEFFERSON: Yes.

23 Q. Have you found any studies for the
24 United States?

25 GEN. JEFFERSON: No.

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1 Q. Now, you have used the value R to be
2 14.5 percent, and you've arrived at that by
3 multiplying two numbers together, 90 percent times
4 95 percent. Is that right?

5 GEN. JEFFERSON: That's correct.

6 MR. SOPER: Now, your Honor, this is
7 not quite as convenient to approach here, but --

8 JUDGE FARRAR: Why don't -- Michelle,
9 if you don't mind serving as an intermediary. If
10 you can hand them to Michelle, she'll hand them to
11 us and the court reporter rather than have you go
12 all the way around a circle here.

13 MR. SOPER: Thank you, your Honor. I
14 believe we're at State Exhibit 149. Is that
15 correct?

16 (STATE'S EXHIBIT-149 WAS MARKED.)

17 JUDGE FARRAR: All right, the document
18 has been marked for identification by the court
19 reporter as State 149.

20 MR. SOPER: Thank you, your Honor.

21 Q. (By Mr. Soper) General Jefferson, I'm
22 showing you, sir, what's been marked as State 149.
23 Do you have that before you?

24 GEN. JEFFERSON: Yes, I do.

25 Q. This document purports to show, I would

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1 offer to you, that the figure you arrived at of
2 14.5 percent was obtained by multiplying 90
3 percent times 95 percent and then subtracting that
4 result from 100 percent to obtain 14.5 percent.
5 Is that basically correct?

6 GEN. JEFFERSON: That's correct.

7 Q. And the numbers were derived, I
8 understand, the 90 percent equals the percentage
9 of crashes where F-16 -- where the F-16 aircraft
10 is controllable by the pilot before he ejects.
11 Would that be correct, sir?

12 GEN. JEFFERSON: We use the 90 percent
13 number as a bound. Actually the number is higher
14 than that, about 95 percent. We use that for
15 conservatism.

16 Q. And you suggest that in 90 percent of
17 the cases the aircraft would be controllable by
18 the pilot?

19 GEN. JEFFERSON: Yes.

20 Q. And in the other 10 percent the crash
21 would be caused by some event where the aircraft
22 is not controlled; it may be spinning out of
23 control, for example?

24 GEN. JEFFERSON: Yes, lost control.

25 Q. So it wouldn't be steerable by the

1 pilot?

2 GEN. JEFFERSON: That's correct.

3 Q. And that as the -- to the other
4 number, 95 percent, that is the percentage of
5 crashes, percentage of the 90 percent of crashes
6 in which the pilot would be able to locate and
7 take whatever avoidance measures he needed before
8 ejecting?

9 GEN. JEFFERSON: Yes.

10 Q. And that 95 percent is a determination
11 that the three of the panel witnesses made
12 together; is that right?

13 GEN. JEFFERSON: That's correct.

14 Q. And that is a subjective determination
15 based on your collective opinions; is that right?

16 GEN. JEFFERSON: No, that's directive
17 -- it's our expert opinion based on data that we
18 gathered as to the amount of time a pilot would
19 have in a controlled situation and his ability to
20 do things like start the engine, see what's
21 outside, see what to avoid.

22 Q. But based on that data, it's your
23 subjective opinion? Let me ask you a different
24 way. Did you do any calculations to come up with
25 95 percent?

1 GEN. JEFFERSON: No. We did the
2 calculations to see how much time we would have.

3 Q. I see. So you might have picked 100
4 percent?

5 GEN. JEFFERSON: Could have.

6 Q. Or 80 percent?

7 GEN. JEFFERSON: Not likely.

8 Q. But it wouldn't have been driven by
9 numbers, it would be, in your opinion, which is
10 the most appropriate to use?

11 GEN. JEFFERSON: Yes, knowing what a
12 pilot does and how much time he has to react.

13 Q. I see. And again, you never have
14 ejected yourself, have you, sir?

15 GEN. JEFFERSON: No, but I've been in
16 emergencies.

17 Q. And neither have your co-panel members,
18 have they?

19 GEN. JEFFERSON: I'll let them speak.

20 Q. You don't know whether they've ever
21 ejected?

22 GEN. JEFFERSON: I don't think they
23 have.

24 Q. So it's your understanding they have
25 not?

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1 GEN. JEFFERSON: Yes.

2 Q. That would be true?

3 GEN. COLE: I've jumped but not
4 ejected.

5 Q. You've not ejected. Colonel Fly?

6 COL. FLY: I've jumped and sky dived,
7 but, like Colonel Horstman and most Air Force
8 pilots, I've never ejected, either.

9 Q. There are pilots who have ejected,
10 though, are there not?

11 COL. FLY: There are a few, but most
12 Air Force fighter pilots you talk to will not have
13 ejected.

14 Q. I see. Let me ask you this, sir. Have
15 you talked to any pilots who actually have
16 ejected?

17 MR. SILBERG: Excuse me. Who is that
18 question directed to?

19 MR. SOPER: Colonel Jefferson --
20 General. Excuse me, sir.

21 GEN. JEFFERSON: Yes, I have.

22 Q. And who would that be, sir?

23 GEN. JEFFERSON: General Norman Gaddis,
24 among others.

25 Q. And what did he eject from?

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1 GEN. JEFFERSON: F-4.

2 Q. And when was what?

3 GEN. JEFFERSON: In the Vietnam war.

4 Q. When did you speak with him?

5 GEN. JEFFERSON: Last time I spoke to
6 him was about a year and a half ago.

7 Q. Did you ask him about his opinion on
8 whether or not a pilot would be able to avoid this
9 site?

10 GEN. JEFFERSON: No. He ejected from
11 an uncontrolled plane.

12 Q. I see. So in his situation, he would
13 have had no opportunity to guide away from the PFS
14 site?

15 GEN. JEFFERSON: No, he would not have
16 had that opportunity. The plane was on fire and
17 destroyed.

18 Q. General, this opinion that this site is
19 safe from air crashes concerns the safety of
20 40,000 tons of high-level nuclear fuel. You're
21 aware of that, are you not?

22 GEN. JEFFERSON: Yes, I am.

23 Q. And you know, do you not, sir, that
24 this is the amount of spent nuclear fuel roughly
25 equivalent to all the spent nuclear fuel existing

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1 in the country today?

2 GEN. JEFFERSON: I've read that, yes.

3 Q. And are you, sir, aware of the dangers
4 from spent nuclear fuel?

5 MR. GAUKLER: Objection. I think we're
6 saying that this is not directed towards
7 consequences, which I hear you say.

8 MR. SOPER: I think it's certainly
9 directed to whether or not his opinion is
10 considering the importance of what he's saying.

11 JUDGE FARRAR: I think, Mr. Gaukler,
12 we'll allow -- your point is well taken, but
13 we'll allow this for the limited purpose not to
14 describe precisely what those consequences would
15 be, but the general consequences that would lead,
16 for example, to a pilot to want to avoid it.

17 MR. SOPER: That would be fine, your
18 Honor.

19 Q. (By Mr. Soper) Generally, what's your
20 understanding generally of the consequences of the
21 release of spent nuclear fuel?

22 MR. GAUKLER: Objection. There's no
23 foundation that there was going to be a release of
24 spent nuclear fuel. We did not get into that area
25 of testimony.

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1 JUDGE FARRAR: Mr. Soper, let's --
2 maybe you didn't mean it that way, but it sounded,
3 I think the way Mr. Gaukler heard it and I heard
4 it, for purposes of this line of questioning, can
5 we just, rather than -- we're talking about --
6 you're saying a pilot would want to avoid this
7 because of some consequences.

8 GEN JEFFERSON: Can I speak to that?

9 JUDGE FARRAR: Without getting into
10 what those precise consequences are we're talking
11 about.

12 GEN. JEFFERSON: I think what counsel
13 is asking me is, do I think this is a serious
14 matter, and yes, I do. I think that's a site that
15 any pilot flying in that direction would also
16 consider that.

17 Q. And serious because spent nuclear fuel
18 as a substance is dangerous to humans; isn't that
19 right?

20 GEN. JEFFERSON: If it ever gets
21 released it is.

22 Q. And you're aware of that in making your
23 opinion that this is absolutely safe?

24 MR. SILBERG: Objection.

25 GEN. JEFFERSON: That's not my --

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1 MR. SILBERG: Objection. There's no
2 foundation for the statement that anything is
3 absolutely safe.

4 MR. SOPER: Well, this is
5 cross-examination, your Honor. I would offer that
6 if the witness doesn't have an answer, he can
7 simply say that.

8 JUDGE FARRAR: Actually, the witness
9 gave the response his lawyer would have wanted him
10 to give, I believe, which -- but let's leave out
11 the words "absolutely safe."

12 MR. SOPER: Fine.

13 Q. (By Mr. Soper) You certainly would
14 want to make sure that your opinion is well
15 founded because of this enormous consequence,
16 would you not?

17 GEN. JEFFERSON: Out of personal pride
18 I'd want to make sure my opinion was well founded,
19 and I know this is significant.

20 Q. I see. Now, in considering anecdotal
21 experience, you're certainly aware that Lt.
22 Colonel Horstman has talked with four active
23 United States fighter pilots who have uniformly
24 said that where their aircraft -- and these
25 people have actually ejected -- they uniformly

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1 have said that they gave no thought to where their
2 aircraft would impact. Are you aware of that
3 statement?

4 GEN. JEFFERSON: I'm aware that he has
5 said that.

6 MR. SILBERG: Excuse me. When you say
7 that he has said that: The colonel, lieutenant
8 colonel?

9 GEN. JEFFERSON: Lieutenant Colonel
10 Horstman.

11 Q. You're aware of that testimony, then?

12 GEN. JEFFERSON: Yes.

13 Q. I see. Well, you are aware of one of
14 the pilots, Major Tom Smith, because you studied
15 his accident report, did you not, sir?

16 GEN. JEFFERSON: Yes, I did, but that
17 part was not in there.

18 Q. And as to his accident report, it shows
19 that his aircraft impacted a golf course in
20 Germany, did it not?

21 GEN. JEFFERSON: Belgium, I believe.

22 Q. Belgium?

23 GEN. JEFFERSON: Yes.

24 Q. And you in fact have reviewed his
25 accident report and opined that this is a

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1 situation where he would have been able to avoid
2 the PFS site; isn't that right?

3 GEN. JEFFERSON: Yes.

4 Q. And his testimony, sir, revealed by
5 Colonel Horstman is that just the opposite, he
6 gave no thought to where his plane was going to
7 impact. You understand that?

8 GEN. JEFFERSON: I understand that's
9 what Colonel Horstman says.

10 MR. GAUKLER: I think Colonel Fly might
11 have something to add to that statement.

12 COL. FLY: I spoke with Major Smith
13 last night, and I had faxed him yesterday question
14 45 and answer 45. I believe it's question -- or
15 pages 18 and 19 out of Lt. Colonel Horstman's
16 testimony, and he took strong objection to the
17 categorization that was in there. He said that he
18 had a minute and 44 seconds or so is what the
19 report said. He said he had time to consider
20 where he was. He knew that he was over rural
21 area. I believe he used the term "farmlands."
22 But he also knew -- he knew he wasn't near major
23 population centers. He was concerned about where
24 the airplane would land, but he didn't see the
25 ground and he was not familiar enough with the

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1 area to know of any specific sites below him.

2 He told me that he ejected. The first
3 thing he did was go find the gentleman that was
4 riding in his back seat, I believe it was an
5 orientation ride, to make sure he was okay. And
6 he said, "The next thing I wanted to do was find
7 out where that airplane hit and pray to God that
8 nobody was hurt."

9 So he does not agree with the testimony
10 the way it's portrayed, and he took strong
11 exception to the second to last sentence of that
12 first paragraph, that in the future he would not
13 consider, because he specifically told me, of
14 course any Air Force pilot would consider avoiding
15 things on the ground.

16 Q. I see. His aircraft did nevertheless
17 impact a golf course, did it not --

18 GEN. JEFFERSON: Yes.

19 JUDGE FARRAR: -- General Fly? Or,
20 excuse me, General Jefferson?

21 GEN. JEFFERSON: Yes.

22 JUDGE FARRAR: Mr. Soper, hold on a
23 second.

24 (The Board consults off the record.)

25 JUDGE FARRAR: Go ahead, Mr. Soper.

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1 MR. SOPER: Thank you, your Honor.

2 Q. (By Mr. Soper) Nevertheless,
3 regardless of what you report that Major Smith may
4 do in the future, his aircraft did hit a golf
5 course, did it not?

6 GEN. JEFFERSON: That's correct.

7 Q. And a golf course is certainly more
8 populated than the PFS site, is it not?

9 MR. GAUKLER: Objection.

10 JUDGE FARRAR: No, we had -- no, keep
11 going. Things like this I'll understand you have
12 made an objection at the end, but let's see where
13 it goes.

14 GEN. JEFFERSON: I would say not. I
15 don't know how to evaluate that. I know golf
16 courses that I've played on are big and there are
17 not many people per square inch or whatever you
18 want to do. The site is going to have people
19 around it, but it's a fairly confined area.

20 Q. How many people would be at the PFS
21 site?

22 GEN. JEFFERSON: I don't know.

23 Q. No more than a golf course, is that
24 what you're assuming, or you just have no idea?

25 GEN. JEFFERSON: I really would hate to

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1 hazard a guess. I don't know what it is.

2 Q. Do you know of anything that would
3 cause a pilot to think the PFS site is a populated
4 area?

5 GEN. JEFFERSON: Certainly.

6 Q. And what would that be?

7 GEN. JEFFERSON: It has a guard fence
8 around it.

9 Q. Anything else?

10 GEN. JEFFERSON: It has lights on it.

11 Q. Anything else?

12 GEN. JEFFERSON: There are buildings
13 there.

14 Q. Residential buildings?

15 GEN. JEFFERSON: No, industrial type
16 building.

17 MR. SOPER: How many buildings does it
18 have?

19 GEN. JEFFERSON: One big one, as I
20 understand.

21 Q. One big building. And anything that
22 would cause a pilot to think a golf course might
23 have people on it?

24 GEN. JEFFERSON: Sure.

25 Q. Now, with respect to -- but you have

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1 not talked to Major Smith, have you, sir?

2 GEN. JEFFERSON: I have not.

3 Q. With respect to the other four pilots
4 -- or, excuse me, other three pilots who were
5 mentioned that were --

6 JUDGE FARRAR: Excuse me, Mr. Soper.
7 Hold on a second. Are you finished with Major
8 Smith?

9 MR. SOPER: Yes.

10 JUDGE FARRAR: Okay, we have a problem
11 up here. I have a written report from Major Smith
12 which is hearsay. We have --

13 MR. SILBERG: Excuse me. Is there a
14 written report?

15 JUDGE FARRAR: Or there's a reference I
16 thought somewhere.

17 MR. SILBERG: In Lt. Colonel Horstman's
18 testimony.

19 JUDGE FARRAR: I thought there was also
20 in writing.

21 MR. GAUKLER: No, the only thing in
22 writing, there is an accident investigation report
23 with respect to the accident in which Captain
24 Smith was involved in.

25 JUDGE FARRAR: Okay. So we have that,

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1 which is hearsay of a kind.

2 MR. SILBERG: Official government
3 record.

4 JUDGE FARRAR: Let me finish. And
5 remember, Mr. Silberg, I know about hearsay from
6 the case you cited. And there's hearsay and
7 there's hearsay, but that report is, it may be
8 admissible hearsay, but it's hearsay. Then we
9 have Colonel Horstman about to tell us at some
10 point this week about his conversation with Major
11 Smith, and now we have Colonel Fly telling us
12 about his conversation with Major Smith, all of
13 which may or may not be admissible and useful.
14 Where is Major Smith?

15 MR. SOPER: He's in Arizona. In fact,
16 we were trying to get him as a witness, and the
17 objection from the applicant.

18 JUDGE FARRAR: Seems to me when we're
19 sitting down in July and August and September to
20 write this opinion, it may turn out then that what
21 Major Smith thinks is very important to the
22 outcome of this case, and it seems to me, not that
23 I don't have confidence in the reports that
24 everybody has of their conversations with him, it
25 certainly would be nice to have Major Smith here

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1 to tell us in his own words subject to cross-
2 examination what he was thinking or what he would
3 think. Who controls him?

4 MR. GAUKLER: He is in the Air Force
5 right now. I know that the State had wanted to
6 use him as a witness, and they were in the process
7 of trying to get approval from the U.S. Air Force
8 to use him officially as a witness. And then it
9 took a long time. I understand they essentially
10 dropped it at that point.

11 JUDGE FARRAR: We said yesterday we
12 didn't want to -- these are your cases and things
13 are different with the lack of the ability of the
14 Board to conduct its own review, but I don't think
15 -- this is one of those situations if everybody's
16 talking about what Major Smith says, it seems to
17 me it may be significant at least to try to find
18 out from Major Smith directly what he thinks.

19 Mr. Turk, Ms. Marco, do you have any
20 thoughts?

21 MS. MARCO: Yes. It would be
22 beneficial to hear from Major Smith.

23 MR. TURK: Your Honor, I don't know
24 whether Major Smith is a willing witness or not.
25 I don't know whether he is interested in

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1 participating or whether the Air Force, for
2 instance, has a rule against his appearance in a
3 trial, or the government may have an interest. I
4 don't know if that even pertains. Where are we if
5 he doesn't appear? Do we have that proposed in
6 terms of the evidence which neither the State nor
7 PFS would be able to rely on their hearsay
8 accounts, in which case we just go past it?

