BY ORDER OF THE SECRETARY OF THE AIR FORCE

AIR FORCE PAMPHLET 11-406

29 DECEMBER 2020

Flying Operations

AEROSPACE PHYSIOLOGY PROGRAM GUIDANCE

ACCESSIBILITY: Publications and forms are available on e-Publishing website at **www.e-publishing.af.mil** for downloading or ordering.

RELEASABILITY: There are no releasability restrictions on this publication.

OPR: 19 AF/DOA

Certified by: AF/A3T
(Maj Gen James A. Jacobson)
Pages: 114

This pamphlet implements Department of the Air Force Policy Directive (DAFPD) 11-4, *Aviation Service*; AFPD, 11-2, *Aircrew Operations*; Air Force Interoperability Council and is consistent with (AFIC) Air Standard Aerospace Medicine (ASM) 3003 Ed 1v3, *Aviation Medicine/Physiology Training of Aircrew*; and AFIC Information Publication ASM 3009 Ed 1 v3, *Spatial Disorientation*. This pamphlet provides information pertaining to the Aerospace Physiology (AP) program as outlined in AFMAN 11-403. This pamphlet is consistent with the North Atlantic Treaty Organization (NATO) Standardization Agreement (STANAG) 3114, *Aeromedical Training of Flight Personnel*; NATO STANAG 3474, *Temporary Flying Restrictions Due to Exogenous Factors Affecting Aircrew Efficiency* (**https://nso.nato.int/nso/nsdd/ListPromulg.html**). This publication applies to the Regular Air Force, the Air Force Reserve, the United States Space Force and associated reserve components, and the Air National Guard. This pamphlet requires the collection and or maintenance of information protected by the Privacy Act of 1974 authorized by Title 10 USC § 9013 Secretary of the Air Force. The applicable System of Records Notices are F044 AF SG H, Air Force Aerospace Physiology Training Programs, and F011 AF XO A, Aviation Resource Management System (ARMS) available at **https://dpcld.defense.gov/privacy/SORNS.aspx**. Ensure all records generated as a result of processes prescribed in this publication adhere to DAF Instruction 33-322, *Records Management and Information Governance Program*, and are disposed in accordance with the DAF Records Disposition Schedule, which is located in the DAF Records Information Management System. Refer recommended changes and questions about this publication to the office of primary responsibility (OPR) using the AF Form *847*, *Recommendation for Change of Publication*; route AF Forms 847 from the field through the appropriate functional chain of command. This pamphlet may be supplemented by MAJCOMs or DRUs, but all supplements must be routed to the OPR of this publication for coordination,

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Chapter 1

AEROSPACE PHYSIOLOGY INSTRUCTOR PROGRAM

1.1. Goals. The goals of this program are to ensure:

1.1.1. All AFMAN 11-403 *Aerospace Physiological Training Program*, aircrew-training courses, located on the AETC e-BOOKSTORE, are available to APTUs in a standardized curriculum format.

1.1.2. Outside evaluations of units, flights, or training teams conducting standardized curriculum courses are described in this chapter.

1.1.3. AP personnel are meeting the approved standardized objectives and appropriately utilizing courseware only in support of AFMAN 11-403 standardized curriculum courses. **Note:** While squadron, safety, and other specialized briefings may include the same subject material the presentation must be tailored to mission specific needs in order to avoid redundant training during aircrew refreshers.

1.1.4. Qualified personnel conduct the presentation of the standardized curriculum.

1.1.5. APTU Senior Leaders educate personnel on the requirements and responsibilities of the Instructor Program and conduct an in-house evaluation program as described in this chapter.

1.1.6. APTUs improve the quality of aircrew training and customer satisfaction through continuous improvement of courseware, instructor proficiency, and operational performance. **Note:** This applies to all aspects of aerospace physiology, human performance enhancement, Air Force Instruction (AFI) 11-290, *Cockpit/Crew Resource Management (CRM) Program*, and AFMAN 11-210, *Instrument Refresher Program*, training conducted by aerospace physiology personnel.

1.2. Platform Instructors. Officer or enlisted instructors giving formal classroom presentations must be graduates of an DAF academic instructor course, technical instructor course, or academic instructor training conducted as a part of the Air Force Specialty Code (AFSC) awarding courses taught at the DAF School of Aerospace Medicine.

1.2.1. Aerospace physiology personnel qualify as platform instructors by meeting MAJCOM/FLDCOM, local APTU, and Standardization/Evaluation requirements listed in this Chapter.

1.2.2. Conduct initial qualification and continued monitoring of physiological training instructors per MAJCOM/FLDCOM direction and this AFPAM.

1.2.3. Maintain a file on each individual assigned to hypobaric and normobaric duties. The file should contain, as a minimum, medical and instructor qualifications. For example: DD Form 2992, *Medical Recommendation for Flying or Special Operational Duty*; hazardous duty orders, if applicable, or a letter signed by the individual's commander placing them on chamber duty; AF Form 1256, *Certificate of Training*; AF Form 1274, *Physiological Training*; DD Form 114, *Military Pay Order*, BLS Provider Card, etc. Dispose of records according to DAF directives.

1.3. Roles and Responsibilities.

1.3.1. **Biomedical Science Corps (BSC) Chief of Aerospace Physiology.** Responsible for the DAF Aerospace Physiology Instructor Program.

1.3.1.1. The BSC Chief assigns a Curriculum Program Manager to AP Lead Command and directs the frequency of instructor evaluations.

1.3.2. **The Curriculum Program Manager.** Responsible for managing the Inspector General (IG) site visits/inspections, and providing program status reports to AP Lead Command. In addition, the Curriculum Program Manager is responsible for developing, maintaining, and distributing Standardized Curriculum and MICT Checklists.

1.3.3. **AP MAJCOM/FLDCOM PM/MFMs.** Responsible for compliance and oversight of the Standardized Curriculum Program within their respective MAJCOM/FLDCOM. PMs/MFMs will track evaluation results, follow-up on required corrective actions, and provide status reports to AP Lead Command.

1.3.4. **Aerospace Physiology Training Flight (APTF) Commanders/Aerospace Physiology Training Team (APTT) Chiefs/Flight Superintendents/Flight Chiefs.** Ensure compliance with the goals of the Standardized Curriculum Program and have the following responsibilities:

1.3.4.1. Ensure instructor evaluations are completed at least annually on each instructor for the purposes of the Standardized Curriculum Program and that the evaluations are documented on a comprehensive instructor evaluation form; examples, AETC Form 281, *Instructor Evaluation Checklist*, AETC Form 281A, Instructor Evaluation Checklist, AETC Form 620, *Academic Instructor Monitoring Checklist*, or comparable form. On each standardized curriculum instructor evaluation completed, a specific comment must be made as to the instructor's compliance with standardized curriculum objectives for that subject. **Note:** Standardized Curriculum Program compliments but does not replace any other regulatory requirements for initial subject area evaluations/certifications of a new instructor or a requirement for more frequent evaluations.

1.3.4.2. Ensure instructors not meeting the objectives of the standardized curriculum are de-certified from teaching standardized curriculum courses. They tailor and document the re-certification process specific to the individual instructors needs. Re-certification documentation is maintained in the individual's instructor folder.

1.3.4.3. Ensure Course Change Requests (CCRs) are submitted via the AETC e-BOOKSTORE when recommending changes in course objectives, presenting for adoption new ideas in curriculum presentation, noting curriculum deficiencies, or making curriculum corrections. Do not accumulate CCRs to send in as a group before the yearly curriculum review, send in CCRs when they are generated. Maintain copies of submitted CCR's until the next standardized curriculum update is received from the Curriculum Program Manager.

1.3.4.4. Ensure requests for standardized courseware of AFMAN 11-403 and training materials from outside the career field are forwarded to AP Lead Command for release authorization.

1.3.4.5. Collect data on the Aerospace Physiology Refresher Course Survey for FY annual submission to Standardized Curriculum updates. Data should arrive no later than 31 October. Commanders should review and summarize local data for regular presentation at unit instructor continuation training.

1.3.4.6. Ensure that training is conducted for AP instructors, appropriate to their subject area qualifications, on changes adopted into the standardized curriculum.

1.3.4.7. Conduct and document regular instructor meetings addressing the standardized curriculum changes, local improvements, instructional techniques, etc., (maintain read file for non-attendees).

1.3.4.8. Maintain Standardized Curriculum Checklist results. **Note:** Both local and outside evaluations use the same checklist as provided by the Curriculum Program Manager. APTT personnel not assigned to an Aerospace Physiology Training Flight (APTF) who teach standardized curriculum subjects may extend the instructor evaluation requirement from one to every two years. OGV Stan/Eval may evaluate the APTT officer for the purposes of the Standardized Curriculum Program. Use a comprehensive instructor evaluation form; examples, AETC Form 281, AETC Form 281A, AETC Form 620, or comparable form.

1.4. Realistic Training Review Board (RTRB). AP Lead Command conducts and funds the select MAJCOM/FLDCOM representatives attending this meeting to update standardized courseware. Current operational focus, initiatives and needs will drive aerospace physiology courseware development, modification and presentation. One officer and one enlisted member may perform Inspector General (IG)/Management Internal Control Toolset (MICT) inspections unless AP Lead Command determines the need for more than two personnel. Inspectors are responsible for the evaluation, and out brief of designated Operations Group personnel. Inspectors will document the APTU evaluation and forward a copy to the respective MAJCOM/FLDCOM PM/MFM and AP Lead Command following the out brief.

1.5. Types of Evaluations.

1.5.1. Annual MICT Evaluation. Each AP MAJCOM/FLDCOM PM/MFM Evaluates all APTUs annually using the MICT Checklist to ensure compliance with all facets of the standardized training program. This evaluation is performed within 60 days of assignment and at least annually thereafter.

1.5.2. Annual Instructor Evaluation. All APTU instructors are evaluated at least annually. The APTF Commanders/APTT Chiefs/Flight Superintendents/Flight Chiefs are responsible for these evaluations. Evaluations will occur not later than 13 calendar months from the last evaluation for instructors currently teaching standardized curriculum. Previously qualified standardized curriculum instructors who are returning to teaching of standardized curriculum are evaluated on one or more of the standardized curriculum hours as determined by the responsible parties.

Chapter 2

PARACHUTE DUTY/MILITARY FREE FALL OR HIGH ALTITUDE LOW OPENING (HALO)

2.1. Purpose. The AP parachute duty and military free fall (MFF) programs represent the career field's effort to enhance readiness, human operational performance, provide critical physiology training and support DAF mishap prevention efforts. This program also increases mission effectiveness and safety by providing the very best instruction via experienced parachutists as platform instructors. The career field also provides physiological training required of all parachutists attending the basic MFF course which includes the completion of the high altitude parachutist (HAP) initial course (S-O-B/A-APH-I) as a prerequisite. MFF parachutists may require DAF refresher physiological training via the Track J course (S-O-B/A-APH-R). Within AETC, Operations Group Commanders have the authority to assign AP personnel to instruct formal and refresher Emergency Parachute Training (EPT) and Ejection Seat Training (EST) instruction.

2.2. Parachute Duty. Sustainability for parachute program includes training and maintaining basic static line and basic MFF parachutists, and upgrading select AP technicians to Static Line Jumpmaster and MFF Jumpmaster throughout the AFSC from 3 to 9-skill level to maintain a stable force. Qualified members assigned to a jump (J) billet on their unit manpower document (UMD) are those that have received a designation as a parachutist, or are undergoing training for such designation. Parachutists need Aeronautical Orders (AOs) to engage in parachute jumping from an aircraft in aerial flight, and who meet the minimum performance requirements listed in DoD 7000.14-R, *DoD Financial Management Regulation (FMR),* Vol 7A, Chapter 24, Table 24-4. Military Free Fall or HALO parachutists perform duty-involving parachute jumping, in military free fall operations where parachute deployment by the jumper occurs without the use of a static line. Qualifying members are those who have graduated from the U.S. Army Military Free Fall Course or a military service-recognized equivalent course. These individuals have received a designation as HALO parachutists, or are undergoing training for such designation. Members meet the requirements of DoD 7000.14-R, Vol 7A, Chapter 24, Table 24-4. Performance requirements are satisfied by free fall jumps.

2.3. Personnel Parachute Program Management and Responsibilities. Designated Personnel Parachute Program Managers (PPPMs) and affected Career Field Managers (CFMs) are the heart of the Personnel Parachute Program (PPP). Each activity or unit with a parachuting mission has a central point of contact (POC) for parachuting issues. PPPMs and organizational POCs disseminate safety information, report incidents and hazards, assist commanders in requirements development, provide leadership and oversight, and cross-flow tactics, techniques, and procedures up and down the chain of command. As such, these personnel establish direct access to the DAF Safety Automated System (AFSAS) or establish a process to ensure organizational safety personnel inform them of all parachute mishaps in a timely manner.

2.4. Parachutist Currency and Refresher Training Requirements. To be considered current, a member meets the standards in **paragraph 2.5**, be qualified or certified as appropriate, be on active parachute status, and meet the requirements in this paragraph. Use this instruction in conjunction with AFMAN 11-420, *Static Line Parachuting Techniques and Tactics* and AFMAN 11-411(I), *Special Forces Military Free-Fall Operations*. Document currency and training in

ARMS, the OJT record using AF Form 1098, *Special Task Certification and Recurring Training*. The following are minimum requirements:

2.4.1. Static Line (S/L) Parachutist Currency. Perform S/L jumps within 180 days to maintain currency or complete refresher training, in accordance with AFMAN 11-420.

2.4.2. Free Fall Parachutist Currency. Any free fall parachutist who has not performed a free fall jump within the previous 180-days is considered non-current and completes free fall refresher training in accordance with AFMAN 11-411(I).

2.4.3. S/L Jumpmaster (JM) Currency. Any S/L (JM) who has not performed primary or assistant JM duties within the previous 180 days, where at least one parachutist actually exited the aircraft, is considered non-current and completes S/L (JM) refresher training in accordance with AFMAN 11-420. To be considered current, the JM need not exit the aircraft when the above conditions are met (static JM); in this case the JM may track the event for JM currency purposes but does not log the jump on AF Forms 4323, *ARMS Multi-Crew Jump Record, or 922*.

2.4.4. Free Fall Jumpmaster Currency. Any free fall JM who has not performed primary or assistant JM duties within the previous 180 days, where at least one parachutist actually exited the aircraft, is considered non-current and completes free fall JM refresher training in accordance with AFMAN 11-411(I). To be considered current, the JM need not exit the aircraft when the above conditions are met (static JM); in this case the JM may track the event for JM currency purposes but does not log the jump on AF Forms 4323 or 922, *Individual Jump Record*.

2.5. Parachuting Standards. In order to obtain or maintain active parachute status, members meet minimum passing standards in the below categories. Courses of instruction, plan of instruction, and career field education and training plans (CFETPs) may prescribe additional standards.

2.5.1. AFI 36-2905, *Fitness Program*. The annual fitness assessment provides commanders with a tool to assist in the determination of overall fitness of their military personnel.

2.5.2. AFMAN 11-403, for members participating in parachuting operations above 10,000 feet mean sea level. Document training and examinations on AF Form 1274.

2.5.3. AFI 48-123V3, *Medical Standards and Examinations Volume 3—Flying and Special Operational Duty*. Document the medical recommendation on DD Form 2992.

Chapter 3

HAZARDOUS DUTY PAY

3.1. Purpose. Hazardous duty and incentive pay is authorized for personnel assigned to inside observer duty, parachuting duty or basic aircrew in a hypobaric chamber and or aircraft. Members on competent orders who do not participate in a hypobaric flight during a month are reported to their appropriate finance office for collect-pay action for that month. Completion of chamber flights or equipment checks strictly to obtain monthly hazardous duty pay is not authorized. To start hazardous duty pay, provide the local finance office a copy of aeronautical orders assigning the individual to inside observer duty, a signed letter from the local commander indicating the member participates in chamber exposures, and a signed DD Form 114 with certifying officer's signature for the effective date. Separate Hazardous Duty orders are not required.

3.2. Injury. When a member performing hazardous duty is injured or otherwise incapacitated as a result of performing such duty, he or she is considered to have met the requirements for that duty during the incapacity, but for not longer than 3 months. Appropriate medical authority determines the cause of the incapacity and the dates thereof.

3.3. Incapacity while performing dual hazardous duties. If members, performing more than one hazardous duty, are injured or otherwise incapacitated as a result of either of those duties, they are entitled to dual incentive pay during the incapacity but for no longer than 3 months. If not entitled to dual incentive pay at the time of the incapacity, they are entitled to the type of incentive pay they were receiving at the time of the incapacitation. The beginning date of the 3-month period is determined separately for each type of incentive pay. Ref DoD 7000.14-R Volume 7A, Table 22-1 through 22-6 for additional guidance.

Chapter 4

ANCILLARY TRAINING

4.1. Purpose. The purpose of this chapter is to provide guidance for the courses AP personnel attend as part of their upgrade training. The program ensures AP personnel are trained properly to become task qualified on assigned tasks determined by the AP Associate Corps Chief and AP Career Field Manager (CFM).

4.2. Training Program. The AP officer and enlisted training program is the cornerstone of an overall effective AP program. The establishment of an effective training program is critical to the human factors and human systems integration affecting the aviation community and directly affecting the safety and health of aircrew. This program is an instructional process that leads to task qualification through initial qualification, continuation, or upgrade training, and is conducted in accordance with AFI 36-2670, *Total Force Development*; 43A/4M0X1 CFETP, and the tables listed below.

Table 4.1. AP Enlisted Career Progression Course Recommendations.

LEGEND: R = Recommended, D - Desired					
Course Title	Course ID	Note	4M031	4M051	4M071
Aircraft Mishap Investigation and Prevention (AMIP)	B3OBY43A3-0A4A		D	D	R
Aircraft Mishap Investigation Course	WCIP05A		-	D	R
AP Apprentice Course	B3ABY4M0310A1C		R	-	-
AP Craftsman Course	B6ACW4M0710SAA		-	-	R
Arctic Survival Training	S-V87-A	1	D	R	-
Basic Airborne Course	L9AZA1XXXX0A1A	2	D	R	-
Combat Survival Training	S-V80-A		R	-	-
Emergency Parachute and Water Survival Training	S-V85-A	3	D	R	-
Flight Safety NCO	L3AZR1S0710S5A		-	D	R
High Altitude Airdrop Mission Support Training (HAAMS) Course	B3XZYHAAMS0A1B		-	R	-
Military Freefall Parachutist Course	L9AQA1XXXX0F1A	2	-	D	R
Mishap Investigation, Non-Aviation	WCIP059		-	D	R
Principles of AP Instruction	B6AIYTXXX	4	R	-	-

	0A1A				
Safety Manager Course	WCIP05D		-	D	R
T-6A Medical-Physiological Officer Flight Training (M/POFT)	S-V8E-A/B		D	R	-
Technical Writer	L3AIRTXXXX 0W1A	5	-	D	R
Training Development	L3AIRTXXXX 0D3A		-	D	R
USAF NVG Academic Instructor Course	NVGAIC		D	D	R
USAF Underwater Egress Training	S-V84-A	6	D	D	R
Water Survival, Non Parachuting	S-V90-A	3	D	R	-

NOTES:

1. One time mandatory training event for Airmen assigned or attached to Alaska units. Training must be completed within 90 days of assignment at the first available S-V87-A course. Additionally, aircrew and any flying support personnel assigned to CONUS rotary wing nuclear surety mission and all aircrew tasked to support polar overflight missions should attend. This is a mandatory course for personnel assigned to the units mentioned in this note and desired for all other personnel.

2. When occupying a position designated as a jump (J)-billet, AP personnel attend the Basic Airborne Course (BAC) and Military Freefall Parachutist course to meet mission requirements at designated locations.

3. S-V85-A is only required for personnel whose primary method of egress is ejection/bailout and S-V90-A is required for ditching aircraft with no parachutes onboard. If transitioning from a ditching aircraft to an ejection/bailout aircraft, personnel will attend S-V85-A within 90 days of assignment/transition. Member is not Mission Ready (MR)/Combat Mission Ready (CMR) until this training is completed. If transitioning from ejection/bailout aircraft to a ditching aircraft, SS05 is required at the gaining unit prior to first overwater sortie. Member is not MR/CMR until this training is completed. Member is not required to attend S-V90-A.

4. The following courses are suitable substitutes: Basic Instructor Course (All 0B2B versions); ANG Instructor Certification Program (ANGC ICP); ACC Classroom Instructor Course (3J5ACC3S200 000); Courses Y120006 and Y120022. Any other CCAF accredited Methods/Principles of Instruction type course may be used to satisfy the AOP requirement, with approval from the member's owning MAJCOM PM/MFM, 43A/4M0X1. Additionally, completion of the AP Officers 101 course meets the intent of PAPI.

5. This course is mandatory for CDC writers and desirable for all other personnel.

6. Required for AP personnel who fly frequently over-water rotary wing/tilt rotor missions. Desirable for all other personnel.

Table 4.2. AP Officer Career Progression Course Recommendations.

LEGEND: R = Recommended, D - Desired

Course Title	Course ID	Note	43A1	43A3
Aircraft Mishap Investigation and Prevention (AMIP)	B3OBY43A3-0A4A		D	R
AP Officers 101 Course	B3OBY43A1 0A1C		R	-
Arctic Survival Training	S-V87-A	1	D	R
Basic Airborne Course	L9AZA1XXXX 0A1A	2	D	R
Combat Survival Training	S-V80-A		R	-
Emergency Parachute and Water Survival Training	S-V85-A	3	-	R
High Altitude Airdrop Mission Support Training (HAAMS) Course	B3XZYHAAMS 0A1B		-	R
Military Freefall Parachutist Course	L9AQA1XXXX 0F1A	2	D	R
Mishap Investigation, Non-Aviation	WCIP059		D	R
Principles of AP Instruction	B6AIYTXXX 0A1A	4	-	-
T-6A Medical-Physiological Officer Flight Training (M/POFT)	S-V8E-A/B		D	R
Technical Writer	L3AIRTXXXX 0W1A	5		
USAF NVG Academic Instructor Course	NVGAIC		R	-
USAF Underwater Egress Training	S-V84-A	6	D	R
Water Survival, Non Parachuting	S-V90-A	3	-	R

NOTES:

1. One time mandatory training event for Airmen assigned or attached to Alaska units. Training must be completed within 90 days of assignment at the first available S-V87-A course. Additionally, aircrew and any flying support personnel assigned to CONUS rotary wing nuclear surety mission and all aircrew tasked to support polar overflight missions should attend. This is a mandatory course for personnel assigned to the units mentioned in this note and desired for all other personnel.

2. When occupying a position designated as a jump (J)-billet, AP personnel

attend the Basic Airborne Course (BAC) and Military Freefall Parachutist course to meet mission requirements at designated locations.
3. S-V85-A is only required for personnel whose primary method of egress is ejection/bailout and S-V90-A is required for ditching aircraft with no parachutes onboard. If transitioning from a ditching aircraft to an ejection/bailout aircraft, personnel will attend S-V85-A within 90 days of assignment/transition. Member is not Mission Ready (MR)/Combat Mission Ready (CMR) until this training is completed. If transitioning from ejection/bailout aircraft to a ditching aircraft, SS05 is required at the gaining unit prior to first overwater sortie. Member is not MR/CMR until this training is completed. Member is not required to attend S-V90-A.
4. The following courses are suitable substitutes: Basic Instructor Course (All 0B2B versions); ANG Instructor Certification Program (ANGC ICP); ACC Classroom Instructor Course (3J5ACC3S200 000); Courses Y120006 and Y120022. Any other CCAF accredited Methods/Principles of Instruction type course may be used to satisfy the AOP requirement, with approval from the member's owning MAJCOM PM/MFM, 43A/4M0X1. Additionally, completion of the AP Officers 101 course meets the intent of PAPI.
5. This course is mandatory for CDC writers and desirable for all other personnel.
6. Required for AP personnel who fly frequently over-water rotary wing/tilt rotor missions. Desirable for all other personnel.

Chapter 5

DECOMPRESSION SICKNESS (DCS) REACTOR PLAN AND NOTIFICATION PROCEDURES

5.1. Purpose. To clarify decompression sickness (DCS) event reporting. DCS is an illness caused by reduced pressure on the body, resulting in the formation of bubbles in the blood and tissues leading to related symptoms. This pamphlet ensures units do not maintain any health or privacy act information on chamber reactions, only information useful in identifying and documenting trends. The unit notifies their respective squadron commander and AP Lead Command within one duty day of the incident. Please ensure the notification to AP Lead Command includes information in Template 1 and 2.

5.2. Action. Any potential reactor needs to go to the nearest ER or Flight Medicine clinic, which should also have after hours contact information for hyperbaric treatment. It is inappropriate and potentially dangerous for a patient to be advised to go direct to hyperbaric medicine. Continue to utilize local procedures for AFSAS reporting/mishap documentation.

5.3. DCS Template. The template located on the following page helps collect data for mishap reporting and facilitates routing to appropriate organizations/chain of command (CoC). Do not keep health or privacy act information on chamber reactions.

Figure 5.1. DCS Template 1.

DCS DEMOGRAPHIC INFORMATION

1. Date Illness was reported:
2. Branch of Service (AF, Army, Navy, Marines, Other: specify):
3. Status (Active, Reserve, ANG, Retired, Civilian, Other specify):
4. Category (Observer, Student, Patient):
5. Aero Rating (Pilot, Navigator, Doctor, Other: specify):
6. Chamber profile with altitude exposure
7. Treatment
8. Long Term Disposition

NARRATIVE SUMMARY

1. Aerial/Chamber flight and dive history.

a. Flight data within five days: date, duration, and maximum cabin altitude of flights

b. Hypobaric chamber data within 48 hours: date duration and maximum altitude.

c. Dive data (sport or hyperbaric) within 48 hours: date, duration and maximum depth.

2. Describe the incident flight profile in detail. Include profile by numeral, start time, altitude of ear and sinus check, duration of ear and sinus check, duration of pre-breathe, with the words "including ear and sinus check," maximum altitude, duration at maximum altitude, altitude and duration of hypoxia demonstration, altitude and duration of night vision demonstration, any pauses on ascent or descent, total flight duration and end time. A Type 4A chamber flight, "Initial", was initiated at XXX hrs;

ended XXX hrs. Maximum altitude was FL250. The profile included 100% O2 pre-breathe for 30 mins; including ear and sinus check (680 AGL - 5000 ft for X mins) and standard hypoxia/night vision demonstration for a total time of XX mins. The total time at FL250 to include the hypoxia demonstration was XX mins. After the hypoxia demonstration, the flight descended to FL180 for the night vision demonstration, which lasted X mins. The reactor also participated in a Type 1 chamber flight, rapid decompression, which lasted X mins with a maximum altitude of XXX ft.

3. If there were deviations in the altitude chamber sequence, include that information.

4. If the reaction was identified at the chamber unit, note onset time of symptoms and time reactor reported.

5. Document follow-up actions by the physiology unit. Include inspection of regulator and student equipment or notice to the reactor's unit to check personal equipment, and an oxygen purity test.

6. Conclude with the name of the APO.

7. Decompression sickness is considered an occupational injury. Public Health and or wing, delta/garrison safety should write up an AFSAS report.

Figure 5.2. DCS Equipment Check.

Decompression Sickness Reactor Equipment Check

Aerospace Physiology Training Flight (APTF) personnel will perform the following inspections on all Aircrew Flight Equipment (AFE) used during a suspected Decompression Sickness event. Inspections will be accomplished within 1 duty day of notification. All inspections will be documented appropriately on AFTO Form 334, *Helmet and Oxygen Mask/Connector Inspection Data.*

Inspectors

Initials Name

____ _____

____ _____

____ _____

Reactor Information:

Name_____ Rank_____

Date of reaction_____ Seat #_____ Flight #_____

Equipment Information:

☐ APTF's AFE

Mask #_____ Mask type_____ CRU-60/P #_____

Post-reaction equipment inspection results:

Mask	PASS	FAIL	N/A
_____ Inhalation/exhalation valve *(check for damage and foreign debris)*	☐	☐	☐
_____ Microphone connection *(check for security)*	☐	☐	☐
_____ Face form *(All masks, inspect for damage, deterioration)*	☐	☐	☐
_____ Hard Shell *(20P mask only, inspect for damage)*	☐	☐	☐
_____ 3 prong connector *(check for presence of all prongs)*	☐	☐	☐
_____ Upper hose clamp *(check for security)*	☐	☐	☐
_____ Lower hose clamp *(check for security)*	☐	☐	☐
_____ Delivery tube *(inspect for damage)*	☐	☐	☐
CRU-60/P Connector			
_____ Female end *(inspect O-ring for damage, security)*	☐	☐	☐
_____ 3" hose *(inspect for damage)*	☐	☐	☐
_____ Male end *(silver "C" ring, neoprene ring)*	☐	☐	☐
Regulator			
_____ Check regulator for leaks	☐	☐	☐
_____ Ship supply hose *(check for damage)*	☐	☐	☐

Oxygen Purity

_____ Provide copy of Oxygen Company's Analysis Report _____%

Remarks or Discrepancies: _____

_____

_____

Reviewed by: _____ Date_____

Chapter 6

JOINT DEFICIENCY REPORTING FOLLOWING UNEXPECTED PHYSIOLOGICAL EVENTS IN ALTITUDE CHAMBERS

6.1. Purpose. Establish Joint Deficiency Reporting System (JDRS) procedures for narrow panel mounted regulators used in DAF hypobaric chambers involved in physiological symptoms outside of hypoxia demonstrations and suspected or confirmed DCS incidents.

6.2. Process. This process provides standardized methods, and procedures to identify, investigate and resolve deficiencies. Throughout operational deployment and sustainment, this guidance provides a method to formally communicate user/operator-identified deficiencies or proposed enhancements to managing activities for analysis and resolution.

6.2.1. The deficiency reporting, investigating and resolution processes outlined in this pamphlet promote the ability to identify and correct deficiencies before they affect mission capability. Successful implementation drives resolution decisions, tempered by total ownership cost, to correct, mitigate, and/or accept risk of conditions affecting operational safety, suitability and effectiveness (OSS&E). Success is based upon two premises: 1) the users/operators reports deficiencies on their assigned systems; and, 2) AP Lead Command establishes a proactive process to analyze data and acts accordingly to implement solutions.

6.2.2. See **Attachment 2** for instructions for using JDRS.

Chapter 7

USE OF PPE DURING OPERATIONS WITH PRESSURIZED GAS CONTAINERS

7.1. Purpose. Provide updated guidance on PPE use during operations using pressurized gas containers.

7.2. Protective Clothing. All AP personnel performing inside observer (IO) duties, chamber operations in general, reduced oxygen breathing device (ROBD) operations and servicing pressurized gas containers wear Nomex gloves, Flight Dress Uniform (FDU)/2 Piece Flight Dress Uniform (2PFDU) and eye protection. Gloves should be clean since dirt or grease stains reduce the flame resistance properties of the material. Servicing operations include any operations when the gas canister is open or gas flows in/out of the canister, such as refilling MA-1 walk-around bottles, altitude chamber and ROBD pre/post flight, etc. Closed pressurized gas containers moved in and out of oxygen banks do not require PPE wear.

7.2.1. AP members wear the FDU/2PFDU with the sleeves pulled down to the wrist when servicing pressurized gas containers.

7.2.2. AP members demonstrate the proper wear of Aircrew Flight Equipment (AFE) in the flight environment while instructing and serving as crewmembers on chamber flights, which includes wearing the FDU/2PFDU with the sleeves pulled down.

Chapter 8

CHAMBER CONTRACT MAINTENANCE ACCEPTANCE

8.1. Purpose. Notify APTUs of general procedures to accept contract maintenance on altitude chambers.

8.2. Contracting Officer Representative (COR). Each APTU with an altitude chamber establishes a designated COR. CORs complete online training to enable them to accept/verify contract maintenance work on the chamber on behalf of the government. CORs are not authorized to direct the contractors to do any work or make any configuration changes. AP personnel can submit an AF Form 1067, *Modification Proposal* requesting configuration changes to AP Lead Command in accordance with AFMAN 11-403 and this pub.

8.3. Systems Program Office (SPO). Once contractor repair/maintenance team travel is approved, the SPO sends an e-mail to the affected chamber unit identifying planned maintenance actions and provides a courtesy copy to AP Lead Command workflow. If additional maintenance actions are conducted while the contractor is on site, the contractor contacts the Program Office to receive contractual direction. APTUs are responsible for timely reporting of concerns to the contractor's help desk prior to the team traveling to a chamber location; this ensures the team has contractual direction and is prepared to address all open maintenance issues at the APTU.

8.4. Contractor. Upon the contractor's arrival to the APTU, it is recommended that the COR and APTU leadership review the maintenance plan with the contractor team. The COR oversees contractor's maintenance actions to ensure compliance with the visit's plans for maintenance. Upon completion of work, the contractor provides a draft Field Service Report (FSR) to the COR for approval. The COR validates completion of work and the accuracy of reported hours. Ensure personnel time distribution matches total number of hours worked and that the labor time used for each task is broken down and annotated next to each task. Do not count lunch breaks or travel time, only time when contractor is on-site and working. If there is a question on FSR completion or the work being accomplished, contact AP Lead Command for assistance.

