

Federal Aviation Administration – [Regulations and Policies](#)
Aviation Rulemaking Advisory Committee

Airport Certification Issue Area
Rescue and Firefighting Requirements

Task 1 – Airport Rescue and Firefighting Requirements – Part 139

[Federal Register: March 22, 2001 (Volume 66, Number 56)]
[Notices]
[Page 16087-16088]
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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

Aviation Rulemaking Advisory Committee; Airport Certification
Issues--New Task

AGENCY: Federal Aviation Administration (**FAA**), DOT.

ACTION: Notice of new task assignment for the aviation rulemaking
advisory committee (ARAC).

SUMMARY: The **FAA** assigned the Aviation Rulemaking Advisory Committee a
new task to develop a

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Notice of Proposed Rulemaking (NPRM) to implement any modifications,
deletions, or additions identified in the review of 14 CFR part 139
subpart D. This notice is to inform the public of this ARAC activity.

FOR FURTHER INFORMATION CONTACT: Ben Castellano, 800 Independence Ave.,
SW., Washington, DC 20591, (202) 267-8728, ben.castellano@faa.gov.

SUPPLEMENTARY INFORMATION:

Background

The **FAA** established the Aviation Rulemaking Advisory Committee to
provide advice and recommendations to the **FAA** Administrator on the
FAA's rulemaking activities with respect to aviation-related issues.

The Task

1. Review the existing aircraft rescue and firefighting (ARFF)
requirements contained in 14 CFR part 139, subpart D and identify ARFF
requirements that should be added, modified, or deleted. This review
should include the current rule and any other documents the agency may
have issued regarding part 139, subpart D, and any ARFF standards
issued by other organizations.

As part of this project, ARAC should address the following issues:

- a. The number of trucks and amount of agent,
- b. Vehicle response times, and
- c. Staffing requirements.

2. Develop an NPRM to incorporate the modifications, deletions, and
additions identified in the preceding reviews. The NPRM should include

the preamble and rule language along with any supporting legal analysis.

3. ARAC may be asked to recommend the disposition of any substantive comments the agency received in response to the NPRM.

Schedule: Recommendations to the **FAA** in the form of an NPRM will be due to the **FAA** by April 11, 2003.

ARAC Acceptance of Tasks

ARAC accepted the task and assigned the task to the newly formed Rescue and Firefighting Requirements Working Group, Airport Certification Issues. The working group will serve as staff to ARAC and assist in the analysis of the assigned task. ARAC must review and approve working group recommendations. If ARAC accepts the working group's recommendations, it will forward them to the **FAA**. The agency seeks ARAC's advice and recommendations on this important issue. Recommendations that are received from ARAC will be submitted to the agency's Rulemaking Management Council to address the availability of resources and prioritization.

Working Group Activity

The Rescue and Firefighting Requirements Working Group is expected to comply with the procedures adopted by ARAC. As part of the procedures, the working group is expected to:

1. Recommend a work plan for completion of the task, including the rationale supporting such a plan for consideration at the next meeting of the ARAC Airport Certification Issues held following publication of this notice.

2. Give a detailed conceptual presentation of the proposed recommendations prior to proceeding with the work stated in item 3 below.

3. Draft the appropriate documents and required analyses and/or any other related materials or documents.

4. Provide a status report at each meeting of the ARAC held to consider airport certifications issues.

Participation in the Working Group

The Rescue and Firefighting Requirements Working Group will be composed of technical experts having an interest in the assigned task. A working group member need not be a representative or a member of the full committee.

An individual who has expertise in the subject matter and wishes to become a member of the working group should write to the person listed under the caption FOR FURTHER INFORMATION CONTACT expressing that desire, describing his or her interest in the task, and starting the expertise he or she would bring to the working group. All requests to participate must be received no later than April 30, 2001. The requests will be reviewed by the assistant chair, the assistant executive director, and the working group chair. Individuals will be advised whether or not their request can be accommodated.

Individuals chosen for membership on the working group will be expected to represent their aviation community segment and actively participate in the working group (e.g., attend all meetings, provide written comments when requested to do so, etc.). They also are expected to devote the resources necessary to support the working group in

meeting any assigned deadlines. Members are expected to keep their management chain and those they may represent advised of working group activities and decisions to ensure that the proposed technical solutions do not conflict with their sponsoring organization's position when the subject being negotiated is presented to ARAC for approval.

Once the working group has begun deliberations, members will not be added or substituted without the approval of the assistant chair, the assistant executive director, and the working group chair.

The Secretary of Transportation determined that the formation and use of the ARAC is necessary and in the public interest in connection with the performance of duties imposed on the **FAA** by law.

Meetings of the ARAC will be open to the public. Meetings of the Rescue and Firefighting Requirements Working Group will not be open to the public, except to the extent that individuals with an interest and expertise are selected to participate. The **FAA** will make no public announcement of working group meetings.

Issued in Washington, DC, on March 14, 2001.

Anthony F. Fazio,
Executive Director, Aviation Rulemaking Advisory Committee.

[FR Doc. 01-7058 Filed 3-21-01; 8:45 am]

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Pratt & Whitney
400 Main Street
East Hartford, CT 06108



Pratt & Whitney

A United Technologies Company

June 23, 2009

Federal Aviation Administration
800 Independence Avenue, SW
Washington, D.C. 20591

Attention: Pam Hamilton, Director, Office of Rulemaking

Subject: ARAC Report Submittal, Airport Rescue and Firefighting
Requirements

Reference: ARAC Tasking, Federal Register, March 22, 2001

Dear Pam,

The referenced tasking resulted in formation of the Airport Rescue and Firefighting Requirements Working Group. In March 2004, the ARFFRWG completed its work and submitted a proposed draft NPRM to the ARAC Airport Certification Issues Group. This document represented extensive effort by the Working Group, but in many areas they were unable to achieve consensus.

The ARAC EXCOM has reviewed the Working Group report and believes that there is a substantial amount of valuable information in this report that would be of use to the FAA even though consensus was not reached. Accordingly, the ARAC EXCOM has voted to provide this report to the FAA for FAA use in any future rulemaking activity. Additionally, attached are comments on the document from the National Air Disaster Alliance/Foundation.

I would like to express our thanks to all of the Working Group members for their dedication in working this very challenging task.

Sincerely yours,

C. R. Bolt
ARAC Chair (Outgoing)

Norm Joseph
ARAC Chair (Incoming)

Copy: Gerri Robinson- FAA, Office of Rulemaking
ARAC EXCOM



U.S. Department
of Transportation
**Federal Aviation
Administration**

800 Independence Ave., SW.
Washington, DC 20591

JUL 14 2009

Mr. Norman Joseph
Chair, Executive Committee for the
Aviation Rulemaking Advisory Committee
30 Camden Village Dr.
Newnan, GA 30265

Dear Mr. Joseph:

This is in reply to your letter dated June 23, 2009, co-signed by the outgoing Chair of the Aviation Rulemaking Advisory Committee (ARAC) Executive Committee (EXCOM), Mr. Craig R. Bolt. That letter transmitted a report prepared by the Airport Rescue and Firefighting Requirements Working Group. I understand the EXCOM reviewed the report of the working group and agreed to forward the report to the Federal Aviation Administration (FAA) for consideration even though consensus was not reached.

I wish to thank the Airport Rescue and Firefighting Requirements Working Group and the EXCOM members who provided resources to develop and review the report. Special thanks to Mr. Richard Marchi who served as the Assistant Chair for the Airport Certification Aeronautical Technical Subject Area for his effort to bring this task to closure. The report will be placed on the ARAC website at: http://www.faa.gov/regulations_policies/rulemaking/committees/arac.

We consider your submittal of the Airport Rescue and Firefighting Requirements report as completion of the original tasking published in the Federal Register on March 22, 2001 (66 FR 16087). We will keep the committee apprised of the agency's efforts on this recommendation through the FAA report at future EXCOM meetings.

Sincerely,

Pamela Hamilton-Powell
Director, Office of Rulemaking

cc: Mr. Craig R. Bolt

1 Memorandum

2

3 To: ARAC EXCOM
4 From: R. Marchi, Airport Issues Focal Point
5 Subject: Transmittal of ARFFRWG report
6 Date: June 10, 2009

7

8

9 On March 22, 2001, the FAA announced the assignment of a new task to ARAC. Specifically, the FAA sought
10 development of "a Notice of Proposed Rulemaking (NPRM) to implement any modifications, deletions, or additions
11 identified in the review of 14 CFR Part 139, subpart D."

12

13 As part of this project, ARAC specifically was asked to address the following ARFF issues:

- 14 a. The number of trucks and amount of agent;
- 15 b. Vehicle response times;
- 16 c. Personnel requirement; and
- 17 d. Airport ARFF Index

18

19 In March, 2004, an Airport Rescue and Firefighting Requirements Working Group (ARFFRWG) established to
20 perform these tasks completed its work and submitted a proposed draft NPRM to the ARAC Airport Certification
21 Issues Group for subsequent approval and transmittal to FAA. To the best of my knowledge, after discussions with
22 FAA and the co-chairman of the ARFFRWG, no further action was taken with respect to this report.

23

24 After receiving the report in late 2008 or early 2009 from FAA, I made attempts to re-establish the Airport
25 Certification Issues Group for the purpose of considering it. However, due to the extensive time elapsed, it has
26 proven difficult to locate the original members, many of whom have retired or otherwise become unavailable. In the
27 interim, HR 916, the FAA Reauthorization Act of 2009 was passed on May 21, 2009 by the House of
28 Representatives, with Section 311 (attached) containing language that mandates the initiation of a rulemaking by
29 FAA, covering essentially the same topics as the ARAC task. Identical language has been introduced in the Senate
30 reauthorization bill, and passage of a rulemaking directive is virtually assured.

31

32 In order to resolve this long standing issue, on March 19, 2009 I met with Michael O'Donnell (AAS-1) and Marc
33 Tonnacliff (AAS-300) of the Office of Airport Safety and Standards and Brenda Courtney (ARM-200) of the Office
34 of Rulemaking, seeking their guidance. It is upon their recommendation that I am transmitting this report to the
35 EXCOM.

36

37 The report represents an extensive effort by the ARFFRWG to reach consensus on a wide range of issues affecting
38 ARFF requirements of Part 139. However, on all the issues originally requested, full consensus was not reached. In
39 most cases the report states that a majority of members agreed with a given recommendation, but that a significant
40 minority did not. Generally, agreement in support of the recommendation was obtained from the Air Line Pilots
41 Association, Aircraft Rescue and Fire Fighting Working Group, Aviation Cabin Safety Specialists Inc., Independent
42 Pilots Association, International Association of Fire Fighters, National Fire Protection Association, International
43 Association of Fire Chiefs, and the San Jose (Calif.) Fire Department, while dissenting opinions were held by the
44 Air Transport Association, Airports Council International-North America, Allegheny County Airport Authority,
45 American Association of Airport Executives, Charlottesville-Albemarle County (Va.) Airport Authority, and the
46 Port Authority of New York and New Jersey.

47

48 Despite the lack of consensus by the ARFFRWG and the inability to transmit a recommendation by the Airport
49 Certification Issues Group, FAA staff at the March 19 meeting felt that the report contained valuable background
50 information on the issues, would be of value in the subsequent rulemaking expected to be mandated by statute and
51 should be submitted to the EXCOM for inclusion in the record.

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53 Submitted by Richard Marchi, Airport Issues Focal Point

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***ARFF Requirements Working Group
(ARFFRWG)
Notice of Proposed Rulemaking***

FINAL RECOMMENDATION

To

***ARAC
Airport Certification Issues Group***

14 CFR Part 139 Subpart D

March 2004

1 Part II
2 Department of Transportation
3 Federal Aviation Administration

4
5 14 CFR Part 139

6
7 Certification of Airports; Proposed Rule

8
9 -----

10 DEPARTMENT OF TRANSPORTATION

11
12 Federal Aviation Administration

13
14 14 CFR Part 139

15
16 [Docket No. FAA-2003-XXXX; Notice No. 03-XX]
17 RIN XXXX-XXXX

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21 Certification of Airports

22
23 AGENCY: Federal Aviation Administration (FAA), DOT.