9 MR. SOPER: May I address that, your
10 Honor? I did inquire extensively into getting
11 Major Smith here. Military lawyers in Washington
12 and at Luke Air Force Base in fact had things
13 initially set up to have his deposition taken down
14 there. The timeline was great and the Applicant
15 wasn't sure if they were going to object to it.
16 It would have been a later addition to actually
17 get him here. In view of all those problems, we
18 ended up not getting him here.

19 I think that the notion that we don't
20 have a single person who has done this, and the
21 Applicant has offered none, we've talked to four,
22 that this depends on something that only a limited
23 number of people have ever done. There's plenty
24 of them out there, but none of them before the
25 panel. Then I'd say before we trust this whole

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1 safety idea of a pilot going through this
2 experience without ever talking to one who has
3 would just be an unbelievable omission.

4 Anyway, the State's thoughts on that.

5 MR. SILBERG: Judge Farrar, it seems to
6 me we have a group of very experienced witnesses
7 on all sides. No one has apparently ejected from
8 an F-16. I suspect in many cases that may be a
9 career limiting experience. However, we have
10 witnesses who have served under stress who have
11 jumped out of airplanes, who have in eject
12 simulations where they've actually pulled the
13 eject mechanism and gone through that experience.

14 JUDGE FARRAR: In simulation?

15 MR. SILBERG: Yes, where the seat
16 actually goes up with the person in it. Who have
17 been in airplanes that have been in difficulty,
18 who have been through Air Force training. And I
19 think the Board is entitled to draw its
20 conclusions from the cumulated evidence as to
21 which stories are credible and which sets of
22 qualifications are credible and which experiences
23 are credible, and to draw your conclusions based
24 on that evidence.

25 Could we get more witnesses? I suspect

1 we could. Could we get them on a schedule that is
2 consistent with this Board's schedule? I have no
3 idea. We're not able to contact these people, and
4 as testimony indicated, Colonel Fly spoke to Major
5 Smith yesterday for the first time.

6 I guess if the parties -- we can try
7 to get him in here. I have no idea what his
8 availability is physically or legally through the
9 Air Force. And if the parties can get him there
10 -- of course, he's only one of the four that they
11 cited, and there are undoubtedly others who have
12 similar experience. But we have four people here
13 who have gone through Air Force training and who
14 have piloted airplanes of various shapes and
15 sizes, two of them in this specific area that
16 we're talking about. And it seems to me that the
17 Board ought to be able to make a decision based on
18 that evidence. If we can get Major Smith or
19 someone else here, maybe that's okay. But I don't
20 know that we need to stop the proceedings or say
21 we can't go forward without that testimony.

22 JUDGE FARRAR: Mr. Silberg, much of
23 what you just said is very cogent and on point,
24 but we're sitting here, and it was important
25 enough for Colonel Fly to call Major Smith last

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1 night. If it was important enough for him to call
2 him, that rings a little bell in my head, this is
3 a pretty important guy. And this is a pretty
4 important issue; and this R factor, as one of the
5 exhibits already admitted indicates, is a crucial
6 factor in the case.

7 Recalling Richardson vs. Perales which
8 you've cited where I wrote the government's brief,
9 one of the reasons we argued that he didn't need
10 those doctors to come into the social security
11 disability claims was their work was routine, and
12 if you insisted that they come in in hundreds of
13 thousands of cases, the doctors would say, look,
14 I'm happy to take a little money to write a
15 report, but I'm not going to take a day off from
16 my practice to come in and testify for no money,
17 and the Social Security Administration would not
18 be able to get those doctors. So our argument
19 there was a systematic one. We've got hundreds of
20 thousands of doctors and we can't be bringing them
21 in all the time, and the Supreme Court agreed with
22 us.

23 Here you've got a very special case, a
24 very special issue and a very special person, one
25 of a relatively few who has actually gone through

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1 this. And give me just one moment here and we'll
2 see --

3 MR. TURK: I wanted to add one thing
4 before you break to discuss, your Honor. It seems
5 to me the question is not before us as to what is
6 the experience like of an ejection for which you
7 would need the pilots who had ejected. I think
8 the more relevant question is, a pilot in an
9 emergency situation, does he have time,
10 inclination, training, instruction to try to avoid
11 populated areas or hazardous facilities.

12 You have before you two very
13 experienced F-16 pilots, one of them brought
14 forward by the Applicant and one brought forward
15 by the State. They have both taken training.
16 They both have been in that seat with the ejection
17 mechanism between their legs with emergency
18 situation training what to do if the engine fails.
19 And my recollection is that part of the Air Force
20 training is, you turn off the engine in flight and
21 recover. So the pilots who are brought before you
22 have very relevant evidence in terms of what is
23 capable, or what instruction do they have and what
24 capability do they have prior to ejection.

25 JUDGE FARRAR: Instruction and training

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1 is great, but none of them, as I understand it,
2 have said, I have three seconds to pull this thing
3 between my legs, what am I going -- what am I
4 going to do in that three seconds. And what we
5 understand in the case, that's very crucial to the
6 outcome of this case.

7 MR. GAUKLER: Your Honor, I'd make two
8 points before break. One, I think we've
9 calculated the time available from a typical
10 engine failure in Skull Valley would be in the
11 range of 30 seconds.

12 JUDGE FARRAR: And when I said three,
13 when I say things, I speak colloquially.

14 MR. GAUKLER: And secondly, that we do
15 have evidence in terms of the actual accident
16 investigation reports. In terms of those accident
17 investigation reports, they reviewed 121
18 situations in which accidents occurred. There
19 were a good percentage of them which were
20 uncontrollable which are not relevant to this
21 discussion; and then with respect to those
22 situations where the pilot was in control, we've
23 gone through based, given what Lt. Colonel
24 Horstman said, looked at those accident reports
25 and we've identified 12 instances where the pilot

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1 specifically made reference to structures on the
2 ground or tried to avoid areas on the ground based
3 on population.

4 So we have an experience base what
5 pilots do in fact in those accident investigation
6 reports. So it's not as if we're looking at this
7 in a totally affect manner from somebody who's not
8 been involved in ejection.

9 MR. SOPER: May I respond, since
10 everybody's had a crack at this? I would say,
11 number one, those accident reports are not written
12 by pilots, they're written by investigators
13 sometime afterwards, and they do not account for
14 -- some of them are very high, very different,
15 very high altitude where there is time to reflect,
16 not like Skull Valley with the three or four
17 thousand foot average flight altitude.

18 And I see the reluctance of the
19 applicant and the Staff to actually get someone
20 here who has been thrust out of a plane at 400
21 miles an hour, shot by rockets with a 7 percent
22 chance of death, very high percent chance of being
23 injured, requiring to get out of there before he
24 crashes with it, crashes too close to it, then he
25 gets burnt in the fire ball, on and on and on and

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1 on, a violent experience, to get that person here
2 to tell us about it, they don't want him. And
3 it's not surprising. I think that alone, the fact
4 that they don't want him here tells us something.

5 JUDGE FARRAR: And I have not -- I'll
6 take everything you said. I have not concluded
7 you don't want him here.

8 MR. GAUKLER: That's exactly right.

9 MR. TURK: May I add, your Honor? This
10 one time I think I have to reply, if you'd allow
11 me one moment. The Staff is not reluctant to have
12 a pilot come before the board with experience.
13 And I want to say it one time. I haven't said it
14 yet. The State has repeatedly attempted to attack
15 the Staff's neutrality. I take exception to it.
16 They did it in their opening statement by Ms.
17 Chancellor. Mr. Soper has done it now. If PFS
18 had never brought this application, the Staff
19 wouldn't care. If PFS withdraws its application,
20 the Staff wouldn't care. We are not here
21 sponsoring this application, and Mr. Soper and
22 your client should understand that we're
23 interested in a fair record and a fair outcome.
24 That is our only interest, and I would ask the
25 State to stop henceforth attacks on the Staff's

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1 neutrality.

2 JUDGE FARRAR: I can't ask them to stop
3 that, but you've stated correctly the way the
4 Staff is supposed to function, and I think you in
5 your opening statement the other day pointed out
6 to the public who wonders why you're always lined
7 up with the applicant, that you're lined up with
8 the applicant after months and years of work
9 reviewing their application, and that you start
10 that process as a neutral, and then by the time
11 you've processed the application and say, okay,
12 now we agree with it, that yes, you're then in the
13 public's mind on the side of the applicant, but
14 you came to that from a position of neutrality.
15 And so we accept that's the way the system works.

16 But I don't want to limit Mr. Soper in
17 the course of his questions from asking what he's
18 -- what he wants to ask. But we will try to --
19 maybe we'd be well off to stick to facts and
20 arguments and not characterization of each other's
21 motives.

22 JUDGE LAM: Let me also add a minor
23 remark to this current discussion. I think the
24 Staff should not only be neutral. My perception
25 of the Staff's role is oversight and enforcement

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1 and protection of health and safety. So the Staff
2 in my mind is not only neutral, but the Staff
3 would have an active role in oversight and
4 enforcement and make sure the applicant's
5 application would ultimately reflect the
6 establishment of a safe operation.

7 MR. TURK: I would join in that, Judge
8 Lam. I agree with you.

9 JUDGE FARRAR: Let us consult here a
10 moment.

11 (The Board consults off the record.)

12 JUDGE FARRAR: I wish you all could
13 have been part of the discussion up here to hear
14 how years of service on the licensing board trains
15 nuclear engineers and environmental sciences in
16 the ins and outs of the law and how good their
17 analyses are.

18 This issue is about attitudes, not
19 arithmetic. It's about what someone who's had the
20 experience does, not what their capabilities and
21 training might be. We wouldn't ordinarily do
22 this, but because both sides have made such an
23 issue of what was in Major Smith's mind, it seems
24 to us that this case cannot be properly resolved
25 -- we said we weren't going to try your case, but

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1 we've got to write that decision. This case
2 cannot be properly resolved unless the three
3 parties get together and get Major Smith in here.

4 We're not going to hold up the
5 proceeding. We do have that sixth week at the end
6 of the seismic that we have kept open for anything
7 that needed to be done. And I know you can't
8 guarantee him. Major Smith may be needed
9 elsewhere. His commanding officer could tell him
10 not to go. Judge Advocate General of the Air
11 Force may tell him not to show up. But it seems
12 to me it's incumbent on us to try to get him. So
13 we would ask the three parties to collaborate and
14 do everything possible to get Major Smith in here.
15 And in extending that invitation, tell him that
16 the board considers it a matter of the utmost
17 importance.

18 MR. SOPER: Your Honor, would you like
19 us to try to attempt to get all four ejected
20 pilots?

21 JUDGE FARRAR: That would be terrific.

22 MR. SILBERG: There may be many others,
23 too.

24 JUDGE FARRAR: You can bring as many as
25 you want. But I don't want to have a hearing

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1 where everyone's talking about what Major Smith
2 said and Major Smith isn't here. And that's --
3 Colonel Fly, no disrespect to your recounting of
4 the conversation, but under the rules of evidence,
5 Major -- there's hearsay and it may be admissible,
6 but in a situation like this where there's
7 conflicting hearsay about the same person, there's
8 something I remember dimly about the best evidence
9 rule, usually dealing with documents, but I think
10 in this case it deals with the testimony of Major
11 Smith.

12 If any counsel has serious heartburn
13 about what I just said, say it now. Mr. Soper has
14 no heartburn about it, I know.

15 MR. SILBERG: There may just be
16 logistical problems. I was talking to Colonel Fly
17 about where Major Smith is.

18 JUDGE FARRAR: If we make our best
19 efforts and don't get him, then we'll decide the
20 case without him. But if he can't make it for
21 whatever reason, I want to be able to say that we
22 and you made our best efforts to get him here. If
23 he's unavailable, then we'll do our hearsay.

24 Mr. Turk?

25 MR. TURK: Yes, your Honor.

1 JUDGE FARRAR: Do you agree?

2 MS. MARCO: We'll cooperate.

3 MR. TURK: We are a party in the
4 proceeding, your Honor. We certainly will follow
5 your direction.

6 JUDGE FARRAR: Again, having being
7 accompanied by board members who have been around
8 the track more than once, Judge Kline has
9 remembered that there was a proceeding where there
10 was an absent witness and the board took his
11 testimony by long distance conference call. We've
12 seen in this proceeding already that we did a
13 video prehearing conference which went well, and I
14 always have some trepidation about those when you
15 haven't met the people, and in this case I had not
16 met the state's lawyers, but the video conference
17 went well. And so that's a possibility. If Major
18 Smith can't leave where he is, then we'll -- we
19 can set up a phone or a video way of taking his
20 testimony.

21 . And even though this is a late witness,
22 it's not a surprise to anybody. We don't need any
23 discovery or any preliminary conversations with
24 him. We'll just take his testimony. So however
25 we can arrange to do it, we will make -- however

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1 and whenever before the record closes, we will be
2 happy to do that.

3 MR. SOPER: Did you want to -- excuse
4 me, your Honor. Hard to find who's talking, I
5 understand. Did you want to set a date or arrange
6 a date, suggest a time for him, or just find out
7 when he's available?

8 JUDGE FARRAR: Obviously, from the
9 efforts you all have made and the needs of the
10 military, he'll be available if and when he's
11 available, and we will arrange to do that. It
12 doesn't have to be during the daytime, it doesn't
13 have to be on a weekday. This proceeding has
14 moved along very nicely with a lot of 3 a.m.
15 e-mails, particularly from you all, and we'll make
16 ourselves available whenever possible.

17 Why don't, if you all -- we can
18 probably proceed without following up on this now,
19 but maybe during a break the three sets of counsel
20 would want to confer and see -- give us a
21 preliminary.

22 MR. GAUKLER: Your Honor, one
23 possibility might just be to take his deposition.
24 If he has a hard time coming here, we might be
25 able to go there and do that. If that was arrived

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1 at, would that be possible --

2 JUDGE FARRAR: It's possible; but
3 again, my sense is that this -- this, or people
4 like him may be so crucial to the case that a
5 deposition is ordinarily fine. But as you've
6 noticed, we're not bashful about asking our own
7 questions; and again, while this is your case,
8 we're the people who have to write the decision,
9 and I wouldn't want to sit down in August with a
10 deposition and say, boy, I wish we had been there,
11 because we would have asked him one more question
12 that might have really helped us. So a
13 deposition is second best, a distant second best.

14 MR. SOPER: Did you want me to proceed,
15 your Honor, or did you say we're going to take a
16 recess here?

17 JUDGE FARRAR: Yeah, why don't we take
18 a -- it's 28 after. Let's take a 12-minute
19 break, come back at twenty of.

20 (A recess was taken.)

21 JUDGE FARRAR: We did ask people to
22 consult. But for the benefit of counsel and the
23 witnesses and the public, we will try to say --
24 and I know you've all been in courtrooms where the
25 judge says he's coming back in 20 minutes and you

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1 come back and the judge shows up an hour later.
2 So we will try not to do that so everybody can in
3 fact plan.

4 Colonel Horstman, will you find your
5 lawyers? A lot of clients would like to lose
6 their lawyers, but --

7 Mr. Soper, while you were out of the
8 room we did say what we will try to do is, when we
9 say we'll be back here at a precise time, that you
10 count on it. And I know there's a practice when
11 you say ten minutes, the judges don't come back
12 for twenty, and you're sitting here wasting your
13 time. But we will try to be pretty accurate.

14 MR. SOPER: I apologize.

15 JUDGE FARRAR: No apology necessary.
16 We're all getting along fine here.

17 Where were we before we started the
18 discussion about the hearsay?

19 MR. SOPER: We were at State Exhibit
20 148, and I believe --

21 MR. GAUKLER: 149, I believe.

22 MR. SOPER: Excuse me, 149. Thank you.

23 JUDGE FARRAR: Are there any
24 discussions you all had among yourselves that are
25 worth reporting now, or we'll just wait to hear

1 later? We'll wait until later.

2 MR. SOPER: I would offer State Exhibit
3 149 into evidence.

4 JUDGE FARRAR: Any objection?

5 MR. GAUKLER: I would object to the
6 characterization "subjective determination by PFS
7 panel." Besides that, I have no objection.

8 JUDGE FARRAR: Mr. Turk, or Ms. Marco?

9 MS. MARCO: I don't think I've heard
10 the witness say that it was a subjective
11 determination when he was pushed.

12 MR. SOPER: Well, I thought that was
13 the testimony. Was it not, General?

14 GEN. JEFFERSON: I don't remember that
15 specific.

16 JUDGE FARRAR: Ms. Reporter, will you
17 -- I remember the discussion, but I'm not sure it
18 would be that easy for you to find it.

19 MR. SOPER: Well, let me ask one more
20 question.

21 JUDGE FARRAR: Does your machine work
22 on key word searches? Off the record.

23 (Discussion off the record.)

24 MR. SILBERG: I don't think we have any
25 objection as long as that is our evidence. If

1 that's State's characterization, that's fine.

2 JUDGE FARRAR: Then let's do this.

3 Let's take the evidence as -- recognizing your
4 objection, Mr. Gaukler, take the exhibit, have it
5 admitted as is, but there were a series of three
6 or four questions relating to this subject where
7 General Jefferson responded with his
8 characterization of how he formed his opinion, and
9 we will take that as either confirming or
10 overriding what the exhibit says. So Exhibit
11 State 149 will be admitted subject to what I just
12 said.

13 (STATE'S EXHIBIT-149 WAS ADMITTED.)