8.5. Chamber Baseline Visits. The chamber baseline visits fall under Firm Fixed Price option of the contract. These reports do not require 'hours worked' reporting and are a one-time, unique visit needed to bring the fleet into a similar configuration. Please forward any questions you have on FSRs or COR responsibilities to AP Lead Command.

Chapter 9

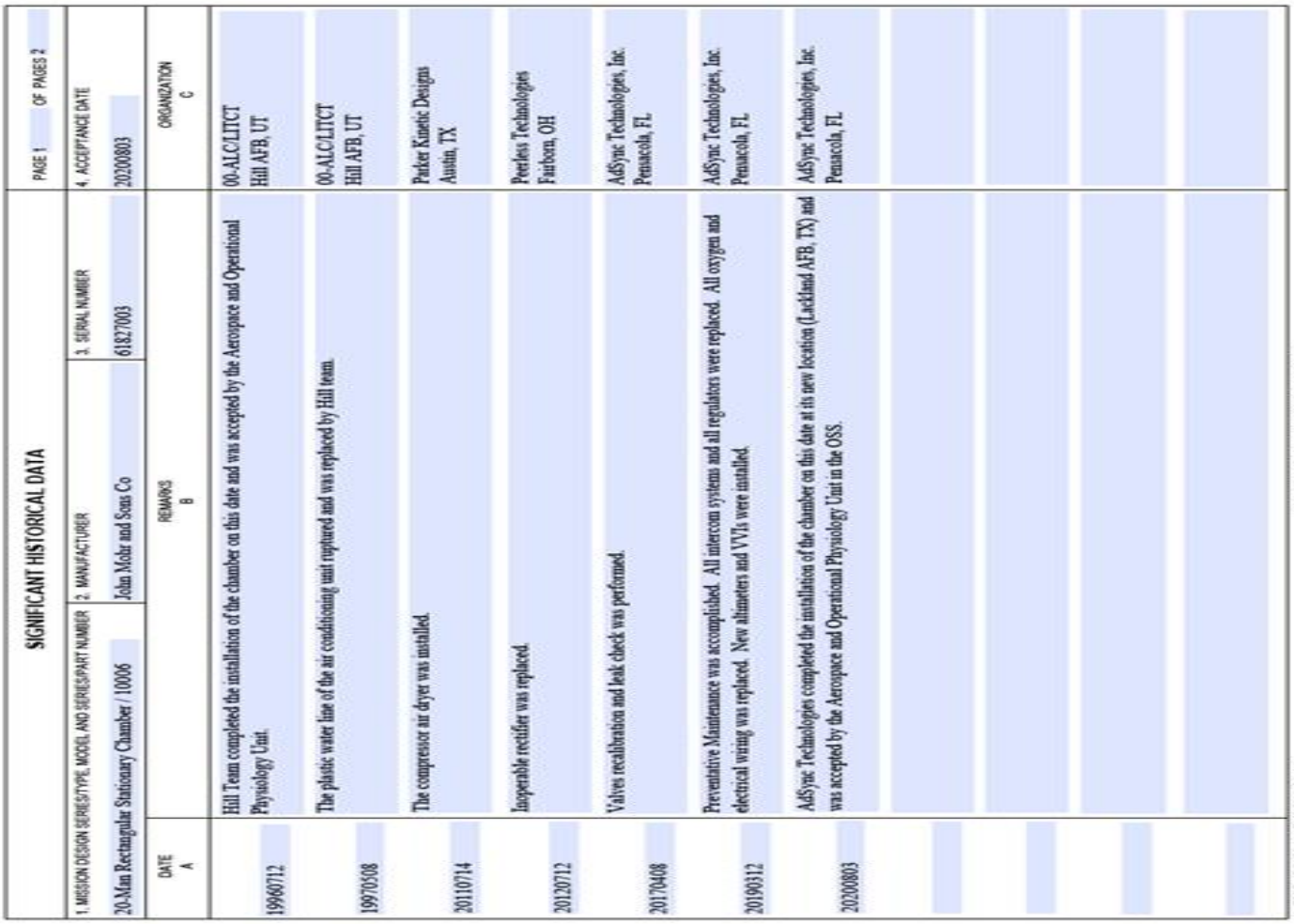
AFTO FORM 95, SIGNIFICANT HISTORICAL DATA

9.1. Purpose. The AFTO Form 95, provides a permanent historical record of AP training devices e.g. altitude chamber, SD trainers, Barany chairs, ROBDs, Hypoxia Familiarization Trainer (HFT), Mission Crew Hypoxia Familiarization Trainer (MCHFT), Parachute Operations Hypoxia Familiarization Trainer (POHFT), and the Unaided Night Vision trainer. This form is used to document significant events that may affect the equipment's future status. Routine maintenance and other routine actions are not annotated on the AFTO Form 95. Repairs of major malfunctions or the completions of preventative maintenance are examples of significant historical data. Use the following instructions as a guide in preparing and maintaining AFTO Form 95.

Table 9.1. Instruction on filling out an AFTO Form 95.

Block	Description
1. MISSION DESIGN SERIES/TYPE, MODEL AND SERIES	Identifies the type equipment. The sample form includes an entry for a 20-occupant low-pressure chamber.
2. MANUFACTURER	Identifies the company that built the piece of equipment. John Mohr and Sons company manufactured the chamber on the sample form.
3. SERIAL NUMBER	Place the number identifying the item of equipment in this block. The serial number in the example is 61827003.
4. ACCEPTANCE DATE	Enter the date the DAF accepted the equipment. Enter unknown if the date is unknown.
The remainder of the form is divided into three columns:	
DATE A	Place the date the work was performed (the entry recorded).
REMARKS B	Enter a brief description of the work performed.
ORGANIZATION C	Enter the name of the organization performing the work.
NOTE: Maintain this form for as long as you own the equipment. If the equipment is transferred, transfer the pertaining forms along with it.	

Figure 9.1. AFTO Form 95 example.



SIGNIFICANT HISTORICAL DATA

PAGE 1 OF PAGES 2

1. MISSION DESIGN SERIES/TYPE, MODEL AND SERIES/PART NUMBER	2. MANUFACTURER	3. SERIAL NUMBER	4. ACCEPTANCE DATE
20-Man Rectangular Stationary Chamber / 10006	John Mohr and Sons Co	61827003	20200803

DATE A	REMARKS B	ORGANIZATION C
19980712	Hill Team completed the installation of the chamber on this date and was accepted by the Aerospace and Operational Physiology Unit.	00-ALC/LITCT Hill AFB, UT
19970508	The plastic water line of the air conditioning unit ruptured and was replaced by Hill team.	00-ALC/LITCT Hill AFB, UT
20110714	The compressor air dryer was installed.	Parker Kinetic Designs Austin, TX
20120712	Inoperable rectifier was replaced.	Peerless Technologies Fairborn, OH
20170408	Valves recalibration and leak check was performed.	AdSync Technologies, Inc. Pensacola, FL
20190312	Preventative Maintenance was accomplished. All intercom systems and all regulators were replaced. All oxygens and electrical wiring was replaced. New altimeters and VVIs were installed.	AdSync Technologies, Inc. Pensacola, FL
20200803	AdSync Technologies completed the installation of the chamber on this date at its new location (Lackland AFB, TX) and was accepted by the Aerospace and Operational Physiology Unit in the OSS.	AdSync Technologies, Inc. Pensacola, FL

AFTO FORM 95, 20130411 PREVIOUS EDITION IS OBSOLETE.

Chapter 10

AFTO FORM 334 HELMET AND OXYGEN MASK/CONNECTOR INSPECTION DATA

10.1. Purpose. This chapter introduces the AFTO Form 334, which is used to record mask and helmet inspections as well as any repair or replacement of equipment components.

10.2. Documenting Inspections and Repairs of Life Support Equipment. Inspection and maintenance on each O2 mask in-use is recorded on an AFTO Form 334. A single form may be used to document maintenance on both the mask and helmet belonging to an inside observer (IO) as long as the equipment is used and stored together.

10.2.1. A separate form is maintained on each trainee mask and helmet. Periodic (30-day, 90-day, and 120-day) inspections are recorded on the front, and component replacements are recorded on the back. **Figure 10.1 and 10.2** shows examples of the front and back of AFTO Form 334. See example in the following pages.

10.2.2. There is a place for the wearer's full name, grade, and organization on the front of the form. Enter Trainee Mask # if the equipment recorded is trainee equipment. Leave the grade block blank, and fill in your unit organization.

Figure 10.1. AFTO Form 334 (Front) example.

HELMET AND OXYGEN MASK/CONNECTOR INSPECTION DATA			NAME LAST	FIRST	MI
			PAEZ	ISMAEL	NMI

GRADE	ORGANIZATION	HELMET TYPE	SIZE	OXYGEN MASK TYPE	SIZE
E-7	1 SOSS/OSM	HGU-55/P	Large	MBU-12/P	Regular

HELMET AND OXYGEN MASK/CONNECTOR INSPECTION RECORD

INSP DATE	REMARKS	INITIALS	INSP DATE	REMARKS	INITIALS	INSP DATE	REMARKS	INITIALS
2 Jun 2017	INITIAL ASSEMBLY	KAP						
30 Jun 2017	30-DAY	AYP						
28 Jul 2017	30-DAY	IIP						
25 Aug 2017	30-DAY	JSD						
22 Sep 2017	30-DAY	KJ						

AFTO FORM 334, 19750301 *(IMT-V1)* PREVIOUS EDITION WILL BE USED

10.2.3. Then either fill in the helmet or mask information. Remember that a separate card is maintained for each piece of trainee equipment. Fill in both areas if the equipment is personal-use equipment or for another member of your organization. The next area of the card is for recording mandated inspections. Fill in the date the inspection occurred, the type of inspection (30-day, 90-day, 120-day), and the inspector's initials. Use the following guides.

10.2.4. Record the repairs made to the equipment on the reverse side of the card. Fill in the date the repair was initiated with initials, and the specific part repaired or replaced. Also, record the date the repair was completed, initials, the basic T.O. date, and the T.O. number.

Figure 10.2. AFTO Form 334 (Back) example.

HELMET AND MASK REPAIR DATA			T.O.C. RECORD			
REPAIR DATE	INITIALS	COMPONENT REPAIR/REPLACED	DATE COMP	INITIALS	T.O. DATE	T.O. NUMBER
28 Jul 2017	IIP	Replaced inhalation/exhalation valve assembly	28 Jul 2017	IIP	22 May 2017	15X5-3-6-1
25 Aug 2017	JSD	Replaced left hand bayonet	25 Aug 2017	JSD	22 May 2017	15X5-3-6-1

AFTO FORM 334, 19750301 *(Reverse)*

Chapter 11

AFTO FORM 244 AND 245, INDUSTRIAL/SUPPORT EQUIPMENT RECORD

11.1. Purpose. APTFs use AFTO Form 244 to report maintenance discrepancies and resolution for use of the altitude chamber, vacuum pumps, and compressor. When all lines of the AFTO Form 244 are completed, send copy to AP Lead Command through the AETC SharePoint®. The original AFTO Forms 244 and 245 remain with the device in the event of relocation. These forms are turned in to AP Lead Command when a device is removed from service.

11.2. The AFTO Form 244 and 245. Provides a complete record of day-to-day maintenance and inspections. The AFTO Form 245, Industrial/Support Equipment Record (Continuation Sheet) is a continuation of Part V of AFTO Form 244. A separate form is maintained for each piece of training equipment used at your unit. This means a separate form is maintained for each hypobaric chamber, parasite chamber, vacuum pump, night vision trainer, centrifuge, etc. The information documented on these forms provides a historical profile of each specific piece of equipment. This profile portrays conditions that may have a bearing on future maintenance of the equipment.

11.3. Completing AFTO Forms 244 and 245. The AFTO Form 244 (and AFTO Form 245 when needed) is used to record discrepancies, operational problems, corrective actions, and inspections. The form contains five parts (I through V) and they are described below.

Table 11.1. Instructions to complete AFTO Forms 244 and 245.

Instruction to complete AFTO Forms 244 and 245		
Part	**Block # and Title**	**Directions**
Part I. ITEM IDENTIFICATION This area provides a means to identify training equipment requiring inspection or maintenance. Chances of confusing one trainer with another are reduced if the equipment is identified correctly.	**1. NOMENCLATURE /MODEL**	Enter the name/nomenclature, type, or model of equipment monitored. In the example we are using: Vacuum Pump/KT-850
	2. REGISTRATION /SERIAL NO.	Most of the equipment used in AP is classified as a trainer. Enter the serial number in this block; otherwise, leave this block blank or enter non-applicable (N/A).
	3. ID NO.	This number identifies aircraft ground equipment. Leave this block blank or enter non-applicable (N/A) because AP equipment is not used for aircraft maintenance support.
	4. FIELD NO	Leave this block blank or enter non-applicable (N/A) because AP equipment is not used for

		aircraft maintenance support.
	5. WORK UNIT CODE (WUC)	This code consists of five characters identifying the system, subsystem, or parts requiring maintenance. In the example we are using: PF700. Leave blank if not applicable.
	6. ORGN WC ASSIGNED	Enter the name of the owning organization or work center
	7. PERIOD COVER	Entries in this block reflect the first date the form is initiated through the date the form is closed out and a new form initiated or the equipment is turned into supply or salvage.
	8.	Only use the command approved entry when required. Leave blank if not applicable.
Part	**Block# and Title**	**Directions**
Part II. NON-SCHEDULED INSPECTION This section documents daily inspections and applicable run times. The section is six columns wide, containing enough space for 60 entries	**TIME**	Total hours or minutes of operation (calculated with real time). Enter the total operating time to the nearest tenth of an hour in the upper left block. For example, 0.8 hours.
	INSP INIT	Enter the total hours for that date followed by a slash "/" and enter the initials of the person completing the inspection. For example, 0.8/CS.
	DATE	Enter the date the inspection was performed in the lower part of the block. The sample shows this form was initiated on 20180927 and the vacuum pump carried over 0.8 hours of operation as recorded on the previous form. The date is entered in YYYYMMDD format. The pump was used on 20180927 for 2.0 hours. This time is added to the previous cumulative run time of 0.8 for a new cumulative time of 2.8.

		Continue to make entries in Section II until the form is completely filled. Add up the total operating time when the form is full of entries.
Part III. SCHEDULED INSPECTION	**INSPECTION REQUIREMENT**	Enter the type of inspection due, such as periodic, special oil change, etc.
	INTERVAL	Enter the scheduled inspection interval (hours, months, etc.).
	DATE DUE	Enter the date or time the next inspection is due. Remember to transfer this information from the previous form as needed.
	DATE COMPL	Enter the date the inspection is completed. You should also enter a new inspection date in the next "DATE DUE" block.
	The sample AFTO Form 244 shows an oil change due at 2,000 hours or 2 years whichever occurs first and a visual oil inspection due on a 12-month interval.	
Instructions to complete AFTO Forms 244 and 245		
Part	**Block # and Title**	**Directions**
Part IV, SUPERVISORY REVIEW This part of the form provides quality control by requiring a supervisor's review of discrepancies and inspections. Supervisors should look for late inspections, failure to follow up on repairs, etc. There is enough room for nine supervisory reviews on each form.	**EMPLOYEE NO**	Enter the first initial, last name, slash (/) and grade of the person who reviewed the record. Normally Logistics Section Chief or Flight Chief.
	DATE	Enter the date the supervisor review was accomplished. Typically conducted in 30-day increments.
Part V, MAINTENANCE/ DELAYED DISCREPANCY Record any discrepancies or corrective actions that occur outside of normal maintenance in this section. Also, use this area to annotate delayed discrepancies or	**T.O.**	Record the applicable TO number or manufacturer's manual for the equipment

malfunctions, overdue scheduled inspections, and discrepancies discovered by the operator.		
	NSN	Enter the national stock number for the item identified in section I. Leave blank if not applicable.
	11. and 12. (BLANK)	Applicable Information for these blocks must be approved and required by the major command. Enter N/A or leave blank when not used.
	DATE DISCOVERED	Enter the date the discrepancy was discovered. Remember that any open discrepancy information must be transcribed onto the new AFTO Form 244 when you close out a previous form.
	DISCOVERED BY	Place the first name initial, last name, and grade of the individual discovering the discrepancy in the upper half of this block. Enter the base supply document number (an order number from base supply) in the lower half of the block if applicable.
	SYMBOL	Enter the status symbol showing the operational status of the equipment resulting from the discovered discrepancy. These symbols are an easy guide, showing the mechanical condition and maintenance status of your training equipment. The use of these symbols must be fully understood to make the correct entries on maintenance forms; therefore, refer to them often. The three basic symbols used to document maintenance forms are:

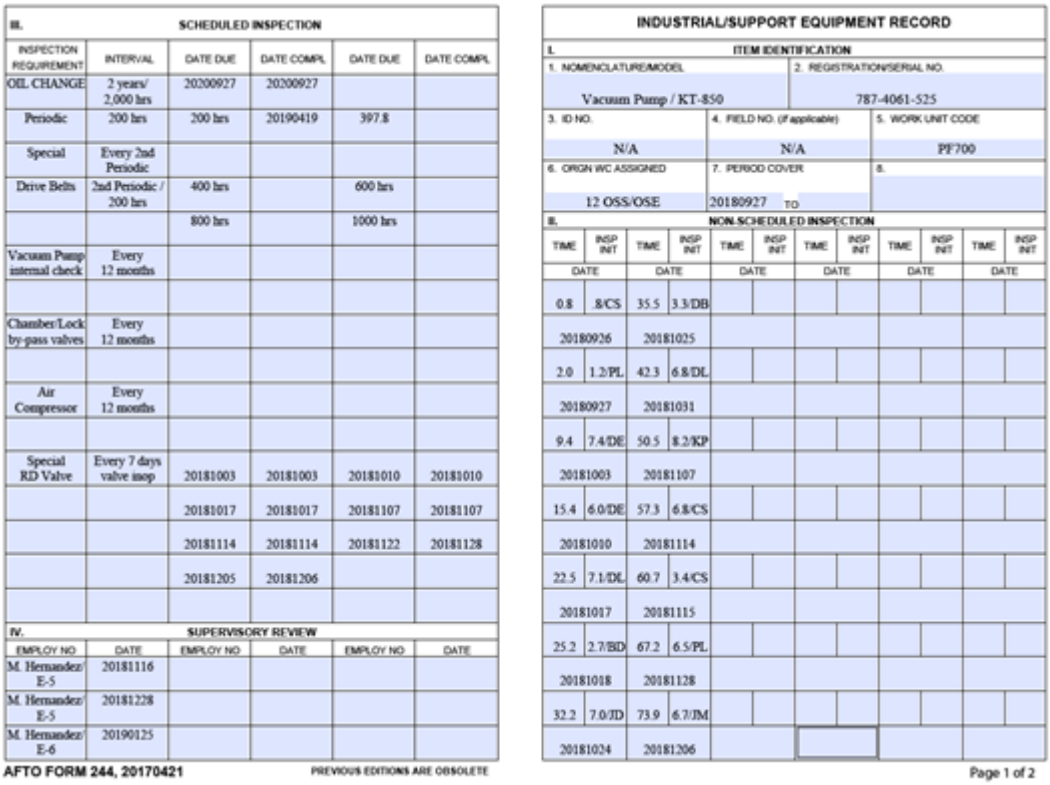
		• Red X • Red dash (-) • Red diagonal (/) Enter these symbols in red to make them stand out. Once you enter a symbol don't erase it.
Part	**Block# and Title**	**Directions**
		Red X: A red X identifies training equipment considered unsafe or unfit for use. No one uses this equipment until the unsafe condition is corrected. Not just anyone can clear this action when a red X is entered. Your unit gives specific individuals the authority to certify that corrective action has been taken (normally 7-skill levels and above). Once the discrepancy is corrected, the authorized individual will enter the appropriate information on the "INSPECTED BY" block and will place the first letter of their last name over the red X symbol. **Red dash:** The red dash represents incomplete or missed required maintenance, scheduled inspections, or operational checks. This symbol means the condition of the equipment is unknown or that a serious condition may exist. Correct the red dash condition as soon as possible. Correction procedures involve performing the required inspection, operational check, or necessary maintenance on the equipment. A red dash must be entered on AFTO Forms 244 or 245 if a time change item is used beyond its scheduled replacement date. The red dash

		remains open until the time change item is replaced or until the discrepancy is upgraded. To a red X. **Red diagonal:** The red diagonal shows that an unsatisfactory condition exists on the training equipment. However, the condition is not sufficiently urgent or dangerous to warrant not using the equipment. Enter a red diagonal immediately upon receipt for an urgent action or routine action safety modification. There may be times when you need to record information that does not require a red symbol. In that case, just print "INFO" in the symbol column. Info entries help ensure a record of information relevant to the status of the training equipment.
	DISCREPANCY	Enter a brief but clear description of the discrepancy or maintenance action required. Enter only one defect per block. Use as many blocks as needed when describing a single discrepancy.
	JOB CON/W.O. NO	Enter the number assigned to the discrepancy (if applicable) to simplify retrieval of inspection data at base level. Leave this block blank when you print *INFO* in the symbol column.
	CORRECTIVE ACTION	Enter a brief description of the corrective action taken. Use the next open block or blocks if more space is needed to make

		this entry.
	DATE CORRECTED	Enter the date the discrepancy was corrected.
	CORRECTED BY **INSPECTED BY**	Enter the first name initial, last name, and grade of the individual who corrected the discrepancy in the top half of the block and enter last name initial over the red symbol. Use the lower half of the block only when you annotate a red X on the form. Then the authorized person enters his or her first initial, last name, and grade. Then, he or she initials over the symbol.

11.4. AFTO Form 245 continuation. The AFTO Form 245 provides a continuation to **Part V** of the AFTO Form 244. The use of this form is a major command option. Follow the same instructions for completing AFTO Form 244, **Part V** when you do use the form. **Note:** supervisory reviews are conducted in 30-day intervals.

Figure 11.1. AFTO Form 244 example.



III. SCHEDULED INSPECTION

INSPECTION REQUIREMENT	INTERVAL	DATE DUE	DATE COMPL	DATE DUE	DATE COMPL
OIL CHANGE	2 years/ 2,000 hrs	20200927	20200927		
Periodic	200 hrs	200 hrs	20190419	397.8	
Special	Every 2nd Periodic				
Drive Belts	2nd Periodic / 200 hrs	400 hrs		600 hrs	
		800 hrs		1000 hrs	
Vacuum Pump internal check	Every 12 months				
Chamber/Lock by-pass valves	Every 12 months				
Air Compressor	Every 12 months				
Special RD Valve	Every 7 days valve inop	20181003	20181003	20181010	20181010
		20181017	20181017	20181107	20181107
		20181114	20181114	20181122	20181128
		20181205	20181206		

IV. SUPERVISORY REVIEW

EMPLOY NO	DATE	EMPLOY NO	DATE	EMPLOY NO	DATE
M. Hernandez/ E-5	20181116				
M. Hernandez/ E-5	20181228				
M. Hernandez/ E-6	20190125				

AFTO FORM 244, 20170421 PREVIOUS EDITIONS ARE OBSOLETE

INDUSTRIAL/SUPPORT EQUIPMENT RECORD

I. ITEM IDENTIFICATION

1. NOMENCLATURE/MODEL	2. REGISTRATION/SERIAL NO.
Vacuum Pump / KT-850	787-4061-525

3. ID NO.	4. FIELD NO. (If applicable)	5. WORK UNIT CODE
N/A	N/A	PF700

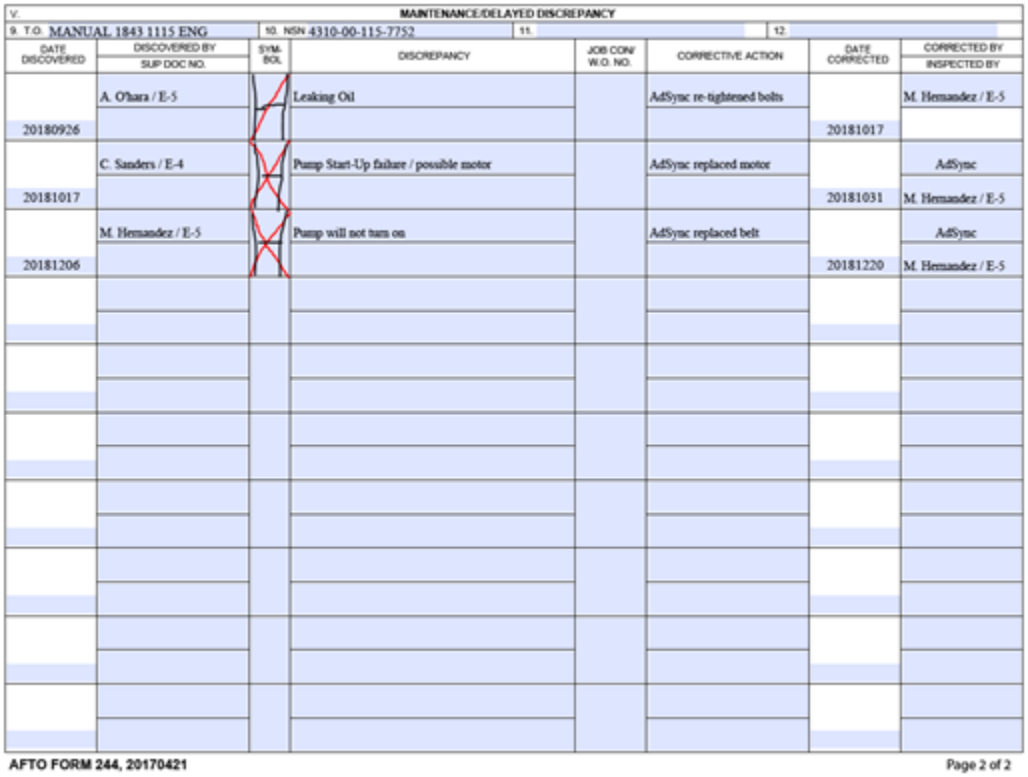
6. ORGN WC ASSIGNED	7. PERIOD COVER	8.
12 OSS/OSE	20180927 TO	

II. NON-SCHEDULED INSPECTION

TIME	INSP INT	TIME	INSP INT	TIME	INSP INT	TIME	INSP INT	TIME	INSP INT	TIME	INSP INT
DATE		DATE		DATE		DATE		DATE		DATE	
0.8	.8/CS	35.5	3.3/DB								
20180926		20181025									
2.0	1.2/PL	42.3	6.8/DL								
20180927		20181031									
9.4	7.4/DE	50.5	8.2/KP								
20181003		20181107									
15.4	6.0/DE	57.3	6.8/CS								
20181010		20181114									
22.5	7.1/DL	60.7	3.4/CS								
20181017		20181115									
25.2	2.7/BD	67.2	6.5/PL								
20181018		20181128									
32.2	7.0/JD	73.9	6.7/JM								
20181024		20181206									

Page 1 of 2

Figure 11.2. AFTO Form 244 example.



V. MAINTENANCE/DELAYED DISCREPANCY

9. T.O. MANUAL 1843 1115 ENG | 10. NSN 4310-00-115-7752 | 11. | 12.

DATE DISCOVERED	DISCOVERED BY / SUP DOC NO.	SYM. BOL	DISCREPANCY	JOB CONT W.O. NO.	CORRECTIVE ACTION	DATE CORRECTED	CORRECTED BY / INSPECTED BY
20180926	A. O'hara / E-5		Leaking Oil		AdSync re-tightened bolts	20181017	M. Hernandez / E-5
20181017	C. Sanders / E-4		Pump Start-Up failure / possible motor		AdSync replaced motor	20181031	AdSync / M. Hernandez / E-5
20181206	M. Hernandez / E-5		Pump will not turn on		AdSync replaced belt	20181220	AdSync / M. Hernandez / E-5

AFTO FORM 244, 20170421 Page 2 of 2

11.5. Forms Maintenance. Enter the close out date in Block 7 when closing out one form and initiating a new form. Then, copy all the entries in blocks 1 through 6 from the old form onto the new form. Be sure to annotate all due inspection information, from **Part III**, on the new form. Enter the information from all open discrepancies in Section V of the new form. On the old forms, place the letters 'CF' which stands for "carried forward" and your initials in the date completed blocks of **Parts III** and **V**.

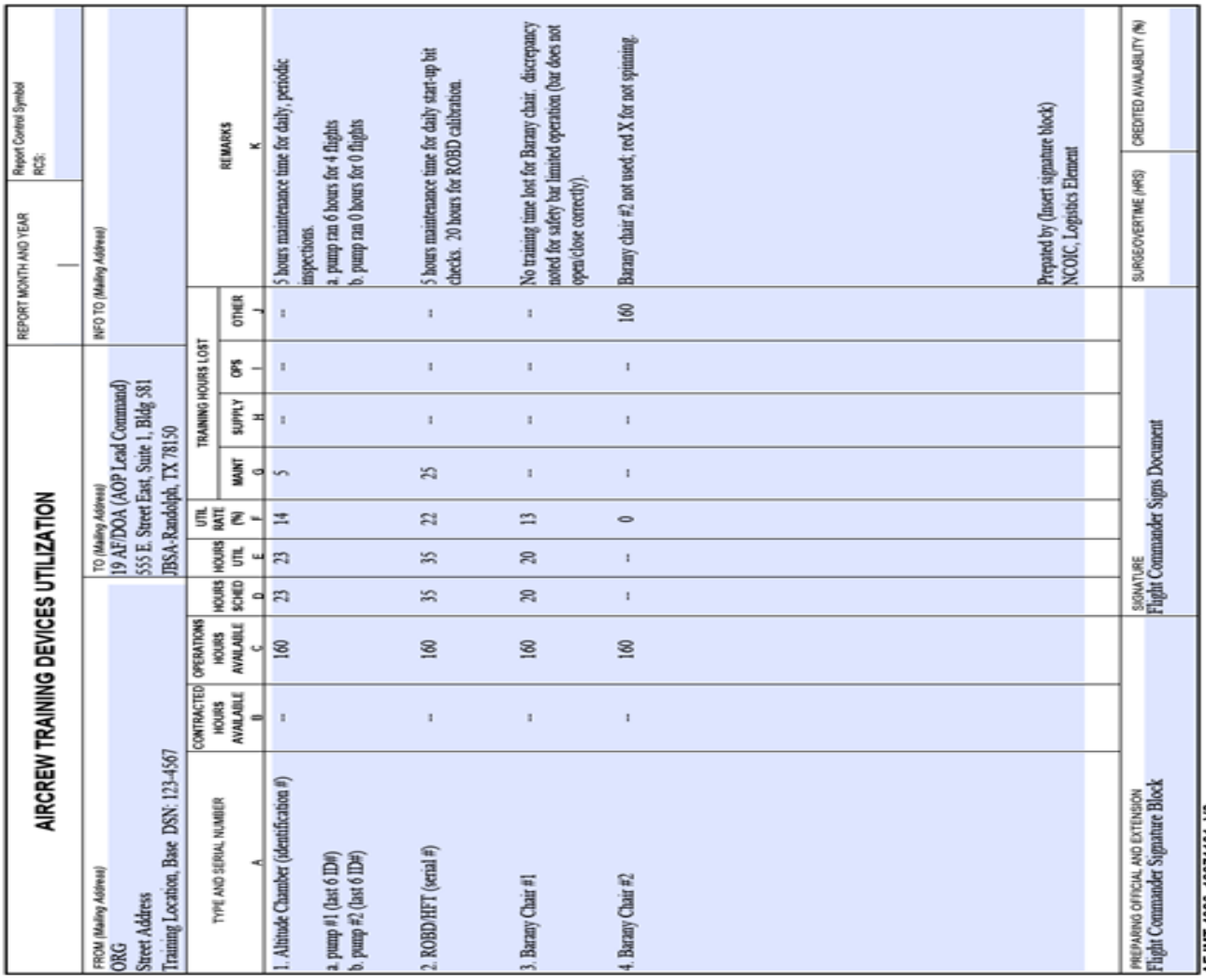
Chapter 12

AF FORM 4026

12.1. Purpose. APTUs use an AF Form 4026 to report monthly and annual use of altitude chambers, pumps, compressors, SD trainers, ROBD, HFT, MCHFT, POHFT and the Unaided Night Vision trainer. APTUs may submit one completed AF Form 4026 to report all devices they operate. Use the AF Form 4026 to report device use to HHQ. Report monthly for all APTU training devices as outlined in AFMAN 11-403 and this pamphlet.