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25 ACTION: Notice of proposed rulemaking (NPRM).

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29 SUMMARY: This document proposes to revise the current airport certification regulation with
30 respect to aircraft rescue and fire fighting (ARFF) requirements for airports serving scheduled air
31 carrier operations in aircraft designed for more than 9 seats. A section of an air carrier operation
32 regulation, as well as a section of a transport category aircraft certification regulation, also would
33 need to be amended to conform with proposed changes to airport certification requirements. The
34 FAA believes that these proposed revisions are necessary to ensure safety in air transportation
35 and to provide a comparable level of safety at all certificated airports.

36
37 DATES: Comments must be submitted on or before XXXX.

38
39 ADDRESSES: Comments on this proposed rulemaking should be mailed or delivered, in
40 duplicate, to: U.S. Department of Transportation Dockets, Docket No. FAA-2003-XXXX, 400
41 Seventh Street, SW., Room Plaza 401, Washington, DC 20590. Comments may be filed and
42 examined in Room Plaza 401 between 10 a.m. and 5 p.m. weekdays, except Federal holidays.

43
44 Comments also may be sent electronically to the Dockets Management System (DMS) at the
45 following Internet address: <http://dms.dot.gov> at any time. Commenters who wish to file
46 comments electronically, should follow the instructions on the DMS web site.

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2 FOR FURTHER INFORMATION CONTACT: Airport Safety and Operations Division (AAS-
3 300), Office of Airport Safety and Standards, Federal Aviation Administration, 800
4 Independence Ave., SW., Washington, DC 20591; telephone: (202) 267-8553, or E-mail:
5 xxx.xxx@faa.gov.

6
7 SUPPLEMENTARY INFORMATION:

8
9 *Comments Invited*

10
11 Interested persons are invited to participate in this rulemaking by submitting such written data,
12 views, or arguments, as they may desire. Comments relating to the environmental, energy,
13 federalism, or economic impact that might result from adopting the proposals in this document
14 are also invited. Substantive comments should be accompanied by cost estimates. Comments
15 should identify the regulatory docket or notice number and should be submitted in triplicate to
16 the Rules Docket address specified above.

17
18 All comments received, as well as a report summarizing each substantive public contact with
19 FAA personnel on this rulemaking, will be filed in the docket. The docket is available for public
20 inspection before and after the comment closing date.

21
22 The Administrator will consider all comments received on or before the closing date before
23 taking action on this proposed rulemaking. Comments filed late will be considered as far as
24 possible without incurring expense or delay. The proposals contained in this rulemaking may be
25 changed in light of the comments received.

26
27 Commenters wishing the FAA to acknowledge receipt of their comments submitted in response
28 to this notice must include a pre-addressed, stamped postcard with those comments on which the
29 following statement is made: ``Comments to Docket No. FAA-2003-XXXX." The postcard will
30 be date stamped and mailed to the commenter.

31
32 *Availability of NPRMs*

33
34 An electronic copy of this document may be downloaded using a modem and suitable
35 communications software from the FAA regulations section of the FedWorld electronic bulletin
36 board service (telephone: 703-321-3339), or the Government Printing Office's (GPO's) electronic
37 bulletin board service (telephone: 202-512-1661).

38
39 Internet users may reach the FAA's web page at <http://www.faa.gov/avr/arm/nprm/nprm.htm> or
40 the GPO's web pages at <http://www.access.gpo.gov/nara> for access to recently published
41 rulemaking documents.

42
43 Any person may obtain a copy of this NPRM by submitting a request to the Federal Aviation
44 Administration, Office of Rulemaking, ARM-1, 800 Independence Avenue, SW., Washington,
45 DC 20591, or by calling (202) 267-9680. Communications must identify the notice number or
46 docket number of this NPRM.

1
2 Persons interested in being placed on the mailing list for future NPRMs should request from the
3 above office a copy of Advisory Circular No. 11-2A, Notice of Proposed Rulemaking
4 Distribution System, that describes the application procedure.
5
6

7 *Background*

8

9 The FAA established the Aviation Rulemaking Advisory Committee (ARAC) to provide advice
10 and recommendations to the FAA Administrator on the FAA's rulemaking activities with respect
11 to aviation-related issues. On March 22, 2001, the FAA announced the assignment of a new task
12 to ARAC. Specifically, the FAA sought development of "a Notice of Proposed Rulemaking
13 (NPRM) to implement any modifications, deletions, or additions identified in the review of 14
14 CFR Part 139, subpart D."
15

16 *The Task*

17

18
19 1. Review the existing aircraft rescue and fire fighting (ARFF) requirements contained in 14
20 CFR Part 139, subpart D and identify ARFF requirements that should be added, modified, or
21 deleted. This review should include the current rule and any other documents the agency may
22 have issued regarding Part 139, subpart D, and any ARFF standards issued by other
23 organizations.
24

25 2. Develop an NPRM to incorporate the modifications, deletions, and additions identified in the
26 preceding reviews. The NPRM should include the preamble and rule language along with any
27 supporting legal analysis.
28

29 3. ARAC may be asked to recommend the disposition of any substantive comments the agency
30 received in response to the NPRM.
31

32 As part of this project, ARAC specifically was asked to address the following ARFF issues:
33

- 34 a. The number of trucks and amount of agent;
- 35 b. Vehicle response times;
- 36 c. Personnel requirement; and
- 37 d. Airport ARFF Index
38

39 Schedule: Recommendations to the FAA in the form of an NPRM will be due to the FAA by
40 January XX, 20**.
41
42

1 *ARAC Acceptance of Tasks*

2
3 ARAC accepted the task and assigned the task to a newly formed Aircraft Rescue and Fire
4 Fighting Requirements Working Group (ARFFRWG), which worked under the existing "Airport
5 Certification Issues" group. The Working Group served as staff to ARAC and performed all
6 analysis and documentation of issues relating to the assigned task. ARAC subsequently reviewed
7 the Working Group's recommendations, made appropriate modifications, and forwarded a final
8 set of recommendations to the FAA's Rulemaking Management Council to address the
9 availability of resources and prioritization. (See "The Role of the Aviation Rulemaking
10 Advisory Committee" below for more information on the tasking, its acceptance, and the means
11 by which it was carried out.)

12 13 *History*

14
15 Since 1970, the FAA Administrator has had the statutory authority to issue airport operating
16 certificates to airports serving certain air carriers and to establish minimum safety standards for
17 the operation of those airports. This authority is currently found in Title 49, United States Code
18 (U.S.C.) section 44706, Airport operating certificates. The FAA uses this authority to issue
19 requirements for the certification and operation of certain land airports. These requirements are
20 contained in Title 14, Code of Federal Regulations Part 139 (14 CFR 139), Certification and
21 Operations: Land Airports Serving Certain Air Carriers, as amended.

22
23 Until recently, this statutory authority was limited to those land airports serving passenger
24 operations of an air carrier that is conducted with an aircraft having a seating capacity of more
25 than 30 passengers. However, this authority was broadened by the Federal Aviation
26 Administration Reauthorization Act of 1996. Section 44706 was amended to allow the FAA to
27 certificate airports, with the exception of those located in the State of Alaska, that serve any
28 scheduled passenger operation of an air carrier operating aircraft designed for more than 9
29 passenger seats, but less than 31 passenger seats. FAA's existing authority to certificate airports
30 serving air carrier operations conducted in aircraft with more than 30 seats remained unchanged.
31 Separate rulemaking action has been undertaken to implement changes based on this
32 amendment.

33
34 This proposal is intended to take a broader look at the entire spectrum of issues related to ARFF
35 in the context of current requirements, potential expansion of requirements under the revised
36 legislation, and advances in ARFF and aircraft design technology. The last major revision of
37 Part 139 occurred in November 1987; another is pending subsequent to a June 2000 NPRM (see
38 discussion below).

39
40 The FAA has gathered data on the effectiveness of Part 139 requirements specific to ARFF,
41 (primarily through joint industry/FAA Working Groups, field research and periodic airport
42 certification inspections), and proposes to use this rulemaking opportunity to update Part 139 and
43 related requirements. A number of accidents where ARFF response has come into question also
44 form part of the overall environment requiring review; accordingly, National Transportation
45 Safety Board reports and recommendations formed part of the body of documentation reviewed
46 in the preparation of this proposal.

1
2 The Preamble for the original printing of FAR Part 139, published in 37 Federal Register 12278
3 on 21 June 1972, is a key document from which to consider the evolution and current form of
4 Subpart D of Part 139, *Certification and Operations: Land Airports Serving CAB - Certificated*
5 *Scheduled Air Carrier Operating Large Aircraft*. There have been a number of Amendments
6 since then (one of which was a major effort in 1987) through 1995.

7
8 More recently, an NPRM published in 65 Federal Register 38636 on 21 June 2000 proposed to
9 revise current airport certification regulation and to establish certification requirements for
10 airports serving scheduled air carrier operations in aircraft with 10-30 revenue seats.

11 *Current Requirements*

12
13
14 Current requirements for ARFF personnel and capabilities at FAA certificated airports are
15 primarily found in the existing Part 139. Part 139 requires each airport to determine the largest
16 type of passenger-carrying scheduled air carrier aircraft using their airport.

17
18 Current requirements for ARFF response also are contained in the existing Part 139, but are
19 ambiguous in two key areas: the correct application of response time standards, and the role
20 mutual aid forces may play in meeting certification and airport emergency planning
21 requirements.

22
23 It is important to note that the issues of agent and equipment requirements have been well
24 studied and documented over the past thirty years, while the issue of personnel requirements has
25 received less attention. In the pursuit of speedier vehicles and more rapid application of agent,
26 design trends in response vehicles have moved toward a need for fewer persons on board. In
27 some cases, this has resulted in airports being operated legally with a small number of on-duty
28 ARFF personnel that may not be able to perform all of the tasks expected of ARFF responders.
29 In other words, it means that adequate numbers of trained fire fighters may not be available to
30 permit safe entry into a burning aircraft while maintaining a separate team to protect the entering
31 team, as referenced by OSHA 29 CFR Part 1910.134(g)(4).

32
33 On the question of response time, the NPRM does not propose response time changes from the
34 existing regulation, but rather changes the location in which the vehicles must respond within the
35 current time. In addition, the concept of pre-positioning of required ARFF vehicles within a
36 specific time frame has been introduced..

37 *Enforcement Action*

38
39
40 The FAA can impose a civil penalty of \$1,000 per day per violation on operators of airports that
41 are currently certificated under Part 139 (airports serving scheduled and unscheduled operations
42 of large air carrier aircraft). However, the FAA does consider mitigating circumstances,
43 including an airport operator's willingness to correct any deficiencies and ability to pay civil
44 penalties. In its inspection role, the FAA works with airport operators and encourages a
45 cooperative relationship between the certificate holder and inspectors, and commonly uses

1 administrative actions to have most discrepancies corrected. Civil penalties and in extreme cases,
2 certificate action, are levied against airport operators only as a last resort to gain compliance.

3
4 *The Role of the Aviation Rulemaking Advisory Committee*

5
6 The FAA has established an Aviation Rulemaking Advisory Committee (ARAC) to provide
7 advice and recommendations to the FAA Administrator concerning a range of FAA's rulemaking
8 activity, including air carrier operations, airman certification, aircraft certification, airports, and
9 noise. The committee affords the FAA a forum to easily obtain direct, firsthand information and
10 insight from affected interests through meeting together and exchanging ideas with respect to
11 proposed rules and existing rules that should be revised or eliminated. While the activities of the
12 ARAC do not circumvent the normal coordination process or the public rulemaking procedures,
13 the committee's recommendations on a particular issue or proposed rule are taken under
14 consideration by the FAA and fully disclosed in the public docket.