14 MR. SOPER: Thank you, your Honor. May
15 I proceed, then?

16 JUDGE FARRAR: Yes.

17 MR. SOPER: I'm offering an exhibit to
18 be marked at this time as State Exhibit 150. And
19 while that's being done --

20 JUDGE FARRAR: Wait. The reporter is
21 --

22 (STATE'S EXHIBIT-150 WAS MARKED.)

23 JUDGE FARRAR: Mr. Soper, the reporter
24 has marked for identification State Exhibit 150,
25 which you've described to us -- or -- go ahead.

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1 MR. SOPER: Thank you, your Honor.

2 Q. (By Mr. Soper) Before we look at 150,
3 General Jefferson, let me just ask you, sir, your
4 testimony shows that the 95 percent number we have
5 been discussing the probability that the pilot
6 would be able to avoid an impact at the site is
7 based on, among other things, the training the Air
8 Force pilots receive, the flight characteristics
9 of the F-16, the absence of other built-up areas
10 in Skull Valley, and the small effect required to
11 avoid the PFS site. That's from your testimony, I
12 believe. Does that sound familiar?

13 GEN. JEFFERSON: Yes. A small effort,
14 but that's correct.

15 JUDGE FARRAR: Did I spell it wrong, or
16 --

17 GEN. JEFFERSON: I thought I heard you
18 say "effect."

19 Q. Oh, excuse me. You mentioned first the
20 training received by a pilot, and by that you
21 include reference to the F-16 flight manual; isn't
22 that correct? That that would be in the crash
23 report?

24 GEN. JEFFERSON: Oh, referring back to
25 the report?

1 MR. SILBERG: Can you give us a
2 reference to the crash report, please, Mr. Soper?

3 MR. SOPER: Yeah. I think that's Tab
4 S. Tab T, excuse me. F-16 flight manual. That's
5 the addendum, excuse me. The addendum to the
6 crash report, tab --

7 MR. GAUKLER: That was, Mr. Soper, from
8 reference to I believe on page 19 A of the report
9 itself, and I think you're right, it's tab T of
10 the report itself.

11 Q. (By Mr. Soper) In any event, General
12 Jefferson, you have reviewed the F-16 flight
13 manual; is that correct, sir?

14 GEN. JEFFERSON: Generally, yes.

15 Q. Did I not say General? I'm sorry.

16 GEN. JEFFERSON: No, I said I have
17 reviewed it generally.

18 Q. Oh, generally. I thought I got your
19 rank wrong. Excuse me. You generally have
20 reviewed it. And have you looked at -- let me
21 show you page 150, which I would offer as a page
22 out of that flight manual.

23 MR. SILBERG: Excuse me. Did you say
24 page 150 or Exhibit 150?

25 MR. SOPER: I probably said page, but I

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1 meant Exhibit 150. That I would offer is a page
2 from the flight manual that concerns, among other
3 things, ejection. Do you recognize that one, sir?

4 GEN. JEFFERSON: I have this 150, yes.

5 Q. Have you ever seen that before?

6 GEN. JEFFERSON: Yes.

7 Q. And did you review that in connection
8 with your opinions you rendered for PFS?

9 GEN. JEFFERSON: Yes.

10 Q. And you mention in your testimony that
11 pilots are trained to point their aircraft away
12 from populated areas; is that right?

13 GEN. JEFFERSON: Yes.

14 Q. Can you tell me what that training is
15 based on? In other words, what is that training
16 that trains them to do that operation?

17 GEN. JEFFERSON: It starts from the
18 beginning of flight training.

19 Q. I see. Do you see a reference to it in
20 the F-16 manual?

21 GEN. JEFFERSON: No, that's not what
22 it's for.

23 Q. So there's no reference to it in there?

24 GEN. JEFFERSON: I don't see it here.

25 MR. TURK: Clarification --

1 Q. Let me offer, sir, to read "Ejection
2 (Time Permitting)." Could you read that
3 paragraph?

4 GEN. JEFFERSON: "If time permits,
5 descend to avoid the hazards of high altitude
6 ejection. Stow all loose equipment and direct the
7 aircraft away from populated areas."

8 Q. So it is in there?

9 GEN. JEFFERSON: Yes.

10 Q. Other than the one reference in one
11 sentence there, is there any other manual that
12 refers to this training of avoiding a populated
13 area?

14 MR. TURK: Could I ask for a
15 clarification? Your Honor, are you asking -- is
16 Mr. Soper asking about that page that he's looking
17 at?

18 MR. SOPER: I'm asking in addition to
19 this page if the witness is aware of any other
20 reference to this training to avoid a populated
21 area.

22 MR. SILBERG: I'm sorry, reference
23 where? This document --

24 MR. SOPER: I'm asking if he knows of

25 --

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1 MR. SILBERG: -- or any document?

2 MR. SOPER: -- any document anywhere in
3 any Air Force manual.

4 GEN. JEFFERSON: I don't have total
5 recall. I suspect it's in every one of these
6 ejection procedures for every aircraft.

7 Q. (By Mr. Soper) Similar to this?

8 GEN. JEFFERSON: Similar to this.

9 Q. A one-sentence reference?

10 GEN. JEFFERSON: Yes, common sense.

11 Q. You did, did you not, sir, consider the
12 fact that when you determined this 95 percent rate
13 of pilots being able to avoid, you considered the
14 fact that pilots would be under stress at the time
15 they were required to perform this avoidance
16 function?

17 GEN. JEFFERSON: Certainly.

18 Q. And there is considerable evidence, is
19 there not, that pilots make errors under the
20 stress of ejection? Isn't that right?

21 MR. GAUKLER: Objection, lack of basis.

22 Q. You may answer. Well, excuse me, your
23 Honor. I guess that's needs a ruling. I'm sorry.

24 JUDGE FARRAR: It's a lot easier if you
25 made the rulings for us, but let me do it. I

1 think, Mr. Gaukler, that given the witness's
2 expertise, he's entitled to ask this question.

3 MR. GAUKLER: It assumes facts not in
4 evidence.

5 JUDGE FARRAR: But we're not a jury,
6 and anything that comes in is subject to being
7 connected up. If it's not connected up later,
8 then it goes out. But since we're not a jury, we
9 don't have to be concerned about exactly the order
10 in which things come in. Objection overruled.

11 Go ahead, Mr. Soper.

12 General Jefferson, do you remember the
13 question, or do you want her to read it back?

14 GEN. JEFFERSON: A read back, please.

15 (Requested portion of the record
16 was read back.)

17 Q. (By Mr. Soper) Did you hear the
18 question?

19 GEN. JEFFERSON: Yes, I did.

20 Q. And do you know of any evidence to that
21 effect?

22 GEN. JEFFERSON: I think you're talking
23 about the stress of events before ejection and not
24 the stress of ejection. Is that correct?

25 Q. I would say either. Yes, under the

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1 ejection -- either during or prior.

2 GEN. JEFFERSON: Yeah. In an
3 emergency, yes, you can make mistakes. That's why
4 you're trained for them.

5 Q. I see.

6 MR. SOPER: I would like to offer 150,
7 your Honor. I forgot to do that.

8 MR. GAUKLER: No objection.

9 MS. MARCO: No objection from Staff.

10 JUDGE FARRAR: I'm sorry. We were --

11 MR. SOPER: I just offered 150.

12 JUDGE FARRAR: You offered 150 and no
13 objection? It will be admitted.

14 (STATE'S EXHIBIT-150 WAS ADMITTTED.)

15 MR. SOPER: And I have also submitted
16 for marking Exhibit 151. This is the wrong one,
17 actually, before you stamp it.

18 JUDGE FARRAR: Mr. Soper, do me a
19 favor. When you say you're submitting something
20 to be marked as a certain exhibit, give us just a
21 capsule description of it.

22 MR. SOPER: Okay.

23 Your Honor, I am asking to be marked as
24 an exhibit the cover and selected portions of the
25 September 2001 issue of the United States Air

1 Force Flying Safety Magazine.

2 JUDGE FARRAR: Then we'll mark that as
3 state 151.

4 MR. SOPER: Yes.

5 JUDGE FARRAR: For identification.

6 (STATE'S EXHIBIT-151 WAS MARKED.)

7 JUDGE FARRAR: All right, Mr. Soper,
8 the reporter has marked that.

9 MR. SOPER: Thank you, your Honor.

10 Q. (By Mr. Soper) General Jefferson,
11 you've been handed a copy of what's been marked as
12 State Exhibit 151, an article from Flying Safety
13 Magazine. Do you have that before you, sir?

14 GEN. JEFFERSON: Yes, I do.

15 Q. Flying Safety Magazine is a publication
16 of the Chief of Safety of the U.S. Air Force; is
17 that correct?

18 GEN. JEFFERSON: That's correct.

19 Q. And you deem the magazine to be
20 reliable and authoritative?

21 GEN. JEFFERSON: Yes, I do.

22 Q. If I could direct your attention, sir,
23 to -- did I identify this as being the September
24 2001 issue? Is that correct, sir?

25 GEN. JEFFERSON: That's what it is,

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1 yes. I don't know if you --

2 Q. If I could direct your attention, sir,
3 to page 11. This is from an article that deals
4 with the ACES II ejection seat. Are you familiar
5 with the ACES II?

6 GEN. JEFFERSON: No, only that I know
7 it's in the F-16.

8 Q. Do you know what ACES stands for?

9 GEN. JEFFERSON: No, I do not.

10 Q. That would be I think the Advanced
11 Concept Ejection Seat II. Does that sound right?

12 GEN. JEFFERSON: That fits.

13 Q. If you would, sir, directing your
14 attention to page 11, do you see what's identified
15 as Table 1 on that page?

16 GEN. JEFFERSON: Yes, I do.

17 Q. Purports to be a study conducted by the
18 Air Force from August 8th of 1978 to September
19 30th of 2000 showing that for the F-16 aircraft 7
20 percent of pilots that ejected did not survive.

21 MR. SILBERG: Could we give the witness
22 an opportunity to look at this document? I don't
23 know if he's seen it before.

24 GEN. JEFFERSON: I haven't seen it
25 before.

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1 MR. SILBERG: Seems to me if we're
2 giving a document to the witness, we ought to
3 allow him to look at it and make sure he
4 understands it.

5 MR. SOPER: I have no objection.

6 JUDGE FARRAR: Go ahead, General
7 Jefferson.

8 GEN. JEFFERSON: Okay, looks like a
9 fairly long article.

10 JUDGE FARRAR: Why don't you take a
11 minute or two and glance through it, and if at any
12 time during your testimony you need to -- if at
13 any time during your testimony you need to, you
14 want to stop and take a look at a particular
15 paragraph, feel free to do so.

16 GEN. JEFFERSON: Thank you.

17 JUDGE FARRAR: General Jefferson,
18 you'll let us know when you --

19 GEN. JEFFERSON: No, I apologize. I
20 just --

21 JUDGE FARRAR: Just wanted to make sure
22 you weren't waiting for us.

23 GEN. JEFFERSON: No, I'm reading it.
24 I'm done.

25 JUDGE FARRAR: General Jefferson has

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1 indicated he's had time to at least review briefly
2 the document.

3 Sir, if you need time during the course
4 of a question or course of an answer to look at it
5 more closely, feel free to ask for time to do so.

6 GEN. JEFFERSON: Thank you, your Honor.

7 JUDGE FARRAR: Go ahead, Mr. Soper.

8 MR. SOPER: Thank you, your Honor.

9 Q. (By Mr. Soper) General Jefferson, in
10 opining that 95 percent of pilots would be able to
11 avoid the PFS site, were you aware of a fatality
12 rate for pilots who have ejected from F-16's?

13 GEN. JEFFERSON: Yes. I was not aware
14 of a rate, but I know that can happen.

15 Q. Did you have any notion of what the
16 fatality rate was?

17 GEN. JEFFERSON: No.

18 Q. I see. Is it surprising to you to
19 learn it's 7 percent?

20 GEN. JEFFERSON: I think that's a very
21 misleading number, actually. These ejected out of
22 the envelope.

23 Q. I see. Nevertheless, that's what the
24 report says, does it not?

25 GEN. JEFFERSON: That's what it says

1 there. The description is important.

2 Q. Let me direct your attention, sir, to
3 Table 2 on page 14. Table 2 is entitled Aircrew
4 Ejection Errors, 1996 to 1999. Do you see that,
5 sir?

6 GEN. JEFFERSON: Yes.

7 Q. Indicates that 25 percent of ejections
8 occurred below a safe altitude. You see that?

9 GEN. JEFFERSON: Yes.

10 Q. Were you aware that there were a number
11 of pilots that failed to eject at a safe altitude
12 when you rendered your opinion?

13 GEN. JEFFERSON: Yes. We saw that in
14 the accident reports.

15 Q. I see. Did you realize it was as high
16 as 25 percent?

17 GEN. JEFFERSON: That they ejected
18 below that altitude, no.

19 Q. You notice that --

20 GEN. JEFFERSON: Now, that's not an
21 F-16.

22 Q. That's all ejections?

23 GEN. JEFFERSON: That's all ejections.

24 Q. You notice that Table 2 provides that
25 26 percent of pilots were not prepared for

1 ejection? Do you see that?

2 GEN. JEFFERSON: Yes, I see as
3 indicated in the text, that means it didn't stow
4 loose equipment or tighten personal equipment.

5 Q. What can be the hazards from that?

6 GEN. JEFFERSON: Flies around, it might
7 hit him.

8 Q. Might injure you; isn't that right?

9 GEN. JEFFERSON: Yeah. That's a minor
10 thing.

11 Q. That's a minor thing?

12 GEN. JEFFERSON: Well, yeah. If you
13 get hit by your checklist, I don't think it's
14 going to hurt you too much.

15 Q. Do you know, sir, how fast an ejection
16 seat travels during ejection?

17 GEN. JEFFERSON: No.

18 Q. Do you know how many g's it exerts on
19 the pilot?

20 GEN. JEFFERSON: No. I think it's in
21 the order of five or six, but I don't remember.

22 Q. Would you be surprised to learn it's
23 between 12 and 20?

24 GEN. JEFFERSON: No, I wouldn't be
25 surprised at that.

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1 Q. Would you be surprised to learn that
2 the flight surgeon has devoted an entire chapter
3 to injuries from ejections?

4 MR. SILBERG: Chapter in what?

5 MR. SOPER: The flight surgeon's guide.

6 Q. Were you aware of that, sir?

7 GEN. JEFFERSON: No, but I'm not
8 surprised. That's his job.

9 MR. SOPER: I would offer Exhibit 151,
10 your Honor.

11 JUDGE FARRAR: Any objections?

12 MR. GAUKLER: There's a lot of
13 extraneous information in the exhibit, and I don't
14 see the need to offer it with all the extraneous
15 information that's in it. He cited I think what
16 he wants to rely upon the document for. So I
17 would object to it.

18 MS. MARCO: Can it be extracted, the
19 part that is extraneous, from this document prior
20 to its admission into evidence?

21 MR. SOPER: May I be heard, your Honor?

22 JUDGE FARRAR: Yeah, but help me. I
23 think this problem has come up with some of the
24 other exhibits that we don't want into the
25 record -- don't want in the record information

1 that we aren't relying on because three years from
2 now somebody will look at this and take the whole
3 thing as a given when it's not a given. So help
4 me with that.

5 MR. SOPER: Here is what I would say,
6 your Honor. This is from the Air Force's Chief of
7 Safety. It's been acknowledged as reliable by
8 General Jefferson. The article deals with and its
9 title is "U.S. Air Force ACES II Ejections and
10 You." The ACES II is in fact the ejection seat
11 that's installed in the F-16. The entire article
12 is a study about ejections in this relevant seat.

13 To extract anything from this would
14 render the study and this article incomplete,
15 inaccurate. I think it --

16 JUDGE FARRAR: So in fact you're
17 offering the entire -- even though we've only
18 discussed with General Jefferson portions of it,
19 you're offering, since he I think at the beginning
20 agreed this was an authoritative source, you're
21 offering the entire article, whatever it says.

22 MR. SOPER: Absolutely. Or otherwise
23 there is much more that I would go into with the
24 General here. Because there is much more dealing
25 with the F-16 and the ACES II and this study that

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1 I think is very relevant.

2 MR. GAUKLER: I would note just for the
3 record that there's a lot of information here on
4 other planes other than the F-16 and others, many
5 situations that would not be applicable here.

6 JUDGE FARRAR: Except if the seat is
7 the one used, you know, if this seat is -- well,
8 let me ask General Jefferson. This is the seat
9 that's used in the F-16?

10 GEN. JEFFERSON: That's correct.

11 JUDGE FARRAR: It's the seat used in a
12 lot of other airplanes?

13 GEN. JEFFERSON: That's correct.

14 JUDGE FARRAR: Can we learn something
15 about the performance of the seat in an F-16 from
16 the performance, if we understand its performance
17 in other aircraft? In other words, if it does a
18 certain thing or has certain hazards in other
19 aircraft, can we fairly extrapolate from that to
20 what might happen in an F-16 with the same seat?

21 GEN. JEFFERSON: Let me look at the
22 aircraft that are involved here.

23 MR. SOPER: Might I offer something,
24 your Honor, in the meantime? Seems to me the
25 argument has been continually that these panel

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1 witnesses have experience in other aircraft, and
2 while they haven't ejected, they're trained by the
3 Air Force and they know things generally and they
4 ought to be able to comment on things. We have
5 here the very seat that we're talking about, and
6 the argument is, well, this is -- it talks about
7 other aircraft. I --

8 JUDGE FARRAR: Okay, but that's why I'm
9 asking General Jefferson if it's fair. And let's
10 get his answer, and then we'll consider your --
11 then we'll, if necessary, take up the argument you
12 just made.