12.2. Instructions. Document report month and year, the reporting APTU in the FROM block, and 19 AF/DOA in the TO block. Leave RCS and INFO TO blocks blank. Number and list each device used for training in column A. Include number of hours pumps were run, number of flights per pump in the remarks section for each chamber assigned. Units that cannot annotate oxygen usage may annotate N/A. Leave column B blank. Update columns C-J with appropriate hours. Ops hours available are calculated for column C as number of training days X number of training hours in the reported month. Document training hours scheduled and used in columns D and E. To calculate utilization rate, divide number of hours used by number of hours available for use (column E/C), then round up to next whole number. AP Lead Command interprets training hours lost as available operations hours the device is not used for training. Document maintenance time (column G), spent waiting for supply items (column H), major wing operations that affect training availability (column I), and other impacts, such as environmental issues like power loss (column J). Use column K to detail discrepancies noted in that month's operations (i.e. redline for chamber pump or two seats unavailable due to broken regulator). Annotate inspections, calibrations, other major maintenance and preparer's name in column K. Use preparing official block to document flight commander review. Maintain document for 2 years with 1 year active and 1 year inactive. **See Figure 12.1** for a representation of a correctly completed AF Form 4026.

Figure 12.1. AF Form 4026 example.



AIRCREW TRAINING DEVICES UTILIZATION

REPORT MONTH AND YEAR: _____

Report Control Symbol RCS:

FROM (Mailing Address)
ORG
Street Address
Training Location, Base DSN: 123-4567

TO (Mailing Address)
19 AF/DOA (AOP Lead Command)
555 E. Street East, Suite 1, Bldg 581
JBSA-Randolph, TX 78150

INFO TO (Mailing Address)

TYPE AND SERIAL NUMBER	CONTRACTED HOURS AVAILABLE	OPERATIONS HOURS AVAILABLE	HOURS SCHED	HOURS UTIL	UTIL RATE (%)	TRAINING HOURS LOST				REMARKS
						MAINT	SUPPLY	OPS	OTHER	
A	B	C	D	E	F	G	H	I	J	K
1. Altitude Chamber (identification #)	--	160	23	23	14	5	--	--	--	5 hours maintenance time for daily, periodic inspections. a. pump ran 6 hours for 4 flights b. pump ran 0 hours for 0 flights
a. pump #1 (last 6 ID#) b. pump #2 (last 6 ID#)										
2. ROBD/HFT (serial #)	--	160	35	35	22	25	--	--	--	5 hours maintenance time for daily start-up bit checks. 20 hours for ROBD calibration.
3. Barany Chair #1	--	160	20	20	13	--	--	--	--	No training time lost for Barany chair. discrepancy noted for safety bar limited operation (bar does not open/close correctly).
4. Barany Chair #2	--	160	--	--	0	--	--	--	160	Barany chair #2 not used; red X for not spinning.
										Prepared by (Insert signature block) NCOIC, Logistics Element

PREPARING OFFICIAL AND EXTENSION
Flight Commander Signature Block

SIGNATURE
Flight Commander Signs Document

SURGE/OVERTIME (HRS)

CREDITED AVAILABILITY (%)

AF IMT 4026, 19971101, V3

REPLACES (ACC, PACAF, & USAFE) MC FORMS 80, APR 93, WHICH IS OBSOLETE.

Chapter 13

AEROSPACE PHYSIOLOGY TRAINING UNIT (APTU) TRAINING REPORTS

13.1. Purpose. This report is used to assess future DAF training requirements, procure and assign specialized equipment, provide for the availability of trained officers and enlisted personnel to conduct the program, and to monitor the workload at training flights. The report provides a list of assigned personnel including: rank, qualified status, quarterly lecture hours, career lecture hours, quarterly flying hours, total career flying hours, quarterly altitude chamber hours, and total accrued chamber time. Training demographics such as branch of service, type of training, and number of aircrew/jumpers trained. Non-Hypoxia AP Training activities; type of reactors, grade of reactors and a summary of Airman's time including TDY, deployment, meetings, additional duties, etc. (**See Figure 13.1**).

13.2. Responsibilities. Officers in charge of APTUs prepare a quarterly report and send to MAJCOM/FLDCOM AP PM and MFM no later than the 10th of each end of quarter (i.e. January/April/July/October). MAJCOM/FLDCOM AP PM and MFMs provide quarterly info to AP Lead Command via the following SharePoint® (**https://usaf.dps.mil/sites/aetc-19af/do/aop/SitePages/Home.aspx**) or other designated central data source.

13.2.1. MAJCOM/FLDCOM/Operations (A3)-designated AP training PM and the MAJCOM/FLDCOM/MFM, 4M0X1 generate an annual physiological training report from the applicable aircrew training database and send to AP Lead Command by no later than October 30th for the preceding fiscal year. This report is used to assess future DAF training requirements, procure and assign specialized equipment, and provide for the availability of trained officers and enlisted personnel to conduct the program. It also provides case studies for chamber reactions and monitors the workload at training facilities.

13.2.2. AP Lead Command collates all MAJCOM/FLDCOM physiological training reports into a single AF-wide report for AF/A3O-AI to be submitted no later than November 10 for the preceding year's training.

13.3. Specialized Physiology Acceleration, Research, Training Aircrew Network (SPARTAN). Implementation of SPARTAN is the result of an DAF Manpower Analysis Agency (AFMAA) study, which identified nonstandard tracking of work Force usage for the AP career field. As a result, SPARTAN was born out of an effort to accurately track career field labor data. This is not the permanent solution; SPARTAN is a gap-fill until the AFMS to LAF AP Transition occurs. Once aligned with LAF, the career field's intent is to integrate tracking of aircrew training into an existing AF system. Utilization of SPARTAN is the preferred method of tracking AP duties and responsibilities however, in the absence of SPARTAN the following paragraphs outline what the quarterly and annual AP reports entail.

13.4. APTU Training Report contents:

13.4.1. Report Period: input date in the following format (DD-MMM-YY - DD-MM-YY)

13.4.2. APTU: include org/office symbol, base, state. Example: 1 SOSS/OSM, Hurlburt Field, FL; 11 AMDS/SGPT, Andrews AFB, MD; 9 PSPTS/SGTP, Beale AFB, CA etc.

13.4.3. Initial Training/Training Course: Input courses as outlined in AFMAN 11-403 and respective syllabi located on the AETC Bookstore: **https://trss3.randolph.af.mil/Bookstore/home/homePage.aspx** . **Note:** input N/A for unfilled blocks.

13.4.3.1. Syllabus Hours: input data in half-hour increments i.e. 3.0, 3.5, 4.0, 4.5, 5.0 etc.

13.4.3.2. Actual Training Hours: input data in half-hour increments i.e. 3.0, 3.5, 4.0, 4.5, 5.0 etc.

13.4.4. Refresher Training/Track: input only the following tracks in accordance with AFMAN 11-403: Track-A, Track-C, Track-H, Track-J, Track-R, and Refresher Pressure Suit Training. **Note:** input N/A for unfilled blocks.

13.4.4.1. Syllabus Hours: Input data in half-hour increments i.e. 3.0, 3.5, 4.0, 4.5, 5.0 etc.

13.4.4.2. Actual Training Hours: input data in half-hour increments i.e. 3.0, 3.5, 4.0, 4.5, 5.0 etc.

13.4.5. Type of Initial Students Trained: provide demographics i.e. DAF (Pilots, NAVs, CSOs, Load Masters, Gunners, PJs etc.), Sister SVCs (USA, USN, USMC, USCG etc.), ANG (AF Air National Guard (Army National Guard should be included under the sister service tab.), AFRC (Individual Mobilization Augmentee, traditional reservist etc.), CIV (Non-military personnel such as GS or contractors), FOR (Foreign Country Students).

13.4.6. Type of Refresher Students Trained: same as **paragraph 13.3.9**

13.4.7. Number of Students Trained: total number of initial students vs. refresher students.

13.4.8. Number of Chamber Flights: identify the number of initial vs. refresher chamber flights conducted.

13.4.9. Number of Rapid Decompressions: identify the number of RD's conducted.

13.4.10. Number of Chamber Reactors: reference AFMAN 11-403 to determine reactor grade.

13.4.11. Hypobaric Chamber Daily Inspections/T.O. Total Time: take the total number of Daily Inspections conducted and multiply them by the number of hours specified in the T.O. 43D8-3-2-6, *Inspection Requirements Hypobaric Training Chambers*.

13.4.12. Hypobaric Chamber Daily Inspections/Actual Inspection Time: take the total number of Periodic Inspections conducted and multiply them by the number of hours taken to complete the task.

13.4.13. Hypobaric Chamber Special Inspections/T.O. Total Time: take the total number of Daily Inspections conducted and multiply them by the number of hours specified in the T.O. 43D8-3-2-6.

13.4.14. Number of ROBD Exposures: identify the number of initial vs. refresher ROBD exposures. Mark N/A if empty.

13.4.15. Number of ROBD Reactors: self-Explanatory. Mark N/A if empty.

13.4.16. ROBD/HFT Daily Inspection/Shut-Down Procedures: add up the total time it took to perform the daily inspection and shutdown procedures during the time-period covered in this report.

13.4.17. Aircrew Flight Equipment Inspected: include AFE, which required inspection during the time-period specified in the report.

13.4.18. Non-Hypoxia AOP Training/Event: input other Aircrew Training Supported by AP Personnel (e.g. Barany Chair, NVG Refresher, Spatial disorientation Device, Head-Up Display (HUD) Review, Instrument Refresher Course, Human Performance Threat Brief, Airsickness Brief, Fatigue Countermeasures, Crew Resource Management (CRM), Human Factors Consultation, Anti-G Strain Maneuver (AGSM) Review, Sq/Wg Safety Briefings, etc.).

13.4.19. Non-Hypoxia AOP Training/No. of Students Trained: self-Explanatory.

13.4.20. Number of Deployments: self-Explanatory. (Mark N/A if empty)

13.4.21. Deployment Length: enter total number of days personnel are deployed. (Mark N/A if none)

13.4.22. Number of TDYs: self-Explanatory. Mark N/A if empty.

13.4.23. TDY Length: enter total number of days personnel were on TDY. Mark N/A if none.

13.4.24. Number of Meetings: enter the total number of meetings personnel attended.

13.4.25. Meeting Length: enter time spent attending meetings in .5 hr. increments. Example: AMC = 1.0 hrs.

13.4.26. Meeting: name meeting and AFI reference. Example: AMC (AFI 48-101, *Aerospace Medicine Enterprise*), etc.

13.4.27. Number of Additional Duties: enter total number of additional duties personnel performed during the reporting period of this report.

13.4.28. Time Spent Conducting Additional Duties: enter time allotted for meeting attendance in .5 hr. increments. Example: AMC = 1.0 etc.

13.4.29. Additional Duties: name additional duty and AFI reference. i.e. Unit Self-Inspection/MICT Manager (AFI 90-201, *Air Force Inspection System*); Unit Physical Training Leader (AFI36-2905); Unit Voting Assistance Officer (AFI 36-3107, *Voting Assistance Program*); Unit Safety Representative (AFI 91-202, *The US Air Force Mishap Prevention Program*); Equipment Custodian (AFMAN 23-101 v2, *Materiel Management Policy*); GPC Account Cardholders (AFI 64-117, *Government Purchase Card Program*); UCC Representatives (AFI 10-2501, *Emergency Management Program*) etc.

13.4.30. Manning Assistance: specify type of manning assistance and include org level. Example: IG (Wg), Honor Guard (Wg), Exec (Sq) etc.

13.4.31. Authorized /Assigned Manning: self-Explanatory. Mark N/A if empty.

13.4.32. Personnel Data.

13.4.32.1. Rank/Full Name: self-Explanatory. Delete row if empty.

13.4.32.2. Lecture Hours: include the number of instructor hours performed by each individual during the time covered for this report. These are annotated in .5 hrs. increments.

13.4.32.3. Career Lecture Hours: include the number of instructor hours performed by each individual during the time covered for this report. These are annotated in .5 hrs. increments.

13.4.32.4. Flying Hours: include the number of flight hours flown on local MDS during time period covered in this report.

13.4.32.5. Career Flying Hours: carry over total flight hours performed by individuals throughout their entire career.

13.4.32.6. Chamber Hours: include chamber time/hours performed by each individual during the time covered in this report.

13.4.32.7. Career Chamber Hours: carry over chamber time/hours performed by each individual throughout his or her entire career.

Figure 13.1. APTU FY Training Report.

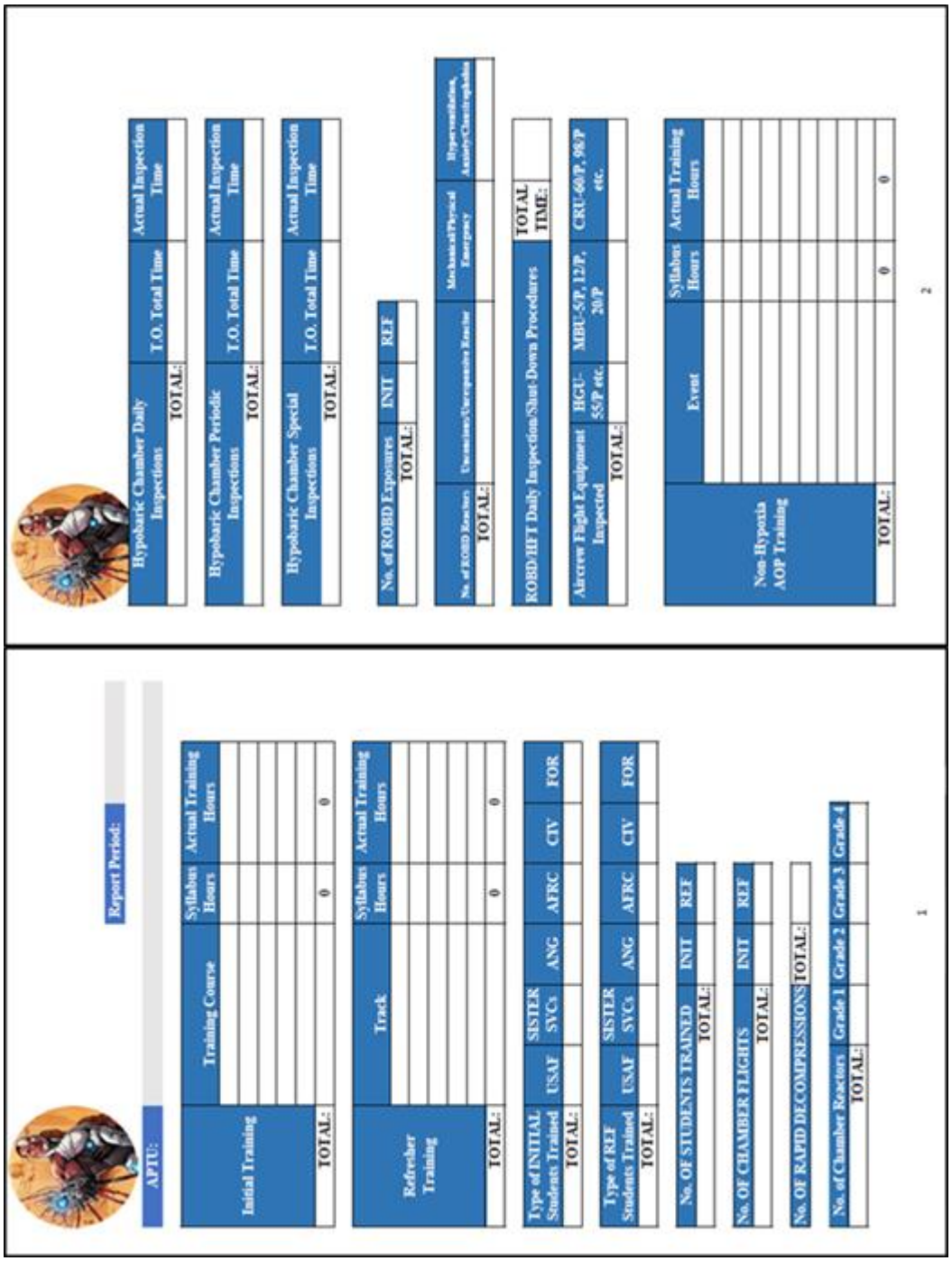


Figure 13.2. APTU FY Training Report cont'd.

Chapter 14

BARANY CHAIR OPERATING INSTRUCTIONS

14.1. General. The Barany chair is a rotational seating device used to provoke a response to motion within a trainee's vestibular system. Training applications for this device include spatial disorientation familiarization training and airsickness physiological adaptation training. Training goals, objectives and demonstrations for each use of the device are detailed within the respective section below.

14.2. Disorientation Familiarization Training. Spatial disorientation presents a serious threat to aircrew safety. Disorientation Familiarization Training can be accomplished using several trainers and demonstrations. The Barany chair is used during initial AP training to provide trainees with an understanding of the visual and vestibular system's susceptibility to error.

14.3. Objectives and Demonstrations. Vestibular reflexes and somatogyral/oculogyral illusions can be demonstrated via the Barany chair by limiting additional orientation information from the visual, auditory, or somatosensory system. Instructors may direct various positioning causing an increased reaction in trainees, and providing a notable effect on the trainee's ability to interpret their orientation in two-dimensional space. This disorientation is easily apparent to both the trainee and observers.

14.4. Personnel Requirements and Qualifications. Personnel who have completed upgrade training per 43A or 4M0 CFETP or local upgrade requirements may demonstrate spatial disorientation to trainees as a part of initial physiology training. Initial trainees should observe all three demonstrations and experience one.

14.5. Preflight Briefing. Trainees receive academic instruction on spatial disorientation prior to training. Each trainee is briefed on safety prior to Barany chair demonstration. This requirement may be met with a general brief to the class when the training session begins. Specific instructions for executing each maneuver is briefed to trainees as each maneuver begins; there is no requirement for this information to be reviewed in a pre-brief.

14.6. Spatial Disorientation Familiarization Training Description.

14.6.1. Graveyard Spiral. Ensure trainee is sitting upright, arms resting on the armrests with thumbs straight up to the ceiling. Fasten outer arm of the chair and seat belt, if applicable. Brief the trainee to point in the direction of the turn perceived before the trainee dons goggles and hearing protection. Brief any observers to stay quiet. Begin rotating the chair clockwise to simulate spinning to the right. Continue spinning until achieving a constant rate of rotation. Minimize abrupt inputs to the chair so the student cannot perceive the added acceleration. Continue at a constant rate for approximately 30 seconds. If the trainee still perceives the clockwise rotation, stop making inputs into the chair. When the trainee shows no perceived rotation (via thumbs up hand signal), show observers the trainee‘s non-perception, and slow or stop the chair‘s rotation. Ideally, the student senses rotation in the opposite direction when the rotation stops. Allow the student to recover for a short period before sending them back to their seat. When they feel no rotation, they may return to their seats. Briefly explain the physiology of semicircular canals and cause of disorientation in

this example after the demonstration. If desired effect is not achieved, wait a minute and try again opposite direction, or simply explain what should happen.

14.6.2. Nystagmus. Ensure trainee is sitting upright, arms resting on the armrests. Fasten outer arm of the chair and seat belt, if applicable. Direct the trainee to pick a focal point and rotate his head/eyes to maintain the focal point within his line of sight. Begin rotating the chair and continue spinning until achieving a constant rate of rotation. The trainee should focus on the approximate location of the focal point as continued spinning reduces visual acuity. Continue spinning for approximately 20-30 seconds. Stop the rotation so the spinning student is facing the focal point. Instruct the student to open their eyes as wide as possible, focus on the focal point, and ask the student to explain how difficult it is to focus. Point out the involuntary eye movement to the class. Allow the student to recover for a short period before sending them back to their seat. When they feel no rotation, they may return to their seat. Briefly explain what is happening physiologically with muscles in the eyes.

14.6.3. Coriolis. Have trainee sit with weight back in the chair, arms crossed over the outer bar with pillow underneath, head resting on their crossed arms as if sleeping on a desk, with one ear pointing towards the ground. **Table 14.1** describes demonstration orientation and resulting feeling of disorientation in the trainee. Direct the trainee to close their eyes and quickly sit upright with arms in the air when the spinning stops. Rotate the chair in a clockwise direction for approximately 30 seconds. Ensure the student does not get "top heavy" with their weight distributed towards the outside of the spinning. If chair starts to rock, have the student sit back in the chair, or terminate the demonstration. Stop the chair with the trainee facing the class and have him describe what motion he perceives.

Table 14.1. Coriolis Demonstration Orientation and Trainee Effects.

Demo Orientation	Effect
Head Right, Spun Right (clockwise)	Front Right Tumble
Head Right, Spun Left (counterclockwise)	Front Left Tumble
Head Left, Spun Right (clockwise)	Back Left Tumble
Head Left, Spun Left (counterclockwise)	Back Right Tumble

14.6.4. Allow the student to recover for a short period before sending them back to their seat. When they feel no rotation, they may return to their seats. Briefly explain what is happening physiologically with more than one semicircular canal stimulated at one time.

14.7. Post Flight Brief/Post Training Review. Ensure trainees understand the physiological cause for the illusion demonstrated and illusion's relevance to aviation operations.

CHAPTER 15

AIRCREW ROTATIONAL TRAINING (ART)

15.1. Purpose. The Airsickness Management Program is directed by the local senior flight surgeon in accordance with AETCI 48-102, *Medical Management of Under Graduate flying Training Students*. Any medical AFSC or Aerospace Physiology personnel designated by the flight surgeon may conduct Aircrew Rotational Training (ART). Airsickness desensitization or adaptation training using a Barany chair occurs via ART. ART is a consecutive three-day program with each day lasting one to two hours. ART saves valuable training dollars and time by educating and building confidence in airsickness control techniques in trainees. For maximum efficacy, the program should occur during three days of flying followed by spinning in the Barany chair.

15.1.1. Each day of the program focuses on a different aspect of controlling airsickness. ***WARNING:*** All flying for the trainee is completed prior to that day's Barany spins. Trainees should not be allowed to fly after spinning in the chair until they have had at least 12 hours uninterrupted crew rest.

15.2. Objectives and Demonstrations. Day one teaches the student to determine different factors influencing their susceptibility to airsickness. It also gives them the chance to practice mechanical methods of reducing airsickness. Day two teaches techniques used to relax the body and lower student's airsickness arousal level. Day three builds confidence in the student's ability to control their susceptibility to airsickness. Maneuvers that can be used in spin sessions include a climb simulated by having the trainee focus eyes on focal point on the ceiling and hold for three revolutions or a bank simulated by holding their right or left ear, respectively to the shoulder.

15.3. Personnel Requirements and Qualifications. Students and aircrew with airsickness problems may be referred to the local APTU for ART as a part of an overall Airsickness Management protocol administered under flight surgeon guidance. Flight surgeons may refer airsick students to psychologists, where available, for relaxation techniques training or additional training/resources. Physiology personnel may accomplish introductory counseling, teach relaxation techniques if needed, and perform desensitization training using the Barany chair but are not responsible for overall case management. Physiology personnel document training via database or MFR and provide copies to trainee's squadron commander, as necessary. Deviations in spin protocols may be directed by flight surgeon as needed for individual patients.

15.4. Trainee Responsibilities. Practice the relaxation/diaphragmatic breathing techniques while both flying and chair flying. Attend all scheduled training sessions each of the three days. If there is a break in flying while still in the three-day program (due to weather, scheduling, etc.) the trainee completes that day of ART. Students who begin a 3-day ART program complete all three days, even if there are no airsickness episodes during day 2 or day 3 of flying.

15.5. Instructor Responsibilities. Counsel trainees on relaxation techniques using both preventive education and the Barany chair. It may be necessary for instructors to be available for training whenever the student is flying schedule dictates per local policy. Instructors use the Subjective Airsickness Rating form located at the end this chapter.

15.6. Goals. The program is designed to speed adaptation to the flight environment via a joint approach between the flying squadrons, Flight Medicine, Team Aerospace, AP personnel, and/or Mental Health. This guidance simply governs AP support to a comprehensive Airsickness Management protocol. Appropriate Surgeon General (SG) leadership should determine the entire airsickness management program and associated protocols.

15.7. Preflight Briefing. Instruction is tailored to the individual based on the student's initial interview. Discuss their emotional, mental and physical state of being throughout the entire day of flying. Focus on high stress activities such as emergency procedures, mission planning, crew briefing, and if applicable, stand up, student pilot (SP)/instructor pilot (IP) relationships and progress in flying training.

15.8. ART Description. Trainees receive three days of consecutive spins using the Barany chair and may receive refresher spins, if needed. **Table 15.1** illustrates the subjective airsickness rating chart, which is used to measure the trainee's response to stimulus and duration. Trainee ratings should be recorded and may be used as a measure of progression in their training.

Table 15.1. Subjective Airsickness Rating Chart.

Airsick Rating	Indication
1-3	Indicates low level of nausea or discomfort. Would not affect duties during flight.
4-6	Indicates a medium nausea level that would cause the student to deviate from planned flight, i.e. straight and level flight.
7-9	Indicates a high nausea level that would cause the trainee to modify or stop performing flight duties, i.e. transfer flight control to the IP.
10	Student becomes actively sick.

15.9. Day One Spin Training. Trainee receives two ten-minute spins with a ten-minute break between each spin session. The primary objective for day one is to get to know the trainee, the history of their problem, and observe the trainee's reaction to extensive rotation. This initial phase enables the student and instructor to identify personal behavioral patterns and physiological/psychological symptoms in relation to airsickness. During this spin, the intent is to assess the trainee's susceptibility to motion. Let the trainee know his/her signs of airsickness, such as paleness, sweating, sudden flushing of the face after performing a head movement, etc., so they have a more intimate knowledge of what is happening to their body prior to becoming actively airsick.

15.9.1. Spin rate is 20-25 RPMs.

15.9.2. Trainee spins with eyes open and fixated on the focal point.

15.9.3. Make a note of any outward (objective) symptoms observed. Examples include gripping the arm rests hard, sweating, paleness, hyperventilating, etc.

15.9.4. Periodically (e.g. each minute) ask the student his or her level of airsickness and record these readings.

15.9.5. The student might perform a few maneuvers or head movements during this ride, if needed to raise nausea levels. They can practice any techniques they currently use for motion sickness. Do not go into "drop-off" maneuvers at this time.

15.9.6. After the spin is finished, discuss subjective and any outward (objective) symptoms with the student. Give the student a ten-minute break before the second spin.

15.9.7. If student becomes actively sick, stop the spin.

15.10. Day Two Spin Training. Trainee receives three ten minute spins with a ten-minute break between each spin session. The primary objective of day two is to reinforce the student's understanding of their symptoms that precede airsickness. Practice deep diaphragmatic breathing, rhythmic breathing, "drop-off" (a continuing cycle of tensing muscles, then relaxing them) maneuver techniques, and progressive muscle relaxation. Simulate realistic aircraft scenarios in the Barany chair and require the student to control their nausea level. The goal for each spin would be to have the student's nausea peak at least once per spin in the 7-8 range on the nausea scale. Nausea at the higher end of at least once per spin forces the student to control it. When they accomplish this effectively, they gain confidence in their abilities and they can incorporate the technique in flight.

15.10.1. Spin rate is 20-25 RPMs.

15.10.2. Trainee spins with eyes open and fixated on the focal point.

15.10.3. Make a note of any outward (objective) symptoms observed. Examples include gripping the arm rests hard, sweating, paleness, hyperventilating, etc.

15.10.4. Periodically ask the student his or her level of airsickness and record these readings.

15.10.5. Talk the student through the progressive muscle relaxation as needed to lower subjective airsickness rating.

15.10.6. If student becomes actively sick, stop the spin.

15.10.7. Encourage the student to practice diaphragmatic breathing and muscle relaxation techniques on their own time to enhance success.

15.11. Day Three Spin Training. Trainee receives three ten minute spins with a ten-minute break between each spin session. The primary objective of day three is to build that final amount of confidence and adaption in the student. Review progress and relaxation techniques with students.

15.11.1. Spin rate is 20-25 RPMs.

15.11.2. Trainee spins with eyes open and fixated on the focal point.

15.11.3. Make a note of any outward (objective) symptoms observed. Examples include gripping the arm rests hard, sweating, paleness, hyperventilating, etc.

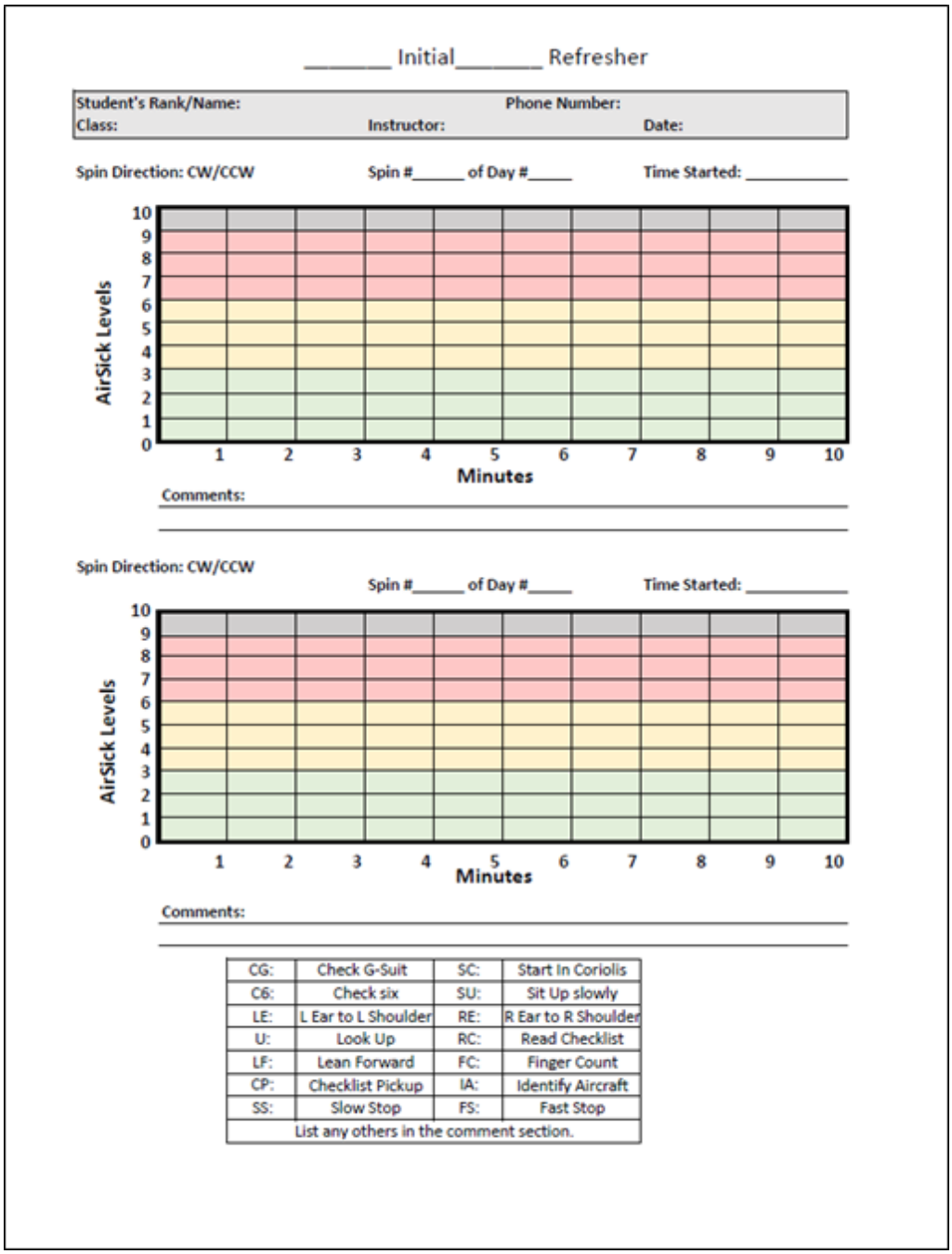
15.11.4. Periodically ask the student his or her level of airsickness and record these readings.

15.11.5. When final spin is complete, get feedback from student on their confidence level and discuss follow-up actions and ability to self-refer for refresher spin training, as needed.

15.12. Refresher Spin Training. Trainee receives one ten-minute spin and one two-minute spin with a ten-minute break between each spin session as needed after completion of the three-day program. These spins are warranted if the student experiences an airsickness episode after completing the three-day program. Physiology personnel ensure that flight surgeon/flying squadron commanders receive training documentation for each refresher spin for self-referred trainees.

15.13. Post Training Follow-up Actions. Instructor's follow-up with students after their first sortie upon ART and again one-month post-ART completion. Discuss any recurrent airsickness symptoms and the measures used to compensate for this type of state.

Figure 15.1. Subjective Airsickness Rating form.