15
16 The ARAC consists of approximately 65 government, industry, labor, and consumer advocacy
17 organizations selected by the FAA to represent various viewpoints of those impacted by FAA
18 regulations. These members are organized into several issue areas to address specific technical
19 subjects, including airport certification. The ARAC only undertakes those tasks requested by the
20 FAA. Meetings of the ARAC are open to the public, and interested persons with expertise in the
21 subject matter are invited to participate.

22
23 To assist in the certification of airports serving smaller air carrier operations, the FAA requested
24 the ARAC's advice and recommendations on changes that might be needed to Part 139 with
25 respect to aircraft rescue and fire fighting capabilities at airports serving commercial air carriers
26 [66 FR 16087, March 22, 2001].

27
28 The ARAC accepted this task and established the Aircraft Rescue and Fire Fighting
29 Requirements Working Group to develop recommendations on this issue. Comprised of
30 members of the main committee plus additional technical experts, the Working Group's
31 membership included representatives from the following organizations:

- 32
- 33 • Air Line Pilots Association International (ALPA) – Captain Thomas J. Phillips
 - 34 • Air Transport Association (ATA) – Mr. Tom Farrier
 - 35 • Aircraft Rescue and Fire Fighting (ARFF) Working Group (ARFFWG) – Assistant Chief
36 Jack Kreckie *co-chair*
 - 37 • Airports Council International - North America (ACI-NA) – Ms. Dawn E. Lucini
 - 38 • Allegheny County (PA) Airport Authority (ACAA) – Mr. Bradley E. Penrod, A.A.E.
 - 39 • American Association of Airport Executives (AAAE) – Mr. Craig Williams, A.A.E.
 - 40 • Armen DerHohannesian and Associates, L.L.C. (ADA) – Mr. Armen DerHohannesian
41 *co-chair*
 - 42 • Aviation Cabin Safety Specialists, Inc. (ACSS) – Ms. Kathy Lord-Jones
 - 43 • Charlottesville-Albemarle County (Va.) Airport Authority (CHO) – Mr. William D.
44 Pahuta
 - 45 • Independent Pilots Association (IPA) – Captain Shannon L. Jipsen
 - 46 • International Association of Fire Fighters (IAFF) – Fire Captain Charles M. Burroughs

- 1 • National Fire Protection Association (NFPA) – Mr. Mark Conroy
- 2 • International Association of Fire Chiefs (I-Chiefs) – Chief Donald Hilderbrand
- 3 • Port Authority of New York and New Jersey (PANYNJ) – Ms. Pam L. Phillips
- 4 • San Jose (CA) Fire Department (SJFD) – Captain Les Omans

5
6 The FAA's Office of Airport Safety and Standards and the William J. Hughes Technical Center
7 also provided technical support from Mr. Ken Gilliam and Mr. Keith Bagot, respectively.

8
9 The individuals representing the aviation community segments listed above actively participated
10 in the Working Group (e.g., attending meetings, providing written comments when requested to
11 do so, etc.). They devoted the resources necessary to support the Working Group in meeting
12 assigned deadlines. Members kept their management chain and those they represented advised of
13 Working Group activities and decisions with the goal of presenting a consensus product to
14 ARAC for approval. All organizations sponsoring Working Group members reserved the right to
15 comment independently to this NPRM.

16
17 The Aircraft Rescue and Fire Fighting Requirements Working Group complied with procedures
18 adopted by ARAC:

- 19
20 1. It recommended a work plan for completion of the task, including the rationale
21 supporting such a plan, to the ARAC Airport Certification Issues group.
- 22
23 2. The Working Group co-chairs gave a detailed conceptual presentation of the
24 proposed recommendations prior to proceeding.
- 25
26 3. The Working Group members prepared all appropriate documents and required
27 analyses, including supporting information.
- 28
29 4. The co-chairs provided status reports to ARAC at all meetings held to consider
30 airport certifications issues.

31
32 The Secretary of Transportation determined that the formation and use of the ARAC to address
33 this issue was necessary and in the public interest in connection with the performance of duties
34 imposed on the FAA by law.

35
36 Over the course of some 24-months, the Aircraft Rescue and Fire Fighting Requirements
37 Working Group met twelve times to research the issue and develop recommendations for the
38 ARAC. The Working Group began by establishing terms of reference to guide their internal
39 deliberations, determining that they would generate recommendations in the following manner:

- 40
41 1. Proposed changes to Part 139, Subpart D.
- 42 2. Proposed changes to other FAR Parts as appropriate.
- 43 3. Proposed new FAA Advisory Circulars and Orders, or changes to existing ACs and
44 Orders, as necessary to support revised procedures or requirements not deemed
45 appropriate for inclusion in Part 139, Subpart D.

1 The Working Group developed both a majority and minority position on each issue where it
2 found itself irreconcilably divided. Some individual Working Group members also provided
3 comments on issues when their respective organizations differed from the position taken by the
4 ARAC Working Group.

5
6 For the issues that the Group was unable to reach full consensus, the members agreed to submit
7 the majority opinion and their recommended language for use in the document. The member(s)
8 with an opposing opinion, the minority, submitted their position and justification to accompany
9 the majority opinion in the document.

10
11 The work undertaken by the ARFF Requirements Working Group was the result of its members'
12 willingness to donate their time and resources to host and travel to meetings and conduct
13 research. The FAA wishes to recognize this contribution and appreciates the Working Group's
14 effort to develop recommendations that represent a balance of safety and economic
15 considerations.

16 *Alternatives*

17
18
19 This NPRM addresses four primary issues: (1) the amount of aircraft rescue and fire fighting
20 equipment and agent that should be required at certificated U.S. airports; (2) airport ARFF index
21 determination; (3) personnel requirements, and (4) the time and location on the airport that
22 should be prescribed for ARFF response, both for airport certification and annual evaluation
23 purposes.

24 *Implementation*

25
26
27 A phased-in approach may be necessary to meet the proposed recommendations due to the
28 administrative, facility, equipment and budgeting cost issues associated with the requirements of
29 this section. A phased-in approach for ARFF personnel will allow an airport sufficient time for
30 the implementation of this rule. A phased-in approach will also allow sufficient time for the
31 training of personnel, airport capital improvement program planning, necessary environmental
32 review processes, construction of any new ARFF facilities and the planning and procurement of
33 ARFF vehicles.

34
35 Each certificate holder shall maintain an FAA approved written plan, which provides compliance
36 with this Part.

37 *General Discussion of the Proposal*

38
39
40 The primary purpose of aircraft rescue and fire fighting at airports is to mitigate situations that
41 pose a threat to life and property by providing a timely initial response to aircraft accidents and
42 incidents with personnel that are properly trained and equipped.

43
44 The ARFFRWG proposed restructuring the existing framework of airport "indexes" to align
45 more closely with the system of "categorization" in use by many ICAO signatories. In addition

1 to providing international harmonization, this has the practical benefit of refining the aircraft size
2 information upon which extinguishing agent calculations are based.

3
4 Although not required by Part 139, the ARFF operational mission, besides aircraft accidents and
5 incidents on the airport, may include or assist in (in no particular order):

- 6
- 7 • Emergency medical services;
- 8 • Hazardous materials response;
- 9 • Structural fire fighting;
- 10 • Mutual aid response off-airport;
- 11 • Fire inspection, prevention, public education activities;
- 12 • Family assistance and critical incident services;
- 13 • Response to vehicle accidents on the airport;
- 14 • Aircraft water rescue;
- 15 • Aircraft recovery;
- 16 • Public relations;
- 17 • Security and law enforcement; and,
- 18 • Operations and maintenance
- 19

20 The main difference between a terrorist act and an accident is intent. Otherwise the results are
21 pretty much the same. The threats and hazards of potential terrorist events are dynamic and exist
22 at all airports. Therefore, the role of ARFF in performing homeland defense tasks is much the
23 same as their role in all other phases of emergency services. The ARFFRWG discussed the role
24 of ARFF in the event of a terrorist attack and agreed that the regulations to mitigate a proper
25 response by ARFF personnel are sufficiently covered in 14 CFR 139.325 and 49 CFR 1542.307.

26
27 In the research and deliberations on the subject of ARFF response time, the ARFFRWG took
28 note of the following observations: “Fire may break out at any time from a few seconds to hours
29 after a crash. The first 60 seconds following fire are critical if air crews are endangered. But
30 efforts can never be relaxed at any time during the fire or response. It may take some minutes of
31 skilled work to extricate trapped air crew. Time saved in arrival at an aircraft not yet on fire is as
32 important as time in arrival when initial fire exists”. This passage first appeared in the NFPA’s
33 Airplane Crash Fire Fighting Manual in 1945, and remains as relevant a set of guidelines today
34 as it was then.

35
36 As a consequence of these proposed changes, several existing sections of the regulation would be
37 combined or moved, and the current numbering scheme of subparts C and D would be altered.
38 The following chart illustrates these changes, comparing existing section titles and numbering
39 against those proposed.

40 41 *Request for Additional Information*

42
43 Throughout this proposal, the FAA is requesting economic and operational information on
44 specific topics. As explained in the following Section-by-Section Analysis, the FAA intends to

1 use this information to further analyze certain proposed requirements. Additional information is
2 requested on the following subject areas:

- 3
- 4 1. The number of airports that will have to purchase additional vehicles to comply with
5 the requirements contained in this NPRM.
- 6 2. The number of airports that will have to purchase and maintain the means to store
7 additional agent to comply with the requirements contained in this NPRM.
- 8 3. The number of airports that will have to arrange to provide additional trained
9 personnel to comply with the requirements contained in this NPRM (comments
10 should include numbers of additional personnel required, personal equipment, and
11 approximate annual salary and benefit costs).
- 12 4. The number of airports that will have to construct new ARFF stations or relocate
13 existing ARFF stations to comply with the changes in response time requirements
14 contained in this NPRM.
- 15

16 *Section-by-Section Analysis*

17 Subpart A--General

18 Section 139.1. Applicability.

19
20
21
22 Currently, Part 139 is applicable only to airports serving scheduled or unscheduled air carriers
23 operating aircraft carrying more than 30 passengers. A final rule resulting from comments
24 received on an NPRM dated June 21, 2000 [65 FR 38636 *et seq.*] is expected to implement
25 legislated changes to lower the size of aircraft designed for more than 9 passengers.

26
27 In the early 1990s, the slogan "One Level of Safety" was used by the FAA to highlight
28 differences that existed at the time among the certification standards contained in Parts 119, 121,
29 and 135 that established requirements for airlines serving passengers. The ARFFRWG took note
30 of similar differences, specifically in the area of required ARFF services, that are applied against
31 aircraft operated under Part 121 based solely on the presence or absence of passengers aboard
32 them.

33
34 Cargo aircraft contain the same fuel loads as passenger aircraft; thus, the potential for fire and
35 destruction on the ground is the same regardless of what service a given aircraft is providing.
36 Also, cargo aircraft frequently carry hazardous materials not permitted in passenger operations.
37 Beyond these practical considerations lies the fact that, in an accident, human lives --
38 specifically, the flight crew's -- are as much at risk in cargo operations as in passenger
39 operations.

40
41 In some cases, the crew of a cargo-configured aircraft has far greater difficulty effecting self-
42 evacuation than do occupants with access to ample numbers of emergency exits throughout a
43 passenger aircraft's cabin; this is because if the structural integrity of the aircraft is compromised
44 during an incident or accident, the L1 door may not open due to the disconfigured fuselage. The
45 L1 door is the only door available on most cargo aircraft for crews to utilize. The primary exits

1 (the windows in the cockpit) may not open if the aircraft is deformed or not sitting on its' landing
2 gear, i.e., aircraft on side or inverted.