13 MR. SOPER: Thank you, your Honor.

14 GEN. JEFFERSON: Though there are some
15 commonalities, no doubt, I've noticed the B-1 is
16 one of these aircraft here that's a multi-person
17 crew airplane. They may have more stuff laying
18 around in there because we have more room, those
19 kinds of things. So I don't know the split-out of
20 these things.

21 MR. SOPER: Well, it's clearly
22 identified as that is the information for the B-2.
23 I mean, I don't see what the --

24 JUDGE FARRAR: But that's an important
25 distinction, that it's not just the seat but it's

1 some of the concerns that might affect its use in
2 another aircraft would not be applicable to the
3 F -16?

4 GEN. JEFFERSON: That's correct. And
5 also the missions of those aircraft are different,
6 and that could affect their altitude of ejection
7 those kinds of things.

8 MR. SILBERG: One of the problems we're
9 having, Judge, frankly is, we just saw the
10 document for the first time. It wasn't part of
11 evidence, it wasn't supplied to us in discovery.
12 We haven't had a chance to read it in detail. To
13 put something into evidence for the truth of
14 everything in here, normally we get opportunity to
15 file motions to strike, to see whether it is
16 relevant to argue parts that are, parts that
17 aren't. I'm sure there's a lot in here that
18 probably is relevant, but there's probably a lot
19 in here that isn't. And I think it's unfair to
20 put it in for the truth of the matters stated
21 without some opportunity to at least explain what
22 is and what isn't relevant.

23 MR. SOPER: It appears that exactly two
24 thirds of the ejections are specifically F-16's,
25 two thirds.

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1 GEN. JEFFERSON: I have another point,
2 if I may, about Table 2 that I'm unclear on. It
3 says the table of aircrew ejection errors, which
4 may simply be those errors that were made rather
5 than a total population experience. And I don't
6 know that. I can't quite tell that. In other
7 words, it makes a point that totals greater than
8 100 percent, indicating that you would have
9 expected it to be 100 percent except some people
10 did more than one thing. In that case, this is
11 only talking about the aircrew that made ejection
12 errors, not total aircrew.

13 MR. SOPER: You know, whatever the
14 interpretation may be, this is put out by the
15 Chief of Safety, and the interpretation can be
16 argued. It's an authoritative document from the
17 Air Force addressing this issue, your Honor.

18 JUDGE FARRAR: I don't think anyone's
19 challenging its authoritativeness. We're trying
20 to figure out precisely how it bears on the issues
21 in front of us. That's no criticism of your use
22 of it, but we have to know --

23 MR. SILBERG: Again, I don't have any
24 problem in Mr. Soper asking the General about a
25 particular statement, and then he can get his

1 reaction to that statement. But then to put
2 everything else in this article into evidence for
3 the truth of the matter seems to be -- you know.
4 And conceding that there are other planes involved
5 here besides the F-16's, other missions besides
6 flying down Skull Valley --

7 MR. BARNETT: It's a generic article.
8 It's not just applicable to our circumstances.

9 MR. SILBERG: But I certainly don't
10 want to restrict Mr. Soper's ability to use it for
11 cross-examining.

12 JUDGE FARRAR: Ms. Marco, do you have
13 any thoughts that might help?

14 MS. MARCO: Could we do what we did
15 before and mark it for identification and allow
16 cross- examination to proceed?

17 JUDGE FARRAR: Thank you. Why don't we
18 do that, mark it, we'll leave it marked for
19 identification. You may continue your cross-
20 examination using it or not as you see fit. At
21 the end of that we'll have you offer parts of it
22 into evidence.

23 MR. SOPER: All right.

24 JUDGE FARRAR: Or you may end up with
25 enough questions that you're going to offer all of

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1 it into evidence, but for now let's not admit it
2 into evidence. We'll just continue using it.

3 Q. (By Mr. Soper) General Jefferson,
4 reference to Table 1 of Exhibit 151. The study
5 concludes that for F-16 aircraft, 222 percent of
6 the pilots or 93 percent --

7 MR. SILBERG: I'm sorry. You said 222
8 percent of the pilots?

9 MR. SOPER: Let me start over, please.

10 Q. For F-16 aircraft, 222 pilots survived,
11 representing 93 percent of those that ejected, and
12 that 16 pilots were fatal or did not survive,
13 representing 7 percent of those who ejected. Do
14 you see that, sir?

15 GEN. JEFFERSON: Yes, I do.

16 Q. Do you have any reason to doubt the
17 accuracy of that study?

18 GEN. JEFFERSON: No. The fatalities
19 are described below as to what they -- out of the
20 envelope ejection or ejection malfunction.

21 Q. I see. Would you rather have this
22 entire article into evidence to make that clear?
23 Is that your opinion?

24 MR. SILBERG: Objection. It's an
25 inappropriate question for a witness.

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1 JUDGE FARRAR: General, that's the
2 second time you used the term "out of the
3 envelope." Would you explain what you mean?

4 GEN. JEFFERSON: Yes. An ejection seat
5 has an envelope of air speed and altitude within
6 which it's -- you can survive, safely eject. If
7 you get outside of that, for instance, you get too
8 low or too fast, heading down, that sort of then,
9 then you're out of the envelope and very likely
10 you're going to get killed.

11 JUDGE FARRAR: Does that explanation,
12 Mr. Soper, allow us to move forward?

13 MR. SOPER: I'll ask some more
14 questions.

15 JUDGE FARRAR: General, where does it
16 say that?

17 GEN. JEFFERSON: It's at the bottom of
18 page 11 on the left column.

19 Q. (By Mr. Soper) Would you read that
20 reference, the entire reference that you're
21 talking about, General?

22 GEN. JEFFERSON: It says, "Fatal
23 ejection attempts were defined as those where
24 crewmembers were fatally injured after: (1) They
25 ejected out of the envelope of the seat; or (2) An

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1 ejection malfunction occurred."

2 Q. So you didn't mention the No. 2 to us.
3 So they're not all out of the envelope?

4 GEN. JEFFERSON: I think I did,
5 actually, but it's part of that.

6 Q. It does represent in any event, does it
7 not, that 7 percent of pilots did not survive an
8 ejection?

9 GEN. JEFFERSON: Yes.

10 JUDGE FARRAR: General, why is there
11 not a No. 3 there, which is, it was within the
12 envelope, no malfunction occurred, but the
13 pilot --

14 GEN. JEFFERSON: That would be over in
15 the survived rate, I think.

16 JUDGE FARRAR: No, he died.

17 GEN. JEFFERSON: Oh, I see what you
18 mean.

19 JUDGE FARRAR: He wasn't out of the
20 envelope, the seat worked but -- or does
21 malfunction include --

22 GEN. JEFFERSON: The parachute itself?

23 JUDGE FARRAR: Yeah.

24 GEN. JEFFERSON: That would be my
25 presumption. I haven't seen the study, so I don't

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1 know for sure.

2 MR. SOPER: Do you want me to proceed,
3 your Honor?

4 Q. (By Mr. Soper) General, if you would,
5 please, look at page 12. The left-hand column
6 starting the second full paragraph begins, "The
7 F-16 has always." Do you see that?

8 GEN. JEFFERSON: Yes, I do.

9 Q. Would you read that to us, please?

10 GEN. JEFFERSON: "The F-16 has always
11 used the ACES II system and has had 238 lifetime
12 ejections in the USAF. The ejection survival rate
13 is 93.2 percent, or 222 crewmembers."

14 Q. And the next sentence?

15 GEN. JEFFERSON: "A total of 71
16 crewmembers were fatally injured in the history of
17 the USAF F-16 peacetime operations, of which 55
18 crewmembers (77 percent) made no attempt to eject
19 and perished."

20 Q. Do you have any reason to dispute that
21 statement?

22 GEN. JEFFERSON: No.

23 Q. Now, that, sir, refers to the lifetime
24 ejections of 238. Doesn't make any reference to
25 whether or not they were in or outside the

1 envelope, does it?

2 GEN. JEFFERSON: No.

3 Q. Directing your attention, sir, to Table
4 -- excuse me. Directing your attention to page
5 14, the second full paragraph in the left-hand
6 column about two thirds of the way down beginning,
7 "Leg and arm restraints weren't incorporated." Do
8 you see that, sir?

9 GEN. JEFFERSON: Yes.

10 Q. Could you read the rest of that
11 paragraph for us?

12 GEN. JEFFERSON: Sure. "Leg and arm
13 restraints weren't incorporated into the ACES II
14 system for the A-10, F-15 and F-16, so it does
15 pose a flail problem in those airframes."

16 Q. Can you continue to the last sentence?

17 GEN. JEFFERSON: "But both the B-1 and
18 F-22 Raptor have arm and leg restraints."

19 Q. So do you have any reason to disagree
20 with that statement, sir?

21 GEN. JEFFERSON: No.

22 Q. And can you tell us what a flail
23 problem is that's associated with the ACES II in
24 the F-16?

25 GEN. JEFFERSON: Sure. It would come

1 about because your legs and arms were not
2 restrained. It would be from the air blast from
3 the ejection. It would blow your arms around, and
4 that's called flail.

5 Q. It would blow your arms around? Is
6 that your testimony, sir?

7 GEN. JEFFERSON: That's what flail is.

8 Q. And flail injuries are commonly -- do
9 you know what they are?

10 GEN. JEFFERSON: No.

11 Q. Would you be surprised to learn that it
12 includes tearing the arms and legs off the pilot?

13 GEN. JEFFERSON: I would be surprised
14 at that.

15 Q. You've never heard of that, sir?

16 GEN. JEFFERSON: No, I haven't. It
17 would have to be going awfully fast for that to
18 happen.

19 Q. Let me just make that real clear.
20 You've never heard of a pilot ejecting and having
21 an arm or a leg torn off?

22 GEN. JEFFERSON: I have not.

23 Q. Colonel Fly?

24 COL. FLY: I'm aware of pilots that
25 were killed in very high speed ejections because

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1 of arm flailing, those types of things, yes.

2 Q. I'm asking if you've ever heard of a
3 pilot having his arms or legs ripped off him in an
4 ejection.

5 COL. FLY: I don't specifically recall.
6 I do know that they have been killed in very high
7 speed ejections.

8 Q. General Cole, you've certainly heard of
9 that, have you not, sir?

10 GEN. COLE: I have not heard of arm or
11 leg removals. I have heard of fatalities and
12 severe body mangling in ejections.

13 Q. Severe body mangling?

14 GEN. COLE: That's correct.

15 MR. SOPER: Thank you. I would again
16 offer Exhibit 151, your Honor.

17 MR. GAUKLER: We have the same
18 objection, your Honor.

19 MR. SOPER: I think it's a matter of
20 whether the Board thinks this is going to assist
21 them.

22 JUDGE FARRAR: In that regard, let me
23 ask our own question. On page 14, beginning of
24 that paragraph you were just asked to read. Could
25 you read the first two sentences of that -- yeah,

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1 the first two sentences of the record -- into the
2 record, please?

3 GEN. JEFFERSON: Certainly. "One
4 common error is not fully preparing for ejection.
5 Crewmembers generally try to complete the
6 pre-ejection checklist but, invariably, the data
7 reflects that checklists aren't completed and
8 important items, like storing loose equipment,
9 tightening personal equipment, and the like, are
10 not done."

11 JUDGE FARRAR: Okay. If I'm a pilot
12 and I don't have time to do that, how do I have
13 time to look for the PFS site?

14 GEN. JEFFERSON: I think it's probably
15 going the other way. You're spending your time
16 trying to maintain control of the airplane, start
17 the engine, do those things, then you let these
18 other items slip.

19 JUDGE FARRAR: Do I let looking for the
20 PFS site --

21 GEN. JEFFERSON: No, you're looking at
22 what's in front of you. And you're spending your
23 time -- your first issue in any emergency is to
24 maintain control of the airplane. That's basic
25 pilotage. The pilot will be doing that to the

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1 conclusion -- or to the priority of filling his
2 checklist and stuff like that.

3 JUDGE FARRAR: But if I'm not able to
4 do the checklist things that you said earlier were
5 important, storing things that can injure me when
6 I pull this ejection mechanism, why -- so if I'm
7 not doing the things that are going to save my
8 life, why would I also be looking for the PFS,
9 taking my time away from the things that are
10 saving my life to look for the PFS site, which
11 isn't going to save my life? Without meaning to
12 impugn the character and conscience of your
13 pilots, somehow I see an inconsistency here
14 between saving my life and looking for the PFS
15 site, or any other site that's important that I
16 not let the plane hit.

17 GEN. JEFFERSON: My experience, and
18 I've ridden the ejection seats for a long time;
19 I've never ejected but been in planes and ridden
20 the ejection seats for years. My approach to that
21 is, aircraft control, try to fix the problem, and
22 as a last resort, if none of that works, eject.
23 But it's not a big deal of anticipation or concern
24 about the ejection. That's my last resort. But
25 in the meantime, I'm doing all these other things

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1 trying to save the airplane.

2 Q. Saving the airplane is not necessarily
3 --

4 GEN. JEFFERSON: I see what you're --

5 JUDGE FARRAR: Let me finish the
6 statement. The airplane is not necessarily
7 consistent -- "consistent" is not the word I'm
8 looking for. If saving the airplane is my
9 priority, then it's not necessarily an equal
10 priority that I'm looking for something on the
11 ground that if I fail to save the airplane I don't
12 want the airplane to hit.

13 GEN. JEFFERSON: I think as an
14 emergency progresses and you realize that you're
15 not going to save that airplane, then that's when
16 you start looking, where is it going to go and is
17 it time for me to get out.

18 JUDGE FARRAR: Am I looking for that or
19 am I trying to complete the checklist that's going
20 to save my life?

21 GEN. JEFFERSON: Well, you'll be doing
22 that.

23 MR. SILBERG: I'm sorry. Can you just
24 be clear as to what "that" is in that statement?
25 The record is not going to reflect.

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1 JUDGE FARRAR: I knew what I meant.

2 MR. SILBERG: It was General

3 Jefferson's answer.

4 JUDGE FARRAR: No, no, my question was
5 not clear, or it would not be clear for the
6 record. I'm now at a position, I'm a hypothetical
7 pilot, I've decided or I've realized I can't save
8 the airplane. I now have two things I could be
9 thinking about: How do I save my life and how do I
10 make the plane land in a safer place in terms of
11 the values people hold dear rather than a bad
12 place in terms of the values people hold dear.
13 Which of those am I most -- it says here that a
14 lot of pilots don't complete doing the things that
15 are going to save their life. Is that because you
16 want to tell me instead they're looking for where
17 to put the plane because they value other people's
18 lives more than their own, or are they focusing on
19 saving their lives, and even focusing on saving
20 their lives, they can't get their checklist done?

21 COL. FLY: Your Honor, may I --

22 JUDGE FARRAR: I'll ask you in a
23 minute.

24 GEN. JEFFERSON: I'd say that's the
25 latter case. But they are focused on the job,

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1 they're professionals. When you are trained as a
2 pilot, you're trained to be sort of detached from
3 emotions. Last thing you could do is point for
4 your own safety or anybody else's safety. So you
5 ride this as far as it's reasonable to do and you
6 make those steps, and then you find the handle and
7 get out. So looking for a place to avoid comes
8 before the handle.

9 JUDGE FARRAR: Comes before the handle
10 but doesn't come before my life-saving checklist?

11 GEN. JEFFERSON: That's right, if that
12 has fallen by. There are certain items on a
13 checklist that are not really critical. And if
14 you don't complete them, then, you know, you may
15 get some injury. That's why they're on a
16 checklist. But that's not critical to you
17 controlling the airplane or getting out of it.

18 JUDGE FARRAR: Colonel Fly, you wanted
19 to add to that?

20 COL. FLY: Yes, I did, your Honor. I
21 don't think the two are mutually exclusive. If
22 you put yourself in a position of an engine
23 failure, one of the things that's not reflected on
24 this exhibit but I think we could find elsewhere
25 in the --

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1 MR. SILBERG: I'm sorry. Which
2 exhibit?

3 COL. FLY: Excuse me. I was referring
4 to -- I believe it's referred to as State Exhibit
5 150.

6 JUDGE FARRAR: The excerpt from the
7 manual?

8 COL. FLY: Yes. There is more to this
9 entire section in the Dash-1 emergency -- back
10 up. The Dash-1, this is -- this document is
11 actually called T.O., Technical Order 1F-16C-1.
12 Fighter pilots refer to it as the Dash-1, okay?
13 It's the, this is what the airplane looks like,
14 this is how it works. Section 3 in every Dash-1
15 that I have ever used has been the emergency
16 procedures section.

17 There is more to this checklist or to
18 this section than what is included in State
19 Exhibit 150. In the typical ejection sections of
20 Dash-1, emergency procedures, one of the things
21 that it will tell you is to eject at the lowest
22 practical or possible -- the wording escapes me --
23 airspeed.

24 When you start talking about the flail
25 and the injuries, we're talking about high-speed

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1 ejection. We're starting to talk now in excess of
2 450, as high as 600 knots, which is very fast. If
3 you can imagine sticking your arm out a window at
4 600 knots in a car, that's equivalent to about
5 650, 700 miles per hour. That's the flail that
6 we're referring to.