_____ Initial_____ Refresher

Student's Rank/Name:		Phone Number:
Class:	Instructor:	Date:

Spin Direction: CW/CCW Spin #_____ of Day #_____ Time Started: _____

Comments: _____

Spin Direction: CW/CCW Spin #_____ of Day #_____ Time Started: _____

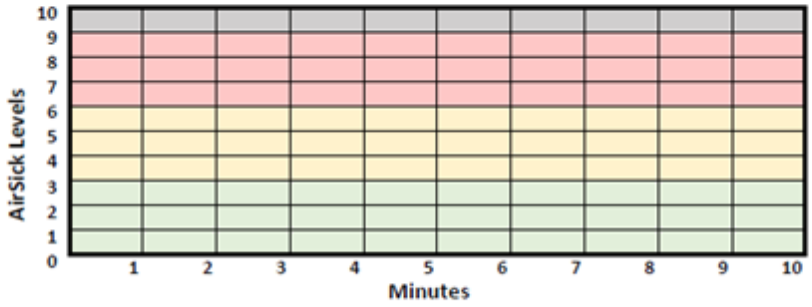
Comments: _____

CG:	Check G-Suit	SC:	Start In Coriolis
C6:	Check six	SU:	Sit Up slowly
LE:	L Ear to L Shoulder	RE:	R Ear to R Shoulder
U:	Look Up	RC:	Read Checklist
LF:	Lean Forward	FC:	Finger Count
CP:	Checklist Pickup	IA:	Identify Aircraft
SS:	Slow Stop	FS:	Fast Stop
List any others in the comment section.			

Figure 15.2. Subjective Airsickness Rating form cont'd.

_____ Initial_____ Refresher

Spin Direction: CW/CCW Spin #_____ of Day #_____ Time Started: _____



Comments: _____

_____

Daily Log

1. Did you fly today? YES/NO

2. Did you get actively (vomiting) airsick? YES/NO Passively (disabling or disruptive nausea)? YES/NO

3. What were your symptoms? _____

4. What time does your crew rest start? _____

5. What time did you call AOP to schedule? _____

6. How many hours of sleep did you get last night? _____

7. When was the last time you ate? _____ What? _____

8. Do you have any flights or test after this? YES/NO

*For initial Day 1 and 2; if a student becomes actively airsick terminate the spin.
For initial Day 3 and refresher spins; **DO NOT** terminate the spin if student becomes actively airsick before 8 minutes;
If the student becomes actively airsick after 8 minutes, then you may terminate the spin.

Chapter 16

ACCELERATION TRAINING PROGRAM

16.1. Acceleration Training Program Goals. Prepare rated aircrew and other flyers for high-G flight and enhance combat capability and safety by optimizing aircrew defense against G-Induced Loss of Consciousness. This is accomplished through education and practical experience including physical conditioning, anti-G equipment, adequate G-oriented situational awareness, the physiology of high-G flight, and an awareness of the factors that affect a crewmember's G tolerance.

16.2. Objectives.

16.2.1. Train and evaluate aircrew on a properly performed Anti-G Straining Maneuver (AGSM) in a controlled environment.

16.2.2. Address strategies to improve aircrew performance under G-stress through the proper fit and use of protective equipment.

16.2.3. Identify aircrew with low G tolerance and poor AGSM skill performance; and provide remediation training as necessary.

16.3. Technique and Assessment. Focus ground training/academics on technique and assessment, including a discussion of the limitations imposed on aircraft/ aircrew performance because of an ineffective AGSM. Emphasize briefing, debriefing, G-suit/aircrew flight equipment differences, and assessing the proper AGSM during flight debriefs.

16.4. Record, Review, Assess and Debrief the Crewmember's AGSM. Identify aircrew having poor AGSM technique or low G tolerance to the flight commander or appropriate operations supervisor. The SQ/DO or appropriate supervisor determines what action is necessary to improve the crewmember's G tolerance. The SQ/CC determines if commander-directed acceleration training is necessary in accordance with AFMAN 11-404, *Fighter Aircrew Acceleration Training Program.* Instructors may use the G Strain Critique and G Awareness worksheet forms located at the end this chapter.

Figure 16.1. G-Strain Critique form example.

G-Strain Critique

BREATHING TECHNIQUE:

1. Breathing interval 3-4 sec	1	2	3	4	5
2. Shallow air exchange	1	2	3	4	5
3. Closure of Airway	1	2	3	4	5

MUSCLE STRAIN:

1. Effectiveness of lower body strain 1 2 3 4 5
   (a) Unload after 5 seconds
   (b) good breathing technique, but experienced light loss
   (c) Cold not hold Gs steady

SUBJECTIVE MEASURES:

1. Fatigue management
   (a) Were signs of fatigue present Yes No
   (b) Was fatigue effectively managed Yes No

2. Non-performance issues
   (a) Was G-strain started prior to G onset Yes No
   (b) Was G-strain continued during unloading Yes No

Figure 16.2. G-Awareness worksheet (Front) example.

G-AWARENESS WORKSHEET

Rank/Name: _____ SQ: _____

Date:_____ Mission Type:_____

Reason for Review: CT / Post-Incident / Other

Engagement	**Prep Breath**			**Air Exchange Rhythm**			**Efficiency**			**General SA**		
G Warm-up	**U**	**M**	**S**	**U**	**M**	**S**	**U**	**M**	**S**	**U**	**M**	**S**
1 Max G:	**U**	**M**	**S**	**U**	**M**	**S**	**U**	**M**	**S**	**U**	**M**	**S**
2 Max G:	**U**	**M**	**S**	**U**	**M**	**S**	**U**	**M**	**S**	**U**	**M**	**S**
3 Max G:	**U**	**M**	**S**	**U**	**M**	**S**	**U**	**M**	**S**	**U**	**M**	**S**

4	Max G:	**U**	**M**	**S**	**U**	**M**	**S**	**U**	**M**	**S**	**U**	**M**	**S**
5	Max G:	**U**	**M**	**S**	**U**	**M**	**S**	**U**	**M**	**S**	**U**	**M**	**S**
6	Max G:	**U**	**M**	**S**	**U**	**M**	**S**	**U**	**M**	**S**	**U**	**M**	**S**

Comments:

Overall Assessment:

Meets Standards – Review Next Training Cycle / Does Not Meet Standards

Follow-up Actions (if applicable):
DO Signature: _____ FS/AP Signature: _____
Date Completed: _____
Pilot Signature/Date: _____
Reviewer printed name/Rank/Position: _____

Figure 16.3. G-Awareness worksheet (Back) example.

Instructions/Notes
Requirements: This review will be conducted at a minimum of once per training cycle IAW AFI 11-2F-16 vol 1. Review must be conducted by an Aerospace Physiologist, Flight Surgeon, or Squadron Supervisor.
Mission Type: Reviews must occur on missions where 7.0 G_z is sustained for 10 seconds or longer. All engagements, including the G-Awareness Exercise, will be evaluated. *Note: Later engagements, once fatigue has set in, are most critical to a quality review. Recommend reviewing last engagement first.*
Purpose of Review: For initial reviews, circle "Initial." For reviews in subsequent training cycles, circle "CT." If a pilot is having a leadership-directed review following a G-related incident, circle "Post-incident." For any other reason, circle "Other."
Grading Matrix: Grade each engagement individually using the criteria in the matrix. Guidelines are as follows: ***Satisfactory (S):*** Meets all criteria described below. ***Marginal (M):*** Minor deficiency (ies); make recommendations for improvement and annotate in comments. ***Unsatisfactory (U):*** Major deficiency (ies); annotate in comments; if any areas are marked

"U," follow-up action and DO notification are required.
Preparatory Breath
Timing - simultaneous with initial lift vector movement, prior to G onset
Audible closing of the glottis ("hook" sound)
Adequate volume of Air
Air Exchange Rhythm
Initial Exchange at peak G or 3 sec
2.5 - 3 second intervals
Not holding breath or rushing
Air Exchange Efficiency
Short (0.5 – 1 sec)
Sharp – adequate volume of air moved (not just making a sound)
Crisp, glottis engaged ("k" sound – not "t" or "p" sound), not dumping/leaking air, groaning, grunting
General G SA
Technique automatic/consistent at high and low G (intensity may vary)
Subsequent high G maneuvers after merge garner adequate strain
No extraneous communication
Errors not captured in above criteria deemed noteworthy by reviewer
Comments
Comment on any area marked "M" or "U" and include recommendations for improvement, if applicable. Include any other comments deemed necessary.
Overall Assessment
If more than four areas are marked "M" or any one area is marked "U", circle "Does Not Meet Standards." Follow-up action is required. Otherwise, mark "Meets Standards – Review Next Training Cycle."
Follow-up Actions: If the pilot receives a grade of "Does Not Meet Standards," or if the reviewer deems follow-up actions necessary for any other reason, notify the DO and consult with the Flight Surgeon or Aerospace Physiologist (if not conducting the review) to choose appropriate course of action. This may include, but is not limited to, review of an additional sortie, retraining locally, or Command Directed Acceleration Training (CDAT). Follow-up action will be documented in the appropriate block and signed off when completed.
Signatures: Reviewer (Flight Surgeon, Aerospace Physiologist, or Squadron Supervisor) and pilot must sign and date. File page 1 of this form in the pilot's grade book in the

"Other" tab. Turn in AF Form 1522 to Squadron Aviation Records Management (SARM) office for tracking.

Chapter 17

STUDENT AEROSPACE PHYSIOLOGY TRAINING DOCUMENTS

17.1. Purpose. Clarify accepted forms of AP training documentation for refresher training students.

17.1.1. Refresher students provide a copy of their current DD Form 2992, clearing the member to participate in altitude chamber or reduced oxygen breathing device (ROBD) training. Additionally, students scheduled for refresher training provide proof of prior AP training. Excerpts from IDS database are the preferred documentation. AP units may also accept AF Form 1274, or training documentation that shows completion of a course of training, which contains Initial Physiological Training as part of the syllabus (e.g. Flight Training Certificate). If questions of adequate documentation arise, please contact the respective MAJCOM/FLDCOM Program Manager/Functional Manager or AP Lead Command for assistance.

Chapter 18

CHAMBER FLIGHT WORKSHEET

18.1. Purpose. To provide the AP career field with guidance on the chamber flight worksheet.

18.2. Recorder Duties. The recorder documents all aspects of the chamber flight. It is recorder's job to provide a record of all events during the chamber flight. AP Lead Command has developed a 'chamber flight worksheet,' where all the information is collected. Typically, the Administration section personnel enter the following information on the worksheet before the flight: type of flight, date, flt #, Total # of Students, gender, and the number of physiology technicians (PTs). Additionally, crew members' names and trainees' ranks, and names. The recorder then collects the following information: Trainee information: mask and helmet number.

18.3. Flight Data. Denitrogenation start/end time, ear and sinus start/end time, main start/end time, total chamber flight time (Total Main + E&S), total time at or above FL 180 and FL250.

18.4. Reactor Information. Seat number, altitude it occurred, reaction grade, reaction code, altitude relieved, treatment used, or removal information, if applicable.

18.5. Inside observer's Removal and Replacement data. If an inside observer is removed from the chamber flight due to a reaction. Use this portion of the Chamber Flight Worksheet to annotate his/her replacement. Include replacement IO peak altitude and chamber flight total time.

18.6. RD Flight data. Start and end times, and peak altitude.

18.6.1. Before the flight begins and in accordance with the worksheet, the recorder ensures all trainees are in their assigned seats. Inside observers refer to seat position when relaying reactor information. Annotating accurate data is necessary to ensure the maintenance section inspects the appropriate regulator, mask and helmet assemblies used by the reactor.

18.6.2. It is the recorders job to not only record physiological incidents, but also any other unusual events or deviations during the chamber flight. Recorder annotates both the time and the specific event incident occurred. The recorder submits the completed chamber flight record to the administration section after the chamber flight is complete. Information from this record is transferred into an electronic database used to create the physiology training monthly report. The administration section maintains the worksheet in the official historical unit files.

18.6.3. The Aerospace Physiology Officer (APO) is the approval authority for chamber flight participation. Trainees whose beards, mustaches, or facial cosmetics interfere with a safe oxygen mask fit may not participate in chamber flights. Personnel who cannot achieve a safe oxygen mask fit are given the option to shave beards, mustache, or remove facial cosmetics prior to the chamber flight or accomplish the hypoxia practical using the ROBD. If a trainee refuses to shave or remove facial cosmetics and cannot attain a proper seal, they are not allowed to proceed with the chamber flight and the trainee receives a non-completion letter. Students who do not complete chamber flight objectives (if applicable) within 90 calendar days of academic training repeat AP training in its entirety.

Figure 18.1. Chamber Flight Worksheet (Front) example.

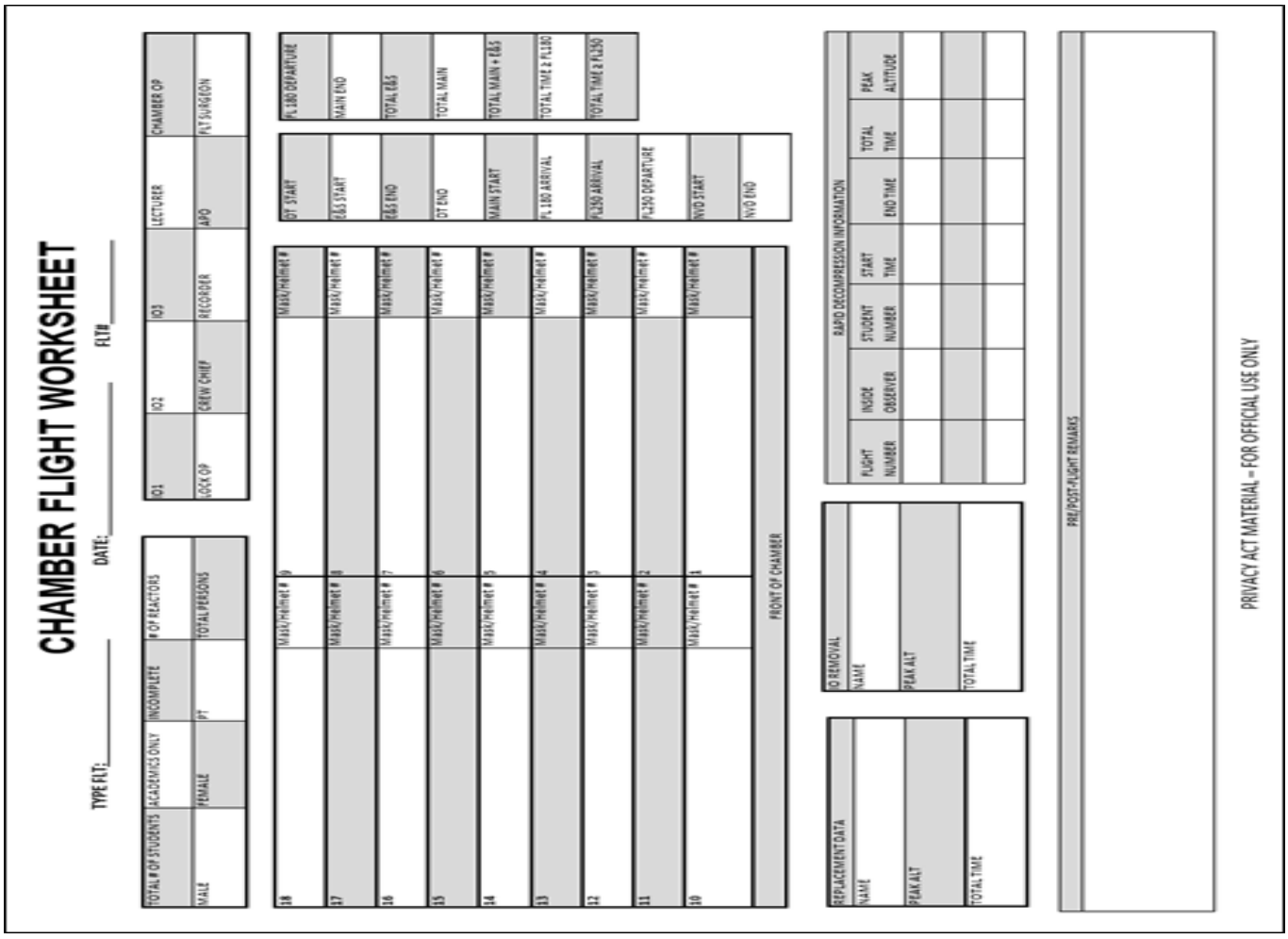
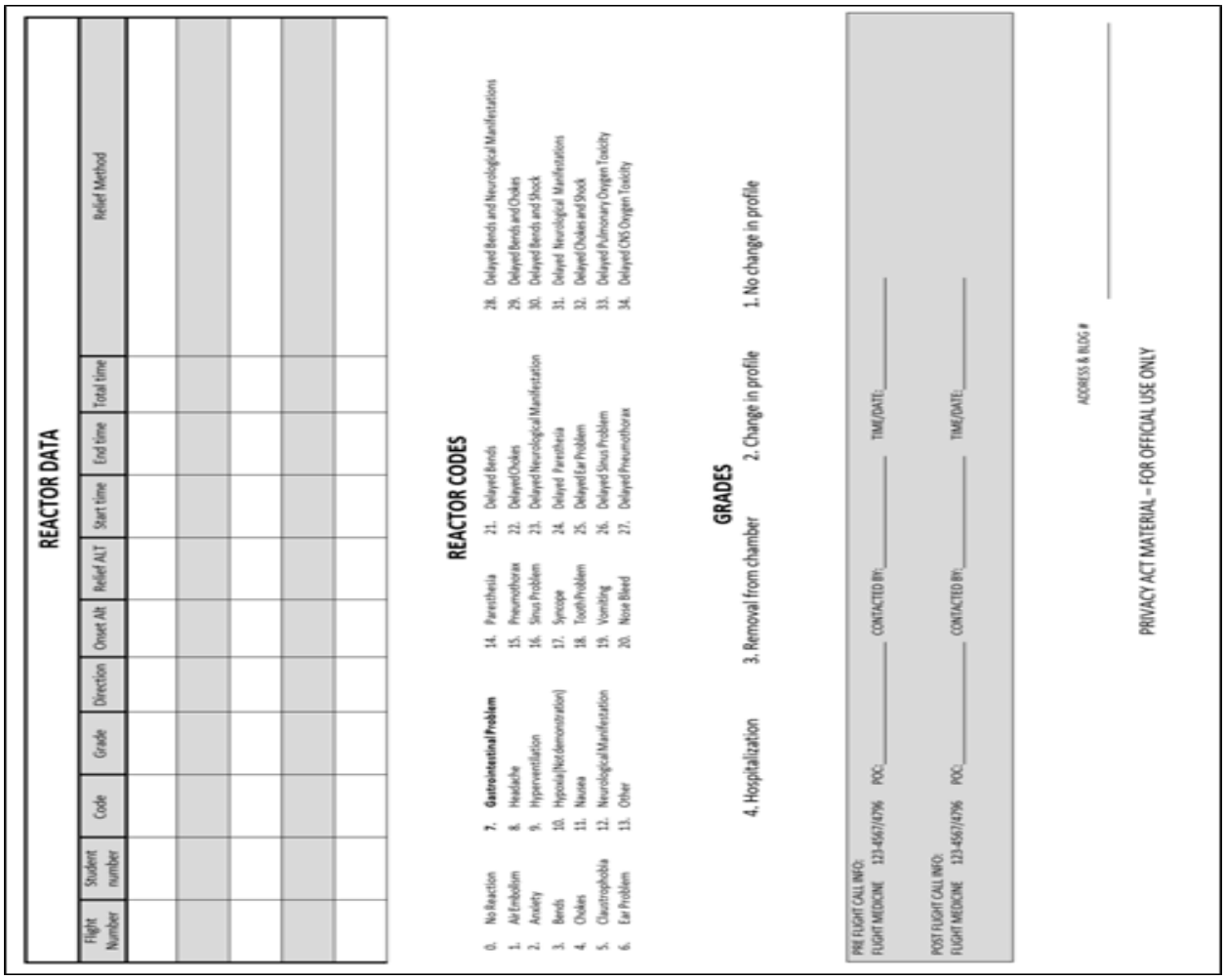


Figure 18.2. Chamber Flight Worksheet (Back) example.



REACTOR DATA

Flight Number	Student number	Code	Grade	Direction	Onset Alt	Relief ALT	Start time	End time	Total time	Relief Method

REACTOR CODES

0.	No Reaction	7.	**Gastrointestinal Problem**	14.	Paresthesia	21.	Delayed Bends
1.	Air Embolism	8.	Headache	15.	Pneumothorax	22.	Delayed Chokes
2.	Anxiety	9.	Hyperventilation	16.	Sinus Problem	23.	Delayed Neurological Manifestation
3.	Bends	10.	Hypoxia (Not demonstration)	17.	Syncope	24.	Delayed Paresthesia
4.	Chokes	11.	Nausea	18.	Tooth Problem	25.	Delayed Ear Problem
5.	Claustrophobia	12.	Neurological Manifestation	19.	Vomiting	26.	Delayed Sinus Problem
6.	Ear Problem	13.	Other	20.	Nose Bleed	27.	Delayed Pneumothorax

28.	Delayed Bends and Neurological Manifestations		
29.	Delayed Bends and Chokes		
30.	Delayed Bends and Shock		
31.	Delayed Neurological Manifestations		
32.	Delayed Chokes and Shock		
33.	Delayed Pulmonary Oxygen Toxicity		
34.	Delayed CNS Oxygen Toxicity		

GRADES

4. Hospitalization 3. Removal from chamber 2. Change in profile 1. No change in profile

PRE FLIGHT CALL INFO:
FLIGHT MEDICINE 123-4567/4796 POC:_____ CONTACTED BY:_____ TIME/DATE:_____

POST FLIGHT CALL INFO:
FLIGHT MEDICINE 123-4567/4796 POC:_____ CONTACTED BY:_____ TIME/DATE:_____

ADDRESS & BLDG #

PRIVACY ACT MATERIAL – FOR OFFICIAL USE ONLY

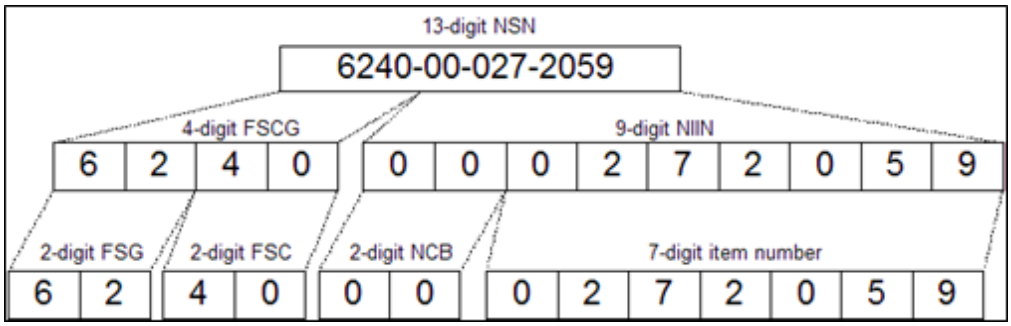
Chapter 19

NATIONAL STOCK NUMBERS AND AP SUPPLY LISTING

19.1. Purpose. To provide guidance concerning National Stock Numbers and the Aerospace Physiology program equipment and supply listing.

19.2. NSN. National Stock Number (NSN) as it is known in the U.S. is a 13-digit numeric code, identifying all the 'standardized material items of supply' as the United States Department of Defense has recognized them.

Figure 19.1. NSN explanation.



19.2.1. The initial subgroup is the Federal Supply Classification Group or National Supply Classification Group. In theory, similar items would always have closely related numbers in this section of the NSN. No matter how the section is referred to as the number of items has steadily increased and the system has become more complicated, it has not always been possible to keep similarity in numbers when the items are similar.

19.2.2. National Item Identification Number (NIIN). These nine digits comprise the NIIN. The first two digits of the NIIN is used to record which country was the first to codify the item. This is generally the country of origin, meaning the country of final manufacture. The formal name of the field is National Codification Bureau (NCB). The NCB is the organization, typically a government agency, in charge of maintaining the NCS database within a given country. The other seven characters are a non-significant identification number (actually code, as some of these characters may be alphanumeric, although in general NIINs are strictly numeric).

19.3. AP Program Equipment and Supply Listing. The Aerospace Physiology program equipment and supply listing is located on the AP Lead Command SharePoint®: **https://usaf.dps.mil/sites/aetc-19af/do/aop/SitePages/Home.aspx**.

Chapter 20

ALTITUDE CHAMBER OPERATIONS

20.1. Personnel Requirements and Qualifications. AP personnel who complete CFETP requirements are evaluated in their ability to perform the duties of the position, (e.g. aid chamber reactors, perform emergencies procedures appropriate to their designated chamber position etc.). These individuals are considered qualified to serve as chamber crewmembers. Document all training via CFETP and final qualifying evaluation on the instructor evaluation form. The minimum required crew positions are lecturer, chamber operator, crew chief, recorder, lock operator, APO, and the appropriate number of inside observers (IO) for number of trainees. Personnel requirements for operation of the altitude chamber are listed in T.O. 43D8-3-2-6-81, *Hypobaric Training Assembly Models 20M331, 20M491, 20M6321, and 10006*. Lock operator position is not required for a chamber flight with a single student.

20.2. Inside Observer (IO) requirements:

20.2.1. Initial classes require one IO for one student, two IOs for 2-10 students, and three IOs for 11 or more students.

20.2.2. Rapid decompressions require one IO per flight.

20.2.3. Refresher classes require one IO for five or fewer students. Two IOs are required for chamber flights with six or more students.

20.3. Aerospace Physiology Officer (APO). A qualified APO is required to supervise the chamber flight anytime the chamber climbs to altitude with a person inside.

20.4. Flight Surgeon. The flight surgeon is notified and is able to respond to chamber reactions in accordance with locally developed response plans.

20.5. Exposure limits for personnel inside low-pressure chambers:

20.5.1. Two flights in a 7-day period to or above 25,000 feet.

20.5.2. Two rapid decompressions in a 7-day period. These flights may be taken in combination with exposures above.

20.5.3. At least 72 hours elapse between exposures to altitudes to or above 18,000 feet.

20.5.4. Allow at least 23 hours between rapid decompression exposures below 18,000 feet.

20.5.5. Inside personnel or students do not exceed altitudes at FL250 for more than 30 minutes or above FL180 for more than 1 hour.

20.5.6. The chamber exposure levels listed in this chapter are considered the maximum exposures permitted.

20.6. Responsibilities. A crew pre/post flight briefing process is applicable to any organization that truly, wants to know how it is doing, where it needs to improve, and how it can find the underlying cause of a problem or dispute. Its sole purpose is to improve performance. Every organization needs to be introspective, transparent, and honest with itself. This only works if everyone is unified on the goals and purpose of the organization and there is trust within the team. High-performing, successful organizations build cultures of introspection and trust and

never lose sight of their purpose. In addition to a crew pre/post flight briefing, AP personnel provide a pre/post-flight briefing to all students in addition to required physiological training. During the pre-flight briefing, the instructor describes the purpose and procedures of the flight and verifies that no trainees have medical complaints rendering them a flight risk during training. Post-flight briefings describe restrictions for personnel who take part in chamber flights. These include but are not limited to physical exercise, procedures for reporting suspected DCS, emergency contact numbers, strenuous or extended duty for a period of 12 hours.

20.6.1. Personnel may fly as crewmember or passenger after a chamber flight to FL250 or below but should remain below a cabin altitude of 15,000 feet in accordance with AFMAN 11-202V3, *Flight Operations*. Specific requirements for each profile pre/post-flight is located in the respective syllabi. **Note:** Local AP leadership is responsible for ensuring all chamber time is used for training and approved research activities only; equipment check flights for pay are not authorized.

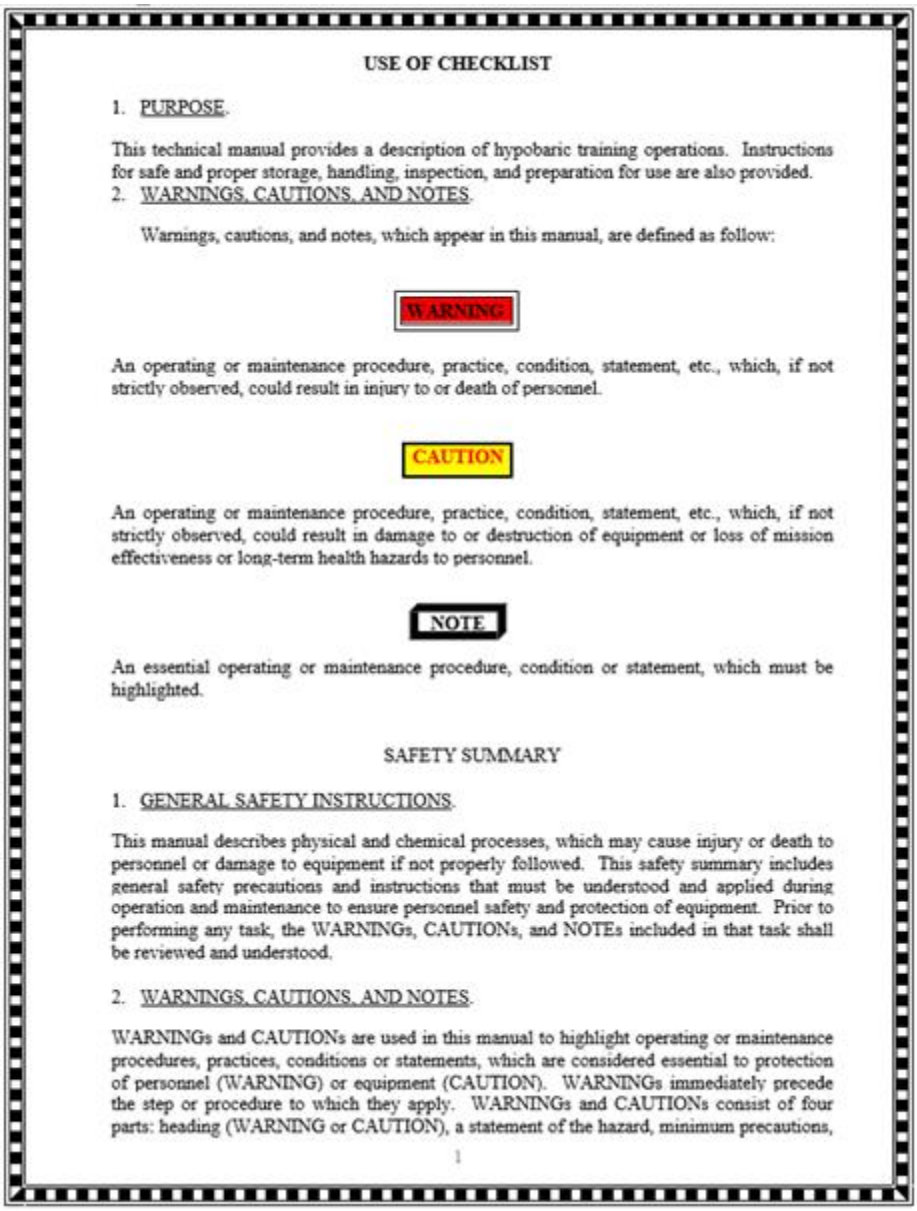
20.6.2. All personnel not directly assigned to a research or training chamber activity may be attached according to MAJCOM/FLDCOM needs to a local research, APTF or PSPTS by the AP MAJCOM/FLDCOM Program Manager with AP Lead Command (19 AF/DOA) approval. If a chamber unit requires attached AP personnel to perform inside observer duties during chamber operations, individual requests for approval are considered. APTT personnel are not ordinarily attached to a chamber unit unless the AP MAJCOM/FLDCOM Program Manager justifies the need. Individual requests are initiated, in writing, by the host APTF or PSPTS commander to their AP MAJCOM/FLDCOM Program Manager for approval. Requests fully justify reasons for using attached personnel (manning shortage, increased training load, etc.) and state a specific period of time the attached person is needed. If approved by the AP MAJCOM/FLDCOM Program Manager, the request is forwarded to AP Lead Command for final approval. Attached personnel also respond to the other needs of the host APTF or PSPTS and provide services as outlined by AP Lead Command and as required by the host APTF or PSPTS commander, or research director.

Chapter 21

ALTITUDE CHAMBER EMERGENCY PROCEDURES

21.1. Purpose. This pamphlet provides emergency procedures (EP) for altitude chamber operations. The information contained herein is documented in a format that allows respective units to print attached checklists from this pamphlet. This line of effort minimizes the time and effort necessary to author and reproduce EPs.

Figure 21.1. Altitude Chamber Emergency Procedures.



USE OF CHECKLIST

1. PURPOSE.

This technical manual provides a description of hypobaric training operations. Instructions for safe and proper storage, handling, inspection, and preparation for use are also provided.

2. WARNINGS, CAUTIONS, AND NOTES.

Warnings, cautions, and notes, which appear in this manual, are defined as follow:

WARNING

An operating or maintenance procedure, practice, condition, statement, etc., which, if not strictly observed, could result in injury to or death of personnel.

CAUTION

An operating or maintenance procedure, practice, condition, statement, etc., which, if not strictly observed, could result in damage to or destruction of equipment or loss of mission effectiveness or long-term health hazards to personnel.

NOTE

An essential operating or maintenance procedure, condition or statement, which must be highlighted.