3
4 The majority of the ARFFRWG concluded that the applicability of Part 139 should be extended
5 to all scheduled and non-scheduled air carrier operations. This would include air carriers
6 conducting all cargo air transportation with aircraft having a maximum gross take-off weight of
7 33,000 pounds (15,000 kg) or greater. (The 33,000 pounds / 15,000 kg comes from the
8 harmonization with the JAA and the legislation that was passed concerning TCAS for all cargo
9 air carriers. The 33,000 pound limit was established to be above the DC-3 type aircraft and yet
10 continue to cover large turboprops and jets.) However, the FAA may not exceed the authority
11 granted it by broadening the applicability of this Part.

12
13 For the purposes of this NPRM, the ARFFRWG has used the word "occupant" throughout its
14 rulemaking recommendations to ARAC when referring to anyone inside an aircraft.

15
16 The dissenting opinion conceded that cargo aircraft do contain the same fuel loads as passenger
17 aircraft; however, airport certification regulations of the past thirty years have been developed
18 with the intent on responding to aircraft accidents involving a large number of people. Currently
19 the FAA authority, and therefore the applicability of Part 139, extends only to passenger carrying
20 aircraft under 49 USC 44706. Should the legislation ever be changed to include cargo aircraft it
21 is recommended that the FAA incorporate regulations that take into account the difference in the
22 number of occupants aboard the aircraft.

23
24
25 Sec. 139.3 Definitions.

26
27 The ARFFRWG saw no need to change any existing definitions provided in Part 139 (except for
28 changing "index" to "category" as explained below), although the definition of "air carrier
29 aircraft" will need to be changed if the U.S. Code is changed as described above with respect to
30 cargo aircraft. The ARFFRWG also took note of the new definitions provided in the "small
31 airports" NPRM of June 2000; a final rule based on that NPRM is pending at this writing.

32
33 The ARFFRWG concluded that several new definitions need to be added to Part 139 to ensure
34 unambiguous understanding of ARFF-specific terminology among all users of it. These include:

- 35
36 (a) *Aircraft rescue and fire fighting (ARFF) personnel* — trained personnel required to
37 meet the minimum response times and objectives as determined by regulatory
38 language and personnel analysis.
39 (b) *Personnel Task Analysis* means a process intended to identify the minimum number
40 of personnel required to undertake identified tasks before supporting external
41 organizations are able to effectively assist ARFF personnel.
42 (c) *Rapid Intervention Team (RIT)* means a minimum of two properly trained and
43 equipped personnel capable of initiating rescue of ARFF personnel. One member of
44 this team may also serve as the initial incident commander.
45 (d) *Response Time* means the measurement of time for a timed response drill. This
46 period begins with the activation of the tower alarm, (tone or signal), followed by

1 response information. This period ends with the initial discharge of agent upon
2 arrival of the first ARFF vehicle(s). Elapsed time is measured from Alert Tone to
3 Initial Discharge.

- 4 (e) *Timed Response Drill* means any test conducted at airports to determine that ARFF
5 vehicles can comply with the requirements of the regulation regarding response times.
6 (f) *Interior Firefighting* – The physical activity of fire suppression, rescue, or both,
7 inside of an aircraft or enclosed structure, which is involved in a fire situation.
8 (g) *Hazardous Materials* – “Substances or materials in quantities or forms that may pose
9 an unreasonable risk to health, safety, or property when stored, transported, or used in
10 commerce (DOT).” This source is from the glossary in IFSTA First Edition
11 “Hazardous Materials for First Responders”, and;
12 (h) *Occupants* – All people on board an aircraft
13

14 These terms are explained within the Section discussions below and are formally proposed for
15 inclusion in Sec. 139.3.

16
17 Sec. 139.5 Standards and procedures for compliance with the certification and operations
18 requirements of this part – no change.

19
20 Subpart B--Certification
21

22 Sec. 139.101 Certification requirements: General -- no change. The ARFFRWG anticipated that
23 the pending rule change based on the changes to 49 USC 44706 will revise this Section to apply
24 to airports serving aircraft operations designed for more than 9 passengers, and operated on that
25 expectation. Should cargo and charter operations be designated as "air carrier aircraft" at some
26 future date, as described above, the ARFFRWG made a separate recommendation to ARAC with
27 proposed language offering two alternatives for the types of aircraft that airports must be
28 certificated to accept: those aircraft designed for more than 9 passengers, and those with takeoff
29 gross weights of 33,000 pounds (15,000 kg) or greater.
30

31 Sec. 139.103 Application for certificate. -- no change.
32

33 Sec. 139.105 Inspection authority. -- no change.
34

35 Sec. 139.107 Issuance of certificate -- no change.
36

37 Sec. 139.109 Duration of certificate -- no change.
38

39 Sec. 139.111 Exemptions -- no change. The ARFFRWG deliberated on this Section based on its
40 specific reference to waivers to ARFF equipment requirements. The proposed new system of
41 indexing set forth in Subpart D of this Part provides a better breakdown of equipment
42 requirements at the very smallest airfields.
43

44 Sec. 139.113 Deviations -- no change.
45
46

1 Subpart C--Airport Certification Manual and Airport Certification Specifications

2
3

4 Sec. 139.201 Airport operating certificate: Airport certification manual -- no change.

5
6

7 Sec. 139.203 Preparation of airport certification manual -- no change.

8
9

10 Sec. 139.205 Contents of airport certification manual -- no change.

11
12

13 Sec. 139.209 Limited airport operating certificate: Airport certification specifications -- no
14 change.

15
16

17 Sec. 139.211 Preparation of airport certification specifications -- no change.

18
19

20 Sec. 139.213 Contents of airport certification specifications -- no change.

21
22

23 Sec. 139.215 Maintenance of airport certification specifications -- no change.

24
25

26 Sec. 139.217 Amendment of airport certification manual or airport certification specifications --
27 no change.

28
29

30 Subpart D--Operations

31
32

33 Sec. 139.301 Inspection authority -- no change.

34
35

36 Sec. 139.303. Personnel

37
38

39 Sec. 139.303(a) ARFF Personnel

40
41

42 The ARFFRWG considers the current regulation concerning ARFF personnel inadequate,
43 although there is debate among the members as to what should be required. There was general
44 consensus among the group that interior aircraft fire fighting and rescue should be a mandatory
45 role for ARFF personnel. The current regulatory role for ARFF personnel to merely provide an
exit path for self-evacuating aircraft occupants is not acceptable to the ARFFRWG.

46
47

48 The number of occupants and available fuel load in a commercial aircraft far exceeds that which
49 is present in most ground vehicle accidents and structure fires. However, the current Part 139
50 requires significantly less personnel to respond to a commercial aircraft accident/incident than a
51 municipal fire and rescue department would dispatch to a vehicle accident or structure fire. The
52 current FAR Part 139 can be interpreted to require only one person per required ARFF vehicle.
53 Under this interpretation, an Index C airport with two ARFF vehicles meeting the index

1 requirement is only required to have two persons available during periods of air carrier
2 operations.

3
4 Though current regulations require “that sufficient rescue and fire fighting personnel be available
5 during all carrier operations to operate the vehicles, meet the response times, and meet the
6 minimum fire fighting agent discharge rates specified within the regulation,” the FAA, through
7 its Advisory Circulars (AC), recognizes that ARFF personnel are required to perform additional
8 tasks, such as the following contained within the current AC 150/5200-12B, “Fire Department
9 Responsibility in Protecting Evidence at the Scene of an Aircraft Accident”.

- 10
- 11 a. “This is not to imply that during ARFF operations wreckage may not be disturbed if a
12 life is involved or if fire can be further suppressed or extinguished by judicious
13 removal of wreckage”
 - 14
 - 15 b. “When aircraft entry doors or emergency exits are jammed or blocked and cannot be
16 used for aircraft occupant escape or rescue, forcible entry into the fuselage is not
17 considered destruction of evidence. Forcible entry includes such actions as forcing
18 exit doors or cutting exits in the fuselage.”
 - 19
 - 20 c. “To assure complete fire extinguishments and accountability of all persons,
21 firefighters are expected to make a thorough examination of the cabin and storage
22 compartments.”
 - 23
 - 24 d. “If attached to the aircraft, they (voice and flight data recorders) should not be
25 removed except to preserve them from any further fire damage.”
 - 26

27 The current Advisory Circular 150/5210-2A, “Airport Emergency Medical Facilities and
28 Services” states;

- 29
- 30 a. “Damage control, rescue efforts, emergency medical aid as well as preservation of
31 evidence required for investigation, are all necessary components.” “The Fire and Rescue
32 Service plays a key role and bears initial responsibility for implementing necessary
33 rescue and first-aid actions at a disaster scene.”
 - 34
 - 35 b. “A rescue vehicle with special equipment is highly desirable at active airports.
36 Equipment on such a vehicle should include special tools for cutting into and entering an
37 aircraft and should include torches, floodlights, blankets, litters, and a
38 resuscitator/inhalator. First-aid kits and medical supplies should also be carried in the
39 vehicle.”
 - 40

41 The current Advisory Circular 150/5210-2A, “Aircraft Fire and Rescue Facilities” states;

- 42
- 43 a. “It is recommended that a variety of rescue, forcible entry, and extrication equipment be
44 carried on ARFF vehicles. The equipment includes ladders, seat belt cutters, air operated
45 chisels, hydraulic rescue kits, portable lighting, self-contained breathing apparatus,
46 smoke- ejectors, and first aid kits.”

1
2 A significant consideration in the development of the proposed regulatory language was an
3 increased level of safety for ARFF personnel. In an aircraft accident/incident, ARFF personnel
4 may be expected to operate in unpredictable and dangerous environments. A successful ARFF
5 operation is dependent upon ARFF personnel being properly trained and equipped, as well as
6 being physically capable of performing the required tasks of aircraft rescue and fire fighting. Due
7 to the physical demands placed on the firefighter, it is strongly recommended that ARFF
8 personnel have annual physical exams by a licensed physician to determine ARFF personnel
9 fitness for duty.

10
11 During the Aviation Rulemaking Advisory Committee (ARAC) process, the ARFF
12 Requirements Working Group (ARFFRWG) members participated in a number of interactive
13 research sessions that included propane and flammable liquid ARFF training simulators, interior
14 aircraft rescue and fire fighting, and handline and vehicle/turret operations. ARFFRWG
15 members participated in these exercises under optimal weather and safety conditions. Task
16 assignments and physical demands that may be expected of ARFF personnel during an aircraft
17 accident/incident with fire were experienced first hand by committee members. These
18 interactive sessions provided Working Group members the opportunity to experience a number
19 of concerns and issues critical to the outcome and validation of ARFFRWG recommendations.

20 For the purposes of this document, ARFF personnel means trained personnel required to meet
21 the minimum response times and objectives as determined by regulatory language and staffing
22 task analysis. A certificated airport may arrange for ARFF personnel from numerous sources.
23 Such sources may include airport fire departments, municipal fire departments, military fire
24 departments, and industrial fire departments. Dual-role airport employees, fixed base operators,
25 and fire brigades may also provide ARFF services. It is not the intent of the regulation to limit
26 such sources as long as the personnel are properly trained and equipped and can meet the
27 minimum response times.

28
29 Some certificated airports may find it advantageous to meet all ARFF personnel with a fully
30 staffed airport fire department. Others may rely on supplemental assistance from the sources
31 described above. In some cases, certificated airports with less frequent numbers of scheduled
32 flights may rely on off-airport sources for all ARFF personnel during air carrier operations.
33 Regardless of the source, the certificated airport has the responsibility to ensure that adequate
34 ARFF personnel will be available to comply with the regulation.

35 The certificated airport also bears the duty of making sure that all required ARFF personnel are
36 properly trained and equipped, as required by the regulation. An airport that relies on an off-
37 airport fire department, military, or non-airport entity to provide all or a portion of its required
38 ARFF personnel must have a written agreement with the entity to guarantee that ARFF
39 personnel, in accordance with the regulation, will be provided. All arrangements between the
40 airport and the entity regarding training, equipment, reimbursement, and other requirements
41 should be included in the agreement.