7 So the Dash-1 tells you to eject at the
8 lowest practical or possible or words to that
9 effect. It's not part of the State's exhibit, so
10 I can't quote you exactly.

11 It will also, if you put yourself in
12 the situation of the engine failure, which we were
13 discussing for the Skull Valley scenario, the
14 engine fails, you go through the zoom maneuvers
15 and you're in that nose low descent six, seven
16 degrees. Your typical airspeed is going to be
17 well below 400 knots. I would as a guesstimate
18 say 200, maybe 225, somewhere in that regime. So
19 the airplane is going much slower, so the flail is
20 not as big an issue at 200 knots as it is at 600
21 knots.

22 So the seat is designed, obviously, to
23 operate within a specified performance envelope,
24 which is what General Jefferson was referring to
25 earlier. So the pilots are going to slow it down

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1 as much as possible because they know that reduces
2 their opportunity for being injured.

3 The other thing is, once they determine
4 that they will not be able to safely glide this
5 airplane to a suitable landing strip while they
6 try to get the engine started and everything, when
7 they start to think that I'm going to have to
8 eject, I mean, when they start to enter into that
9 process, actually part and parcel of this process,
10 pilots are looking out the window through that HUD
11 that we described. Whether it's on or off, it
12 doesn't matter. It's just a piece of glass that
13 has green squiggly lines put on it. They know
14 what's in front of them. If they see towns,
15 objects, things like that and they can turn a few
16 degrees to avoid it while they're doing these
17 things, they're going to do that, your Honor.

18 JUDGE FARRAR: They're going to do
19 that, but we were positing the circumstance where
20 they know they've lost the plane. In other words,
21 at some point, as I understood General Jefferson
22 to say, this is a bad day, I've lost this
23 airplane.

24 COL. FLY: Uh-huh.

25 JUDGE FARRAR: At that point the

1 question is, we were trying to ask, deal with --
2 at that point, I say, now I'm not where I'm
3 supposed to be, and now I've got to forget about
4 the airplane, I need to save my life. Which I
5 think is a step after what you just described
6 while I'm still trying to save the airplane.

7 COL. FLY: As part of the ejection
8 checklist, your Honor, that is part of State
9 Exhibit 150, if you would look at the IFF,
10 Identification Friend or Foe master knob to
11 emergency.

12 JUDGE FARRAR: Where is that? It's on
13 Exhibit 150?

14 COL. FLY: Yes, your Honor.

15 JUDGE FARRAR: Okay, I've got it.

16 COL. FLY: All that's going to do is
17 send out a radio beacon to all the air traffic
18 control scopes and say, this guy's got an
19 emergency. It highlights you on the radar scopes,
20 if you want to think of it that way. The master
21 zeroize switch, if you're in combat you want to go
22 to zeroize. There is a position that says
23 zeroize. The Air Force uses some funny
24 terminology. What that refers to is, there is a
25 classified code that the airplane emits. It's

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1 called mode 4, if you care. When you go to
2 zeroize, that dumps that signal so you don't
3 compromise this -- in the event, when the enemy
4 grabs that box out of the wreckage, you haven't
5 compromised that signal. Guys are not going to be
6 overly concerned about that on a peacetime
7 training mission in the United States.

8 No. 3, "loose equipment and
9 checklist--stow." Now we're starting to get to
10 things that are going to affect the pilot, in my
11 opinion, during the ejection sequence. I can't
12 speak for others, but I generally flew with as
13 much stuff stowed in my -- all the different
14 compartments in my g suits and places as possible.

15 Lap belt and helmet chin strap. My
16 personal technique, and this is just Ron Fly's
17 personal technique, is I used to fly with those
18 things snugged down, just because that's one less
19 thing I have to do if I have to eject.

20 Night vision devices, I never flew with
21 those but I could see where you would want to get
22 those off because that puts additional weight up
23 here, and you start doing the math on acceleration
24 forces.

25 The visor down, that's to protect your

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1 eyes and those types of things, but that's not
2 necessarily life threatening. But it's certainly
3 something you would do.

4 The "throttle--idle," and see, here it
5 specifically says, "slow to lowest practical
6 airspeed." So I would venture to say it's
7 elsewhere in the ejection sequence discussion.

8 And then of course No. 4 is, assume the
9 proper ejection position. That's important. And
10 "ejection handle--pull," that's also important,
11 because if you don't do that it's not going to
12 function.

13 So what I was trying to say is that
14 there is a priority. Some of the things in here
15 are not necessarily as critical. One of the main
16 things a guy wants to do is slow down as much as
17 possible, because that reduces the impact or the
18 effects of once he enters the airstream
19 surrounding the aircraft.

20 JUDGE FARRAR: All right. And we
21 appreciate that explanation, which is helpful.
22 Each of the items you just discussed, correct me
23 if I'm wrong, don't they go either to preservation
24 of the pilot's life or preservation of national
25 security?

1 COL. FLY: I'm not sure that I
2 understand -- I'm not sure that the first two --
3 if I understood your question correctly, your
4 Honor, the first two probably do not, for a UTTR
5 training mission.

6 JUDGE FARRAR: Right, okay. So you
7 said No. 2 that he wouldn't have to do. But if
8 he did it, that's either in really or practicing
9 to preserve national security in the instance of
10 losing an airplane.

11 COL. FLY: Uh-huh.

12 JUDGE FARRAR: Okay. Back up before
13 those nine items, and it says, "If time permits,
14 descend to avoid the hazards of high altitude
15 ejection. Stow all loose equipment and direct the
16 aircraft away from populated areas." Would I be
17 correct to read that as saying in conscience of
18 the military as reflected in that training or
19 policy is to avoid --

20 COL. FLY: Absolutely, without
21 question.

22 JUDGE FARRAR: Let me finish. -- is
23 to avoid putting the plane in populated areas,
24 cities, Superbowl stadium, whatever, but it
25 doesn't say there, avoid cathedrals built in the

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1 Middle Ages that are precious to people, and it
2 doesn't say avoid facilities on the ground where
3 there are no people like the PFS facility -- I'm
4 sorry -- where there are relatively few people,
5 like the PFS facility?

6 COL. FLY: I think, your Honor, what
7 that reflects is that the general Air Force
8 training in the sense of the Air Force is that if
9 there's something on the ground and you can avoid
10 it, you will avoid it. And it's a matter of
11 scale. You say, would I hit this town of 20? No,
12 I would not hit that town of 20 if -- but if my
13 choice is to park it into a school versus a house,
14 I would probably go for the house if that's my
15 only two choices. I will -- the Air Force
16 training is to do the minimum damage possible. I
17 guess that's a way of saying it.

18 JUDGE FARRAR: So you would want us to
19 read populated areas as kind of a catch phrase for
20 anything that I'd like to avoid if given the
21 choice?

22 COL. FLY: Yes, your Honor. I can't
23 think of an Air Force pilot who would
24 intentionally not turn away from an object that he
25 thought he was going to hit if he had an option to

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1 do so.

2 JUDGE FARRAR: So even if he didn't see
3 any people on the golf course we've talked about
4 before, or didn't see any people at the -- how
5 far, Mr. Silberg, is the -- would the casks be
6 from the building?

7 MR. SILBERG: I'm sorry, which
8 building? The canister transfer building?

9 JUDGE FARRAR: Yeah.

10 MR. SILBERG: Couple hundred feet.
11 Plus we have the O&M building, the health physics
12 building, the other facilities on the ground.

13 JUDGE FARRAR: Let me not ask any more
14 questions and let counsel get back to his --

15 MR. SOPER: Thank you, your Honor.

16 Q. (By Mr. Soper) Colonel Fly, of course
17 your description of not avoiding something would
18 depend on the pilot being able to, for instance,
19 if there were clouds or whatever, being able to
20 see the ground physically, would it not?

21 COL. FLY: That would depend.

22 Q. So a pilot could do it without being
23 able to see?

24 COL. FLY: Well, it depends what I'm
25 trying to avoid and what the circumstances are,

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1 yes. It may be possible I could have my TACAN on
2 and I know that it's taking me towards Hill Air
3 Force Base. I could turn away from the TACAN.

4 MR. SILBERG: Excuse me. Could you
5 explain what the "tacan" or "tack hand" is?

6 COL. FLY: T-A-C-A-N, I'm sorry, is the
7 abbreviation. It's the navigation ground station.
8 It's a radio signal that's transmitted by
9 different stations around the country. The pilots
10 dial up the frequency and they -- it tells you,
11 I'm this far away from this bearing. So it's one
12 of the ways that pilots TACAN. TACAN is one of
13 the means of navigation. You would have the
14 Inertial Navigation System, the INS, which
15 provides you capability depending which steer
16 point you have selected, but that's an opportunity
17 that may present itself in terms of providing you
18 information as to where you are.

19 There may be significant terrain
20 features around that prevent you from seeing the
21 specific objects or area, but you know that
22 because of the position of this mountain peak,
23 it's at the base of the mountain or something, I
24 see the mountain peak; if I point over here or if
25 I point toward the end of the mountain range,

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1 that's going to keep me well clear of this city or
2 this down or this cathedral or whatever.

3 So I can't categorically say no, you
4 could never avoid something if you couldn't see
5 it, because you may very well be familiar enough
6 with the area, with the general location of the
7 facility, the town, the church, whatever it
8 happens to be, there may be enough other
9 information available to you in terms of your
10 positional awareness that you can quite reasonably
11 avoid this thing, whatever it happens to be.

12 Q. (By Mr. Soper) Let me see if I
13 understand you, Colonel Fly. If you're saying you
14 can't see the ground because of the cloud cover
15 and you're 3,000 feet in the air, you might know,
16 nevertheless, where a church is on the ground? Is
17 that what you're saying?

18 COL. FLY: I think you're trying to
19 imply something that I didn't say. I talked about
20 general specific positional awareness, general
21 awareness of where certain things might be that
22 you may have the opportunity to avoid it. I may
23 not know where the church is on Fourth and Main,
24 but I might know that the city of Ogden is
25 underneath that cloud.

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1 MR. SOPER: I see, okay. Thank you.

2 Do you want me to think about a place
3 to pause? This would probably be appropriate,
4 your Honor.

5 JUDGE FARRAR: Okay. Some of us are
6 getting hungry, but I didn't want to interrupt you
7 if you were in the middle of something. It's
8 quarter to one. The counsel and the witnesses, we
9 have box lunches coming in for us.

10 MR. SILBERG: I think we have food
11 arranged to come next door.

12 JUDGE FARRAR: So we don't need to
13 allow an extraordinary amount of time.

14 MR. SILBERG: Well, I can't speak for
15 the Staff.

16 MS. MARCO: We have food arranged, but
17 I'm not sure if it's here. It's here.

18 JUDGE FARRAR: How about the State?

19 MR. SILBERG: Jim, how much time do you
20 need for lunch?

21 MR. SOPER: I'm sorry?

22 MR. SILBERG: Can we go off the record?
23 I don't think we need the transcript to --

24 JUDGE FARRAR: It may be important
25 sooner or later. Off the record.

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1 (Lunch recess taken at 12:49 p.m.)

2

3 Wednesday, April 10, 2002

1:40 p.m.

4

5 JUDGE FARRAR: All right. We're back
6 on the record, and everyone who needs to be here
7 is here.

8 Mr. Soper, you had come to a stopping
9 point, so get started again.

10 MR. SOPER: Thank you, Your Honor.

11 JUDGE FARRAR: Mr. Soper, while you're
12 getting ready, let me ask the parties for help
13 with something.

14 You've been giving us six copies of
15 exhibits, and, as usual, I forgot about Michelle,
16 who does a lot of work and will continue to do a
17 lot of work. So if you have seven, give us seven,
18 or if you only have six for today and other days.
19 But when you're preparing exhibits for the
20 future, if you can have seven, three for the
21 reporter and three for us and one for Michelle.

22 MR. SOPER: Forgive me just a moment,
23 Your Honor.

24 JUDGE FARRAR: That's fine.

25 MR. SOPER: Thank you.

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CROSS-EXAMINATION (Resumed)

BY MR. SOPER:

Q. Let's see. I believe that we were at State Exhibit 151. General Jefferson, if you would look at that again, it's that one final --

GEN. JEFFERSON: Yes, I have it.

Q. Judge Farrar read a portion from page 14, and you had some discussion on that. It appears in the left-hand column at the beginning of the second paragraph. It begins, "One common error." Do you find where I'm at?

GEN. JEFFERSON: Yes, I do. Yes, I have that.

Q. Judge Farrar read this to you, and if I might -- if you'd indulge me, it reads as follows:

One common error is not fully preparing for ejection. Crew members generally try to complete the preejection checklist. But invariably the data reflects that checklists aren't completed, and important items, storing loose equipment, tightening personal equipment and the like, aren't done. Initial windblasts

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1 can easily lead to serious injuries of the arms
2 and legs (due to flailing) as well as head and
3 face (as when the oxygen mask isn't attached).

4 Do you have any reason to disagree
5 with that assessment, sir?

6 GEN. JEFFERSON: No, I don't.

7 MR. SOPER: Okay. I would -- have we
8 been over this offering and the result of
9 Exhibit 151, Your Honor?

10 JUDGE FARRAR: The last we said, as
11 best I remember, is you would use it for
12 cross-examination and at some point would move
13 the admission of parts of it, not all of it.

14 Mr. Gaukler, is that your recollection?

15 MR. GAUKLER: I don't know if we've
16 reached an agreement, but that was one thing we
17 had suggested that we do.

18 JUDGE FARRAR: That was diplomatically
19 said.

20 Ms. Marco?

21 MS. MARCO: That was my understanding
22 of what Staff had suggested, that it be marked
23 for identification and have those portions marked
24 out.

25 JUDGE FARRAR: Mr. Gaukler, do you have

1 a different preference?

2 MR. GAUKLER: I have no problem with --

3 JUDGE FARRAR: What you want, you did
4 not want the whole thing put in and just left
5 lying around?

6 MR. GAUKLER: Left lying around for
7 people to reference on points that were not
8 discussed, et cetera.

9 JUDGE FARRAR: Mr. Soper, we don't have
10 to resolve that right now. If you're finished
11 for now with the document, why don't you tonight
12 or sometime figure out if there are parts of
13 it -- I mean physically we can accept the whole
14 document eventually, but I'd like to know at that
15 point that only certain parts of it are being
16 admitted.

17 MR. SOPER: It's --

18 JUDGE FARRAR: Unless you want to argue
19 that the whole thing should be admitted.

20 MR. SOPER: Well, I would suggest that
21 it's -- it's an article that shouldn't be quoted
22 out of context. And General Jefferson, in fact,
23 referred to some qualifier or something at other
24 places in the article when he discussed this,
25 and I would hate to excise portions of this and

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1 claim that this article had been selectively
2 admitted.

3 I mean there's nothing in here -- in
4 other words, the danger of letting it go in with
5 everything where everything is clearly
6 identified, those things that don't pertain are
7 clearly noted that they don't pertain, as
8 opposed to excising portions and running the risk
9 of excising things that would render the rest of
10 it inaccurate or incomplete.

11 So I think the safest thing is to
12 admit the article, and it stands for whatever
13 the air force claims it stands for. It's, I
14 think, articulated clearly as to what everything
15 is.

16 JUDGE FARRAR: Let's go off the record
17 for a minute.

18 (A discussion was held off the record.)

19 JUDGE FARRAR: Back on the record.

20 Why don't we, as usual, trust the
21 parties to work out something. Maybe what we'd
22 like to see is a new version of the document that
23 kind of boxes in the things that we've actually
24 talked about here. That way those things would
25 appear in context, we would admit the portions in

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1 the box but recognize that -- other things with
2 those portions in context. In other words, you'd
3 be admitting the things that we -- and we don't do
4 that right now, maybe by the end of the week or
5 sometime -- box in the things we've talked about.
6 We'll admit the boxed portions and take the rest
7 to the extent that it provides context for the
8 boxed portions.

9 MR. SOPER: May I address that, Your
10 Honor? The problem that I have is that the
11 article scopes the problem, starts out with here's
12 a revelation for you, ejection seat systems,
13 boom, boom, boom. It talks about a little
14 history. It talks about this particular ejection
15 seat, Advanced Concept Ejection Seat II. It
16 talks about the methods that were used in
17 researching these issues and the period of times,
18 how the database was queried, explains the
19 results. I would say that -- and not all of which
20 we've talked about.

21 I would say that the only thing --
22 you know, I'm not even sure -- the only thing
23 that's been mentioned is there's a bomber in
24 here, the B-1B, that might not be applicable
25 because it's a bomber, not a fighter. Everything

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1 else relates to ejection from the type of seat
2 we're dealing with and from fighter aircraft.

3 MR. SILBERG: But it relates to
4 ejection under conditions that are totally not
5 relevant, parts of it relate to conditions that
6 are totally not relevant to what we're talking
7 about, which is traffic in Skull Valley.

8 MR. SOPER: What I'm offering this for
9 is for the fact that air force pilots are under
10 stress, they make mistakes in ejection and the
11 circumstances surrounding ejection from a jet
12 aircraft. I'm not saying that these -- they're
13 A-10s or F-15s or any other aircraft in Skull
14 Valley or where these people ejected. I'm
15 saying that this is a known fact of life for air
16 force pilots, and they're under some duress in
17 contemplation of knowing these things.

18 JUDGE FARRAR: Let's do this: Let's
19 table this issue. I'll think about it some
20 more, talk to my fellow board members and come
21 back tomorrow or the next day with maybe some
22 better thoughts than I have now. And there's
23 some substance to this, but basically we're
24 dealing with a procedural problem, so I don't
25 want to spend any more time on it.