SAFETY SUMMARY

1. GENERAL SAFETY INSTRUCTIONS.

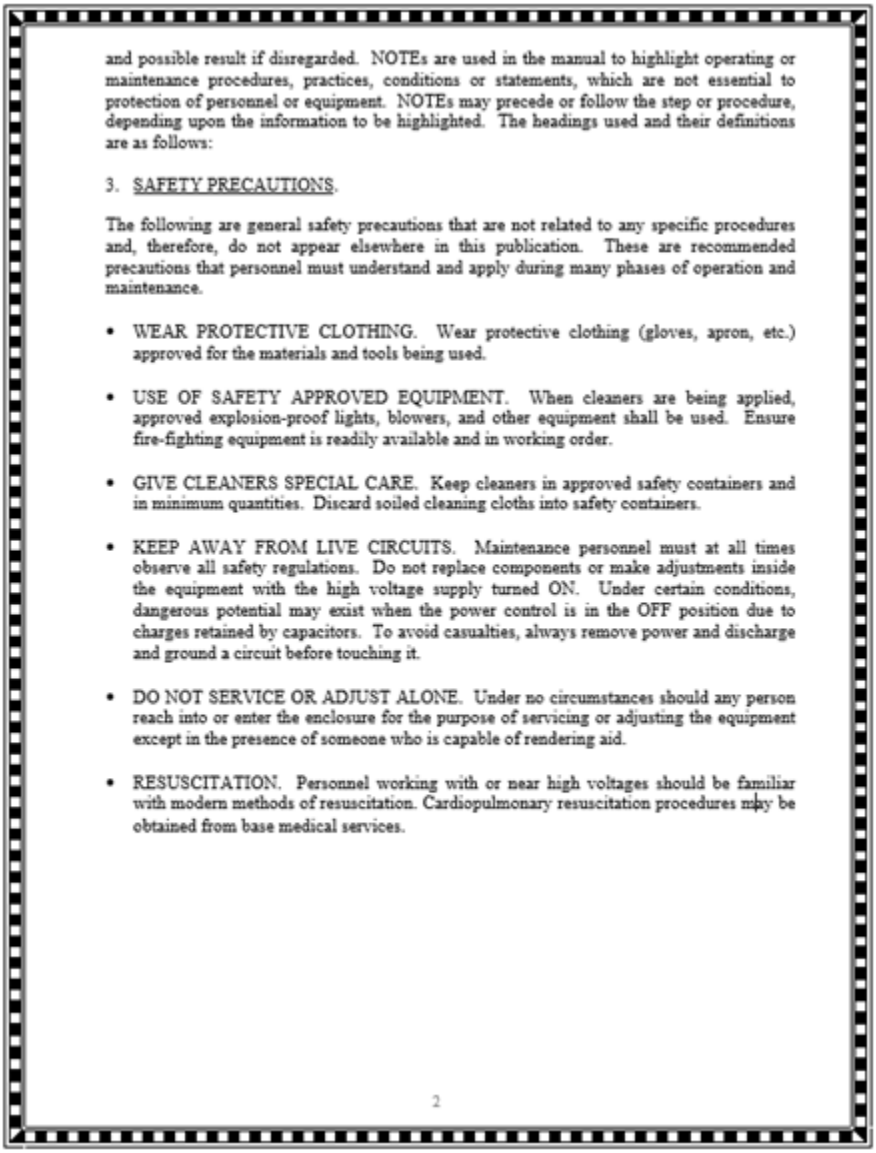
This manual describes physical and chemical processes, which may cause injury or death to personnel or damage to equipment if not properly followed. This safety summary includes general safety precautions and instructions that must be understood and applied during operation and maintenance to ensure personnel safety and protection of equipment. Prior to performing any task, the WARNINGs, CAUTIONs, and NOTEs included in that task shall be reviewed and understood.

2. WARNINGS, CAUTIONS, AND NOTES.

WARNINGs and CAUTIONs are used in this manual to highlight operating or maintenance procedures, practices, conditions or statements, which are considered essential to protection of personnel (WARNING) or equipment (CAUTION). WARNINGs immediately precede the step or procedure to which they apply. WARNINGs and CAUTIONs consist of four parts: heading (WARNING or CAUTION), a statement of the hazard, minimum precautions,

1

Figure 21.2. Altitude Chamber Emergency Procedures cont'd.



and possible result if disregarded. NOTEs are used in the manual to highlight operating or maintenance procedures, practices, conditions or statements, which are not essential to protection of personnel or equipment. NOTEs may precede or follow the step or procedure, depending upon the information to be highlighted. The headings used and their definitions are as follows:

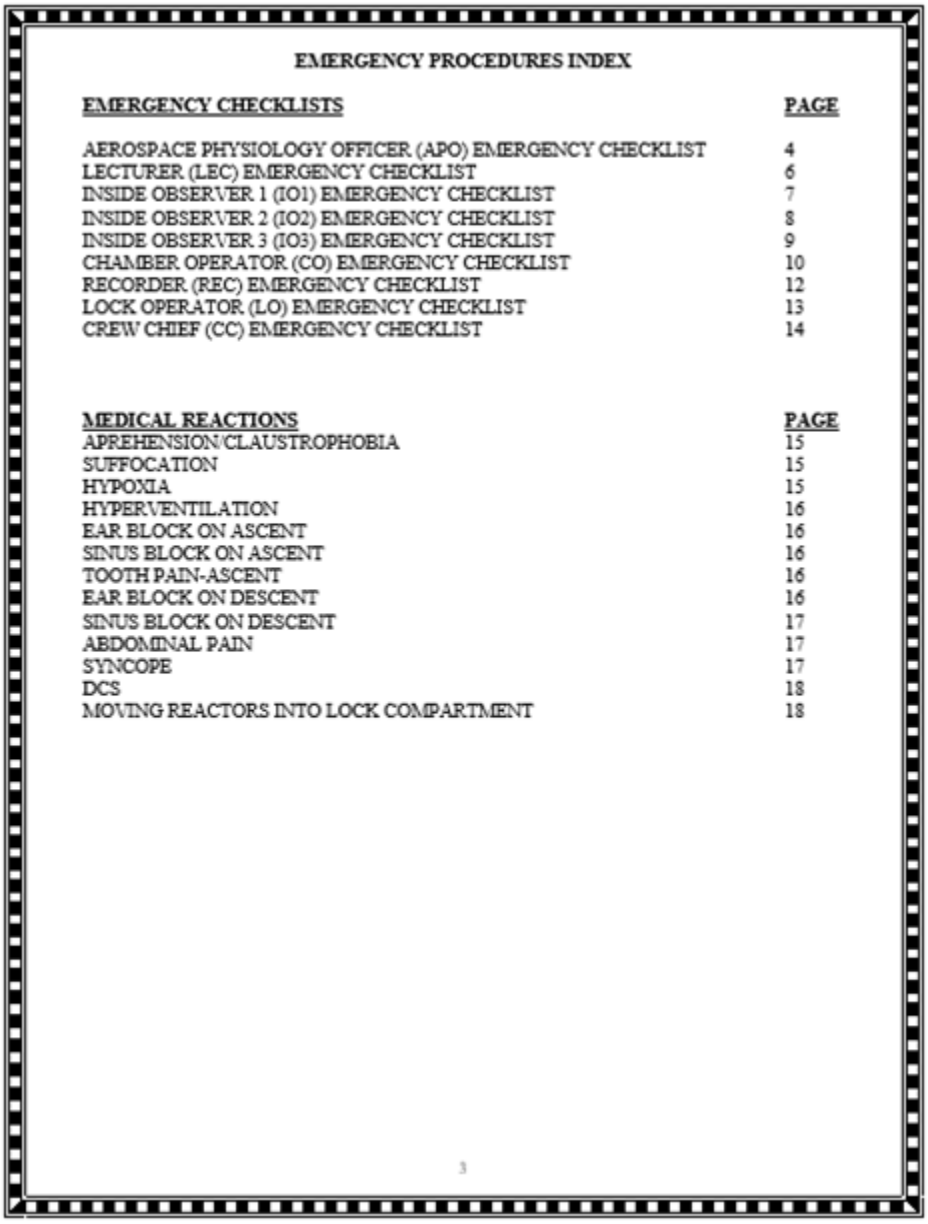
3. SAFETY PRECAUTIONS.

The following are general safety precautions that are not related to any specific procedures and, therefore, do not appear elsewhere in this publication. These are recommended precautions that personnel must understand and apply during many phases of operation and maintenance.

- WEAR PROTECTIVE CLOTHING. Wear protective clothing (gloves, apron, etc.) approved for the materials and tools being used.
- USE OF SAFETY APPROVED EQUIPMENT. When cleaners are being applied, approved explosion-proof lights, blowers, and other equipment shall be used. Ensure fire-fighting equipment is readily available and in working order.
- GIVE CLEANERS SPECIAL CARE. Keep cleaners in approved safety containers and in minimum quantities. Discard soiled cleaning cloths into safety containers.
- KEEP AWAY FROM LIVE CIRCUITS. Maintenance personnel must at all times observe all safety regulations. Do not replace components or make adjustments inside the equipment with the high voltage supply turned ON. Under certain conditions, dangerous potential may exist when the power control is in the OFF position due to charges retained by capacitors. To avoid casualties, always remove power and discharge and ground a circuit before touching it.
- DO NOT SERVICE OR ADJUST ALONE. Under no circumstances should any person reach into or enter the enclosure for the purpose of servicing or adjusting the equipment except in the presence of someone who is capable of rendering aid.
- RESUSCITATION. Personnel working with or near high voltages should be familiar with modern methods of resuscitation. Cardiopulmonary resuscitation procedures may be obtained from base medical services.

2

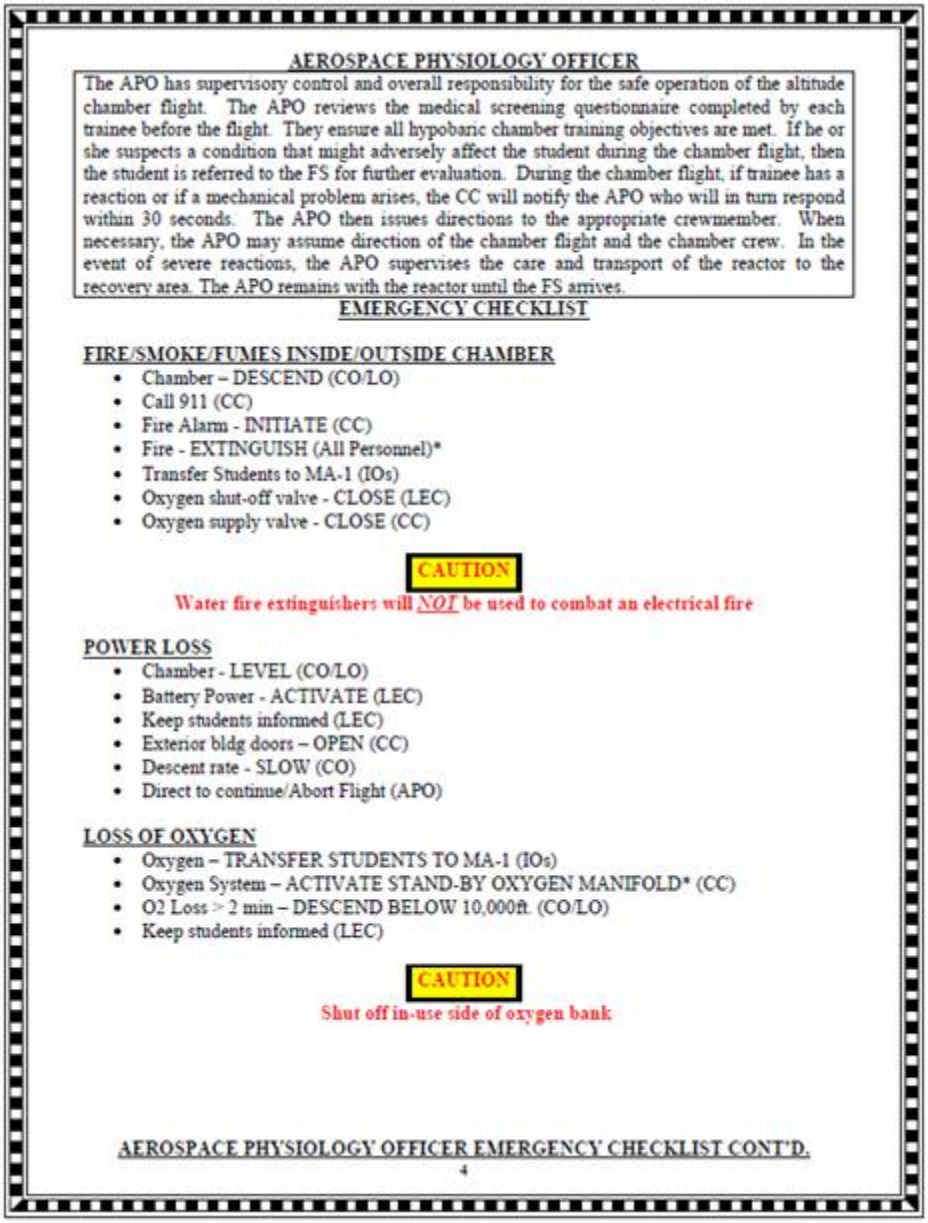
Figure 21.3. Altitude Chamber Emergency Procedures cont'd.



EMERGENCY PROCEDURES INDEX

3

Figure 21.4. Altitude Chamber Emergency Procedures APO.



AEROSPACE PHYSIOLOGY OFFICER

The APO has supervisory control and overall responsibility for the safe operation of the altitude chamber flight. The APO reviews the medical screening questionnaire completed by each trainee before the flight. They ensure all hypobaric chamber training objectives are met. If he or she suspects a condition that might adversely affect the student during the chamber flight, then the student is referred to the FS for further evaluation. During the chamber flight, if trainee has a reaction or if a mechanical problem arises, the CC will notify the APO who will in turn respond within 30 seconds. The APO then issues directions to the appropriate crewmember. When necessary, the APO may assume direction of the chamber flight and the chamber crew. In the event of severe reactions, the APO supervises the care and transport of the reactor to the recovery area. The APO remains with the reactor until the FS arrives.

EMERGENCY CHECKLIST

FIRE/SMOKE/FUMES INSIDE/OUTSIDE CHAMBER

- Chamber – DESCEND (CO/LO)
- Call 911 (CC)
- Fire Alarm - INITIATE (CC)
- Fire - EXTINGUISH (All Personnel)*
- Transfer Students to MA-1 (IOs)
- Oxygen shut-off valve - CLOSE (LEC)
- Oxygen supply valve - CLOSE (CC)

CAUTION

Water fire extinguishers will *NOT* be used to combat an electrical fire

POWER LOSS

- Chamber - LEVEL (CO/LO)
- Battery Power - ACTIVATE (LEC)
- Keep students informed (LEC)
- Exterior bldg doors – OPEN (CC)
- Descent rate - SLOW (CO)
- Direct to continue/Abort Flight (APO)

LOSS OF OXYGEN

- Oxygen – TRANSFER STUDENTS TO MA-1 (IOs)
- Oxygen System – ACTIVATE STAND-BY OXYGEN MANIFOLD* (CC)
- O2 Loss > 2 min – DESCEND BELOW 10,000ft. (CO/LO)
- Keep students informed (LEC)

CAUTION

Shut off in-use side of oxygen bank

AEROSPACE PHYSIOLOGY OFFICER EMERGENCY CHECKLIST CONT'D.

4

Figure 21.5. Altitude Chamber Emergency Procedures APO cont'd.

AEROSPACE PHYSIOLOGY OFFICER EMERGENCY CHECKLIST CONT'D.

PUMP FAILURE

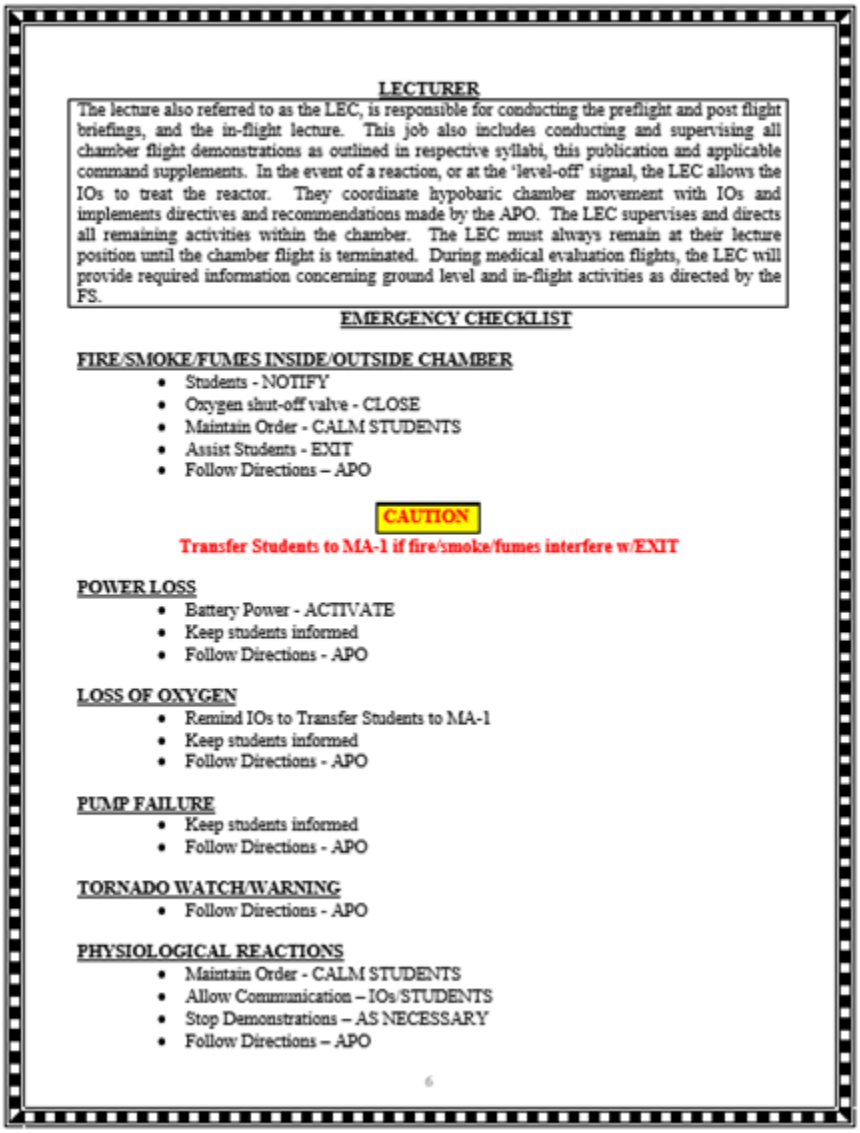
- Chamber/Lock - LEVEL (CO/LO)
- Isolation Valve - CLOSE (CC)
- Pump-Restart [Analyze problem – consider back up pump] (CC)
- Descent rate - SLOW (CO)
- Keep students informed – LEC
- Direct to continue/Abort Flight (APO)

TORNADO WATCH/WARNING

- Consider rescheduling/aborting flight

5

Figure 21.6. Altitude Chamber Emergency Procedures LEC.



LECTURER

The lecture also referred to as the LEC, is responsible for conducting the preflight and post flight briefings, and the in-flight lecture. This job also includes conducting and supervising all chamber flight demonstrations as outlined in respective syllabi, this publication and applicable command supplements. In the event of a reaction, or at the 'level-off' signal, the LEC allows the IOs to treat the reactor. They coordinate hypobaric chamber movement with IOs and implements directives and recommendations made by the APO. The LEC supervises and directs all remaining activities within the chamber. The LEC must always remain at their lecture position until the chamber flight is terminated. During medical evaluation flights, the LEC will provide required information concerning ground level and in-flight activities as directed by the FS.

EMERGENCY CHECKLIST

FIRE/SMOKE/FUMES INSIDE/OUTSIDE CHAMBER

- Students - NOTIFY
- Oxygen shut-off valve - CLOSE
- Maintain Order - CALM STUDENTS
- Assist Students - EXIT
- Follow Directions – APO

CAUTION

Transfer Students to MA-1 if fire/smoke/fumes interfere w/EXIT

POWER LOSS

- Battery Power - ACTIVATE
- Keep students informed
- Follow Directions - APO

LOSS OF OXYGEN

- Remind IOs to Transfer Students to MA-1
- Keep students informed
- Follow Directions - APO

PUMP FAILURE

- Keep students informed
- Follow Directions - APO

TORNADO WATCH/WARNING

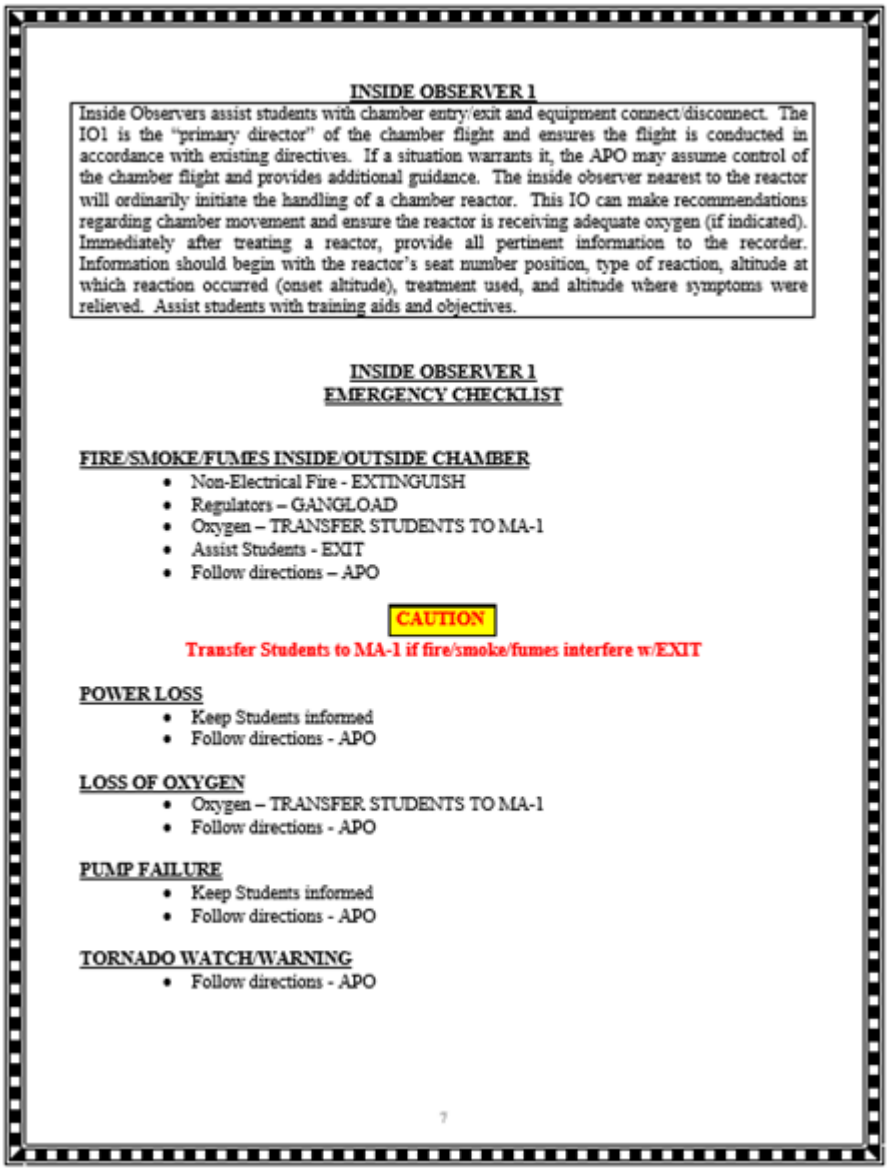
- Follow Directions - APO

PHYSIOLOGICAL REACTIONS

- Maintain Order - CALM STUDENTS
- Allow Communication – IOs/STUDENTS
- Stop Demonstrations – AS NECESSARY
- Follow Directions – APO

6

Figure 21.7. Altitude Chamber Emergency Procedures IO1.



INSIDE OBSERVER 1

Inside Observers assist students with chamber entry/exit and equipment connect/disconnect. The IO1 is the "primary director" of the chamber flight and ensures the flight is conducted in accordance with existing directives. If a situation warrants it, the APO may assume control of the chamber flight and provides additional guidance. The inside observer nearest to the reactor will ordinarily initiate the handling of a chamber reactor. This IO can make recommendations regarding chamber movement and ensure the reactor is receiving adequate oxygen (if indicated). Immediately after treating a reactor, provide all pertinent information to the recorder. Information should begin with the reactor's seat number position, type of reaction, altitude at which reaction occurred (onset altitude), treatment used, and altitude where symptoms were relieved. Assist students with training aids and objectives.

INSIDE OBSERVER 1
EMERGENCY CHECKLIST

FIRE/SMOKE/FUMES INSIDE/OUTSIDE CHAMBER

- Non-Electrical Fire - EXTINGUISH
- Regulators – GANGLOAD
- Oxygen – TRANSFER STUDENTS TO MA-1
- Assist Students - EXIT
- Follow directions – APO

CAUTION

Transfer Students to MA-1 if fire/smoke/fumes interfere w/EXIT

POWER LOSS

- Keep Students informed
- Follow directions - APO

LOSS OF OXYGEN

- Oxygen – TRANSFER STUDENTS TO MA-1
- Follow directions - APO

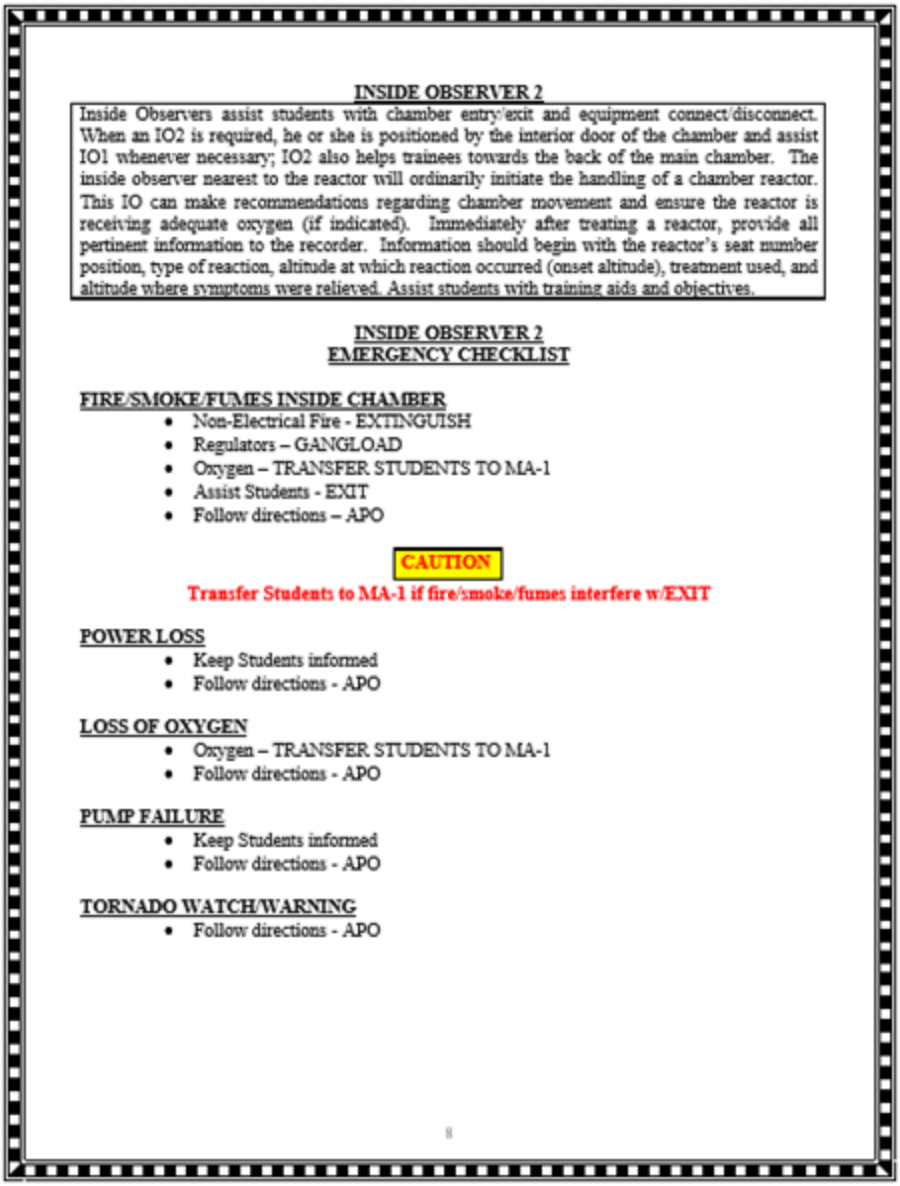
PUMP FAILURE

- Keep Students informed
- Follow directions - APO

TORNADO WATCH/WARNING

- Follow directions - APO

Figure 21.8. Altitude Chamber Emergency Procedures IO2.



INSIDE OBSERVER 2

Inside Observers assist students with chamber entry/exit and equipment connect/disconnect. When an IO2 is required, he or she is positioned by the interior door of the chamber and assist IO1 whenever necessary; IO2 also helps trainees towards the back of the main chamber. The inside observer nearest to the reactor will ordinarily initiate the handling of a chamber reactor. This IO can make recommendations regarding chamber movement and ensure the reactor is receiving adequate oxygen (if indicated). Immediately after treating a reactor, provide all pertinent information to the recorder. Information should begin with the reactor's seat number position, type of reaction, altitude at which reaction occurred (onset altitude), treatment used, and altitude where symptoms were relieved. Assist students with training aids and objectives.

INSIDE OBSERVER 2
EMERGENCY CHECKLIST

FIRE/SMOKE/FUMES INSIDE CHAMBER

- Non-Electrical Fire - EXTINGUISH
- Regulators – GANGLOAD
- Oxygen – TRANSFER STUDENTS TO MA-1
- Assist Students - EXIT
- Follow directions – APO

CAUTION

Transfer Students to MA-1 if fire/smoke/fumes interfere w/EXIT

POWER LOSS

- Keep Students informed
- Follow directions - APO

LOSS OF OXYGEN

- Oxygen – TRANSFER STUDENTS TO MA-1
- Follow directions - APO

PUMP FAILURE

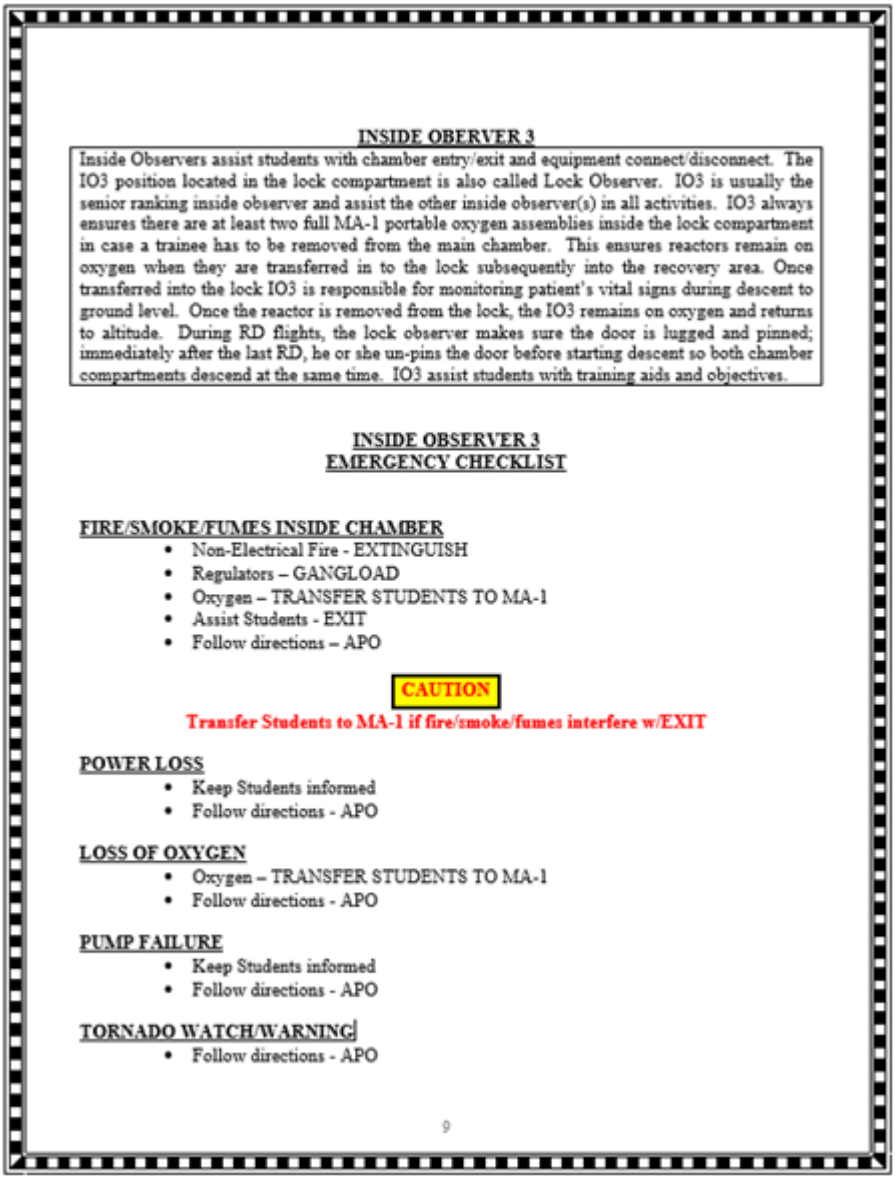
- Keep Students informed
- Follow directions - APO

TORNADO WATCH/WARNING

- Follow directions - APO

8

Figure 21.9. Altitude Chamber Emergency Procedures IO3.