42
43 The ARFFRWG identified key tasks that ARFF services should be capable of providing at an
44 aircraft accident/incident within specified time objectives. The location of an aircraft
45 accident/incident, for planning purposes, should be the furthest end of the farthest runway.

1 These key tasks and time objectives, as follows, provide benchmarks on which to determine
2 ARFF staffing requirements.
3

4 Category 4 & 5 Airports

5 3 Minutes Begin discharge of required agent from first required vehicle
6 4 Minutes Begin discharge of required agent from all other required vehicles
7 Establish incident command system and request additional resources
8 Initiate access to aircraft cabin
9 5 Minutes Begin interior aircraft rescue and firefighting
10 Establish rapid intervention team (RIT)
11 9 Minutes Establish second interior ARFF team
12 Establish emergency medical services
13 Establish water supply and resupply required ARFF vehicles
14

15 Category 6 & 7 Airports

16 3 Minutes Begin discharge of required agent from first required vehicle
17 4 Minutes Begin discharge of required agent from all other required vehicles
18 Establish incident command system and request additional resources
19 Initiate access to aircraft cabin
20 5 Minutes Begin interior aircraft rescue and firefighting
21 Establish rapid intervention team
22 8 Minutes Initiate second access to aircraft cabin
23 Establish second interior aircraft rescue and firefighting team
24 Establish water supply and resupply required ARFF vehicles
25 Provide emergency medical services
26 10 Minutes Provide stationary vertical access to aircraft

27 Category 8, 9, & 10 Airports

28 3 Minutes Begin discharge of required agent from first required vehicle
29 4 Minutes Begin discharge of required agent from all other required vehicles
30 Establish incident command system and request additional resources
31 Initiate access to aircraft cabin
32 5 Minutes Begin interior aircraft rescue and firefighting
33 Establish rapid intervention team
34 6 Minutes Initiate second access to aircraft cabin
35 Establish second interior aircraft rescue and firefighting team
36 Establish emergency medical services
37 Establish water supply
38 8 Minutes Establish third interior aircraft rescue and firefighting team
39 Establish second rapid intervention team
40 Resupply required ARFF vehicles
41 Provide stationary vertical access to aircraft
42
43
44

1 The key tasks identified by the ARFFRWG are described below:
2

- 3 a. Discharge required extinguishing agent from the first required ARFF vehicle –
4 Adequate ARFF personnel shall be available to safely and effectively drive and
5 operate the required ARFF vehicle. ARFF personnel shall be capable of
6 discharging required extinguishing agent at the required discharge rate from the
7 first required ARFF vehicle.
8
- 9 b. Discharge required extinguishing agent from all other required ARFF vehicles -
10 Adequate ARFF personnel shall be available to safely and effectively drive and
11 operate the other required ARFF vehicles. ARFF personnel shall be capable of
12 discharging required extinguishing agent at the required discharge rate from these
13 vehicles.
14
- 15 c. Establish incident management system - An incident management system shall be
16 implemented and an on-scene ARFF incident commander shall be designated.
17 The incident commander shall give an initial report to the main emergency
18 communications facility and request, as necessary, additional resources
19 (personnel, vehicles, etc.). Adequate ARFF personnel shall be available to
20 perform incident management functions during an aircraft incident or accident.
21
- 22 d. Initiate access to aircraft cabin - ARFF personnel shall be capable of initiating
23 access to the aircraft cabin, using forcible entry tools and ground ladders. ARFF
24 personnel shall be capable of gaining vertical access to the aircraft by ground
25 ladder, aerial fire apparatus, or mobile stair. ARFF personnel gaining access to
26 the cabin shall be protected by ARFF vehicle turrets and/or handlines. Adequate
27 ARFF personnel shall be available to safely and effectively perform these
28 functions.
29
- 30 e. Begin interior aircraft rescue and firefighting - An interior ARFF team, consisting
31 of not less than two ARFF personnel, shall be capable of entering the aircraft with
32 a charged handline. The interior ARFF team shall be equipped with protective
33 clothing and self-contained breathing apparatus. The interior ARFF team shall be
34 protected by ARFF vehicle turrets and/or additional handlines. Interior aircraft
35 and firefighting shall be conducted in accordance with 29 CFR 1910.134.
36
- 37 f. Establish a rapid intervention team (RIT) - A RIT, consisting of not less than two
38 ARFF personnel, shall be prepared to rescue the interior firefighting and rescue
39 team. RIT personnel shall be equipped with protective clothing and self-
40 contained breathing apparatus. Interior aircraft and firefighting shall be
41 conducted in accordance with 29 CFR 1910.134. At Category 4 and 5 airports,
42 one member of the RIT team may act as the initial incident commander until
43 relieved from the RIT or incident command is assumed by another qualified
44 person.
45

- 1 g. Provide emergency medical services - An advanced life support team, consisting
2 of not less than two personnel trained at the emergency medical technician –
3 paramedic level and two personnel trained at the emergency medical technician –
4 basic level shall be on scene and equipped to provide basic and advanced life
5 support, including mass casualty management. Emergency medical personnel
6 may be non-ARFF personnel, if they are not assigned to rescue and firefighting
7 tasks.
8
- 9 h. Establish second interior ARFF team - A second interior ARFF team, consisting
10 of not less than two ARFF personnel, shall be capable of entering the aircraft with
11 a second charged hoseline. The second ARFF team shall be equipped with
12 protective clothing and self-contained breathing apparatus. NOTE: The second
13 interior ARFF team may consist of non-ARFF personnel if they have been trained
14 in interior structural firefighting and are equipped with protective clothing and
15 self-contained breathing apparatus.
16
- 17 i. Establish water supply and resupply required ARFF vehicles – A continuous
18 water supply of the rate specified shall be established for firefighting. All
19 required ARFF vehicles shall be reserviced to their required capacity. Adequate
20 ARFF personnel shall be available to safely and effectively drive and operate
21 ARFF vehicles. Non-ARFF personnel may operate structural fire apparatus and
22 other support vehicles to accomplish these tasks.
23
- 24 j. Initiate second access point to aircraft cabin - ARFF personnel shall be capable of
25 initiating a second means of access to the aircraft cabin, using forcible entry tools.
26 ARFF personnel shall be capable of gaining vertical access to the aircraft by
27 ground ladder, aerial fire apparatus, or mobile stair. ARFF personnel initiating
28 access to the cabin shall be protected by ARFF vehicle turrets and/or handlines.
29 Adequate ARFF personnel shall be available to safely and effectively perform
30 these functions.
31
- 32 k. Provide stationary vertical access to aircraft cabin - ARFF personnel shall be
33 capable of providing stationary vertical access and a water supply of not less than
34 250 gpm to the aircraft cabin by means of aerial fire apparatus or other suitable
35 platform. These tasks may be performed by non-ARFF firefighter personnel if
36 they have been trained in interior firefighting and are equipped with protective
37 clothing and self contained breathing apparatus. Adequate ARFF and non-ARFF
38 firefighter personnel shall be available to safely and effectively perform these
39 functions.
40

41 The following definitions are included for descriptive purposes for the preceding section and
42 may not necessarily be recommended by the ARFFRWG as “official” definitions:
43

- 44 a. ARFF personnel – Personnel trained and equipped to perform required ARFF
45 tasks, including interior rescue and firefighting.
46

- 1 b. Advanced life support team – A team consisting of not less than two personnel
2 trained and certified at the emergency medical technician – paramedic level and
3 two personnel trained and certified at the emergency medical technician – basic
4 level shall be on scene and equipped to provide basic and advanced life support,
5 including mass casualty management. Advanced Life Support team personnel
6 may consist of non-ARFF personnel if such personnel do not engage in rescue
7 and firefighting operations.
8
9 c. Aerial fire apparatus - An aerial ladder, elevating platform, aerial ladder platform,
10 or water tower that is designed to position personnel, handle materials, provide
11 egress, and discharge water.
12
13 d. Forcible entry – The act of making entry into an aircraft or other structure when
14 normal entry points are not accessible.
15
16 e. Ground ladder -Any portable ladder specifically designed for fire department use
17 in rescue, fire-fighting operations, or training, and not permanently attached to
18 fire apparatus.
19
20 f. Incident management system – A system that defines the roles and responsibilities
21 to be assumed by personnel and the operating procedures to be used in the
22 management and direction of emergency operations; the system is also referred to
23 as an incident command system (ICS).
24
25 g. Interior aircraft rescue and firefighting – The physical activity of fire suppression,
26 rescue or both inside of an aircraft or enclosed structure, which is involved in a
27 fire situation. Interior aircraft and firefighting shall be conducted in accordance
28 with 29 CFR 1910.134.
29
30 h. Main emergency communications center – The facility providing emergency
31 communications services to ARFF personnel at an aircraft emergency.
32
33 i. Non-ARFF firefighter – A person trained, equipped, and capable of performing
34 interior structural firefighting and rescue.
35
36 j. Personal protective clothing – Clothing designed to provide a degree of protection
37 for fire fighters from adverse exposures to the inherent risks of aircraft fire-
38 fighting operations and certain other emergency operations.
39
40 k. Rapid intervention team (RIT) – A minimum of two properly trained and
41 equipped personnel capable of initiating rescue of ARFF personnel engaged in
42 interior rescue and firefighting operations. Interior aircraft and firefighting shall
43 be conducted in accordance with 29 CFR 1910.134.
44

- 1 l. Self-contained breathing apparatus (SCBA) - A respirator worn by the user that
- 2 supplies a respirable atmosphere that is either carried in or generated by the
- 3 apparatus and is independent of the ambient environment.
- 4
- 5 m. Vertical access – Access from ground level to aircraft floor level or levels to
- 6 permit egress of ambulatory aircraft occupants and entry of ARFF personnel.
- 7
- 8 n. Continuous water supply - A water supply that is sufficient to provide the
- 9 required rate of flow of water to an aircraft emergency. Potential water supplies
- 10 include hydrants, engine/pumper relays, tankers, and static water sources.
- 11

12 There was general consensus on the use of a staffing task analysis to evaluate ARFF staffing.
 13 However, there were two opinions from the ARFFRWG on how best to determine the minimum
 14 required level of ARFF staffing required to perform these key tasks within the specified time
 15 objectives. These two opinions are presented as options in the proposed regulatory language.

- 16
- 17 a. The Air Line Pilots Association International, Aircraft Rescue and Fire Fighting
- 18 Working Group, Aviation Cabin Safety Specialists, Inc., Independent Pilots
- 19 Association, International Association of Fire Fighters, national Fire Protection
- 20 Association, International Association of Fire Chiefs, and the San Jose (Calif.)
- 21 Fire Department were of the opinion that there is a need to provide a table
- 22 outlining the minimum number of trained ARFF personnel for each airport.
- 23

24 The table only should be used as a reference for minimum staffing levels. In
 25 other words, every airport should never have fewer than the number of trained
 26 ARFF personnel outlined in the table. A staffing analysis should always be
 27 performed to determine the need for additional trained ARFF personnel (beyond
 28 the numbers in the table) based on the individual needs of each airport. This
 29 group’s model regulatory language mirrors that of the most recent revision to
 30 NFPA 403 (2003).

31

32 The Air Line Pilots Association International, Aircraft Rescue and Fire Fighting
 33 Working Group, Aviation Cabin Safety Specialists, Inc., Independent Pilots
 34 Association, International Association of Fire Fighters, National Fire Protection
 35 Association, International Association of Fire Chiefs, and the San Jose (Calif.)
 36 Fire Department were opposed to allowing only a staff analysis to be conducted
 37 and ignoring the table, because they felt there is a danger that someone could do a
 38 staffing analysis and provide fewer trained ARFF personnel than outlined in the
 39 table. Therefore, the table is essential so that this will never happen.

40

41 This group proposes that the minimum number of trained ARFF personnel
 42 responding to an initial alarm shall not be less than that outlined in Table 1.