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1 Let's take up the next item.

2 MR. SOPER: So State's 151, the issue
3 of whether it's admitted is under advisement for
4 right now?

5 JUDGE FARRAR: Right.

6 MR. SOPER: Thank you, Your Honor.

7 I'm offering an exhibit to be marked
8 right now, Your Honor. I am offering the document
9 -- on its face it bears the following: Chapter
10 17, Emergency Egress From Aircraft, U.S. Air
11 Force Flight Surgeon's Guide, Chapter 17, revised
12 by Ron Peveto, M.D., M.P.H.

13 JUDGE FARRAR: And you want that --

14 MR. SOPER: I would like to have that
15 marked as State's Exhibit 151.

16 JUDGE FARRAR: Okay.

17 (STATE EXHIBIT-152 WAS MARKED.)

18 JUDGE FARRAR: Okay. We've had a
19 document marked for identification, State's
20 Exhibit 152. A copy has just been given the
21 witnesses.

22 Mr. Soper, which witness are you going
23 to direct your questions to first?

24 MR. SOPER: General Jefferson.

25 JUDGE FARRAR: General Jefferson, then

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1 as we did before, take a quick look at it, if you
2 would, and let us know when you've had enough
3 time to review it.

4 MR. TURK: May we go off the record for
5 a minute?

6 JUDGE FARRAR: Certainly.

7 (A discussion was held off the record.)

8 JUDGE FARRAR: Back on the record.

9 General Jefferson has just indicated
10 he's finished a quick look at the documents, so
11 we're ready to proceed, Mr. Soper.

12 MR. SOPER: Thank you, Your Honor.

13 Q. I don't expect you to review this with
14 the scrutiny of a physician, General Jefferson, I
15 just wanted to ask you some questions, just as it
16 relates generally to injuries that pilots might
17 expect from an ejection.

18 And you have taken a quick look at
19 State's Exhibit 152; is that right, sir?

20 GEN. JEFFERSON: Correct.

21 .Q. And as far as you can tell from the
22 face of it, it appears to be Chapter 17 from the
23 U.S. Air Force Flight Surgeon's Guide; is that
24 correct?

25 GEN. JEFFERSON: Yes. That's what's

1 written here.

2 Q. Have you had occasion before today to
3 look at this?

4 GEN. JEFFERSON: No.

5 Q. Could I direct your attention to page
6 7? The very first paragraph, the first three
7 sentences read: "Ejection forces are primarily in
8 the upward direction. The object is to attain
9 the greatest possible velocity over a specified
10 period of time. The force which causes the seat
11 to move upward ranges between 12 and 20 Gs."

12 Do you have any reason to disagree with
13 that statement?

14 GEN. JEFFERSON: No, no.

15 Q. Does that sound about right to you?

16 GEN. JEFFERSON: That's what you
17 quoted earlier, I think.

18 Q. It is.

19 MR. SILBERG: Excuse me. I think the
20 question, Dr. Jefferson, was do you agree with it,
21 not whether --

22 GEN. JEFFERSON: Well, it's here. I
23 have no reason to disagree with it.

24 Q. (By Mr. Soper) I see. And directing
25 your attention to the second paragraph,

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1 approximately the middle to lower part starts with
2 the word "Flail," "Flail injuries."

3 GEN. JEFFERSON: Um-hum, I see it.

4 Q. Let me read that, if I may. "Flail
5 injuries are the result of the differential
6 deceleration of the extremities in relationship to
7 the torso and seat. Flail injuries occur as a
8 consequence of the extremities leaving their
9 initial position, building up substantial
10 acceleration and then suddenly stopping. The
11 sudden stop may produce a bone fracture, joint
12 dislocation or total disarticulation."

13 Do you see where that's provided, sir?

14 GEN. JEFFERSON: Yes, I see that.

15 Q. Do you have any reason to disagree with
16 that?

17 GEN. JEFFERSON: No, but I would point
18 out that's for high-speed stuff.

19 Q. I see. Okay.

20 So the notion of disarticulation,
21 that is removal of a limb from the pilot; is that
22 right?

23 MR. SILBERG: Excuse me. I guess I
24 want to have the witness say whether he
25 understood disarticulation to mean total removal

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1 of a limb. I don't know what that term means.

2 MR. SOPER: That was my question.

3 MR. SILBERG: Okay.

4 GEN. JEFFERSON: I don't know that I
5 know that word actually means that. It looks
6 like it might.

7 Q. (By Mr. Soper) All right. Assuming it
8 means that, you have no reason to doubt the
9 statement?

10 GEN. JEFFERSON: No.

11 Q. If you would turn your page, sir, to
12 page 8, under the bold heading Pattern of
13 Ejection Injuries, the sentence that precedes the
14 table there reads, "Table 2 is an overview of
15 injuries that might be expected during an ejection
16 sequence (3)."

17 Do you see that, sir?

18 GEN. JEFFERSON: Yes.

19 Q. The (3) is a footnote, so I guess it
20 would just read ejection sequence.

21 And reviewing the list of injuries
22 there, it starts with spinal compression
23 fracture. Do you see that list of injuries?

24 GEN. JEFFERSON: Yes.

25 Q. Were you aware, sir, that that's an

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1 expected injury or a common injury from ejection?

2 GEN. JEFFERSON: It's fairly common.

3 Q. And hemorrhaging, are you aware of
4 that? I'm just reading -- skipping down the list.

5 GEN. JEFFERSON: No.

6 Q. And internal injuries to body organs,
7 were you aware that that's a consequence of
8 ejection?

9 GEN. JEFFERSON: That could happen.
10 That's not one that I've heard about a lot.

11 Q. And do you see any injuries on that
12 list that you are unfamiliar with as far as a
13 consequence or possible consequence of ejection?

14 GEN. JEFFERSON: No. I think all those
15 are possibilities.

16 Q. And including -- including subdural
17 hematoma; is that right?

18 GEN. JEFFERSON: Yes. I -- I see that.
19 I'm not entirely sure what it means. I think it's
20 below-the-skin bleeding, but I'm not entirely
21 sure of that.

22 Q. Okay. If I might, sir, at the end of
23 the table -- it would be the following page 9 --
24 in the first -- first paragraph that follows the
25 table, approximately in the middle of the page,

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1 it says, In a 2-year period the United States Air
2 Force reported that compression fracture was the
3 leading type of injury sustained in 468 ejections.
4 It is estimated that radiographic evidence of
5 fracture can be found in 30 to 50 percent of
6 aircrew after ejection. Any degree of flexion
7 in the posture of the seat occupant enhances the
8 risk of spinal injury.

9 Do you have any reason to disagree with
10 that statement?

11 MR. SILBERG: Could I just, for the
12 record -- and I don't know if the Board had looked
13 at it. We're just looking at it for the first
14 time. The reference to that statement, at least
15 the first sentence, is a -- looks to be a 1968
16 document or maybe dated from 1968 to 1970. And I
17 don't know whether that affects or doesn't affect
18 the conclusion, but that probably ought to be
19 included in what's being read into the record.

20 MR. SOPER: I have no objection to
21 that.

22 JUDGE FARRAR: I think that's fair,
23 Mr. Silberg.

24 MR. SILBERG: I'm sorry?

25 JUDGE FARRAR: I say I think that's

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1 fair.

2 MR. SILBERG: Okay.

3 (A discussion was held off the record.)

4 MR. SOPER: Is there a question
5 pending? I'm sorry. I've lost track of where we
6 are.

7 MR. SILBERG: I think there was a
8 question that was read concerning compression
9 fractures based on some data.

10 MR. SOPER: Let me rephrase the
11 question and make it real simple.

12 MR. SILBERG: Okay.

13 Q. (By Mr. Soper) General Jefferson, I
14 think you earlier said that you thought
15 compression fractures were the most -- or are at
16 least a common injury in ejections; is that
17 right?

18 GEN. JEFFERSON: That's correct.

19 Q. And the Exhibit 152 where we've been
20 referring reads, "It is estimated that
21 radiographic evidence of fracture can be found in
22 30 to 50 percent of aircrew after ejection."

23 Is that consistent with your
24 understanding, sir?

25 MR. GAUKLER: Your Honor, I would like

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1 to have -- again, this is a large document that is
2 being put up on cross-examination for the first
3 time. We haven't seen it before. Also, it's a
4 concept that's never been developed either in
5 discovery by the State or even in its own prefiled
6 testimony, and it seems to me like they're
7 trying to raise many things in detail new for the
8 first time in this hearing, far beyond what
9 they've put in their prefiled testimony.

10 And for an example, I don't know if
11 it's correct or not, but I notice on page 3 of
12 this document it makes reference to a different
13 type of seat used on an earlier airplane, on the
14 F-4. You know, we haven't had a chance to
15 evaluate whether or not this 20 or 30 percent even
16 relates to that seat. I don't know if General
17 Jefferson has had a chance to look at that, and
18 therefore, I think this question is unfair.

19 MR. SOPER: It doesn't even relate to
20 my question, actually.

21 JUDGE FARRAR: Well --

22 MR. SOPER: I asked him if this was
23 consistent with his understanding, was all, Your
24 Honor.

25 JUDGE FARRAR: Okay. Let me ask you

1 where we're going with this.

2 MR. SOPER: This is --

3 JUDGE FARRAR: In other words, I'm
4 getting the sense, not necessarily shared by my
5 colleagues, that we're spending a lot -- some
6 collateral -- we're spending a lot of attention
7 on something that may be collateral -- I mean are
8 we trying to establish -- are you trying to
9 establish that ejection is an extraordinarily
10 stressful event?

11 MR. SOPER: I am. I am, Your Honor.

12 And if I might -- and you're exactly
13 right, Your Honor. This is taking an awful long
14 time.

15 But the whole proposition here is this
16 is like driving a Cadillac down the street and a
17 pilot can just eject and next question. It's, in
18 fact, not the case, and it's required the State
19 to demonstrate that. And that's why we're here.
20 I'm about ready to leave the -- this document.
21 This is my last question.

22 MR. GAUKLER: And all I would say is
23 the appropriate place for the State to
24 demonstrate that would be in its prefiled
25 testimony instead of taking our witnesses through

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1 a lengthy cross on a document they haven't
2 reviewed before.

3 JUDGE FARRAR: Well, if we're near the
4 end, why don't we see if -- without making any
5 great philosophical rulings, why don't we see if
6 we can't get to the end with another couple of
7 questions.

8 Q. (By Mr. Soper) Did you understand
9 the question?

10 GEN. JEFFERSON: Repeat it, please.

11 Q. You'd indicated, sir, I believe, that
12 you were aware that compression fractures were a
13 common injury in ejections; is that right?

14 GEN. JEFFERSON: Yes, sir.

15 Q. This document says it's estimated that
16 there's evidence of fracture in 30 to 50 percent
17 of aircrew after ejection. Is that consistent
18 with your understanding?

19 GEN. JEFFERSON: I would be suspicious
20 of that because it appears this data is about 30
21 years old and I know the seats have been improved
22 since then.

23 Q. Well, this does involve the ACES II
24 ejection seat, does it not, that's referenced in
25 here?

1 GEN. JEFFERSON: Reference 5 ended in
2 '71, which is 30 years ago. I don't think ACES
3 was around then.

4 Q. So at least at that time -- you think
5 it would be accurate as of that period of time?

6 GEN. JEFFERSON: That's probably in
7 reference to the Martin-Baker seat, or earlier
8 even.

9 MR. SILBERG: Excuse me. Just for the
10 record, can you tell us when the Martin-Baker seat
11 was in use?

12 GEN. JEFFERSON: It was -- it was the
13 F-4, seat, wasn't it?

14 GEN. COLE: It was the primary seat in
15 use by the F-4. I don't think that the air force
16 used it in any aircraft after that. I could be
17 wrong about that, but you're talking about a '60s
18 kind of -- it may be developed in the '50s, used
19 in the '60s and then phased out in the '70s,
20 maybe the '80s. The F-16 had the ACES II probably
21 in '75. The F-15, when it first came out, did
22 not use the ACES II. It used another one. I
23 believe it was called Escape Pack, but I could be
24 wrong about that.

25 MR. SOPER: I have a question, Your

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1 Honor, if I might, for Colonel Fly.

2 Q. It was the Martin-Baker seat you're
3 talking about?

4 GEN. COLE: Yes.

5 Q. Would you look at Exhibit 152, exhibit
6 page 2? Do you see there a picture of the ACES
7 II? Is that correct?

8 COL. COLE: Correct.

9 Q. Would you look at page 6, and do you
10 see there an exploded view of the ACES II seat?

11 GEN. COLE: Correct.

12 Q. Do you see any reference to the
13 Martin-Baker seat in this document?

14 GEN. COLE: I believe it was in the
15 front part. If you'll give me a few minutes, I'll
16 be happy to reread it and see if I can find it.

17 MR. SILBERG: Look on page 3 in the
18 third paragraph. It's just one place I noted it.

19 GEN. COLE: I notice it talks about
20 the T-37 ejection seat on page -- which is not --
21 neither the Martin-Baker. It's more primitive
22 than that. The Martin-Baker is discussed on page
23 3. About halfway down the third full paragraph,
24 it says, "The Martin-Baker seat was utilized."

25 Q. (By Mr. Soper) Okay. So in the

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1 history it refers to it. Do you see any pictures
2 of it in here?

3 GEN. COLE: No.

4 Q. So, General Jefferson, then, just a
5 final question. It is your understanding of the
6 current ejection system that compression
7 fractures are a common injury; isn't that right?
8 Or if you don't know, that's fine too.

9 GEN. JEFFERSON: I'm not sure I can
10 answer that.

11 MR. SOPER: All right. I'm not
12 offering this as an exhibit, Your Honor.

13 JUDGE FARRAR: Thank you.

14 MR. SOPER: We'll leave it marked and
15 unadmitted.

16 JUDGE FARRAR: Marked and not admitted.

17 MR. SILBERG: Not offered.

18 JUDGE FARRAR: Not offered.

19 Are you through with ejection seats,
20 Mr. Soper?

21 MR. SOPER: No. I have one other
22 document, Your Honor.

23 JUDGE FARRAR: Okay. Does the
24 document deal with simulated ejection?

25 Then while we're doing our paperwork

1 here, you mentioned, General, about a -- I knew
2 that you didn't practice ejections at the --

3 MR. SOPER: Excuse me. I just want to
4 say that the trouble marking this, this is
5 already an evidence exhibit.

6 MS. NAKAHARA: We haven't offered it
7 into testimony yet. It's a State's exhibit.

8 MR. SOPER: It's been marked as one of
9 our prefiled exhibits, and I just didn't know if
10 we wanted to give it another number.

11 MR. SILBERG: No, don't give it
12 another number.

13 MR. GAUKLER: No. It's prefiled.

14 MR. SILBERG: Stay with the numbers.
15 We have enough --

16 MR. SOPER: Excuse me for interrupting,
17 Your Honor. I just wanted to save the confusion.

18 Can we have this marked as State's
19 Exhibit 57? Then I apologize.

20 JUDGE FARRAR: So we will mark it --
21 the reporter will mark it as 57, which it already
22 indicates on there. She'll stamp it.

23 (STATE'S EXHIBIT-57 WAS MARKED.)

24 JUDGE FARRAR: Okay. The court
25 reporter has marked the -- has marked the

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1 document as State Exhibit 57.

2 Go ahead, Mr. Soper. I'll hold my
3 question until later.

4 MR. SOPER: Thank you -- thank you,
5 Your Honor.

6 Q. General Jefferson, do you have before
7 you what's been marked as State's Exhibit 57?

8 GEN. JEFFERSON: Yes, I do.

9 Q. And you're familiar with that
10 document, are you not?

11 GEN. JEFFERSON: Yes, I am.

12 Q. And you've reviewed that in some detail
13 before today?

14 GEN. JEFFERSON: Yes.

15 Q. This is a document known as a SAFECOM;
16 is that correct?

17 GEN. JEFFERSON: Yes, ALSAFECOM.

18 Q. ALSAFECOM, excuse me.

19 And that's the abbreviation for all
20 safe communication? Is that your understanding?

21 GEN. JEFFERSON: My understanding --
22 Gen. Cole's more accurate on this probably, but
23 it's safety communications to all commands.

24 Q. And this is from the air force chief
25 of safety; is that correct?

1 GEN. JEFFERSON: Yes.

2 Q. Would SAFECOMs be used for major items
3 of safety concern?

4 GEN. JEFFERSON: Yes.

5 Q. And you would take this to be a
6 reliable document?

7 GEN. JEFFERSON: Yes.

8 Q. And this particular SAFECOM was issued
9 in 1996; is that right?

10 GEN. JEFFERSON: Yes.

11 Q. It appears to be bearing the
12 signature initials of Robert Lee, Lieutenant
13 Colonel, United States Air Force; is that correct?

14 GEN. JEFFERSON: Actually, I think
15 that's Orin Godsey, Brigadier General's
16 signature.

17 Q. Oh, I'm sorry. You're right.

18 This document, sir, notes that 73
19 percent of the ejections in the past months --
20 speaking from the time frame of this memo -- were
21 below safe ejection altitude of 2,000 feet; is
22 that correct?