INSIDE OBERVER 3

Inside Observers assist students with chamber entry/exit and equipment connect/disconnect. The IO3 position located in the lock compartment is also called Lock Observer. IO3 is usually the senior ranking inside observer and assist the other inside observer(s) in all activities. IO3 always ensures there are at least two full MA-1 portable oxygen assemblies inside the lock compartment in case a trainee has to be removed from the main chamber. This ensures reactors remain on oxygen when they are transferred in to the lock subsequently into the recovery area. Once transferred into the lock IO3 is responsible for monitoring patient's vital signs during descent to ground level. Once the reactor is removed from the lock, the IO3 remains on oxygen and returns to altitude. During RD flights, the lock observer makes sure the door is lugged and pinned; immediately after the last RD, he or she un-pins the door before starting descent so both chamber compartments descend at the same time. IO3 assist students with training aids and objectives.

INSIDE OBSERVER 3
EMERGENCY CHECKLIST

FIRE/SMOKE/FUMES INSIDE CHAMBER

- Non-Electrical Fire - EXTINGUISH
- Regulators – GANGLOAD
- Oxygen – TRANSFER STUDENTS TO MA-1
- Assist Students - EXIT
- Follow directions – APO

CAUTION

Transfer Students to MA-1 if fire/smoke/fumes interfere w/EXIT

POWER LOSS

- Keep Students informed
- Follow directions - APO

LOSS OF OXYGEN

- Oxygen – TRANSFER STUDENTS TO MA-1
- Follow directions - APO

PUMP FAILURE

- Keep Students informed
- Follow directions - APO

TORNADO WATCH/WARNING

- Follow directions - APO

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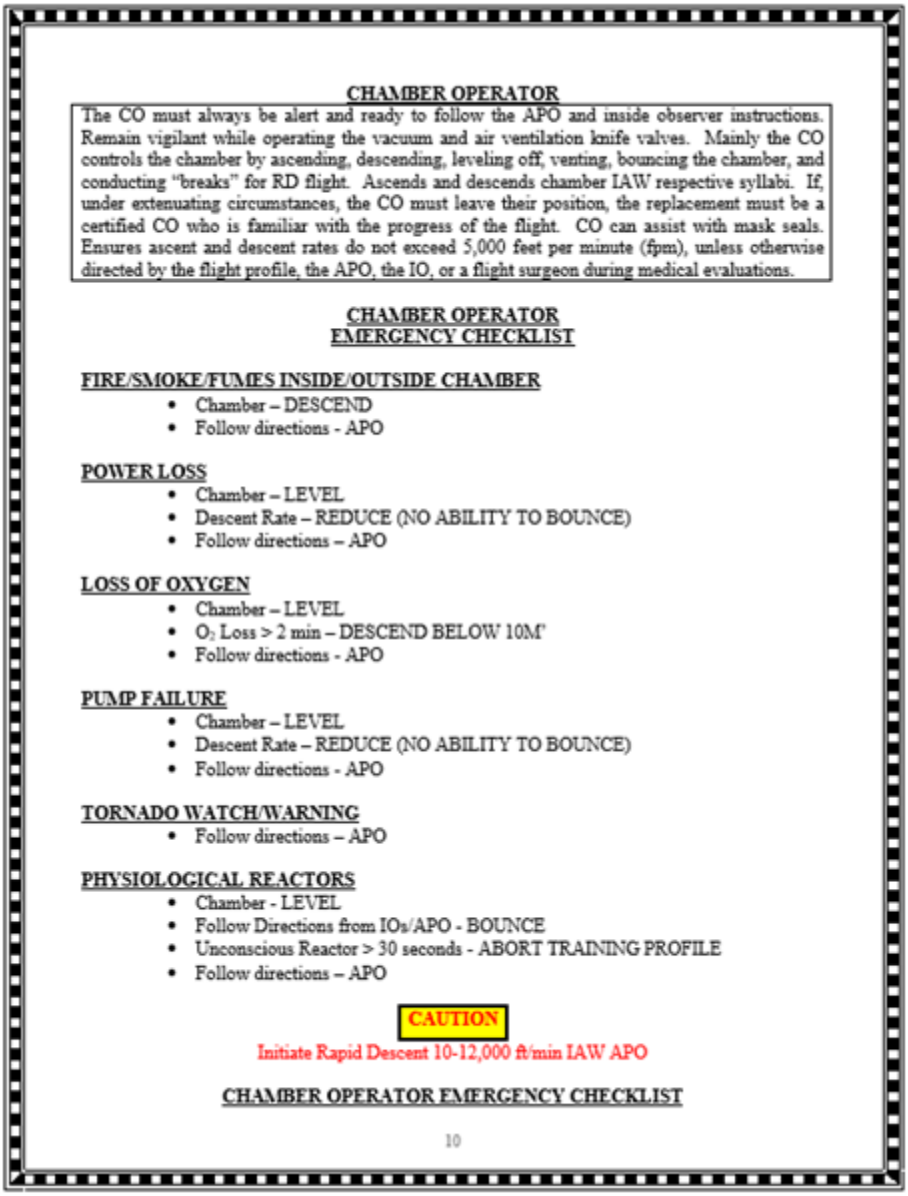
Figure 21.10. Altitude Chamber Emergency Procedures CO.



CHAMBER OPERATOR

The CO must always be alert and ready to follow the APO and inside observer instructions. Remain vigilant while operating the vacuum and air ventilation knife valves. Mainly the CO controls the chamber by ascending, descending, leveling off, venting, bouncing the chamber, and conducting "breaks" for RD flight. Ascends and descends chamber IAW respective syllabi. If, under extenuating circumstances, the CO must leave their position, the replacement must be a certified CO who is familiar with the progress of the flight. CO can assist with mask seals. Ensures ascent and descent rates do not exceed 5,000 feet per minute (fpm), unless otherwise directed by the flight profile, the APO, the IO, or a flight surgeon during medical evaluations.

CHAMBER OPERATOR
EMERGENCY CHECKLIST

FIRE/SMOKE/FUMES INSIDE/OUTSIDE CHAMBER

- Chamber – DESCEND
- Follow directions - APO

POWER LOSS

- Chamber – LEVEL
- Descent Rate – REDUCE (NO ABILITY TO BOUNCE)
- Follow directions – APO

LOSS OF OXYGEN

- Chamber – LEVEL
- O_2 Loss > 2 min – DESCEND BELOW 10M'
- Follow directions - APO

PUMP FAILURE

- Chamber – LEVEL
- Descent Rate – REDUCE (NO ABILITY TO BOUNCE)
- Follow directions - APO

TORNADO WATCH/WARNING

- Follow directions – APO

PHYSIOLOGICAL REACTORS

- Chamber - LEVEL
- Follow Directions from IOs/APO - BOUNCE
- Unconscious Reactor > 30 seconds - ABORT TRAINING PROFILE
- Follow directions – APO

CAUTION

Initiate Rapid Descent 10-12,000 ft/min IAW APO

CHAMBER OPERATOR EMERGENCY CHECKLIST

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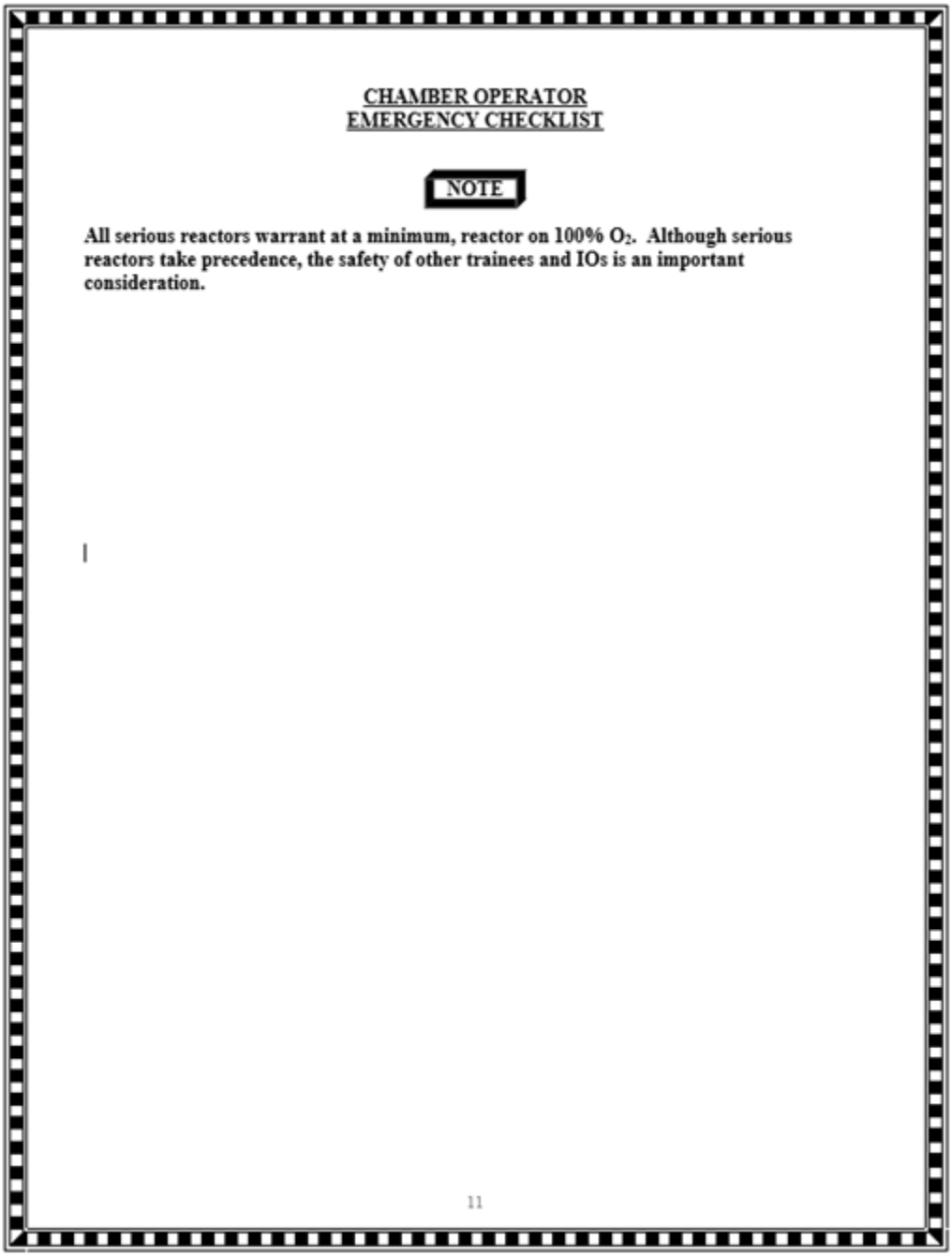
Figure 21.11. Altitude Chamber Emergency Procedures CO cont'd.



CHAMBER OPERATOR
EMERGENCY CHECKLIST

NOTE

All serious reactors warrant at a minimum, reactor on 100% O_2. Although serious reactors take precedence, the safety of other trainees and IOs is an important consideration.

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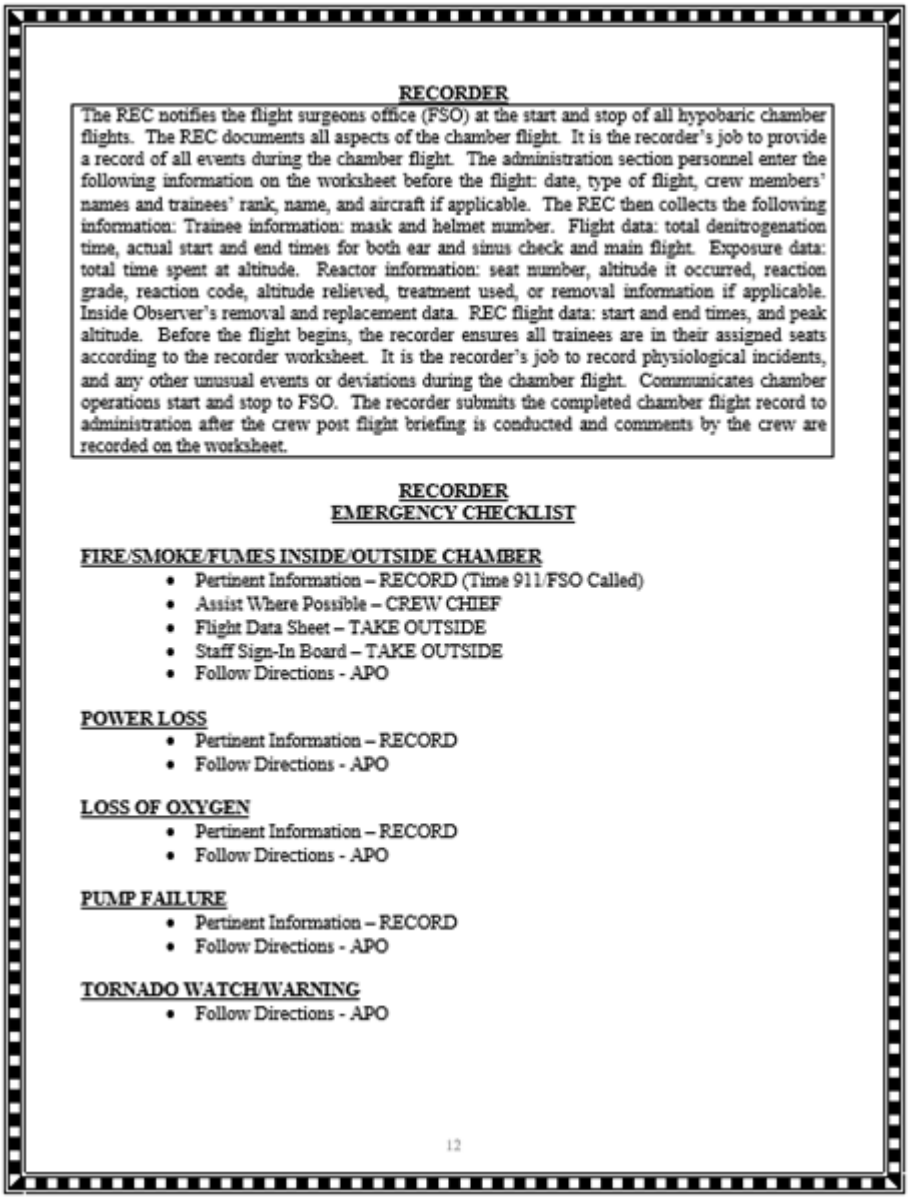
Figure 21.12. Altitude Chamber Emergency Procedures REC.



RECORDER

The REC notifies the flight surgeons office (FSO) at the start and stop of all hypobaric chamber flights. The REC documents all aspects of the chamber flight. It is the recorder's job to provide a record of all events during the chamber flight. The administration section personnel enter the following information on the worksheet before the flight: date, type of flight, crew members' names and trainees' rank, name, and aircraft if applicable. The REC then collects the following information: Trainee information: mask and helmet number. Flight data: total denitrogenation time, actual start and end times for both ear and sinus check and main flight. Exposure data: total time spent at altitude. Reactor information: seat number, altitude it occurred, reaction grade, reaction code, altitude relieved, treatment used, or removal information if applicable. Inside Observer's removal and replacement data. REC flight data: start and end times, and peak altitude. Before the flight begins, the recorder ensures all trainees are in their assigned seats according to the recorder worksheet. It is the recorder's job to record physiological incidents, and any other unusual events or deviations during the chamber flight. Communicates chamber operations start and stop to FSO. The recorder submits the completed chamber flight record to administration after the crew post flight briefing is conducted and comments by the crew are recorded on the worksheet.

RECORDER
EMERGENCY CHECKLIST

FIRE/SMOKE/FUMES INSIDE/OUTSIDE CHAMBER

- Pertinent Information – RECORD (Time 911/FSO Called)
- Assist Where Possible – CREW CHIEF
- Flight Data Sheet – TAKE OUTSIDE
- Staff Sign-In Board – TAKE OUTSIDE
- Follow Directions - APO

POWER LOSS

- Pertinent Information – RECORD
- Follow Directions - APO

LOSS OF OXYGEN

- Pertinent Information – RECORD
- Follow Directions - APO

PUMP FAILURE

- Pertinent Information – RECORD
- Follow Directions - APO

TORNADO WATCH/WARNING

- Follow Directions - APO

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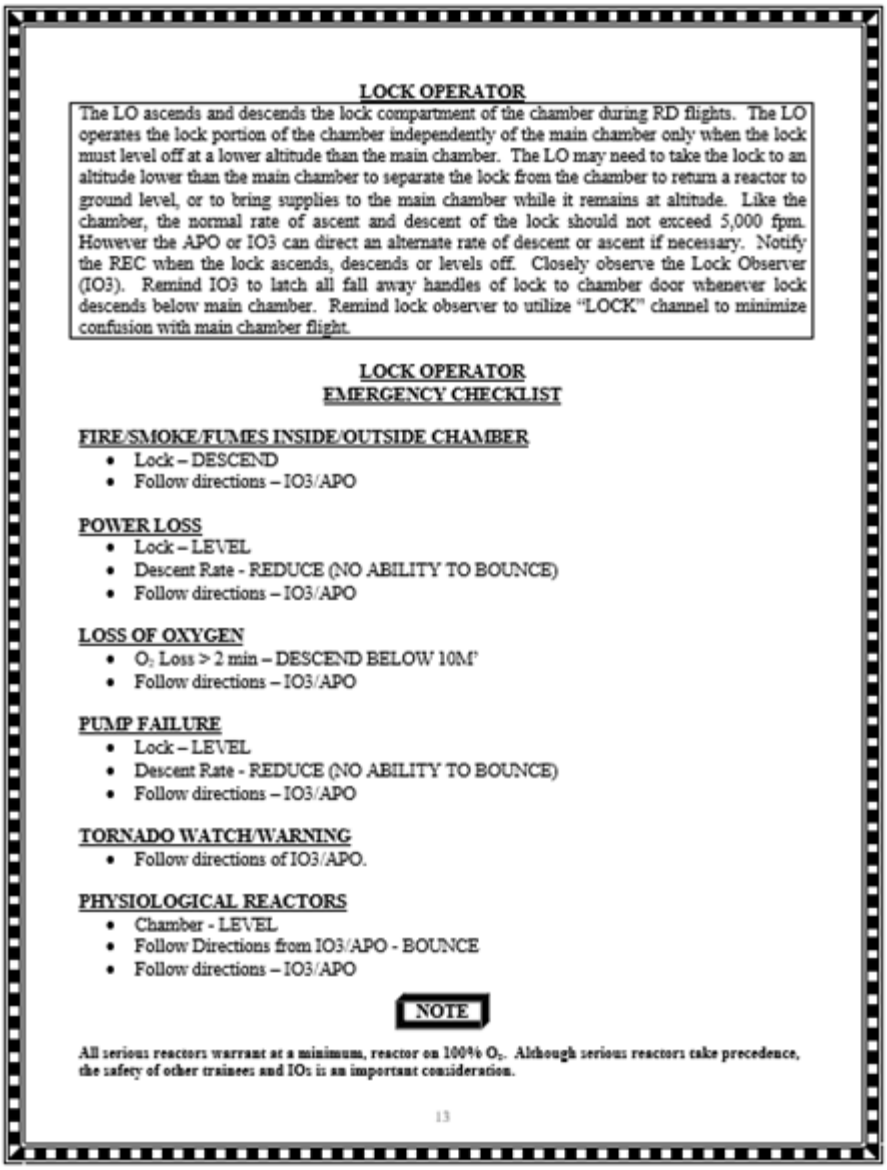
Figure 21.13. Altitude Chamber Emergency Procedures LO.



LOCK OPERATOR

The LO ascends and descends the lock compartment of the chamber during RD flights. The LO operates the lock portion of the chamber independently of the main chamber only when the lock must level off at a lower altitude than the main chamber. The LO may need to take the lock to an altitude lower than the main chamber to separate the lock from the chamber to return a reactor to ground level, or to bring supplies to the main chamber while it remains at altitude. Like the chamber, the normal rate of ascent and descent of the lock should not exceed 5,000 fpm. However the APO or IO3 can direct an alternate rate of descent or ascent if necessary. Notify the REC when the lock ascends, descends or levels off. Closely observe the Lock Observer (IO3). Remind IO3 to latch all fall away handles of lock to chamber door whenever lock descends below main chamber. Remind lock observer to utilize "LOCK" channel to minimize confusion with main chamber flight.

LOCK OPERATOR
EMERGENCY CHECKLIST

FIRE/SMOKE/FUMES INSIDE/OUTSIDE CHAMBER
- Lock – DESCEND
- Follow directions – IO3/APO

POWER LOSS
- Lock – LEVEL
- Descent Rate - REDUCE (NO ABILITY TO BOUNCE)
- Follow directions – IO3/APO

LOSS OF OXYGEN
- O_2 Loss > 2 min – DESCEND BELOW 10M'
- Follow directions – IO3/APO

PUMP FAILURE
- Lock – LEVEL
- Descent Rate - REDUCE (NO ABILITY TO BOUNCE)
- Follow directions – IO3/APO

TORNADO WATCH/WARNING
- Follow directions of IO3/APO.

PHYSIOLOGICAL REACTORS
- Chamber - LEVEL
- Follow Directions from IO3/APO - BOUNCE
- Follow directions – IO3/APO

NOTE

All serious reactors warrant at a minimum, reactor on 100% O_2. Although serious reactors take precedence, the safety of other trainees and IOs is an important consideration.

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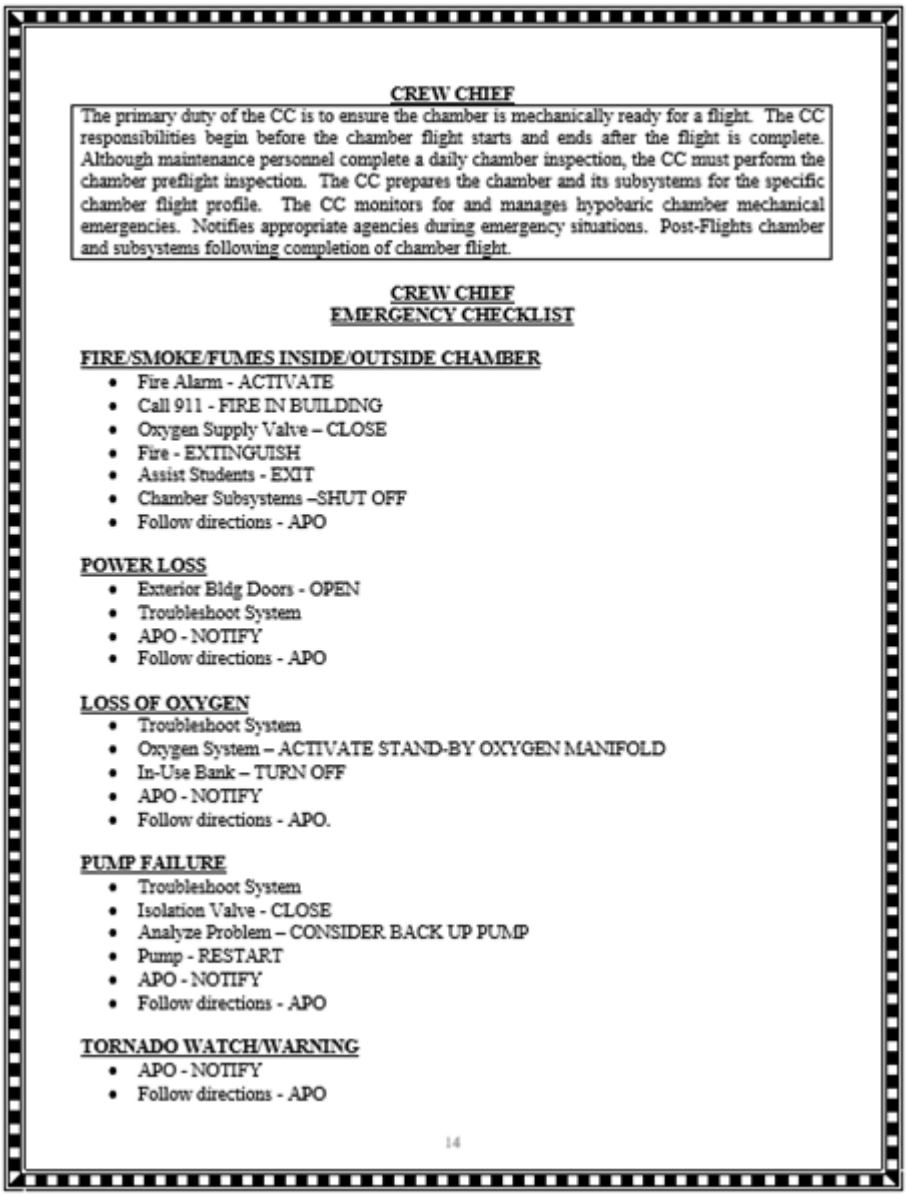
Figure 21.14. Altitude Chamber Emergency Procedures CC.



CREW CHIEF

The primary duty of the CC is to ensure the chamber is mechanically ready for a flight. The CC responsibilities begin before the chamber flight starts and ends after the flight is complete. Although maintenance personnel complete a daily chamber inspection, the CC must perform the chamber preflight inspection. The CC prepares the chamber and its subsystems for the specific chamber flight profile. The CC monitors for and manages hypobaric chamber mechanical emergencies. Notifies appropriate agencies during emergency situations. Post-Flights chamber and subsystems following completion of chamber flight.

CREW CHIEF
EMERGENCY CHECKLIST

FIRE/SMOKE/FUMES INSIDE/OUTSIDE CHAMBER

- Fire Alarm - ACTIVATE
- Call 911 - FIRE IN BUILDING
- Oxygen Supply Valve – CLOSE
- Fire - EXTINGUISH
- Assist Students - EXIT
- Chamber Subsystems –SHUT OFF
- Follow directions - APO

POWER LOSS

- Exterior Bldg Doors - OPEN
- Troubleshoot System
- APO - NOTIFY
- Follow directions - APO

LOSS OF OXYGEN

- Troubleshoot System
- Oxygen System – ACTIVATE STAND-BY OXYGEN MANIFOLD
- In-Use Bank – TURN OFF
- APO - NOTIFY
- Follow directions - APO.

PUMP FAILURE

- Troubleshoot System
- Isolation Valve - CLOSE
- Analyze Problem – CONSIDER BACK UP PUMP
- Pump - RESTART
- APO - NOTIFY
- Follow directions - APO

TORNADO WATCH/WARNING

- APO - NOTIFY
- Follow directions - APO

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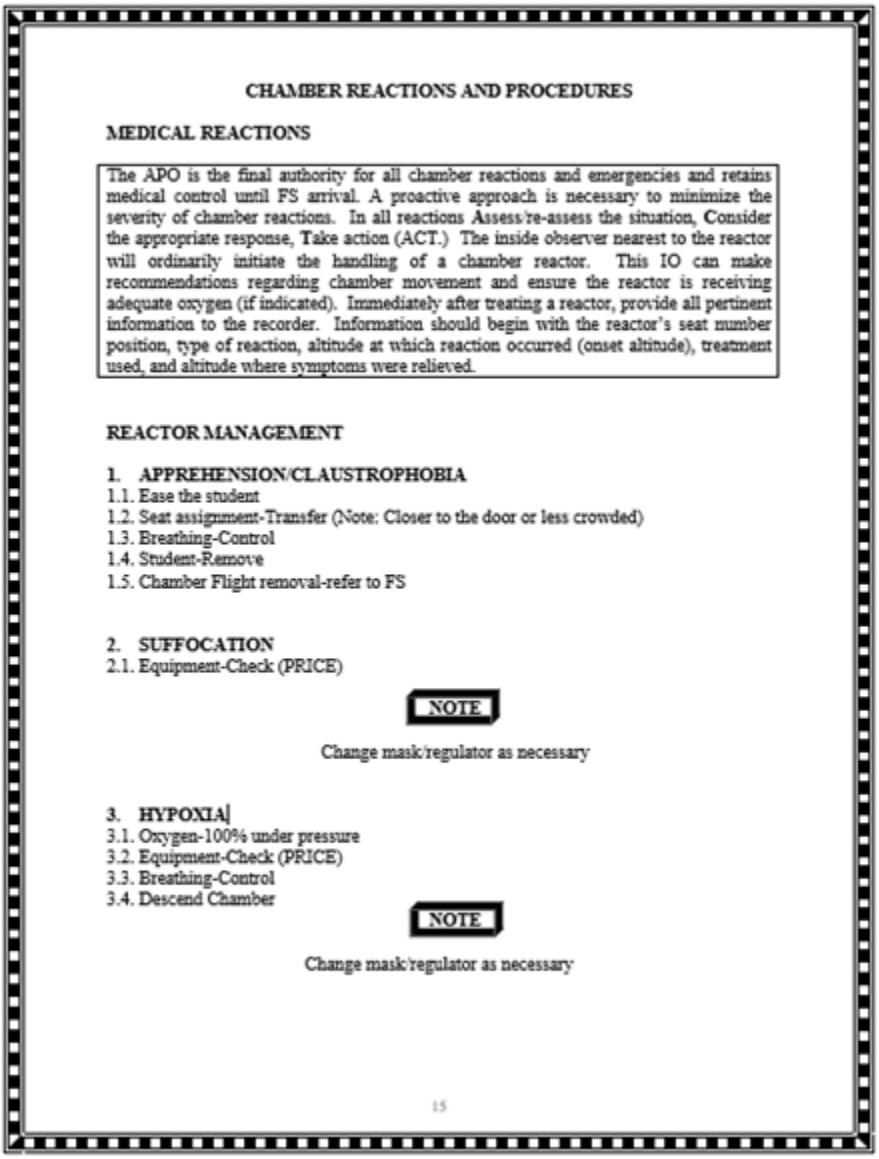
Figure 21.15. Altitude Chamber Emergency Procedures Medical Reactions.



CHAMBER REACTIONS AND PROCEDURES

MEDICAL REACTIONS

The APO is the final authority for all chamber reactions and emergencies and retains medical control until FS arrival. A proactive approach is necessary to minimize the severity of chamber reactions. In all reactions Assess/re-assess the situation, Consider the appropriate response, Take action (ACT.) The inside observer nearest to the reactor will ordinarily initiate the handling of a chamber reactor. This IO can make recommendations regarding chamber movement and ensure the reactor is receiving adequate oxygen (if indicated). Immediately after treating a reactor, provide all pertinent information to the recorder. Information should begin with the reactor's seat number position, type of reaction, altitude at which reaction occurred (onset altitude), treatment used, and altitude where symptoms were relieved.

REACTOR MANAGEMENT

1. APPREHENSION/CLAUSTROPHOBIA
1.1. Ease the student
1.2. Seat assignment-Transfer (Note: Closer to the door or less crowded)
1.3. Breathing-Control
1.4. Student-Remove
1.5. Chamber Flight removal-refer to FS

2. SUFFOCATION
2.1. Equipment-Check (PRICE)

NOTE

Change mask/regulator as necessary

3. HYPOXIA
3.1. Oxygen-100% under pressure
3.2. Equipment-Check (PRICE)
3.3. Breathing-Control
3.4. Descend Chamber

NOTE

Change mask/regulator as necessary

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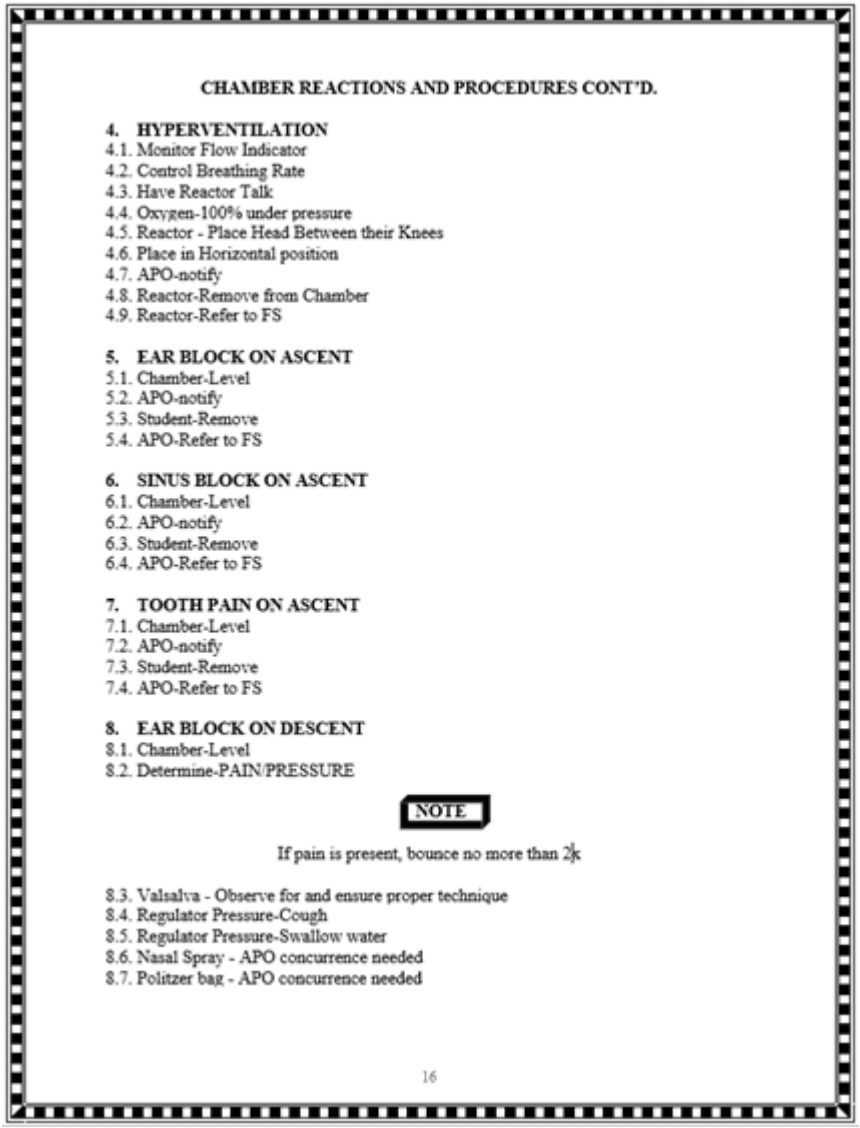
Figure 21.16. Altitude Chamber Emergency Procedures Medical Reactions cont'd.