43
 44
 45
 46

Table 1, Minimum ARFF Personnel per ARFF Category

<u>Category</u>	<u>Minimum Number of ARFF Personnel</u>
1-3	N/A
4	3 ARFF trained personnel including an Incident Commander
5	6 ARFF personnel including an Incident Commander and 2 trained personnel for Rapid Intervention
6-10	The minimum total number of trained personnel responding should be based on the equivalent of 3 per required ARFF vehicle. Additionally, an Incident Commander and 2 trained personnel for Rapid Intervention should be provided.

- b. A minority of the ARFFRWG were of the opinion that a staffing analysis alone was sufficient because each airport is unique in size, physical layout and availability of external resources. The utilization of hard numbers may also lead to staff reductions at some airports and may cause some airports to rely on hard numbers and not properly address the task analysis. The staffing task analysis provides a means of identifying tasks and time parameters. Airports may have resources available or made available to meet their requirements.

There was general consensus among the ARFFRWG on the manner in which a staffing task analysis should be conducted, regardless if minimum numbers are identified or not. A staffing task analysis should primarily consist of a qualitative analysis of a certificated airport’s ARFF services response to a worst case, aircraft accident scenario. The qualitative analysis should be supported by a quantitative risk assessment to estimate the reduction in risk. This risk assessment should be related to the reduction in risk to passengers and aircrew from deploying additional personnel. One of the most important elements is to assess the impact of any critical paths identified by the qualitative analysis.

A staffing task analysis should be performed by experienced ARFF personnel and the certificate holder to determine additional staffing requirements. The staffing task analysis should evaluate ARFF response to a worst case, aircraft accident scenario at the certificated airport. For the purpose of conducting a staffing task analysis, the response time to the location of an aircraft accident scenario shall be to the farthest point of the farthest runway or the location of the aircraft accident scenario, whichever is farther.

The analysis should be supported by a risk assessment which examines the risks to aircraft occupants. By using a risk-based approach that focuses upon worst case scenarios, the staffing task analysis should identify the minimum number of personnel required to undertake identified tasks in real time before supporting external services are able to effectively assist ARFF services.

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A qualitative analysis should be used to identify the effectiveness of the current staffing level and to identify the level of improvement resulting from additional staffing. A worst case accident scenario should be analyzed to assess the relative effectiveness of at least two levels of ARFF staffing.

A quantified risk assessment should be used to support the conclusions of the qualitative analysis by examining the risks to passengers and aircrew from aircraft accidents at the airport. This comparison of the risks allows the benefit of employing additional RFFS staff to be evaluated in terms of the risk reduction in passengers and aircrew lives saved expressed in monetary terms. This can be compared with additional costs incurred in employing the additional personnel. This is of little, if any, value in determining minimum levels of personnel.

The following items, at a minimum, should be used to determine the basic contents of the staffing task analysis:

- Description of the airport (i.e., runways, taxiways, roadways, terminals, buildings)
- Current ARFF category (as defined by Part 139)
- Response criteria (i.e., terrain, environment, climate, fire station location)
- Current rate of aircraft operations (i.e., frequency, largest scheduled air carrier aircraft)
- Operational hours (i.e., scheduled flight operations)
- Current ARFF organizational structure (i.e., administration, supervision, structure)
- Level of personnel (i.e., number, training, experience and availability of ARFF personnel)
- Level of supervisors (i.e., number, training, experience and availability of ARFF supervisors)
- ARFF competence (i.e., level of training and experience of ARFF services)
- Extraneous duties of ARFF services (i.e., structural firefighting, emergency medical services, code enforcement, law enforcement, airport operations, maintenance, fixed based operators)
- Alerting system (i.e., radio, telephone, pager)
- ARFF vehicles (i.e., number, type and operating requirements)
- Extinguishing agents (i.e., primary and complementary agents, resupply and water supply)
- Special equipment (i.e., structural firefighting apparatus, rescue equipment, stair trucks)
- Medical facilities (i.e., emergency medical services available on and off airport)
- Pre-determined attendance (i.e., automatic aid, fire brigade, military)
- Other ARFF staffing sources (i.e., mutual aid, call back, military)
- Incident Task Analysis (i.e., aircraft accident/incident scenarios)
- Appraisal of existing ARFF provision (i.e., assessment of ARFF services capabilities)

- 1 • Future requirements (i.e., airport expansion, category changes, regulatory
- 2 mandates)
- 3 • Enclosures (i.e., maps, event trees, charts)
- 4

5 The results of the analysis should be recorded in a table or spreadsheet format and should be laid
6 out in such a way as to ensure that the following is recorded:

- 7
- 8 a. Time Objective – Beginning at initial response time and continuing until all
- 9 required tasks have been initiated
- 10
- 11 b. Tasks – Listing of all tasks and priorities
- 12
- 13 c. Resources – Personnel and equipment required for each task
- 14
- 15 d. Comments – Explanatory information
- 16

17 The certificate holder would then determine its staffing requirements to ensure that an adequate
18 number of ARFF personnel are readily available during aircraft operations to staff required
19 ARFF and other emergency vehicles and to perform ARFF operations.

20

21 To aid certificate holders and ARFF personnel, the FAA should establish standards or guidance
22 for conducting effective staffing task analyses. This guidance should be based on industry
23 accepted practices for conducting such analysis. A draft advisory circular has been developed by
24 the ARFFRWG and is included with the recommendations that accompany this document.

25

26 Immediate notification is essential to rapid response to an accident/incident within required
27 response times. Direct voice notification to ARFF personnel by radio, telephone or public
28 address systems will generally result in a more rapid and effective response. Notifying ARFF
29 personnel by pager or through another party will usually delay response times and important
30 information may not be accurately relayed.

31

32 An incident management system ensures an efficient and organized response to an aircraft
33 incident and should be implemented on every aircraft incident. Incident command should be
34 established outside of the hazard area for the overall coordination and direction of the aircraft
35 incident.

36

37 Aircraft occupants may be unable to self-evacuate following an aircraft incident. Therefore,
38 ARFF personnel may be required to enter the aircraft to locate and remove those occupants.
39 ARFF personnel also need to account for, assist and locate self-evacuating occupants to ensure
40 their safe egress from the hazard area. ARFF personnel may be required to assist in the
41 evacuation of occupants, i.e., deploy and steady aircraft emergency slides.

42

43 Fire fighting, whether in a structure or aircraft, is an inherently dangerous operation. Certificated
44 airports should establish procedures to reduce the risk of injury or death to ARFF personnel
45 during an aircraft incident. Safety procedures should address interior and exterior aircraft fire

1 fighting, emergency vehicle operations, ARFF personnel accountability, incident management,
2 and aircraft operating area safety.

3
4 ARFF personnel at certificated airports should be equipped, trained and capable of interior
5 aircraft fire fighting. Such operations should be performed in accordance with the Occupational
6 Safety and Health Administration under 29 CFR Part 1910.134(g)(4), which is commonly
7 referred to as the “two-in/two-out” rule. FAR Part 139 certificate holders should develop and
8 implement policies addressing aircraft fire fighting operations.

9
10 Interior aircraft fire fighting is a key component in determining the minimum number of ARFF
11 personnel required. Interior aircraft fire fighting means the physical activity of fire suppression,
12 rescue or both, inside of an aircraft or enclosed structure, which is involved in a fire situation
13 beyond the incipient stage. An incipient stage fire is a fire which is in the initial or beginning
14 stage and which can be controlled or extinguished by portable fire extinguishers. An interior
15 aircraft fire produces an atmosphere that is immediately dangerous to life and health (IDLH) as
16 defined by OSHA. Similar to a structure fire, an interior aircraft fire results in an uncontrolled
17 and unpredictable situation that can rapidly deteriorate. ARFF personnel involved in interior
18 aircraft fire fighting face great personal danger and inherent urgency.

19
20 The “two-in/two-out” rule mandates that ARFF personnel engaged in interior aircraft fire
21 fighting should work in a paired system; at least two personnel in the aircraft (entry team) and at
22 least two personnel outside in case a rescue is needed (rapid intervention team). If environmental
23 conditions safely permit, a minimum of two ARFF personnel should enter the aircraft to search
24 for and rescue occupants who are unable to self-evacuate. These ARFF personnel should remain
25 in visual and voice contact with each other at all times. One of the two personnel outside the
26 aircraft may be assigned to an additional role, such as incident commander in charge of the
27 incident or safety officer, so long as this individual is able to perform assistance or rescue
28 activities without jeopardizing the safety or health of any ARFF personnel working at the
29 incident.

30
31 ARFF personnel should not be precluded from performing emergency rescue activities before an
32 entire team has assembled. If initial ARFF personnel find a known life hazard situation where
33 immediate action could prevent the loss of life, deviation from the two-in/two-out rule may be
34 permitted. However, such deviations must be exceptions and not de facto standard practices. A
35 certificated airport could not, as a policy, invoke the emergency rescue exception to two-in/two-
36 out to avoid deploying less than four ARFF personnel to an aircraft emergency.

37
38 Even with rapid notification, ARFF personnel must have a means to safely respond to an aircraft
39 incident within required response times. Personnel operating ARFF vehicles and other
40 emergency response vehicles should be properly trained and licensed to operate those vehicles.
41 The ARFFRWG recommends that a minimum of two ARFF personnel respond on each required
42 ARFF vehicle for safe response to an aircraft emergency.

43
44 The impact forces of an aircraft incident may require ARFF personnel to make forcible entry into
45 the aircraft and to extricate entrapped occupants. Forcible entry and extrication often require the
46 use of heavy tools both manual and hydraulic. More than one person is required to operate these

1 tools. Due to the presence of flammable vapors, protective hoselines should be available to
2 protect forcible entry and extrication activities.

3
4 An aircraft fire may not be suppressed or extinguished with the exclusive use of ARFF vehicle
5 turrets. ARFF personnel may be required to utilize hoselines to suppress fires in areas
6 inaccessible to vehicle turrets or to protect search and rescue operations and self-evacuating
7 occupants.

8
9 Safe evacuation of an aircraft via escape slides may require someone at the bottom of the slide to
10 steady it, and to assist and direct evacuees away from the slide. This becomes even more critical
11 during windy conditions.

12
13 The configuration, type and size of regularly scheduled commercial aircraft serving the airport
14 may impact ARFF personnel response and tactics. A large aircraft may require that ARFF
15 personnel make entry at more than one point or require the use of ladders to gain entry.
16 Additional ARFF personnel may be necessary to aid in the evacuation of aircraft with a large
17 number of occupants or unusual configurations.

18
19 Aircraft accidents/incidents may involve releases of, or substantial threats of release of,
20 hazardous substances. All emergency response operations for releases of, or substantial threats
21 of release of, hazardous substances on or around aircraft shall be performed in accordance with
22 the procedures for emergency response operations in OSHA's Hazardous Waste Operations and
23 Emergency Response Standard, 29 CFR 1910.120. ARFF personnel should only perform tasks
24 during such accidents/incidents at the level of their individual training and certification.

25
26 Sec. 139.303(b) Training and certification of ARFF personnel.

27
28 ARFF personnel training programs should follow an approved curriculum. At a minimum, the
29 curriculum for initial and recurrent training should include:

- 30 • Airport familiarization.
- 31 • Emergency vehicle operations / certification
- 32 • Aircraft familiarization.
- 33 • Rescue and fire fighting personnel safety.
- 34 • Self Contained Breathing Apparatus.
- 35 • Emergency communications
- 36 • Incident command system.
- 37 • Fire hoses, nozzles, turrets, and other appliances
- 38 • Aircraft rescue and safety equipment.
- 39 • Extinguishing agents
- 40 • Emergency aircraft evacuation
- 41 • Interior/exterior aircraft fire fighting
- 42 • Hazardous materials/dangerous goods
- 43 • Airport emergency plan
- 44 • Ventilation
- 45 • Evidence preservation

1
2 A carefully organized training program should be developed to meet the qualification
3 requirements of NFPA 1003, *Standard for Airport Fire Fighter Professional Qualifications* and
4 NFPA 405, *Standard for the Recurring Proficiency of Airport Fire Fighters*.