23 GEN. JEFFERSON: Is this the 12-month
24 paragraph or the 6-month?

25 Q. Well, I'm reading from the first page,

1 No. 2, about the third sentence down. It reads,
2 "Seventy-three percent (8 of the 11 ejections)" --

3 GEN. JEFFERSON: In the past 6 months.

4 Q. -- "in the past six months were below
5 minimums."

6 GEN. JEFFERSON: Okay.

7 Q. And that would be below the minimum
8 2,000-foot minimum safe ejection?

9 GEN. JEFFERSON: Yes.

10 Q. It notes on page 3 -- well, excuse
11 me. Pick up on page 2 at the very bottom. It
12 reads as follows: "Critical checklist actions
13 have been missed by formation members and
14 unchallenged by other participants. Erroneous
15 assumptions and poor airmanship have flourished
16 without challenge."

17 And that is with respect to the
18 in-flight emergency of ejection; is that right?

19 Well, let me do this, sir. Let me not
20 select things. Let me read paragraph 4.

21 Another significant problem has been
22 inadequate communications between lead, wingmen
23 and other crew members that prevented correct
24 assessment of various airborne situations and
25 timely ejection decisions. Recent flight mishap

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1 reports reveal a downward trend in the quality of
2 mutual support during normal ops or when faced
3 with an aircraft malfunction or an in-flight
4 emergency. The well-proven challenge and
5 response method appears to have broken down.
6 Critical checklist actions have been missed by
7 formation members and unchallenged by other
8 participants. Erroneous assumptions and poor
9 airmanship have flourished without challenge.
10 Even more disturbing is the fact that in almost
11 all poorly handled in-flight emergencies, at
12 least one formation member noted the discrepancy
13 and had the smarts, solution or the time to get
14 more information but did not speak up. The
15 excuses for failing to support the in-flight
16 emergency flight member included, It was not my
17 aircraft, or, I was just a student, wingee or a
18 backseater. Also, inappropriate chase information
19 (sic) positioning during an in-flight emergency
20 significantly degraded the ability to support the
21 in-flight emergency pilot as noted above. Futile
22 repeated attempts to recover failed engines are
23 driving crews to controlled ejections well below
24 the recommended 2000 feet AGL minimum. In recent
25 mishaps these delays were not challenged by chase

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1 pilots or backseaters. Because of a recent
2 controlled ejection at less than 400 feet AGL, a
3 pilot suffered severe injuries. It is
4 imperative that all formation members provide
5 active and full-fledged support during in-flight
6 emergencies. Human factors specialists indicate
7 that crew members, when confronted with in-flight
8 emergency induced stress, may need external or
9 interpersonal intervention to alter their
10 inappropriate performance/actions.

11 Is that how that reads, sir?

12 GEN. JEFFERSON: That's literal, yes.

13 Q. Okay. Had you considered this
14 document in assessing your -- the ability of a
15 pilot to avoid the PFS site?

16 GEN. JEFFERSON: No. I didn't see it
17 until after I'd done that.

18 Q. I see. Did you -- the essence of
19 this document is that pilots are making poor
20 decisions in emergency situations, is it not?

21 GEN. JEFFERSON: As I read it, the poor
22 decision is sticking with the aircraft below
23 2,000 feet and then not being challenged by their
24 wingman to say it's time for you to get out.

25 Q. So that would be yes, they do make poor

1 decisions during the ejection --

2 GEN. JEFFERSON: In that regard. But
3 that has nothing to do with controlling the
4 airplane or that sort of thing.

5 Q. It has nothing to do with that?

6 GEN. JEFFERSON: No.

7 Q. And --

8 GEN. JEFFERSON: Steering it and that
9 sort of thing.

10 Q. So you would say, wanting to be
11 absolutely safe in your approach to evaluating
12 this nuclear waste site, that this memo sent out
13 by the chief of safety concerning the stress of
14 crew members during ejection circumstances does
15 not bear on your decision? Would that be your
16 testimony?

17 GEN. JEFFERSON: I think this is a
18 message that was sent out six years ago to address
19 a problem at that time. I don't think that's
20 particularly current.

21 Q. So it would be your view that even
22 though this problem existed at this time, it's no
23 longer a problem; is that right?

24 GEN. JEFFERSON: I think it's one of
25 the things that the pilots always have to train

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1 for, and evidently there was a rash of this at
2 that time.

3 Q. And that was due to the stress
4 encountered during emergencies; is that right?

5 GEN. JEFFERSON: Yes. It's -- it's to
6 remind crew members that they need to support
7 each other.

8 MR. SOPER: We would offer Exhibit 57
9 into evidence, Your Honor.

10 GEN. COLE: May I add something, sir?

11 MR. SOPER: Well, I don't have another
12 question. It's up to --

13 JUDGE FARRAR: Hold the offer.

14 And, General Cole, go ahead.

15 GEN. COLE: Yes, sir. Thank you,
16 Your Honor.

17 This ALSAFECOM message addresses
18 several issues. The first, as you so accurately
19 identified, sir, is ejecting below the recommended
20 altitude, in the case of the F-16, 2,000 feet.

21 But there are others within here that
22 are corollary and bearing on. You've got
23 basically issues here of aircrew discipline and
24 accountability for how you do what you're supposed
25 to do and behave under stress. You've got human

1 factors and crew resource management issues, and
2 also, you've got basic Dick-and-Jane
3 communications issues. And they're all lumped
4 into this message.

5 I'd like to address the 2,000 feet
6 first. Depending on where you have your
7 emergency, if it's at 10,000 feet, you may glide
8 for quite some period of time and have a very
9 easy time of it, doing a controlled bailout well
10 below 2,000 feet. If you have your emergency at
11 5,000 feet and you've done the three big things,
12 maintain aircraft control and fly the airplane,
13 assess the situation and take the appropriate
14 action, perform your procedures -- you have
15 several decision lines running at this time.
16 They're not in a series or sequentially, they're
17 in parallel. You're working your procedures,
18 you're maintaining your situational awareness,
19 you're controlling the airplane. And then land
20 as soon as practical if you can. And if you
21 can't and you have to jump out, you make a
22 decision to jump out.

23 Now, this citation here of the 2,000
24 feet, there are several reasons why a crew
25 member might go below 2,000 feet, some good and

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1 some not so good. In the first instance, there's
2 a big difference between regulations, procedures
3 and techniques.

4 And I'll give you an example of two
5 Class A mishaps before and after this one. One
6 was 20 January of '96 before this message went
7 out, and one was afterward, 7 June of '96. Both
8 those young aviators ejected below the minimum of
9 2,000 feet.

10 In one case it was 1600 feet above
11 AGL. Now, if that aviator thought he had a chance
12 to restart the engine, he had no obstacles in
13 front of him and he thought it was worth one more
14 try, I'm not sure 2,000 feet in that instance is
15 a hard-and-fast let's give it one more shot and
16 then he jumps out.

17 You're right, regulations and
18 procedures, 2,000 feet is the number. But if he's
19 rushed, he's stressed and delays too long and
20 then he can't get out safely, that's in the
21 procedures and bad judgment category. So the
22 issue here that he starts out with is read the
23 book, follow the book and use good judgment,
24 valid guidance.

25 Point two, these other things work

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1 into this, aircrew discipline and accountability,
2 human factors and crew resource management,
3 support your lead, support your wingman, if you
4 see somebody struggling, help them. That is
5 Dick-and-Jane leadership and aircrew skill. That
6 is good material too.

7 JUDGE FARRAR: When you say help them,
8 General, you mean talk -- not help them physically
9 but talk to them and say --

10 GEN. COLE: Sure, talk to them --

11 JUDGE FARRAR: -- do the --

12 (A discussion was held off the record.)

13 GEN. COLE: You're off your heading,
14 your air speed's a little high, pull it in, that
15 type of thing.

16 So, at any rate, my assessment would
17 be that they had had perhaps some mishaps and
18 some incidents where the trend lines were going
19 in the wrong direction, so this is a listen hard
20 and pay attention, ladies and gentlemen, let's
21 focus on the basics.

22 And so there's an onerous tone to this
23 message, and, frankly, I would take issue with
24 that. When I was chief of safety -- and I'm not
25 trying to second-guess my successor -- I wouldn't

1 have written it quite this way. You've got to
2 take in it the context of what this means.
3 We've had some worrisome incidents and some bad
4 trends going on, and the 20 January mishap where
5 the young man ejected at 1600 feet as opposed to
6 2,000 feet, perhaps not a show stopper but,
7 nevertheless, an indicator. And other things
8 like that probably prompted this message.

9 So my bottom line, sir, is just kind
10 of keep this in context. It has an alarmist
11 tone. It has a worry and fear tone when, in
12 fact, it's a management and leadership tool to
13 say, Everybody, focus on what's important, get
14 back to basics, fly smart, fly safe.

15 Q. (By Mr. Soper) And you recognize,
16 being chief of safety, do you not, General Cole,
17 that the last comment here that when faced with
18 in-flight emergency and due stress, the crew
19 member may need external or interpersonal
20 intervention to alter their inappropriate
21 performance?

22 GEN. COLE: Yes, sir.

23 May I elaborate on that a bit?

24 MR. SOPER: I have a feeling that
25 Your Honors will let you.

1 JUDGE FARRAR: You're correct.

2 GEN. COLE: In the business of
3 aviation, we've been dealing with this issue
4 forever. We're getting better at it. We're
5 training the crews more intensely at it. And this
6 is not an inaccurate assessment. Stress and
7 duress when you're flying an airplane is something
8 that's got to be recognized and managed and
9 managed skillfully. Your commanders have got to
10 understand what people are going through and help
11 them where they need it. This is a coaching
12 mechanism, is what it is. It doesn't mean the sky
13 is falling. It's a raise your hand, back to
14 basics, focus on what we're doing, and let's
15 focus how to do it and, more importantly, focus on
16 doing the right things the right way.

17 Thank you, Mr. Soper.

18 MR. SOPER: Thank you, General.

19 Your Honor, I wasn't quite accurate. I
20 forgot one other document on this subject, if I
21 might.

22 JUDGE FARRAR: When we interrupted you
23 to let the general add his thoughts, you were
24 about to offer State Exhibit 57 for admission.

25 MR. SOPER: I was.

1 JUDGE FARRAR: Any objection?

2 MR. GAUKLER: No, sir.

3 JUDGE FARRAR: There being no
4 objection, it will be admitted into evidence.

5 (STATE EXHIBIT-57 WAS ADMITTED.)

6 MR. SOPER: Thank you, Your Honor.

7 JUDGE FARRAR: And now you have
8 something you want --

9 MR. SOPER: I've offered to be marked,
10 from the Air Force News, an account of a rescued
11 pilot --

12 JUDGE FARRAR: That's all the -- and
13 you want that as number what?

14 MR. SOPER: It was released April 5th
15 of 1999, and I've asked to have it marked as
16 State's Exhibit 153.

17 JUDGE FARRAR: Okay.

18 (STATE EXHIBIT-153 WAS MARKED.)

19 JUDGE FARRAR: All right. The reporter
20 has marked it. Who are you going to ask?

21 MR. SOPER: I'd ask General Cole this.
22 He seemed to be familiar with -- as chief of
23 safety, of these matters.

24 JUDGE FARRAR: General Cole, let us
25 know when you've had time to read through the

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1 document.

2 GEN. COLE: Yes, Your Honor.

3 MR. SOPER: General Cole, this --

4 JUDGE FARRAR: Wait, wait.

5 MR. SOPER: Oh, excuse me.

6 JUDGE FARRAR: He's going to let us

7 know when he's --

8 MR. SOPER: Oh, I'm sorry. I didn't

9 understand that.

10 GEN. COLE: All right, sir.

11 MR. SOPER: May I proceed, Your Honor?

12 JUDGE FARRAR: Yes.

13 MR. SOPER: Thank you.

14 Q. I've handed you State's Exhibit 153,
15 General Cole. It's from Air Force News, released
16 April 5, 1999. Do you have that before you?

17 GEN. COLE: I do, sir.

18 Q. I have no intention of going into this
19 whole thing. It's a rather dramatic account of a
20 pilot who ejected behind enemy lines and has a lot
21 to do with matters not before us.

22 But I wanted to ask you, sir, in
23 connection with your job as chief of safety and
24 having been familiar with the stress of crew
25 members --

1 JUDGE FARRAR: Off the record.

2 (A discussion was held off the record.)

3 JUDGE FARRAR: Go ahead.

4 MR. SOPER: Broke my timing here.

5 Q. I'll direct your attention, General
6 Cole, to page 2, and I just wanted to read you
7 one -- two sentences here. They quote the pilot
8 as saying this: "'Am I going to know when it's
9 time to get out?' is the question on every
10 fighter pilot's mind," he said. The one fragment
11 of this whole event I can't remember is pulling
12 the handles. God took my hands and pulled.'"

13 Now, I realize that's a rather
14 dramatic statement, and it would indicate to me
15 that that pilot might be under some stress. And
16 I just wondered if that was consistent with the
17 type of stress that you might have been referring
18 to in this ALSAFECOM memo.

19 GEN. COLE: Yes, sir.

20 May I give you three lead-in
21 antecedents to this before I talk about it?

22 And the first one, the stress level was
23 pretty high because, if this is the particular
24 aircraft loss that I'm thinking of, he was shot
25 down, which pegs the needle significantly.

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1 He bailed out. Yes, he was under
2 stress, tremendous stress. He was in combat,
3 first, and secondly, he got hit and the airplane
4 apparently went nearly out of control. But the
5 training and discipline kicks in. He says, "'Am
6 I going to know when it's time to get out? Is the
7 question on every fighter pilot's mind,' he
8 said." You bet. Well, you know what? The
9 training and the discipline kicked in. He may
10 not be able to remember it, but he sure did it
11 right. That's -- that's a real testimony of
12 discipline, skill and courage right here.

13 Uninjured except for a few minor
14 abrasions, describes the ejection as violent.
15 Well, it notes up here in the top five times the
16 force of gravity, negative g forces. Negative g
17 forces are -- if I can slow this down, is when
18 you get bounced up towards the ceiling as opposed
19 to pulled into your seat. That is terribly
20 stressful on your body.

21 Once again, may I flip forward and now
22 say this was a combat mission. He was probably
23 taking evasive maneuvers. He got hit, the
24 airplane went out of control, so the g forces are
25 excessive. Training, discipline, worked

1 through, he got out of the airplane.

2 I would roll this to the issue at
3 hand, sir, of driving through Skull Valley at 350
4 to 450 knots, basically straight and level,
5 g-clearing turns. Much different from what
6 this young man went through, and I would
7 certainly hope you wouldn't get tagged by a Sam
8 6 going through Skull Valley.

9 So this is an example of the stress
10 that was highlighted in Gen. Godsey's message, and
11 it's very real in combat or in up tempo
12 operations or if you're flying hard. But one of
13 the great things about our pilots is that
14 they're well trained, well conditioned, well led,
15 and they deal with it very well. And although
16 this is a media account, which we've got to
17 levin our assessments of it a little bit, it's
18 really well written and laid out as far as the
19 human emotions and the stress involved, everything
20 from his young crew chief that gave him the flag
21 and just wanted him back.

22 Q. Sounds to me like the action of
23 actually pulling the ejection handle is somewhat
24 automatic due to training. Is that what you'd
25 assume from this?

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1 GEN. COLE: Yes, I would. And I'd like
2 to offer my colleague here on the right to add,
3 since he's an F-16 pilot. But when you do
4 emergency procedures, you rehearse them,
5 rehearse them, study them and rehearse them and
6 practice them. And when you practice them, you
7 think worst case. And they actually take you
8 every year -- it's like going to the dentist at
9 mach 3 -- and put you in a simulator and lay every
10 emergency conceivable on you, singly, multiply
11 and parallel, to enable you to learn to deal with
12 stress. And this young man passed the test.

13 Q. Would you say, sir, that he was correct
14 when he says "Am I going to know when it's time
15 to get out? Is the question on every fighter
16 pilot's mind"?

17 GEN. COLE: That's a rapid, high speed
18 decision process you go through, and certainly
19 there's that element of self-doubt. But the pros
20 are the ones that manage that, and he obviously
21 did it right.

22 MR. SOPER: I see. Thank you, sir.

23 COL. FLY: I think you did great.

24 JUDGE FARRAR: Are you on to another
25 subject now?

1 MR. SOPER: Did we get Col. Fly's
2 remark on there, I thought you did great?

3 COL. FLY: I do think he did well. I
4 thought he answered all the points I would have
5 answered. And, as he said, we train for that all
6 the time in the simulator, and the F-16, in fact,
7 we do emergency procedures much more frequently
8 than once a year. In the simulator, not the
9 plane.

10 JUDGE FARRAR: Mr. Soper, are you on to
11 another subject?

12 MR. SOPER: I am. I'm just thinking
13 Your Honor.

14 JUDGE FARRAR: Let me ask a couple of
15 questions.

16 This is the second or third time you've
17 mentioned the simulator. And I thought I'd
18 figured out on my own that ejection is not
19 something that we actually practice, but do you
20 ever do it in a two-seater?

21 COL. FLY: No, sir. You would never
22 eject -- you would never practice eject from an
23 actual airplane. The simulator never leaves the
24 ground.

25 JUDGE FARRAR: But even from -- so you

1 never say, okay, we're going to show you what
2 this is really like, get in the back of a
3 two-seater and eject.

4 GEN. COLE: No, sir. No, sir.

5 JUDGE FARRAR: Okay. Mr. Silberg, did
6 you want to --

7 MR. SILBERG: No. I was just going
8 to ask -- because my understanding is they do
9 simulate the ejection in a real --

10 JUDGE FARRAR: Yeah. I was going to
11 get to that.

12 So tell me about this -- a little more
13 than you said before about how the simulator
14 works.

15 COL. FLY: Well, the F-16 simulator
16 is -- General Cole was talking -- it simulates
17 flight. You have different instruments that
18 function, and it gives you some limited visual
19 display as well.