CHAMBER REACTIONS AND PROCEDURES CONT'D.

4. HYPERVENTILATION
4.1. Monitor Flow Indicator
4.2. Control Breathing Rate
4.3. Have Reactor Talk
4.4. Oxygen-100% under pressure
4.5. Reactor - Place Head Between their Knees
4.6. Place in Horizontal position
4.7. APO-notify
4.8. Reactor-Remove from Chamber
4.9. Reactor-Refer to FS

5. EAR BLOCK ON ASCENT
5.1. Chamber-Level
5.2. APO-notify
5.3. Student-Remove
5.4. APO-Refer to FS

6. SINUS BLOCK ON ASCENT
6.1. Chamber-Level
6.2. APO-notify
6.3. Student-Remove
6.4. APO-Refer to FS

7. TOOTH PAIN ON ASCENT
7.1. Chamber-Level
7.2. APO-notify
7.3. Student-Remove
7.4. APO-Refer to FS

8. EAR BLOCK ON DESCENT
8.1. Chamber-Level
8.2. Determine-PAIN/PRESSURE

NOTE

If pain is present, bounce no more than 2k

8.3. Valsalva - Observe for and ensure proper technique
8.4. Regulator Pressure-Cough
8.5. Regulator Pressure-Swallow water
8.6. Nasal Spray - APO concurrence needed
8.7. Politzer bag - APO concurrence needed

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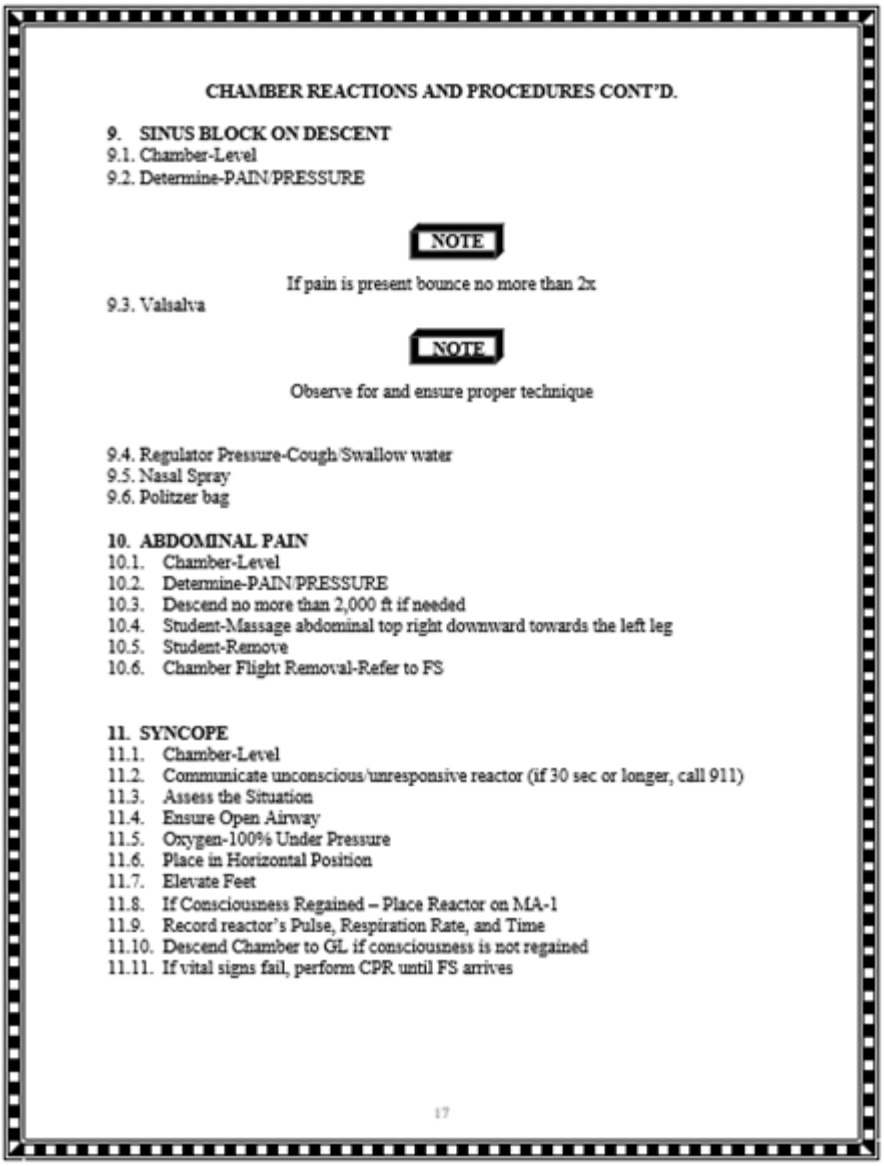
Figure 21.17. Altitude Chamber Emergency Procedures Medical Reactions cont'd.



CHAMBER REACTIONS AND PROCEDURES CONT'D.

9. SINUS BLOCK ON DESCENT
9.1. Chamber-Level
9.2. Determine-PAIN/PRESSURE

NOTE

If pain is present bounce no more than 2x

9.3. Valsalva

NOTE

Observe for and ensure proper technique

9.4. Regulator Pressure-Cough/Swallow water
9.5. Nasal Spray
9.6. Politzer bag

10. ABDOMINAL PAIN
10.1. Chamber-Level
10.2. Determine-PAIN/PRESSURE
10.3. Descend no more than 2,000 ft if needed
10.4. Student-Massage abdominal top right downward towards the left leg
10.5. Student-Remove
10.6. Chamber Flight Removal-Refer to FS

11. SYNCOPE
11.1. Chamber-Level
11.2. Communicate unconscious/unresponsive reactor (if 30 sec or longer, call 911)
11.3. Assess the Situation
11.4. Ensure Open Airway
11.5. Oxygen-100% Under Pressure
11.6. Place in Horizontal Position
11.7. Elevate Feet
11.8. If Consciousness Regained – Place Reactor on MA-1
11.9. Record reactor's Pulse, Respiration Rate, and Time
11.10. Descend Chamber to GL if consciousness is not regained
11.11. If vital signs fail, perform CPR until FS arrives

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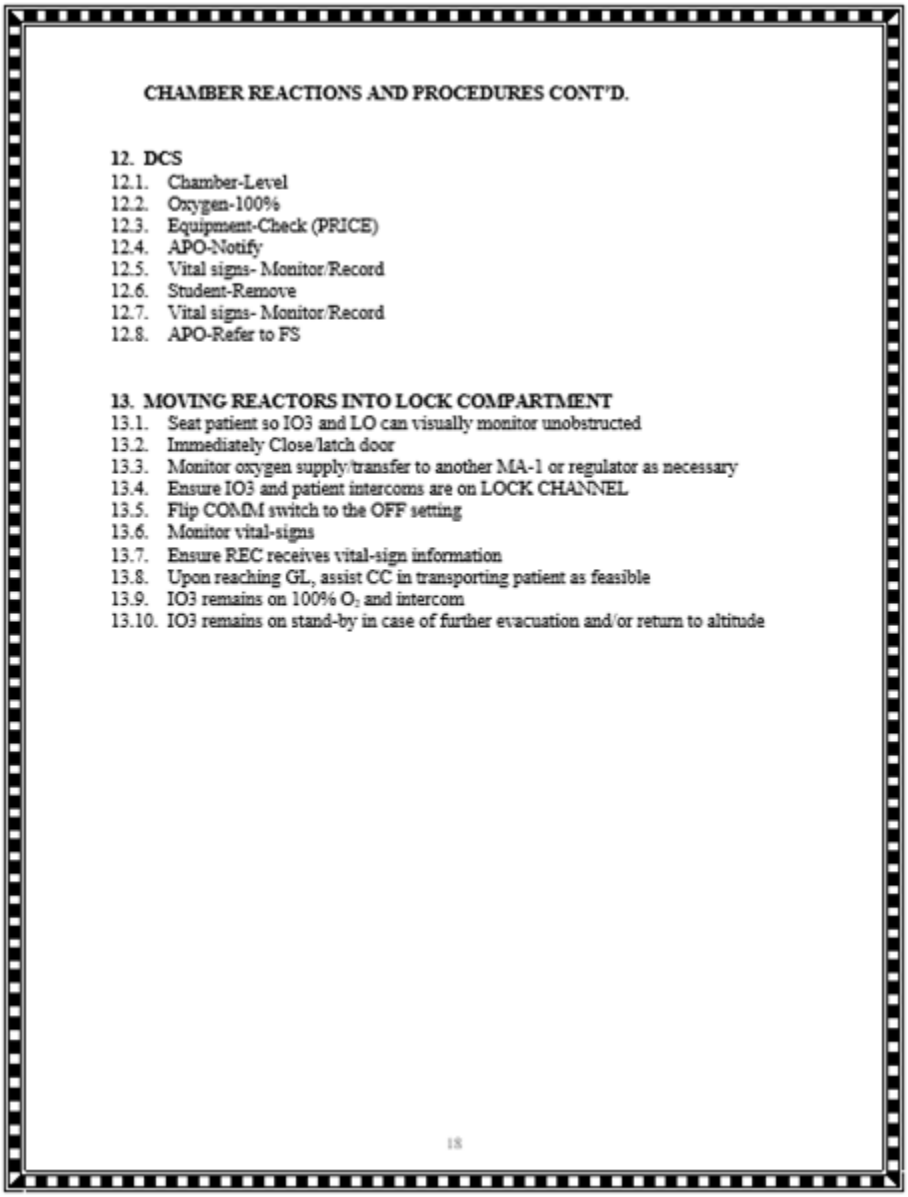
Figure 21.18. Altitude Chamber Emergency Procedures Medical Reactions cont'd.



CHAMBER REACTIONS AND PROCEDURES CONT'D.

12. DCS
12.1. Chamber-Level
12.2. Oxygen-100%
12.3. Equipment-Check (PRICE)
12.4. APO-Notify
12.5. Vital signs- Monitor/Record
12.6. Student-Remove
12.7. Vital signs- Monitor/Record
12.8. APO-Refer to FS

13. MOVING REACTORS INTO LOCK COMPARTMENT
13.1. Seat patient so IO3 and LO can visually monitor unobstructed
13.2. Immediately Close/latch door
13.3. Monitor oxygen supply/transfer to another MA-1 or regulator as necessary
13.4. Ensure IO3 and patient intercoms are on LOCK CHANNEL
13.5. Flip COMM switch to the OFF setting
13.6. Monitor vital-signs
13.7. Ensure REC receives vital-sign information
13.8. Upon reaching GL, assist CC in transporting patient as feasible
13.9. IO3 remains on 100% O_2 and intercom
13.10. IO3 remains on stand-by in case of further evacuation and/or return to altitude

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Chapter 22

REDUCED OXYGEN BREATHING DEVICE (ROBD) OPERATIONS

22.1. Personnel Requirements and Qualifications.

22.1.1. Only designated AP personnel, AFSC 43A and 4M051 or above, may instruct and operate the ROBD for aircrew training. If several ROBDs (two or more devices) are being used in the same location, each device has a qualified and dedicated instructor/observer (I/O).

22.1.2. Qualifications: 43As/4M0X1s document their training in the CFETP prior to operating the ROBD or supervising ROBD operations. All personnel operating or supervising ROBD operations are certified in basic life support to include automated external defibrillator (AED) and are current in AP training in accordance with AFMAN 11-403, the CFETP and this pamphlet.

Figure 22.1. Reduced Oxygen Breathing Device 2 (ROBD2).

22.2. Responsibilities: This section covers the duties and responsibilities of the ROBD I/O.

22.2.1. I/O. The I/O reviews the pre-flight student screening form and refers any students with a suspected condition that might adversely affect the student during training to the flight surgeon.

22.2.2. The I/O ensures the correct ROBD configuration for training, operates the ROBD during the system self-test, selects and controls the training profiles, activates the ROBD emergency oxygen for student recovery and directly supervises the student's training session and completion of training objectives.

22.2.3. The I/O is responsible for guiding and conducting student ROBD training. The I/O ensures that the flight surgeon has been notified of training start and finish. The I/O is the go/no-go decision authority for remedial ROBD training following any unsuccessful completion of the training objectives outlined in the AP training syllabi. If unsuccessful

completion of training objectives is due to an adverse reaction, the I/O consults with the local flight surgeon prior to resuming training.

22.2.4. I/O develops an ROBD emergency action plan to cover procedures in the event of mechanical failures and adverse/unusual student reactions. In the event of an emergency or adverse reaction during ROBD training, the I/O ensures all appropriate emergency procedures are executed. In addition, I/O ensure injury or adverse reactions are documented and reported in accordance with AFI 91-204, *Safety Investigations and Reports*.

22.2.5. The I/O as the first responder to any unusual student reactions executes appropriate emergency procedures. The I/O reports the student injury/adverse reaction as a ground event in accordance with AFI 91-204.

22.3. ROBD Reactions and Emergencies.

22.3.1. **Apprehension and Claustrophobia.** Apprehension and claustrophobia should be minimal as training occurs in a familiar environment with experienced aircrew and parachutists. However, training is normally not accomplished while in a reduced oxygen environment, so apprehension and claustrophobia are still possible. Professionalism and sensitivity by AP personnel can help alleviate problems and limit/minimize hyperventilation reactions. If the student appears to be apprehensive, work with them prior to accomplishing ROBD training by practice breathing off the device before the training event begins. The student should not be rushed or crowded. If the student insists on leaving the ROBD training site/simulator, the student should be allowed to leave and is referred to his/her commander or flight surgeon, as required. If ROBD is determined to be inappropriate for training, then efforts are made to schedule the student at a chamber location where the training requirement can be achieved.

22.3.2. **Hyperventilation.** Hyperventilation can result from apprehension, positive pressure breathing and/or hypoxia. If student exhibits signs of hyperventilation, the I/O activates the oxygen dump switch, monitors the student, and encourages the student to slow their breathing rate and depth. Having the student read a checklist or talk is one recommended way to slow breathing rate. If the student cannot control rate and depth of breathing adequately and/or blood oxygen saturation levels begin to drop after activation of 100% oxygen, the I/O removes the student from the ROBD training system and refers the student to the flight surgeon for further evaluation. If the student becomes unconscious or unresponsive for more than 30 seconds, place the student on the floor in a horizontal position (if practical) and follow procedures listed under loss of consciousness in accordance with **paragraph 22.3.5**

22.3.3. **Suffocation.** When a student reports the feeling of suffocation, have the student immediately lower his/her mask and check connections. If connections check is good, check ROBD system state for correct mode of operation and remedy in accordance with ROBD Operations Checklist. If the ROBD passes ops test, inspect reactor's mask and have him/her exchange aircrew flight equipment or provide student with a properly fitted training mask if available.

22.3.4. **Hypoxia.** If during the non-hypoxia stage of the training the student becomes hypoxic, immediately activate the oxygen dump switch on the ROBD. Monitor oxygen sensor and heart rate to ensure appropriate recovery. If hypoxia symptoms do not subside,

instruct the student to disconnect the mask from the right side of his/her helmet and allow them to recover breathing ambient air; however, recovery from hypoxia may be delayed without 100% oxygen under pressure. Continue to monitor for recovery and ensure no further degradation of consciousness occurs. If student becomes unresponsive or unconscious, follow procedures under loss of consciousness in accordance with **paragraph 23.3.5**

22.3.5. **Loss of Consciousness.** Loss of consciousness is considered a medical emergency. If student loses consciousness for 30 seconds or more, activate the EMS system immediately then call the on-call flight surgeon. Ensure the student is on 100% oxygen (ROBD Oxygen Dump Switch activated), place the student in a supine position on the floor, and monitor respiration, pulse, and oxygen levels via the student's pulse oximeter until directed otherwise by emergency response personnel. Vital signs are taken initially and at least every two minutes thereafter unless otherwise directed by emergency response personnel. Continue to provide basic emergency lifesaving skills and AED if available until relieved by emergency response personnel.

22.4. Mechanical/Electrical Emergencies.

22.4.1. **Power Loss.** If electrical power is lost during hypoxia portion of ROBD training, I/O instructs the student to disconnect the mask from the right side of his/her helmet and allow them to recover breathing ambient air. If electrical power is lost during non-hypoxia portion of ROBD training, student disconnects the mask and waits for instructions from I/O. Training can be restarted once electrical power is restored and the I/O has performed an ROBD self-test in accordance with ROBD operations checklist. Training commences from the beginning of the profile following an equipment check/retest.

22.4.2. **Electrical Fire.** If an electrical fire is detected, cease all training activities and follow local emergency fire procedures. If not the source of the electrical fire, turn off the ROBD power switch and close all cylinder valves but do not disconnect any hoses.

22.4.3. **Loss of Oxygen, Nitrogen, or Air.** If oxygen source is inadequate during hypoxia recovery portion of ROBD training, the ROBD oxygen alarm will sound. Disconnect student from ROBD by instructing the student to disconnect the mask from the right side of his/her helmet and allow them to recover breathing ambient air; however, recovery from hypoxia is delayed without 100% oxygen under pressure. If air and nitrogen sources are inadequate, the ROBD disables hypoxia training and automatically activates 100% oxygen. Discontinue training until bottles are professionally serviced or replaced.

22.5. Required Recurring Emergency Procedure Training. Emergency procedures are exercised no less than annually and can be scheduled concurrently with wing, delta/garrison medical group (MDG) exercises or inspections. These exercises should be conducted where ROBD training is located to include simulator facilities at least annually. These exercises include local first responder teams. The senior AP staff member ensures all training events are documented and routed through appropriate agencies to ensure the opportunity for exercise feedback from all responders.

22.6. ROBD Training System Management. This section describes the roles and responsibilities for ROBD training system management and sustainment.

22.6.1. AETC as Lead Command for the AP training program and 19 AF/DO as the OPR manages the ROBD training systems in accordance with AFPD 10-9, *Lead Command Designation and Responsibilities for Weapon Systems* and AFI 16-1007, *Management of Air Force Operational Training Systems*, guidance.

22.6.2. 19 AF/DO ensures ROBD and HFT training system configuration control via acquisition and sustainment contract vehicles and Training Planning Teams. ROBD training system configuration changes are coordinated through the MAJCOM/FLDCOM/A3 POC for training systems and approved by AP Lead Command.

22.6.3. AP Lead Command forwards an annual ROBD Training System Utilization and Maintenance Report in accordance with AFMAN 11-403 paragraph 11.5.3.

22.7. Wing/Delta/Garrison.

22.7.1. All ROBD training system components are accounted for on a base-level equipment account such as a Custodian Authorization Custody Receipt Listing (CA- CRL) or listed as Ready Value items and placed in Tab B of the R-14 supply binder.

22.7.2. All materials required for the operation of the ROBD that are considered HAZMAT have authorization, approval and control in accordance with AFJMAN 23-209, *Storage and Handling of Hazardous Materials*, and AFJMAN 23-210, *Joint Service Manual (JSM) for Storage and Materials Handling*.

22.7.3. Coordinate movement and disposition of any ROBD training system components with MAJCOM/FLDCOM AP training PM/MFM and AP Lead Command. Allow enough lead-time to enable proper planning, programming and funding.

22.8. Operations Group.

22.8.1. Provides location and space for ROBD training system and AP personnel to conduct aircrew physiological training requirements in accordance with AFMAN 11-202V1, *Aircrew Training*, AFMAN 11-403 and this publication.

22.8.2. Facilitates approval for AP personnel security clearance requirements required for simulator facility access.

22.8.3. Approves all simulator profiles used with ROBD training. Enables close coordination between simulator instructors/operators and AP personnel to ensure ROBD training objectives are met with the most efficient use of personnel and simulator systems.

22.8.4. Plans, programs and budgets requirements for ROBD training system re-supply of consumables; (e.g., resupply of compressed gases, leak test fluid, and training supplies) used in the execution of physiological training.

22.8.5. Provides AP personnel access to aircrew training schedules to include flight simulator training to enable advance planning for aircrew physiological training sessions.

22.8.6. Provides qualified AP personnel to conduct ROBD training for wing, delta/garrision aircrew and parachutists.

22.8.7. Executes annual emergency response reviews for ROBD reactors. These emergency response reviews are fully exercised with local EMS and Aeromedical response teams annually.

22.8.8. Ensures AP personnel manpower billets have appropriate security clearance requirements for access to flight simulators and training facilities.

22.9. Medical Group.

22.9.1. Provides qualified aerospace medicine personnel and equipment for emergency response during ROBD aircrew training. For units without a Medical Treatment Facility (e.g. ANG and AFRC), emergency response may be provided by base or civilian EMS personnel.

22.10. Aerospace Physiology Training Units (APTUs).

22.10.1. Coordinates closely with flying squadrons and Operational Support Squadrons to ensure aircrew are offered adequate opportunity to complete refresher physiological training in accordance with appropriate syllabi. Due to the use of ROBD in flight simulators at some locations, close coordination with aircrew flight simulator training schedules is required to use training systems with utmost efficiency and within contractual utilization limits.

22.10.2. Conducts and documents physiological training in accordance with AFMAN 11-403. Due to the MDS-specialized capability of wing, delta/garrison-based physiological training, refresher physiological training academic topics are adapted to meet wing, delta/garrison aircrew MDS requirements, however all refresher objectives in the respective syllabus are met.

22.10.3. APTF/APTT personnel are responsible for local management of ROBD training systems and HFTs, and ensures all technical manuals, associated checklists, and procedures are properly followed for storage, operation and maintenance.

22.10.4. Prepares/submits annual budget to OG through their owning squadron commander for ROBD aircrew training consumables requirements.

22.10.5. Updates AP Aircrew Training Devices Utilization AF Form 4026 in accordance with AFMAN 11-403 paragraph 10.2.

22.10.6. Notifies AP Lead Command and their respective wing, delta/garrison and MAJCOM/FLDCOM PM/MFM AP POCs any time the ROBD or HFT is non-operational due to maintenance or otherwise not an available training option for wing, delta/garrison aircrew in accordance with AFMAN 11-403 and this pamphlet. Updates AP Lead Command SharePoint® page at the following SharePoint® address: **https://usaf.dps.mil/sites/aetc-19af/do/aop/SitePages/Home.aspx**, with any changes to ROBD and HFT operational status.

22.11. ROBD and HFT Maintenance. ROBD user/unit-level periodic and emergency maintenance is limited to fan filter cleaning and oxygen sensor replacement unless otherwise directed by AP Lead Command. These procedures are performed strictly in accordance with ROBD technical manuals and associated checklists.

22.11.1. Whenever the ROBD or HFT training system is non-operational due to maintenance, the user notifies AP Lead Command and their respective wing, delta/garrison and MAJCOM/FLDCOM PM/MFM AP POCs to report lost/reduced training capacity. This notification takes place within 24 hrs. after ROBD or HFT unit non-operational status so that any students awaiting training can be redirected to an alternate training facility.

22.11.2. User/unit is required to prepare and ship ROBD unit and any associated equipment to the repair facility in accordance with AP Lead Command instructions and sustainment funding guidelines. At no time shall user/unit perform maintenance or otherwise alter the ROBD or HFT without express approval and guidance from AP Lead Command.

22.11.3. Users update utilization and maintenance via the forms and guidance listed in accordance with AFMAN 11-403 paragraph 10.2.2.

Chapter 23

HYPOXIA FAMILIARIZATION TRAINER (HFT) OPERATIONS

23.1. Personnel Requirements and Qualifications. Personnel who have completed upgrade training per 43A or 4M0 CFETP and local upgrade requirements may operate the HFT as part of refresher physiological training. Because the HFT is operated in tandem with ROBD, personnel are qualified in accordance with AFMAN 11-403 paragraph 8.7.1.

23.2. Responsibilities. This section covers the duties and responsibilities of the HFT I/O. I/O. All HFT procedures ensure student safety at all times. The I/O is responsible for guiding and conducting student HFT scenarios. The I/O directly supervises the student‘s training session and ensures completion of training objectives. The I/O conducts the preflight briefing and post training review.

23.3. Refresher Training Description. The HFT is configured to replicate the trainee‘s aircraft/crew position to the maximum extent in accordance with the most current HFT User Configuration Guide provided by Detachment 9 ACC Training Support Squadron Luke AFB, AZ. All hypoxia training conducted in the HFT is to be accomplished in accordance with AFMAN 11-403 and AETC Syllabus S-O-B/A-APH Aerospace Physiology Training. Goals. The HFT allows aircrew to experience symptoms of hypoxia while performing duty related tasks and respond using proper emergency procedures in a controlled setting. Upon completion of training events, the student will have a heightened awareness of the potential compounding hazards that can result in the flight realm because of hypoxia.

Figure 23.1. Hypoxia Familiarization Trainer (HFT) and Mission Crew Hypoxia Familiarization Trainer (MCHFT).

23.3.1. Preflight Briefing Details. All students complete the appropriate refresher academics prior to receiving training in an HFT. Additional briefing items include training device limitations, actions that will be simulated and any safety items unique to individual training locations.

23.3.2. Training Description. APTUs coordinate with the local OG to develop HFT scenarios to ensure aircraft specific training objectives are met in accordance with ROBD Training Plan syllabus located in the AETC Bookstore at the following address: **https://trss3.randolph.af.mil/bookstore/home/homePage.aspx** . HFT profiles mimic local flight operations to the maximum extent possible.

23.3.3. Post Training Review. Each student receives a thorough post training briefing that is tailored to emphasize positive and negative aspects of how the individual accomplished hypoxia recovery procedures. Any flight task deviations that were caused by the hypoxia event are explained in detail.

Chapter 24

PARACHUTE OPERATIONS HYPOXIA FAMILIARIZATION TRAINER (POHFT) OPERATIONS

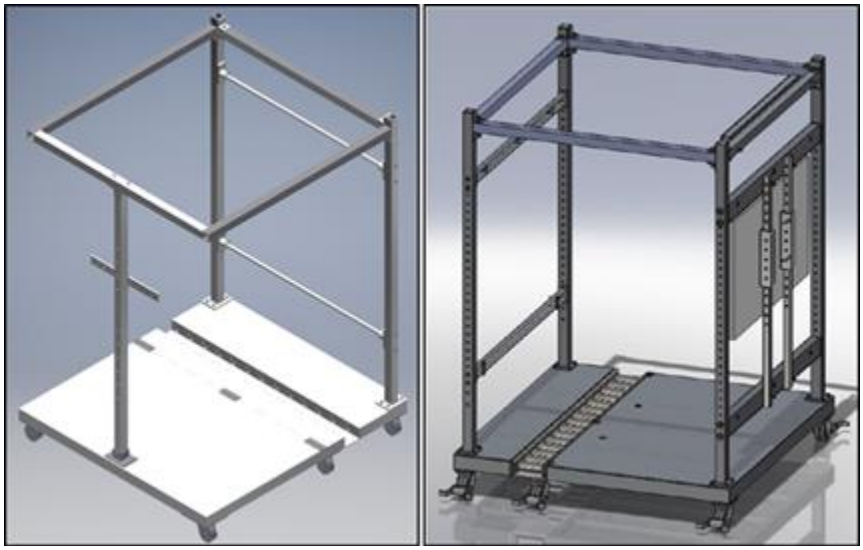
24.1. POHFT Training Description. In March of 2015, recognizing the need for a robust platform to train parachutists, Capt Eric G. Chase and MSgt Ismael Páez Jr., designed and fielded the first parachute operations hypoxia familiarization trainer (POHFT) at Hurlburt Field, FL. The POHFT is configured to replicate jump operations to the maximum extent in accordance with the most current POHFT User Configuration Guide provided by 502d Trainer Development Squadron JBSA-Randolph, TX. All hypoxia training conducted in the POHFT is to be accomplished in accordance with AFMAN 11-403 and AETC Syllabus S-O-B/A-APH-R, Aerospace Physiology Training.

24.2. Personnel Requirements and Qualifications. Personnel who have completed upgrade training per 43A or 4M0 CFETP and local upgrade requirements may operate the POHFT as part of refresher physiological training. Because the POHFT is operated in tandem with ROBD, personnel are qualified in accordance with AFMAN 11-403 paragraph 8.7.1.

24.3. Responsibilities. This section covers the duties and responsibilities of the POHFT I/O. I/O. All POHFT procedures ensure student safety at all times. The I/O is responsible for guiding and conducting student POHFT scenarios. The I/O directly supervises the student‘s training session and ensures completion of training objectives. The I/O conducts the preflight briefing and post training review.

24.4. Goals. The POHFT allows parachutists to experience symptoms of hypoxia while performing duty related tasks and respond using proper emergency procedures in a controlled setting. Upon completion of training events, the student will have a heightened awareness of the potential compounding hazards that can result in high altitude environments because of hypoxia.

Figure 24.1. Parachute Operations Hypoxia Familiarization Trainer (POHFT).



24.4.1. Preflight Briefing Details. All students complete the appropriate Track J refresher academics prior to receiving training in a POHFT. Additional briefing items include training device limitations, actions that will be simulated and any safety items unique to individual training locations.

24.4.2. Training Description. APTUs coordinate with the local OG to develop POHFT scenarios to ensure parachuting specific training objectives are met in accordance with **AP Instructor Guide Training syllabus located in the AETC Bookstore**. POHFT profiles mimic local jump operations to the maximum extent possible.

24.4.3. Post Training Review. Each student receives a thorough post training briefing that is tailored to emphasize positive and negative aspects of how the individual accomplished hypoxia recovery procedures. Any jump task deviations that were caused by the hypoxia event are explained in detail.

Chapter 25

UNAIDED NIGHT VISION TRAINER OPERATIONS

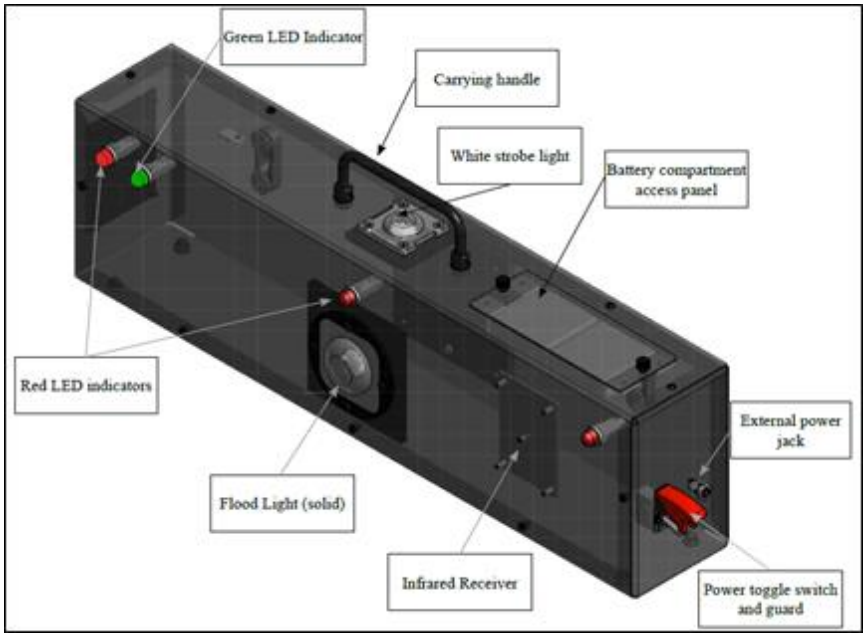
25.1. Personnel Requirements and Qualifications. Personnel who have completed upgrade training per 43A or 4M0 CFETP and local upgrade requirements may operate the unaided night vision trainer as part of initial and refresher physiology training.