5
6 The following guidelines are offered for structuring a professional qualifications program.

7
8 (1) The objectives of a training program for aircraft rescue and fire-fighting personnel at
9 airports should be to accomplish the following:

10 (a) Teach the safe application of recognized practices and procedures

11
12 (b) Develop and maintain the confidence and competency of all personnel
13 assigned ARFF duties

14
15 (c) Instill the concept of professionalism

16
17 (d) Serve as a source of accurate technical information whereby the lessons
18 gained from aircraft accidents or incidents are properly analyzed and the
19 information disseminated to others concerned with ARFF operations

20
21 (e) Create an awareness of the hazards and dangers they may face in carrying out
22 ARFF operations

23
24 (2) Control and Planning. The complete training and educational program for aircraft
25 rescue and fire-fighting personnel should be under the direction of one officer of the
26 airport fire department for planning, development, and supervision.

27
28 (3) Resources for Training. Training material resources for a training program oriented
29 specifically to meet the needs of aircraft rescue and fire-fighting personnel should take
30 into consideration providing suitable amounts of extinguishing agents, such as foam
31 concentrate, dry chemical, and clean streaming agent; and fuel for training fires.

32
33 (4) Phases of Training. Training in all phases should be conducted for support personnel
34 used as auxiliary fire fighters and for full-time aircraft rescue and fire-fighting personnel.
35 Because of the factor of time availability for schooling, the depth into which subjects are
36 covered will vary, but the scope should not be reduced for auxiliary fire fighters.

37
38 (5) Indoctrination. Indoctrination training should include the following:

39 (a) The rules and regulations applicable to ARFF services

40
41 (b) Knowledge of the basic duties and responsibilities and those of co-workers

42
43 (c) Emergency response procedures

1 (d) The command structures for administration and operations

2
3 (e) The importance of practicing occupational safety

4
5 (6) Operating ARFF Equipment. All aircraft rescue and fire-fighting personnel should be
6 capable of effectively handling fire and rescue equipment under varied conditions of
7 terrain and weather. The aim of training should be to ensure that every fire fighter is so
8 well versed in handling all types of appliances and tools used in ARFF operations that
9 under stressful conditions individual fire fighters can take effective action without the
10 need for specific direction. Some of the items that should be covered are included in the
11 following list:

12
13 (a) Complete knowledge of each tool and piece of equipment.

14
15 (b) Location of each piece of equipment and tool carried on each vehicle.

16
17 (c) Method of using each piece of equipment and tool, with emphasis on personal
18 safety factors.

19
20 (d) Special handling precautions for the use of power tools.

21
22 (e) Knowledge of, and training in, the use of breathing apparatus and other
23 protective equipment.

24
25 (f) Techniques employed in utilizing the available communication equipment.

26
27 (g) Knowledge of the apparatus, its built-in equipment, including the pump and
28 its performance capabilities, the agents carried and their delivery systems.

29
30 (h) Actual operation of all vehicle controls and behind-the-wheel driver training
31 under circumstances including negotiating obstacles and muddy or snow-
32 covered soil conditions. This is done to provide a degree of assurance that the
33 vehicle will not get bogged down or damaged during emergencies.

34
35 (i) Knowledge of departmental policies on positioning of apparatus for tactical
36 service at accidents/incidents under the variety of possible conditions to be
37 encountered.

38
39 (j) Record keeping to document the efficiency and effectiveness of the various
40 vehicles utilized by the airport fire department.

41
42 (k) Location and operation of on-board fire fighting systems

43
44 (7) Fire Behavior and Fire Suppression. Aircraft rescue and fire-fighting personnel should
45 possess a sound knowledge of fire behavior. Instruction in this phase should include the
46 following:

- 1
- 2 (a) Principles of combustion, with emphasis on the types of aircraft fuels
- 3
- 4 (b) How fire propagates through the effects of heat conduction, convection, and
- 5 radiation
- 6
- 7 (c) Influence of fuel distribution on heat production
- 8
- 9 (d) Principles of fire suppression by the various types of agents utilized in aircraft
- 10 rescue and fire-fighting operations
- 11
- 12 (e) Live fire exercises that include but are not limited to exterior fuel fires, interior
- 13 fires, engine fires, wheel fires, and fires involving on-board auxiliary power units
- 14

15 Training should be given covering the advantages and disadvantages of each fire-

16 extinguishing agent employed. Every opportunity should be taken to use the agents on

17 realistic training fires. Each routine equipment test should be used as a training exercise

18 to provide experience in the proper handling of the equipment, and to establish the proper

19 technique of application of each agent available.

20

21 (8) Effects of heat exposure on individuals

22

23 (9) Understanding of hazards from composite materials.

24

25 (10) Understanding of hazardous materials on all types of aircraft expected to serve the

26 airport. In addition, this block of instruction should include all required annual training

27 for the first responders' role in weapons of mass destruction (WMD) events. Proficiency

28 shall be demonstrated in using detection equipment carried by ARFF units.

29

30 (11) Rescue and Fire-Fighting Procedure. Care should be taken to ensure that aircraft

31 rescue and fire-fighting personnel fully understand that to achieve the objective of

32 safeguarding the lives of those involved in an aircraft accident requires that fire in the

33 practical critical area (PCA) be controlled quickly and that this area be kept secure. Strict

34 discipline should be maintained to ensure that fire suppression agents are not expended

35 on fire outside the PCA until it is positively established that the immediate and long-term

36 security of the PCA will not be jeopardized. Personnel should be given thorough

37 instructions in the following subject areas:

38

39 (a) Standard operating guidelines (SOG) to be expected from the aircraft

40 crewmembers under specified circumstances, e.g., recurrent training in airport

41 SOG for WMD events.

42

43 (b) Locations within aircraft where victim concentration may be anticipated under

44 accident conditions of various types

45

46 (c) Behavior patterns of individuals involved in major disasters

- (d) Means of preventing or minimizing panic
- (e) Means of gaining entry through normal aircraft openings
- (f) Locations most suitable for forcible entry into the aircraft
- (g) Least risk bomb locations (LRBL) for aircraft serving the airport
- (h) Requirements of setting up triage and treatment areas that should be part of the airport/community emergency plan (see NFPA 424, Guide for Airport/Community Emergency Planning)
- (i) Methods of carrying injured persons (one-person and by teams)
- (j) Training in SOG established for designated Threat Levels Yellow, Orange and Red

(12) Familiarization with Local Terrain.

A thorough knowledge of the terrain of the airport and its immediate vicinity is essential. The existence of any areas that may from time to time become impassable because of weather or other conditions (tides, growth of brush, etc.) should be known to all crewmembers. Training should include actual ARFF vehicle operations over primary and secondary travel routes on the airport and runway overrun areas. Familiarization with areas outside the airport boundary to which the on-airport ARFF equipment might be authorized to respond can be accomplished with other vehicles. Personnel should also receive training during periods of diminished visibility. The instruction program should include the following:

- (a) Locations of obstacles both temporary and permanent
- (b) Locations of exit points (gates and/or frangible sections) in the security fence
- (c) Location of rendezvous points for mutual aid apparatus as planned in the airport/community emergency plan
- (d) Areas that might become impassable in inclement weather
- (e) Availability of helicopters, boats, swamp buggies, air-cushion vehicles, or other off-road conveyances

(13) Operation of each ARFF vehicle and its capability to negotiate the existing terrain under the various conditions that may be anticipated. At the completion of vehicle training, a competency evaluation shall be conducted.

1 (14) Aircraft Familiarization Training. Aircraft rescue and fire-fighting personnel should
2 be familiar with the following:

- 3
- 4 (a) Locations of phone jacks on different types of aircraft
- 5
- 6 (b) Availability and method of operation of aircraft escape devices
- 7
- 8 (c) Location of aircraft batteries, and means of disconnect
- 9
- 10 (d) Manual operation of passenger doors, cargo doors, emergency exits, and other
- 11 access points
- 12
- 13 (e) Amount and type of aircraft fuel carried and the fuel storage locations in each
- 14 aircraft
- 15
- 16 (f) Location and quantity of oxygen carried
- 17
- 18 (g) Cockpit access issues associated with each type of aircraft serving the airport
- 19
- 20 (h) Access to wheel wells, electrical and engine accessory compartments, and
- 21 other areas of critical concern
- 22
- 23 (i) Fire behavior characteristics and locations in the aircraft of combustible metals
- 24 (magnesium, titanium), plastics (cabin liners, seating), combustible insulation (for
- 25 electrical wiring and sound deadening), hydraulic fluids, lubricating oil, rubber,
- 26 and similar combustibles and flammable materials
- 27
- 28 (j) Least Risk Bomb Locations in aircraft serving the airport

29

30 (15) Factors that influence response time:

- 31
- 32 (a) Means of notification of the ARFF services
- 33
- 34 (b) Completeness of the information in the activation message
- 35
- 36 (c) Location of the fire station
- 37
- 38 (d) Acceleration, top speed, on-road handling, and off-road mobility
- 39 characteristics of the vehicles
- 40
- 41 (e) Degree of preparatory training
- 42
- 43 (f) Provision of emergency access roads
- 44
- 45 (g) Climatic conditions
- 46

1 139.303(c) Live fire drill.

2

3 Prior to being assigned to duty and at least every 12 consecutive calendar months thereafter, all
4 ARFF personnel should participate in at least one live-fire drill. Live fire training exposes ARFF
5 personnel to near-realistic aircraft fire conditions. It also provides an opportunity for airport
6 operators to evaluate ARFF personnel performance and evaluate training needs. This training
7 should be done at an FAA approved ARFF training facility using a mock-up and burn area
8 appropriately sized based on the representative aircraft serving the airport. Live fire training
9 should include interior and exterior aircraft fire fighting, including the use of hoselines and
10 ARFF vehicle turrets.

11

12 In jurisdictions where allowed ARFF personnel shall participate in practical training using
13 primary and complimentary agent(s) carried on ARFF apparatus. In addition, training on three-
14 dimensional fires shall be encountered.

15

16 139.303(d) Emergency medical training.

17

18 ARFF personnel play a key role and bear initial responsibility for implementing necessary rescue
19 and emergency medical care at an aircraft incident. The current FAR Part 139 requires ARFF
20 personnel to be familiar with a number of training areas, to include medical training. At a
21 minimum, all ARFF personnel should be required to receive training at least at the level of U.S.
22 Department of Transportation (DOT) First Responder. Use of the DOT First Responder provides
23 ARFF personnel with a standard curriculum for basic medical training.

24

25 139.303(e) Training records.

26

27 Maintenance of ARFF personnel training records provides evidence of the certificate holder's
28 regulatory compliance. Each certificate holder shall maintain a record of all training received by
29 ARFF personnel under this section. Such records shall be maintained during the course of the
30 individual's employment and for at least 12 months after the employment ends. Certificated
31 airports that utilize ARFF personnel from non-airport entities should maintain or have access to
32 training records for those individuals. Records shall include, at a minimum, the name of the
33 instructor, the date and duration of the training, and description of the training received.

34

35 Sec. 139.303(f). Advisory Circulars

36

37 The current Advisory Circulars in the 150 series, related to ARFF services, including equipment,
38 planning, training, and airport emergency plans should be reviewed to ensure current industry
39 concerns and best practices are included and available to ARFF personnel.

40

41 Sec. 139.305 Paved areas -- no change.

42

43 Sec. 139.307 Unpaved areas -- no change.

44

45 Sec. 139.309 Safety areas -- no change.

1
2 Sec. 139.311 Marking and lighting -- no change.

3
4 Sec. 139.313 Snow and ice control -- no change.