20 JUDGE FARRAR: If I'm in it, what am I
21 sitting in?

22 GEN. COLE: You're sitting in what
23 looks to be an F-16 cockpit. The seat tilts back
24 at the correct angle and all those types of
25 things.

1 And you can fly instrument
2 procedures, you can -- which is how do I navigate
3 and get around in the weather? How do I land in
4 bad weather conditions? They can put you in
5 simulated air-to-air combat things and figure
6 out, okay, I've got these airplanes out here 40
7 or 50 miles away, I can use my radar to close
8 toward engagement, and take simulated missile
9 shocks, those types of things. You can do some
10 practice bombing in the simulator --

11 JUDGE FARRAR: Okay. I've got that
12 now --

13 COL. FLY: -- and you can also fail any
14 and all systems that the airplane normally uses.
15 The console operator can start to fail them at
16 his discretion or, if you're taking an evaluation,
17 at the evaluator's discretion, he'll fail things
18 as you ask. And you get presented with situations
19 such as perhaps an engine flameout, and you'll go
20 through all the training that you would do, the
21 normal steps. You would turn toward the nearest
22 suitable field and all that type of thing. If
23 there was no suitable field, you couldn't make
24 it, the engine wouldn't restart, then you would
25 pull the handle in a controlled ejection

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1 situation.

2 JUDGE FARRAR: It's the same handle --

3 COL. FLY: Same handle, same location.

4 JUDGE FARRAR: Okay. When I pull it,
5 what happens?

6 COL. FLY: Basically the simulator
7 goes blank. It stops it. If you don't -- it
8 doesn't shoot you up the rail like they alluded
9 to earlier in the initial training in pilot
10 training where we would go through that T-37
11 thing that would shoot you up.

12 JUDGE FARRAR: Okay. So somewhere in
13 my training --

14 COL. FLY: Yes, sir. Very early in
15 your training -- if I remember correctly, when I
16 got to undergraduate pilot training, which is
17 where I first flew the T-37, the first jet that
18 the air force uses in training, I think it was
19 within the first 30 days of arrival they put
20 us -- we called it the boom bucket. You went
21 through all the procedural training, and then
22 they literally sat you in a T-37 ejection seat
23 that was not in an airplane, that had a charge
24 underneath it. You pulled the handle, and it
25 would shoot you up the rail, I'm guessing 12, 15

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1 feet, something like that.

2 JUDGE FARRAR: But that is not in
3 conjunction with having just failed to --

4 COL. FLY: No, sir. That's --

5 JUDGE FARRAR: Wait, wait, wait. I
6 don't mind, but the reporter does.

7 So at that point you're just letting
8 me experience a simulated ejection. You're not
9 calling upon me to make a decision, having just
10 failed to beat the simulator at its own game.

11 GEN. COLE: That's correct. For that
12 particular boom bucket training, that's correct.

13 JUDGE FARRAR: Okay. So then until --
14 if I understand all this together, until I
15 actually eject from an airplane because
16 something's gone wrong, I've never -- I've never
17 fully experienced that sensation?

18 GEN. COLE: That's correct, Your
19 Honor.

20 JUDGE FARRAR: I've done the simulator,
21 I've been simulated in the seat, but I have not
22 experienced them together.

23 GEN. COLE: That's correct, Your
24 Honor.

25 JUDGE LAM: And, Colonel Fly, how

1 closely does this boom bucket simulate ejection
2 relative to the F-16?

3 COL. FLY: I would say probably not
4 that well at this point. It gives you the
5 sensation of the charge underneath. It was
6 designed to simulate the T-37 seat. I can't --
7 it's not nearly as sophisticated a seat as the
8 F-16 ACES II. It gives you more of an initial --
9 it was described as a 105 howitzer or 155 -- I'm
10 not sure which -- howitzer shell kind of thing,
11 and it was one big impulse. It's a boom like you
12 were shot out as opposed to the ACES where you get
13 the acceleration but it's rockets. And although
14 the g forces are fairly high, as described in
15 that flight surgeon's document, the acceleration
16 is actually not quite as bad because it's done
17 over time and it's a smoother type thing than
18 just a quick impulse. It doesn't throw you up --
19 I mean I can't tell you exactly what the
20 differences are. That's an engineering factor
21 that I'm not familiar with.

22 JUDGE FARRAR: Would it be fair of me,
23 then, to be thinking that while you've prepared
24 me for -- you've prepared me physically for what
25 ejection might feel like and you've prepared me

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1 for the panic that comes in when I fail the
2 simulator, you haven't mentally prepared me for
3 the moment of truth when I actually have to eject?

4 COL. FLY: I think, Your Honor, I would
5 politely disagree with that. I think that the
6 air force does everything they can to make you as
7 prepared as you can possibly be so that when
8 you're faced with that decision, you will make
9 the correct one. And, Your Honors, I would just
10 like to point out that the alternative is not very
11 good. Riding the airplane into the ground is
12 not a very satisfactory solution.

13 JUDGE FARRAR: Well, you anticipated my
14 next question. How much does an F-16 cost?

15 COL. FLY: Your Honor, I can give you a
16 range of numbers. I can defend anywhere from \$15
17 to \$40 million, depending how you want to price
18 it.

19 JUDGE FARRAR: Okay. In the course of
20 the training, is that number ever mentioned to
21 your student pilots?

22 COL. FLY: I -- it's been so long -- I
23 don't recall ever mentioning a specific number as
24 part of the Syllabus training that I used to do
25 when I was an instructor pilot.

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1 JUDGE FARRAR: And this is a very
2 simple-minded question, but you see where I'm
3 headed with it. At some point in my training as
4 a pilot, somebody tells me, Son, this is a
5 valuable airplane to your government.

6 COL. FLY: Your Honor, I would agree.
7 They all have an appreciation -- I can't give you
8 a specific number, but I think if you ask the
9 average F-16 pilot, What's this airplane cost,
10 he'll given you a number somewhere between \$20
11 and \$40 million.

12 JUDGE FARRAR: Okay. And being aware
13 of that number, is this one of the human factors
14 that drives me to stay with the plane longer than
15 I ought to?

16 COL. FLY: I'm not sure I can speak to
17 every person, Your Honor. I think that's a
18 decision that most pilots are going to have to
19 make individually. We will discuss this with
20 people. You know, we will talk about the
21 procedures, what to do, how to do it, when to do
22 it and when, if warranted, to make that decision
23 to eject. One of the things that I used to tell
24 guys -- and I'll be quite honest with you. When
25 I was a formal course instructor in the F-16, I

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1 would tell them, The air force has a couple of
2 thousand F-16s. They have one Jack Cole or Joe
3 Smith or Hugh Horstman. So at some point you
4 have to make that decision. And I think most
5 people sit down and they think their way through
6 this. What about this? What about that? Just
7 part of routine training that gets drilled into
8 you.

9 JUDGE FARRAR: General Cole, this is,
10 then, what you were saying, why you try to get
11 the engine going one more time if it's in a
12 decent glide path where I can violate the
13 2,000-foot rule?

14 GEN. COLE: Yes, sir. I would prefer
15 to say deviate from rather than violate here.

16 JUDGE FARRAR: Fair enough.

17 GEN. COLE: But that's procedure and
18 judgment realm.

19 But to add one comment, if I may, to
20 Colonel Fly, that element is there. But we've all
21 three been wing commanders, we've all three been
22 squadron commanders. And we've talked to our
23 pilots, we've had commanders call. And I've used
24 the phrase, "Your life, your wife, if you have
25 one, are more important than any piece of

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1 equipment the air force has."

2 JUDGE FARRAR: Thank you.

3 Oh, one unrelated question. A typical
4 commercial airliner lands at what speed?

5 GEN. COLE: Depending on the type, sir,
6 something like a C-9 -- Northwest Airlines has
7 about 70 of them -- will have a final approach
8 course air speed of about 135 nautical miles per
9 hour. A larger one like a 707 or an Air Bus,
10 140, 150 perhaps, depending on the gross weight.

11 JUDGE FARRAR: And I ask that
12 question, obviously, just for the only comparison
13 I have with the speeds you were talking about.

14 Go ahead, Mr. Soper.

15 MR. SOPER: The conversation has just
16 raised another issue. I'll deal with it very
17 briefly.

18 Q. Colonel Fly, you were a wing
19 commander; is that right?

20 COL. FLY: That's correct.

21 Q. And at Hill?

22 COL. FLY: That's correct.

23 Q. And it was only for a few months; is
24 that right?

25 COL. FLY: A little less than a year.

1 Q. A little less than a year, and you
2 stepped down over safety concerns, I understand.
3 Well, let me paraphrase that or restate that.

4 I'm just reading from Air Combat
5 Command Unit Service that characterizes this
6 388th flight wing commander to retire over
7 safety issues and referring to your retirement.
8 Would that be correct sir?

9 COL. FLY: That would be -- they were
10 reassigning me, and I had elected to retire.
11 That's correct.

12 Q. And that was because you had three
13 F-16 crashes within two days as I recall; is
14 that right?

15 COL. FLY: There was a midair sometime
16 in January. I don't remember the specific
17 example. One of the airplanes was lost. The
18 other airplane recovered successfully at Michael
19 Army Airfield. And then the following day there
20 was a single F -- well, it was an F-16 flying low
21 level out on the northern UTTR when an engine that
22 had been put together about 18 months prior --
23 put together improperly about 18 months prior to
24 the incident failed.

25 Q. And then you retired subsequently?

1 That precipitated your retirement, I take it?

2 COL. FLY: It was actually several
3 months after that.

4 Q. That's because you took crew leave and
5 so forth; is that right?

6 COL. FLY: I stepped down as the wing
7 commander, I believe it was -- it was in early
8 April. I cannot give you a specific date. My
9 actual retirement date from the air force was
10 either September or October of that year. I
11 don't remember the specific date of the -- I can
12 find it. It's in the --

13 Q. I see. After you retired from the air
14 force, have you been an active pilot?

15 COL. FLY: I did some flying for a --
16 excuse me, some flying for a -- it was a small
17 group out in the Lakeland, Florida, area. It was
18 called Fighter Pilots U.S.A. They flew a small
19 Italian airplane.

20 Q. I see. And you're engaged now in what
21 business, sir?

22 COL. FLY: I work in a couple of
23 different businesses. I'm here in my capacity
24 as an associate for Burdeshaw Associates. A
25 friend and I in Tampa have a small business that

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1 has nothing to do with aviation.

2 Q. What business is that, sir?

3 COL. FLY: We are renting equipment
4 that's used for environmental remediation.

5 Q. Is that with the Specialized Civilian
6 Response Team?

7 COL. FLY: That's correct.

8 Q. And you have another business called
9 Fly Consulting; is that right?

10 COL. FLY: That's correct. It's a
11 Burdeshaw Associate.

12 Q. I see. And that's --

13 COL. FLY: I'm an independent
14 contractor. I've also done some work for a couple
15 of firms around the Tampa area in the consulting
16 business, but they're not aviation related.

17 Q. I see. And then you're involved with
18 Fly Enterprises?

19 COL. FLY: It's a holding company
20 that -- Fly Consulting is a wholly owned
21 subsidiary of Fly Enterprises.

22 Q. I see. These businesses have nothing
23 to do with aviation?

24 COL. FLY: None of those -- well, the
25 consulting does to the extent that I have provided

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1 services to Burdeshaw relating to this incident.

2 MR. SOPER: I see. Thank you.

3 I'm ready to move on to another area
4 unless Your Honors have any questions.

5 (A discussion was held off the record.)

6 MR. TURK: Has Utah 153 been offered?

7 JUDGE FARRAR: No. Thank you,

8 Mr. Turk.

9 The news report of the pilot that was
10 marked, Mr. Turk (sic), did you say you were not
11 going to offer it --

12 MR. SOPER: No, I was not going to
13 offer that, Your Honor. We'll leave that marked
14 and unoffered.

15 JUDGE FARRAR: Okay.

16 MR. GAUKLER: If you're going on to a
17 different topic, it might be a good time to take
18 a break since we've been going about an hour and
19 a half.

20 JUDGE FARRAR: Okay. It's three
21 minutes of. Let's be back at -- is five after
22 long enough?

23 Off the record.

24 (A discussion was held off the record.)

25 JUDGE FARRAR: On the record.

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1 We'll be back at ten after.

2 (A recess was taken.)

3 JUDGE FARRAR: Okay. We're back on the
4 record.

5 And, Mr. Soper, we had distributed a
6 document, but I don't know that we've done
7 anything with it yet.

8 MR. SOPER: We have. May I proceed,
9 Your Honor?

10 JUDGE FARRAR: Yes.

11 Q. (By Mr. Soper) I've handed out to the
12 witnesses and to Judge Farrar and opposing
13 counsel a page from Exhibit O, page 4.

14 General Jefferson, do you have that in
15 front of you, sir?

16 JUDGE FARRAR: So we don't need to
17 identify this --

18 MR. SOPER: This is a page from an
19 exhibit that's been admitted into evidence.

20 JUDGE FARRAR: Okay. So this is just
21 for everyone's convenience rather than an exhibit
22 that will be offered?

23 MR. SOPER: It is, Your Honor.

24 Q. General Jefferson, in connection with
25 determining the impact from F-16 crashes in Skull

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1 Valley, you were required, in using the formula
2 that we've previously discussed, to determine a
3 value for N. That's the number of flights; is
4 that right, sir?

5 GEN. JEFFERSON: Correct.

6 Q. And the PFS is below Sevier B and
7 below Sevier D, as in delta, MOAs as I think we
8 earlier discussed in this case; is that correct?

9 GEN. JEFFERSON: That's correct.

10 Q. And to calculate the possibility of
11 impacts in Skull Valley, you would need to know,
12 would you not, the number of annual flights
13 occurring in those two MOAs, Sevier B and Sevier
14 D?

15 GEN. JEFFERSON: That's correct.

16 Q. Page 4 of the Exhibit O that you have
17 reflects the numbers of flights for Sevier B and
18 Sevier D for the fiscal years '98, '99 and 2000.
19 This is from your Exhibit O. Are you familiar
20 with this?

21 MR. SILBERG: Excuse me. You said
22 physical year or fiscal year?

23 MR. SOPER: Fiscal year.

24 GEN. JEFFERSON: Is this whole thing
25 Exhibit O? Is that --

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1 Q. (By Mr. Soper) This is page 4 from
2 Exhibit O that I've handed out.

3 GEN. JEFFERSON: Yes. I'm sorry. I
4 have it.

5 Q. I notice in looking at this that the
6 numbers -- number of sorties -- first of all, that
7 word, "sorties," I take that to mean a flight --
8 one flight measured from the time of takeoff
9 and -- between the time of takeoff and the time of
10 landing, that's known as a sortie. Am I
11 correct?

12 GEN. JEFFERSON: That's one flight of
13 one airplane.

14 Q. One flight of one airplane. Okay.
15 So these are sortie numbers, are they
16 not, that appear on page 4?

17 GEN. JEFFERSON: Yes.

18 Q. And it shows that they've increased --
19 the total number of sorties for these MOAs has
20 increased from each year from '98 to 2000; is that
21 right?

22 GEN. JEFFERSON: They increased for B
23 but not for D.

24 Q. I see. But totals of B and D would be
25 increasing for each year; is that right?

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1 GEN. JEFFERSON: That's correct.

2 Q. For the convenience of the reporter,
3 sir, if you can just wait until I get my last word
4 out and then --

5 GEN. JEFFERSON: I apologize.

6 Q. -- it's easier for her. Thank you.

7 Now, if we're trying to estimate the
8 future number of flights for the next 20 years,
9 you would want to use a number that wouldn't be
10 exceeded in the next 20 years; isn't that true,
11 sir?

12 GEN. JEFFERSON: Yes. You'd want to --
13 you'd want to use a reasonable number from what
14 you think it's really going to be. I'd say that.

15 Q. Okay. And you'd want to be
16 conservative. That's your whole approach to this
17 is to be conservative?

18 GEN. JEFFERSON: Yes.

19 Q. And if you err at all, you'd want to
20 err on the side of safety; isn't that right?

21 GEN. JEFFERSON: Conservatism, yes.

22 Q. Yes.

23 However, you did not use the numbers
24 for the latest year, the year 2000 here. You
25 used instead an average for '99 and 2000

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1 together; is that correct?

2 GEN. JEFFERSON: That's correct.

3 Q. And you say that you -- it was
4 inappropriate to use the year 2000 for this
5 reason: Based on past history and the current
6 war on terrorism, it is reasonable to expect
7 periodic unscheduled future deployments and
8 associated lower sortie count at Hill.

9 MR. GAUKLER: Would the counselor
10 please identify where he's reading from, because
11 it's not from Exhibit O any longer, I don't
12 believe.

13 MR. SOPER: This is from his testimony,
14 I believe.

15 MR. GAUKLER: Okay. Just identify it,
16 please.

17 MR. SOPER: I was afraid you were going
18 to ask me that.

19 Yes. That's in answer to Question 49,
20 page 20, of the prefiled testimony of
21 General Jefferson and others.

22 MR. GAUKLER: I still don't see the
23 exact question.

24 MR. SOPER: Let's see. It would be the
25 top of page 20, the first full sentence.

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