25.2. Aerospace Physiology Training Units (APTUs). Notifies AP Lead Command and their respective wing, delta/garrison and MAJCOM/FLDCOM PM/MFM AP POCs any time the unaided night vision trainer is non-operational due to maintenance or otherwise not an available training option for wing aircrew in accordance with AFMAN 11-403, respective syllabi and this pamphlet. Updates respective AF Form 4026 and uploads data to AP Lead Command SharePoint® page at the following address: **https://usaf.dps.mil/sites/aetc-19af/do/aop/SitePages/Home.aspx**, with any changes to unaided night vision trainer operational status.

25.3. Goals. The unaided night vision trainer enhances the student's ability to understand night vision threats and emphasizes measures to enhance situational awareness in a nighttime environment.

25.3.1. Training Description. The unaided night vision trainer demonstrates how dark adaptation and various lighting enhance unaided night vision. Some of the anomalies that can be demonstrated using this device include autokinesis, Purkinje shift, flash blindness, and the strobe light effect.

Figure 25.1. Unaided Night Vision Trainer.

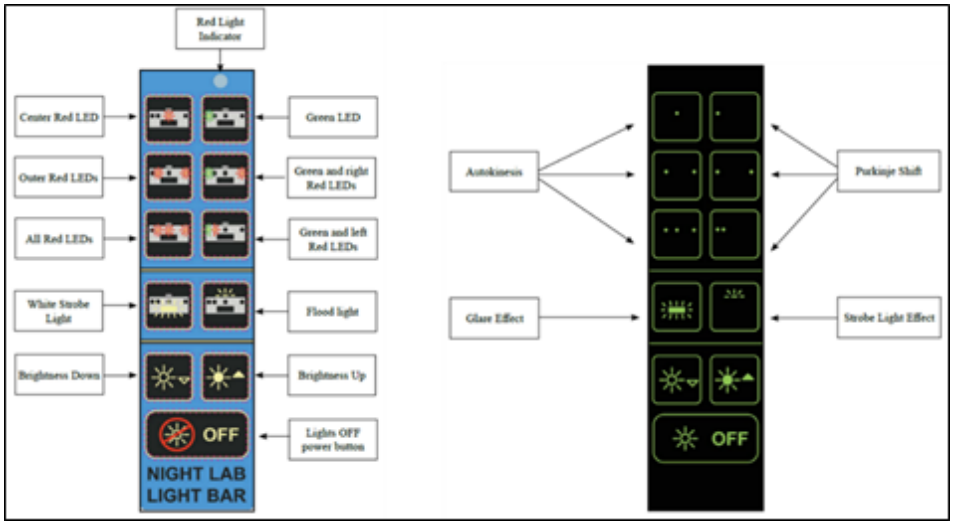


25.4. Autokinesis. The demonstration of this illusion helps flyers recognize the causes, effects, and appropriate prevention of autokinesis during flight, freefall, and while under canopy. These demonstrations are first conducted using one visual reference, then two visual references.

Finally, instructors demonstrate how to use the nighttime scanning technique to eliminate these illusions.

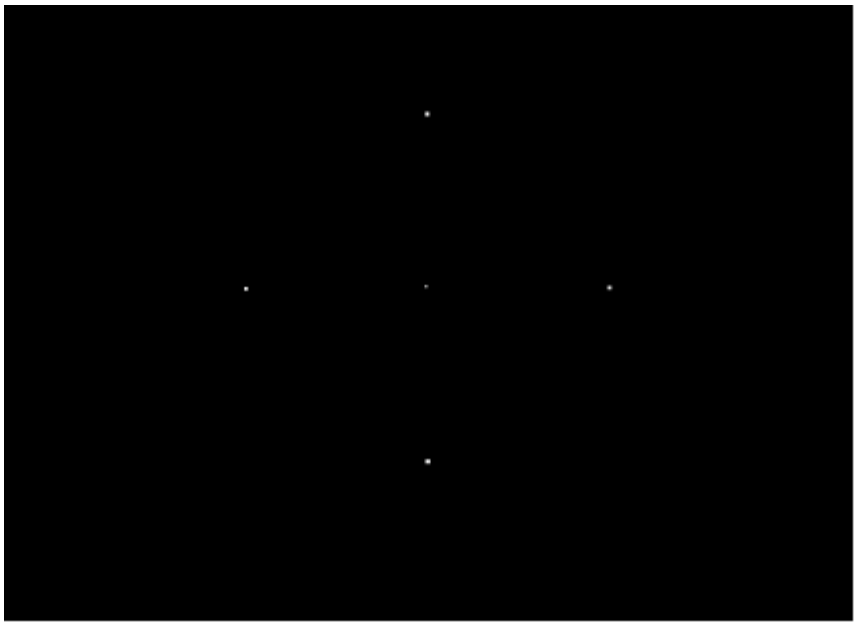
25.5. Autokinesis Demonstration. (Red Lights) Turn the red light in the middle of the Night Vision Trainer ON. The demonstration begins by having students stare at a single, fixed light for a minimum of 8 to 10 seconds. Upon staring at the fixed light source, students experience the illusion of an erratically moving light, which is the autokinetic phenomenon. Next, turn the single red light OFF and turn the outer (2) red lights ON. The second autokinesis demonstration is conducted by having students stare between two lights for 8 to 10 seconds. Performing this task causes the movement of light to increase. When there are up to four lights with little to no visual references, the autokinesis illusion increases. For these reasons, aircrew and parachutists should concentrate on a single light while maintaining it in their peripheral vision. This is done by performing the nighttime scanning technique. Once an individual realizes the light is not the target and does not present an immediate danger, the focus shifts to other lights/targets. The nighttime scanning technique helps to avoid autokinesis illusions.

Figure 25.2. Unaided Night Vision Trainer remote control configuration.



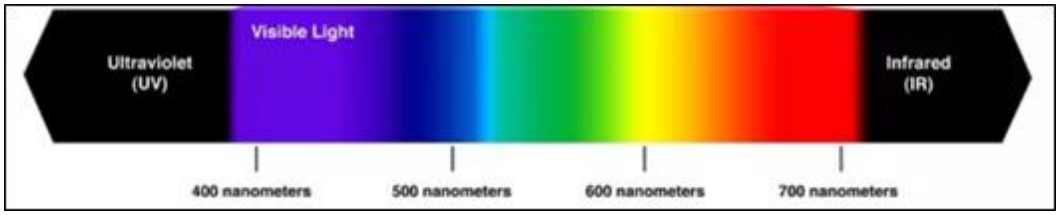
25.6. Nighttime Scanning technique. Perform the nighttime scanning technique by visualizing a diamond around an object. A person must consciously focus on each point of the imaginary diamond for a period of 2-3 seconds. When keeping the target in the peripheral field of view, it prevents the autokinesis illusion from affecting night operations.

Figure 25.3. Nighttime Scanning technique example.



25.7. Color Spectrum. Every individual wavelength of visible light is perceived as a spectral color, in a continuous spectrum; the colors of sufficiently close wavelengths are indistinguishable for the human eye. The spectrum is often divided into named colors, though any division is somewhat arbitrary; the spectrum is continuous.

Figure 25.4. Color Spectrum example.



25.8. Purkinje Shift. The Purkinje effect (sometimes called the Purkinje shift) is the tendency for the peak luminance sensitivity of the eye to shift toward the blue end of the color spectrum at low illumination levels as part of dark adaptation. Because of dark adaptation, as light levels decrease red and orange colors appear dim relative to other colors.

25.9. Purkinje Shift Demonstration. (Red and Green lights). Turn the green and red light "ON" and have students stare directly between both lights. **NOTE:** the brightness of each light will look the same.

25.9.1. Direct students to gaze 20-30 degrees upward. This will cause the red light to appear dim. This occurs since rod cells are more sensitive than cone cells in a nighttime environment. The purkinje phenomenon occurs as sensitivity in the eye shifts from longer (e.g. red) to shorter (e.g. green) wavelengths in a nighttime environment. When these colors fall in the periphery (viewing 20-30 degrees), the lack of cone cells causes the red to appear to dim or totally disappear.

25.9.2. The use of scanning techniques are important in nighttime operations for detection of red lights. When detecting red and green lights in the sky, aircrew know another aircraft is heading towards them. These lights help determine aircraft position and direction, thus the name position lights. The same holds true for jumpers under canopy and the manner in which chem lights are positioned.

25.10. Strobe Light Demonstration. Turn strobe light ON (at the top of the Night Vision Trainer) for 5-7 seconds, then turn strobe light "OFF." This demonstration illustrates how bursts of low-level lighting can assist night vision. Since strobe lights are designed to not impede night vision, ground forces use strobe lights for signaling and marking. Similarly, small arms fire of short duration, tracers, or strobe lights under canopy do not reduce dark adaptation. However, rocket fire, or exposure to a search light beam for a duration longer that one second may cause temporary loss of night vision.

25.11. Glare effect (Flash Blindness demonstration). This phenomenon is demonstrated by switching the glare light "ON" several times while the trainees are looking at a power point slide or Hypoxia Familiarization Trainer (HFT) screen. Instructors flash the light for one, three, and 10-second exposures. After each flash, trainees measure recovery time by their ability to identify details on the screen. Repeat the cycle, but this time have the trainees wear red goggles to demonstrate the protection provided from glare effects. Repeat the glare-light cycle a third time, only this time, ask the trainees to keep one eye closed and covered with the palm of their hand. Instructors should have trainees compare their vision in both eyes with each exposure. They will notice a remarkable difference in vision between the both eyes. The third demonstration is also an effective way to show how the eyes function independently.

25.11.1. Instructors explain to aircrew and parachutists that their eyes perceive "afterimages" following glare exposure. These afterimages affect their vision for varying lengths of time. The length of the effect depends on the length of the exposure. The afterimages appear as "whiteout" areas within the field of vision. Personnel compensate for the whiteout by using their peripheral vs. central vision.

25.11.2. To show this problem, instructors ask students to look at the source of the glare. Upon turning off the light, students experience a central "afterimage." They experience low-luminance images in their direct line of vision. Instructors close the demonstration by discussing the benefits of applying the principles of the nighttime scanning technique to lessen the glare effect.

Chapter 26

POLITZER BAG

26.1. Purpose. The Politzer Bag is used to relieve altitude related sinus and ear blocks.

Figure 26.1. Politzer Bag.

26.2. Parts. The Politzer Bag consists of three components: a rubber bulb, a tube, and a nasal tip.

26.3. Pre-flight. Ensure all three components are present, and that there is no damage to any of the parts. Ensure bottled water is readily available in chamber.

26.4. Performance. Treat and/or manage the ear block in accordance with **Chapter 21** of this pamphlet. If these measures fail and ear block persists, attempt to clear the blockage with the Politzer Bag.

26.4.1. Place the tip of the Politzer Bag in one nostril. **Note:** If the patient's nasal opening is too small for the Politzer Bag tip, remove the tip and insert the tube into the nasal opening. DO NOT insert the tube farther than 3/4 inch. If the rubber tubing is also too large, remove the tubing from the bulb, and use the bulb tip in the nostril. DO NOT insert the tip of the bulb farther than 1/2 to 3/4 inch into the patient's nostril.

26.4.2. Direct reactor to take a sip of water and retain in mouth. Then seal the nose by gently squeezing it and ask the reactor to swallow the water.

26.4.3. The sudden increased pressure in the Nasopharyngeal Cavity when water is swallowed should open the Eustachian Tubes, allowing the pressure in the Middle Ear to equilibrate with the ambient pressure.

26.4.4. Repeat as necessary.

Chapter 27

TECHNICAL ORDERS

27.1. Purpose. The DAF Technical Order (T.O.) program has been established to improve weapon system reliability and maintainability, while reducing the costs of weapon system acquisition and support. The Enhanced Technical Information Management System (ETIMS) is of paramount importance as it is intended to make a significant reduction in paper and in labor necessary to enter, manipulate, transfer, and interpret data. The technical information digitized in ETIMS includes maintenance procedures, test procedures, engineering drawings, design criteria models, etc. The DAF T.O. system was established as the official medium for disseminating technical information, instructions, and safety procedures pertaining to DAF systems and equipment. T.O.s are published under the authority of the Secretary of the DAF, are distributed, maintained, and filed in accordance with T.O. 00-5-1, *Technical Order System*.

27.2. Training Order Program. The AP T.O. program is the cornerstone of an overall effective maintenance, test, and inspection program to ensure training devices are reliable and maintained in accordance with established procedures. The establishment of an effective T.O. program is critical to mission accomplishment and directly affects the safety and health of AP personnel and the students trained in these simulators/devices. The Tables listed below identify career field specific T.O.s and T.O.s referenced by AP personnel in the performance of inspections, maintenance and tests conducted on Aircrew Flight Equipment necessary to the accomplishment of the AP mission.

Table 27.1. AP Technical Order Reference Table.

T.O. Number	Aerospace Physiology Technical Orders
43D8-3-2-6	Hypobaric Training Chambers
43D8-3-2-6WC-1	Inspection Workcards Hypobaric Altitude Training Chamber
43D8-3-2-11	6-Man Hypobaric Chamber Assembly Operation and Service Instruction
43D8-3-2-14	Auxiliary Altitude Chamber Exhibit No. WCRDF-79 Illustrated Parts Breakdown
43D8-3-2-21	Hypobaric Chamber Assembly, Operation Instructions Models 20M331, 20M491, and 37M423
43D8-3-2-81	Hypobaric Training Assembly Models Operation And Maintenance Instructions 20M331, 20M491, 20M6321, and 10006
43D8-3-2-84	Hypobaric Training Assembly Models 20M331,20M491, 20M6321, and 10006 Illustrated Parts Breakdown
43D8-3-5-31	6-Man Rectangular Stationary Auxiliary Chamber Operation And Maintenance Instructions W/Parts Breakdown (Guardite) Part No. 6M331b
43D8-7-6-1	Operation and Maintenance Manual W IPB_Combined Centrifuge, Time and Altitude Test Set, PN MBEU205123-1
T.O. Number	**Technical Orders Referenced by Aerospace Physiology**
00-5-1	AF Technical Order System

00-20-1	Aerospace Equipment Maintenance Inspection, Documentation, Policies, and Procedures
00-20-14	Air Force Metrology and Calibration Program
00-35D-54	USAF Deficiency Reporting, Investigation, and Resolution
00-35D-54	USAF Deficiency Reporting, Investigation, and Resolution
13A1-1-1	Aircraft Safety Belts, Shoulder Harness, and Miscellaneous Personnel Restraint Equipment
13A5-56-11	Escape System Assemblies
14-1-1	U.S. Air Force Aircrew Flight Equipment Clothing and Equipment
14P3-1-161	Combined Advanced Technology Enhanced Design "G" Ensemble (Combat Edge Equipment)
15X-1-1	Oxygen Equipment
15X-1-102	General Care and Cleaning of Oxygen Gauges and Oxygen Device Related Test Equipment
15X1-4-2-12	Emergency Bail-Out Oxygen Cylinder Assemblies
15X5-4-1-101	Oxygen Mask to Regulator Connector Assemblies
15X5-4-4-12	Pressure Demand Breathing Oxygen Mask USAF Type MBU-5/P
15X5-4-4-13	Pressure Demand Breathing Oxygen Mask USAF Type MBU-5/P
15X5-4-8-1	Quick-Donning Oxygen Mask Assembly Type MBU-10/P
15X6-3-13-3	Pressure Demand Oxygen Regulator CRU-68A/A
15X6-3-21-13	Oxygen Regulator CRU-73/A, CRU-92/A
15XX5-3-6-1	MBU-12/P Pressure-Demand Oxygen Mask
33D2-10-55-1	Oxygen Regulator Field Tester Part No. 31TA2655-2
33D2-10-67-2	PBG Oxygen Regulator Field Tester
42B5-1-2	Gas Cylinders (Storage Type) Use, Handling, and Maintenance

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Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

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DAFPD 11-4, *Aviation Service*, 11 Apr 2019

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AETCI 48-102, *Medical Management of Undergraduate Flying Training Students*, 6 March 2019

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AFMAN 11-202V3, *Flight Operations*, 10 June 2020

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AFI 90-201, *The Air Force Inspection System*, 19 Nov 2018

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T.O. 14-1-1, U.S. Air Force Aircrew Flight Equipment Clothing and Equipment, 7 August 2020

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T.O. 15X-1-1, Oxygen Equipment, 1 September 2020

T.O. 15X-1-102, General Care and Cleaning of Oxygen Gauges and Oxygen Device Related Test Equipment, 29 April 2020

T.O. 15X1-4-2-12, Emergency Bail-Out Oxygen Cylinder Assemblies, 1 October 2020

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T.O. 43D8-7-6-1, *Operation and Maintenance Manual w/IPB_Combined Centrifuge, Time and Altitude Test Set, PN MBEU205123-1*, 30 Nov 2015

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DD Form 114, *Military Pay Order*

DD Form 2992, *Medical Recommendation for Flying or Special Operational Duty*

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Abbreviations and Acronyms

A3—Director of Operations

AFE—Aircrew Flight Equipment

AFI—Air Force Instruction

AFIC—Air Force Interoperability Council

AFMAN—Air Force Manual

AFPAM—Air Form Pamphlet

ASM—Aerospace Medicine

DAFPD—Department of the Air Force Policy Directive

AFRC—Air Force Reserve Command

AFSAS—Air Force Safety Automated System

AFTO—Air Force Technical Order

AFSC—Air Force Specialty Code

AGSM—Anti-G Straining Maneuver

ANG—Air National Guard

AO—Aeronautical Orders

AP—Aerospace Physiology

APTF—Aerospace Physiology Training Flight

APTT—Aerospace Physiology Training Team

APTU—Aerospace Physiology Training Unit

APO—Aerospace Physiology Officer

ARMS—Aviation Resource Management System

ART—Aircrew Rotational Training

CC—Crew Chief

CF—Carried Forward

CFETP—Career Field Education and Training Plan

CFM—Career Field Manager

CO—Chamber Operator

COR—Contracting Officer Representative

DCS—Decompression Sickness

DAF—Department of the Air Force

DMWR/TM—Depot Maintenance Work Request or Technical Manual

DoDI—Department of Defense Instruction

DR—Deficiency Report

DRU—direct reporting unit

FDU—Flight Dress Uniform

FL—Flight Level

FSR—Flight Service Report

HAF—Headquarters Air Force

HALO—High Altitude Low Opening

HAP—High Altitude Parachutist

HAAMS—High Altitude Airdrop Mission Support

HFT—Hypoxia Familiarization Trainer

HHQ—higher headquarters

FLDCOM—The Field Command

IO—Inside Observer

I/O—Instructor, Observer

IP—Instructor Pilot

JDRS—Joint Deficiency Reporting System

JM—Jump Master

LEC—Lecturer

LO—Lock Operator

MAJCOM—Major Command

MCHFT—Mission Crew Hypoxia Familiarization Trainer

MDS—Mission Design Series

MFM—MAJCOM Functional Manager

MMAC—Material Management Aggregate Code

MNCL—Master Nuclear Certification List

MR—Mission Ready

NATO—North Atlantic Treaty Organization

N/A—not applicable

NAF—Numbered Air Force

NCB—National Codification Bureau

NIIN—National Item Identification Number

NSN—National Stock Number

NVG—Night Vision Goggles

OG—Operations Group

OPR—office of primary responsibility

OSS—Operations Support Squadron

OSS&E—Operational Safety, Suitability & Effectiveness

PM—Program Manager

POHFT—Parachute Operations Hypoxia Familiarization Trainer

POFT—Physiology Officer Flight Training

PPE—Personal Protective Equipment

PPP—Personnel Parachute Program

PPPM—Personnel Parachute Program Manager

REC—Recorder

ROBD—Reduced Oxygen Breathing Device

SARM—Squadron Aviation Records Management

SERE—Survival, Evasion, Resistance, and Escape

SD—Spatial Disorientation

S/L—Static Line

SPO—Systems Program Office

SS—Survival Training Events

STANAG—Standardized Agreement

STAN/EVAL—standardization/evaluation

ST/LMTC—Support Team/ Lead Maintenance Technical Center

TDY—temporary Duty

TTP—Tactics, Techniques and Procedures

2PFDU—Two Piece Flight Dress Uniform

Terms

Aerospace Physiology (AP) Personnel—The total complement of officer and enlisted members holding the AFSC of 43AX or 4M0X1 responsible for providing aerospace physiology academic training and the safe operation of physiology training devices.

Aerospace Physiology Training Flight (APTF)—The APTF is a flight consisting of Aerospace Physiology personnel, which is aligned in elements, then sections. The flight is responsible for

all aspects of training and support. It supports regional aircrews with aerospace physiology and human performance enhancement training. It manages active and safe participation of unit aerospace physiology personnel in flying operations. The flight establishes a strong relationship with Flight Safety to include a review of recent/applicable ground and flight safety mishaps due to human performance or physiological factors. It participate regularly in wing delta/garrison and squadron flying safety meetings and ensures all briefings are properly coordinated with the host Flight Safety Office.

Aerospace Physiology Training Team (APTT)—The APTT consists of 2 to 6 Aerospace Physiology personnel which provide input to wing, delta/garrison commanders on human performance issues, which may negatively, impact combat capability. They assist in Operational Risk Management. They provides local life support and wing, delta/garrison safety consultation on theater specific human performance issues. They develops human performance related threat briefs specific to the theater of operation, based on local intelligence analysis, weather, and other operational/environmental conditions to increase mission effectiveness. The team also supports regional aircrews with aerospace physiology and human performance enhancement training.

Aerospace Physiology Training Unit (APTU)—The term Aerospace Physiology Training Unit and acronym APTU is used as a catch phrase, which denotes an APTF or APTT.

Aircrew—The total complement of rated, career enlisted aviator, and non-rated aircrew personnel responsible for the safe ground and flight operation of the aircraft and onboard systems, or for airborne duties essential to the accomplishment of the aircraft's mission. Individuals on AOs and assigned to an authorized position according to AFI 65-503, *US Air Force Cost and Planning Factors*, or nonrated aircrew not in an aircraft's basic complement, but required for the mission. See AFPD 11-4. ***NOTES:*** US Air Force Academy (USAFA)/Air Force Reserve Officer Training Corps (AFROTC) cadets enrolled in approved USAFA flight programs are accorded aircrew status while actively participating in such programs.

Chain of Command—The succession of commanding officers from a superior to a subordinate through which command is exercised.

Element—The basic formation; the smallest drill unit, comprised of at least 3 individuals, but usually 8 to 12 persons, one of whom is designated as the element leader.

Evaluation—1) Procedure to determine the effectiveness of the performance of an instructional product or process in order to ascertain specific causes for the effectiveness or lack of it, and to make decisions appropriate to the extent of the effectiveness. Evaluation of formal courses includes field evaluation and internal evaluation. 2) The review and analysis of qualitative or quantitative data obtained from design review, hardware inspection, testing or operational use of equipment.

Fiscal Year—A 12-month period for which an organization plans to use its funds. The fiscal year starts on 1 October and ends on 30 September.

Hardware—The generic term dealing with physical items as distinguished from its capability or function, such as equipment, tools, implements, instruments, devices, sets, fittings, trimmings, assemblies, subassemblies, components, and parts.

Internet—An informal collection of government, military, commercial and educational computer networks using the transmission control protocol/internet protocol (TCP/IP) to transmit

information. The global collection of interconnected local, mid-level, and wide area networks that use IP as the network layer protocol.

Lead Command—The DAF MAJCOM/FLDCOM or agency possessing an MDS that is designated by AFPD 10-9 as responsible for the coordination of MDS-Specific activities.

Logistics—The science of planning and carrying out the movement and maintenance of forces. In its most comprehensive sense, those aspects of military operations that deal with design and development, acquisition, storage, movement, distribution, maintenance, evacuation, and disposition of materiel; movement, evacuation, and hospitalization of personnel; acquisition or construction, maintenance, operation, and disposition of facilities; and acquisition or furnishing of services.

Operational Control (OPCON)—The authority to perform those functions of command over subordinate forces involving organizing and employing commands and forces, assigning tasks, designating objectives, and giving authoritative direction necessary to accomplish the mission.

Office of Primary Responsibility (OPR)—Any headquarters, agency, or activity having the primary functional interest in, and responsibility for, a specific action, project, plan, program or problem.

Physiological—Having to do with the physical or biological state of being.

Rank—A single line of Airmen standing side by side.

Read File—A collection of publications and material determined by the MAJCOM/FLDCOM and unit as necessary for day-to-day operations.

Software—A set of computer programs, procedures, and associated documentation concerned with the operation of data processing system, such as compilers, library routines, manuals, and circuit diagrams.

Tactical Control (TACON)—The authority over forces that is limited to the detailed direction and control of movements or maneuvers within the operational area necessary to accomplish

missions or tasks assigned.

Weapon System—A combination of one or more weapons with all related equipment, materials, services, personnel, and means of delivery and deployment (if applicable) required for self-sufficiency.

Attachment 2

JOINT DEFICIENCY REPORTING SYSTEM INSTRUCTIONS

Table A2.1. JDRS Instructions.

Table A2.1. explains steps for reporting oxygen regulators in AF hypobaric chambers involved in an unexpected physiological event.
Step 1: access the Joint Deficiency Reporting System Website at https://jdrs.mil/. Additionally, a web search via the AF Portal for the "Joint Deficiency Reporting System" can be used to retrieve the website.
Step 2: click on No Login Users; Initiate Deficiency Report (DR)
Step 3: community: Aeronautical
Step 4: report type select: EI (Engineering Investigation) Category 1. Category 1 is for deficiencies, which may cause death, severe injury, or severe occupational illness, which may cause loss or major damage to a weapon system, and it critically restricts the combat readiness capabilities of the using organization or results in a production line stoppage.
Step 5: click "Initiate DR" button at the bottom
Step 6: select Originating Point: "AP Lead Command" (located toward bottom ¼ of drop down menu, alt, originating point in JDRS system is "AP Lead Command.")
Step 7: priority: Urgent
Step 8: mishap: N/A
Step 9: software: NO
Step 10: OSS&E: Safety
Step 11: stock screening: leave unchecked

Table A2.2. Engineering Investigation Request Instructions.

Table A2.2. explains how to complete an Engineering Investigation request.
1. From: provide DR submitter's name (last, first suffix etc.) **E-mail address:** input military e-mail address **Phone:** provide commercial phone number to include area code **Fax:** provide commercial fax number to include area code or type N/A if unknown **DoDAAC:** type FA3007 **Unit/Org:** provide unit and office symbol **Address:** add the mailing address where UPS packages are delivered. Include Base under City designation

2. ST/LMTC: type, "HQ DAF WASHINGTON DC" (All Caps)

Deficiency Subject: type, "DR on CRU-73A w/potential physical failure."

3. Description of Deficiency: leave all blocks in 3A. blank (AP Lead Command fills out this information)

3B. Description: provide a detailed summary of the Decompression Sickness incident. Include information such as chamber pre-flight, completion/non-completion of functional test, chamber flight specifics (i.e. max altitude, total time at altitude, total time off oxygen, chamber flight end time etc.). Include timeline of student/patient symptomatology.

Below is an example, **DO NOT** copy word for word.

Example: This regulator was used during a refresher profile chamber flight, a simulation in which we purposely place students in a controlled low-pressure environment for recognition of hypoxia symptoms to prepare them for real life mishaps. Training was conducted on 10 December 2018. A functional test was conducted during the chamber pre-flight inspection prior to the chamber flight and regulator passed the functional test as outlined in T.O. 15X-1-1. There is an alternate method described in 15X-1-1 in case PBG testing is unavailable, which was conducted and verified the integrity of the regulator. The students went through 30 minutes of denitrogenation time, a process where gas composition of at least 99.5% oxygen, which is aviator oxygen standard, is administered to students with the intent to expel necessary amount of nitrogen, the main molecule that causes decompression sickness, if not eliminated to a safe level. Chamber was above the ground for 30 minutes. Students were off oxygen supply for roughly 17 minutes during 30 minutes above ground. Chamber flight started at 1522 and ended at 1548. Maximum altitude was 25,000 ft. above sea level. The Aerospace Physiology flight received initial notification of the aircrew member's symptom at 1601. Student was later diagnosed with decompression sickness. Upon initial notification, an inspection was completed on the aircrew flight equipment used by said individual during the chamber flight. No discrepancies or failures were found to be present in the crew station used by the aircrew member. We are requesting an engineer investigation to determine if there are discrepancies with the regulator in question.

Do not use acronyms or jargon as items go to the depot and not a physiologist.

3C. Malfunction Defect Code: select, "equipment or material physically failed."

4. Date Deficiency Discovered: enter date (The Julian date automatically calculates)

UII: leave blank

Under "Is this Part of the DAF Master Nuclear Certification List (MNCL)?": click, "NO"

5. NSN Information: Leave both of the following options unchecked: check if UNK, Check if N/A **NSN (FSC):** enter the first four numbers of the regulator NSN. **(NIIN):** enter the remaining numbers in the NSN. Enter the 9-digit National Item Identification Number (NIIN) portion of the National Stock Number (NSN) of deficient material (do not enter dashes) **MMAC:** leave blank
6. Nomenclature: type, "Oxygen Regulator Diluter"
7. Operating time at failure: enter time if known, if unknown; enter the number "0." Note: *This is regulator-operating time, which, is not to be confused with chamber operating time*. Measurement Unit: enter "flight hours."
8. Part number: input regulator part number.
9. Manufacturer: input N/A for all of block 9
10. Quantity: leave "Check if N/A" unchecked. **Received:** mark as "0" **Inspected:** mark as "0" **Deficient:** mark as "0" **In Stock:** mark as "0"
11. Serial Number: enter serial number if available otherwise, enter N/A **Lot of batch number:** enter N/A **Haz Mat / Procedure / DMWR / TM:** enter N/A
12A. New, Reworked or Repaired: if clear regulator was overhauled, select overhauled in the drop down menu otherwise select new.
12B. Date manufactured, Reworked, or repaired: enter date of the regulator overhaul. If the answer to step 12A is new or N/A, step 12A is left blank.
12C through 13C: type in "N/A" in each block.
13D. Regulator value /Std Price: type in "10992" (enter whole dollar amounts only, w/no characters such as commas or dollar signs)
14. Government furnished material: select N/A
15A through 16. WUC/LCN: select or type N/A

17. Next Higher Assembly. NSN: submit Altitude Chamber stock number in the following format ####-##-###-#### (This information is found in T.O. 43D8-3-2-81, Hypobaric Training Assembly pg. 1-12) **Nomenclature:** 20-Man Rectangular Stationary Chamber **Part Number:** submit the Chamber's part number (This information is located in T.O. 43D8-3-2-81, Hypobaric Training Assembly pg. 1-13) **Serial Number:** submit the Chamber's serial number. (This information is located in T.O. 43D8-3-2-81, Hypobaric Training Assembly pg. 1-13)
18. End Item: enter deficient regulator info in this block otherwise DR is rejected NSN: Nomenclature: Part Number: Serial Number: Cage:
19. Action / Exhibit disposition Code: select "Holding Exhibit."
20. Exhibit disposition; Exhibit Available?: the "Yes" option populates automatically.
20B. Action / Exhibit Disposition Narrative: upon selecting "Non-JDRS Activity, this section is populate automatically w. "--------NOTE: EXHIBIT CREDIT (if applicable) IS NOT AUTHORIZED-------- - Provide this credit statement to your supply activity to process turn-in of the exhibit as a suspended asset condition code "Q" without a credit transaction. Hold exhibit for 30 days awaiting receipt of the exhibit disposition instructions. - Instructions are to "hold", "ship for investigation", or "turn-in per true condition".
21. Requested Exhibit Action: enter "Request Credit."
22A. Details: provide a narrative on how safety of personnel or activity mission is affected.
22B. Number of similar deficiencies in like items reported by the originating activity: Type or copy and paste the following statement, "___simulator deficiencies in ___ months." (AP Lead Command fills-in the blanks)
22C. How deficiency was detected or confirmed: provide narrative on how deficiency was detected or confirmed such as, visually or functional operation. Where deficiency was discovered, for example, upon receipt, during maintenance, after operational test.

22D. Storage and handling information: N/A
22E. Attach supporting documents or pictures: attach supporting documents or pictures. When photographs are taken, place a ruler alongside the object to appear in each photograph.
22F. Description of incorrectly identified new material: type in N/A
22G. Recommendations: type the following, "Provide EI final report to AP Lead Command;
aetc.a3kf.AOPLeadCommand@us.af.mil and (your unit Org/office symbol).
22H. Fleet Representative: rank, name, DSN phone number and e-mail address of submitting unit representative.
22I. TMS/MDS: select or type in N/A in all applicable blocks.
22J. Engine: select N/A or type in N/A
22K. If TFOA/DO: N/A, leave box unchecked.
Finally: click on "Validate DR"