5
6 Sec. 139.315 Aircraft rescue and fire fighting: Index determination – significant changes
7 proposed, including changing the term used to establish airport ARFF requirements from "index"
8 to "category."

9
10 The FAA currently utilizes an airport indexing system. Its early use was in the term of indexes 1
11 through 5 and evolved to its current system of A through E with a revision in 1972 and this
12 lettering system has been in use for thirty years. The switch to a category based system provides
13 a harmonization with ICAO standards that will provide airports a greater level of flexibility
14 while allowing airports to align into a category that may provide a focused level of protection for
15 the aircraft landing and departing the airport. Table 2 compares ICAO and NFPA categorization
16 criteria against current FAA indexes:
17

18 Table 2 – ARFF Index Comparison to ICAO and NFPA

FAA Index	Aircraft Length (ft.)	ICAO Cat.	Aircraft Length (ft.) up to but not including	Width up to but not including	NFPA Cat.	Aircraft Length up to but not including	Width up to but not including	Sample Aircraft
GA-1	NA	1	29' 9 m	6.6'	1	30	6.6	Cessna 182
GA-1	NA	2	39' 12m	6.6'	2	39	6.6	Cessna Caravan
GA-2	NA	3	59' 18m	9.8'	3	59	9.8	Cessna 404
A	<90	4	78' 24m	13.1'	4	78	13.0	EMB120
A	<90	5	91' 28m	13.1'	5	90	13.0	CRJ-200; Saab 340
B	90 – 126	6	127' 39m	16.4'	6	126	16.4	DC-9,A320
C	126 – 159	7	160' 49m	16.4'	7	160	16.4	B757-200; B767-200ER
D	159 – 200	8	200' 61m	22.9'	8	200	23.0	A300; B757-300
E	>200	9	249' 76m	22.9'	9	250	23.0	A340-600; B777
		10	295' 90m	26.2'	10	295	25.0	AN-225, A380

19
20
21 However, the proposed language provides for one significant difference from the current
22 regulatory structure – the inclusion of width as part of fire protection determination. Aircraft
23 width has long been a consideration by both the ICAO and the National Fire Protection
24 Association (NFPA). The inclusion of width allows for consideration of wide-body aircraft and

1 some wider narrow-body aircraft. Additionally, this allows for a greater alignment of the aircraft
2 size and the agent needs prescribed in accepted national and international standards through
3 ICAO and NFPA but also outlined in AC 150/5210-6C, Aircraft Fire and Rescue Facilities and
4 Extinguishing Agents.

5
6 The effect of the proposed change is to completely replace the current language of Sec. 139.315,
7 Paragraphs (a) and (b).

8
9 Table 3 lists certificated airports that are currently used by Part 121 cargo carriers. Many of the
10 airports listed may have more ARFF equipment or staff than what is required by Part 139;
11 however, the data listed on the table is what is currently required by FAR Part 139 at these
12 airports. This data is based only on the Part 121 passenger aircraft utilizing these airports and
13 using current 'remission' allowances. [Data in table was obtained from the FAA Airport Facility
14 Directory & www.airnav.com] For example, SDF (Louisville, KY) is shown as Index C;
15 however, due to large cargo aircraft utilizing this airport, the actual ARFF available is Index E
16 although it is not shown. Another example is BOI (Boise, ID), it's shown as Index B in May of
17 2003 down from Index C in April 2002. However, the reason that the Index dropped is due to
18 the number of passenger flights into BOI by a certain type of jet aircraft. The ARFF availability
19 did not change, just the Index letter; however, the lower Index is now what is required.

20
21 Should 49 USC 44706 be changed to include air carriers conducting all cargo air transportation
22 with aircraft having a maximum gross take-off weight of 33,000 pounds (15,000 kg) or greater at
23 some future date, and the concept of "remission" be eliminated (see Paragraph 139.315 (c)
24 discussion below), then Table 3 shows the airports that might be affected for increases in ARFF
25 equipment and/or staff. Many of the airports on this chart already have ARFF Index availability
26 above what is listed as required. Note: There are some airports such as RFD or SDF that already
27 have ARFF equipment and/or staff that are higher than listed in the "Current Index / Category
28 Comparison". Column of Table 4; therefore, the 'Potential' column may not be affected.

1 **Table 3 – Certificated Airports Used by Part 121 Cargo Carriers**

ARPT	INDEX (MAY 03)	NEW CATEG.	LARGEST CARGO ACFT	ARPT	INDEX (MAY 03)	NEW CATEG.	LARGEST CARGO ACFT	ARPT	INDEX (MAY 03)	NEW CATEG.	LARGEST CARGO ACFT
ABE	C	7	727	FNT	B	6	727	OGG	D	8	757
ABQ	C	7	DC-8	FSD	B	6	A300	OKC	C	7	757
ABY	A	4 or 5	757	FWA	B	6	757	OMA	C	7	757
AFW	NONE	---	MD-11	GEG	C	7	757	ONT	D	8	MD-11
ALB	C	7	757	GFK	B	6	727	ORD	E	9	MD-11
ANC	E	9	MD-11	GJT	B	6	727	ORF	C	7	757
ATL	E	9	MD-11	GRR	C	7	727	PBI	D	8	757
ATW	B	6	727	GSO	C	7	757	PDX	E	9	DC-10
AUS	D	8	MD-11	GSP	C	7	757	PHL	E	9	747
BDL	D	8	DC-8	GTF	C	7	DC-10	PHX	D	8	MD-11
BFI	A	4 or 5	A300	HNL	E	9	MD-11	PIA	B	6	727
BFM	NONE	---	DC-10					PIE	C	7	DC-8
BHM	C	7	A300	HRL	B	6	757	PIT	D	8	DC-8
BIL	C	7	757	HSV	C	7	727	PNS	C	7	DC-9
BNA	C	7	DC-9	HTS	B	6	727	PVD	C	7	747
BOI	B	6	A300	IAD	E	9	DC-10	PWM	C	7	727
BOS	E	9	DC-10	IAH	E	9	MD-11	RDU	C	7	DC-8
BTV	C	7	727	ICT	C	7	757	RFD	A	4 or 5	DC-8
BUF	D	8	A300	ILN	NONE	---	767	RIC	C	7	757
BUR	C	7	A300	IND	D	8	MD-11	RNO	C	7	A300
BWI	D	8	A300	ISP	C	7	DC-9	ROA	B	6	757
CAE	C	7	A300	JAN	C	7	757	ROC	C	7	A310
CHA	B	6	DC-9	JAX	D	8	A300	RST	B	6	727
CHS	C	7	A300	JFK	E	9	MD-11	RSW	D	8	757
CID	C	7	757	KOA	D	8	747	SAN	D	8	DC-10
CLE	C	7	DC-8	LAN	C	7	757	SAT	C	7	MD-11
CLT	D	8	DC-8	LAS	D	8	757	SAV	C	7	727
CMH	C	7	DC-8	LAX	E	9	MD-11	SBN	B	6	757
CNW	NONE	---	DC-9	LBB	C	7	727	SDF	C	7	747
COS	C	7	DC-9	LCK	NONE	---	MD-11	SEA	E	9	MD-11
COU	A	4 or 5	DC-9	LFT	B	6	757	SFO	E	9	DC-10
CPR	A	4 or 5	727	LGB	C	7	767	SGF	B	6	757
CVG	D	8	727	LIT	C	7	757	SHV	C	7	757
CWF	NONE	---	DC-9	MCI	C	7	A300	SJC	C	7	DC-10
DAL	C	7	767	MCO	D	8	A300	SJU	D	8	A300
DAY	C	7	727	MDT	C	7	DC-8	SLC	E	9	MD-11
DEC	A	4 or 5	727	MDW	D	8	DC-9	SMF	C	7	DC-10
DEN	D	8	MD-11	MEM	D	8	MD-11	SNA	C	7	757
DFW	E	9	MD-11	MHR	NONE	---	767	STL	D	8	DC-10
DLH	B	6	727	MHT	C	7	A300	SWF	C	7	757
DSM	C	7	A300	MIA	E	9	MD-10	SYR	C	7	757
DTW	E	9	DC-10	MKE	C	7	DC-8	TLH	C	7	727
EFD	A	4 or 5	757	MLI	B	6	DC-9	TPA	D	8	DC-10
ELP	C	7	A300	MOB	C	7	757	TRI	B	6	DC-9
EWR	E	9	MD-11	MSN	C	7	727	TUL	D	8	757
FAR	C	7	DC-9	MSP	E	9	MD-11	TUS	D	8	727
FAT	C	7	767	MSY	D	8	DC-8	TYS	C	7	DC-8
FLL	E	9	MD-11	OAK	D	8	747	YNG	A	4 or 5	DC-9

2 NOTE: MHR and ILN are not Part 139 certificated airports; therefore, they are not required to have an ARFF Index or provide ARFF for any
 3 aircraft.

4 NOTE: The 'new category' column in Table 3 relates the proposed category nomenclature to the current existing index nomenclature.

5 NOTE: The smallest size aircraft currently being used in Part 121 scheduled air carrier cargo operations, based on the exterior dimensions would
 6 fall into an Index B or higher.

7

1 **Table 4 – Certificated Airports Used by Part 121 Cargo Carriers without Remission**

ARPT	Current Index Category Comparison.	LARGEST CARGO ACFT	Potential PAX/CARGO CATEG.	ARPT	Current Index Category Comparison.	LARGEST CARGO ACFT	Potential PAX/CARGO CATEG.	ARPT	Current Index Category Comparison.	LARGEST CARGO ACFT	Potential PAX/CARGO CATEG.
ABQ	C/7	DC-8	D/8	GFK	B/6	727	C/7	ONT	D/8	MD-11	E/9
ABY	A/4 or 5	757	C/7	GJT	B/6	727	C/7	PHX	D/8	MD-11	E/9
				GTF	C/7	DC-10	D/8				
				HRL	B/6	757	C/7				
				HTS	B/6	727	C/7				
AUS	D/8	MD-11	E/9	ILN	None	767	Non-139	PIA	B/6	727	C/7
BHM	C/7	A300	D/8					PIE	C/7	DC-8	D/8
BOI	B/6	A300	D/8	KOA	D/8	747	E/9	PVD	C/7	747	E/9
BUR	C/7	A300	D/8	LCK	None	MD-11	E/9	RDU	C/7	DC-8	D/8
CAE	C/7	A300	D/8	LFT	B/6	757	C/7	RFD	A/ 4 or 5	DC-8	D/8
CHS	C/7	A300	D/8	LGB	C/7	767	D/8	RNO	C/7	A300	D/8
CLE	C/7	DC-8	D/8	MCI	C/7	A300	D/8	ROA	B/6	757	C/7
CMH	C/7	DC-8	D/8	MDT	C/7	DC-8	D/8	SAT	C/7	MD-11	E/9
CNW	None	DC-9	D/8	MEM	D/8	MD-11	E/9	SBN	B/6	757	C/7
COU	A/4 or 5	DC-9	B/6	MHR	None	767	Non-139	SDF	C/7	747	E/9
CPR	A/4 or 5	727	C/7	MHT	C/7	A300	D/8	SGF	B/6	757	C/7
DEN	D/8	MD-11	E/9	MKE	C/7	DC-8	D/8	SJC	C/7	DC-10	D/8
DLH	B/6	727	C/7	OAK	D/8	747	E/9	SMF	C/7	DC-10	D/8
DSM	C/7	A300	D/8					TYS	C/7	DC-8	D/8
EDF	A/ 4 or 5	757	C/7					YNG	A/ 4 or 5	DC-9	B/6
ELP	C/7	A300	D/8								
FAT	C/7	767	D/8								
FSD	B/6	A300	D/8								
FWA	B/6	757	C/7								

2 [Note: the information for Table 3 is based on current passenger requirements with 'remission' in effect. Even if all cargo air carriers were not
3 included in the future, the ARFF Index {Category} at many of these airports shown would increase.]

4 **Sec. 139.315 (c). Reduction in rescue and fire fighting.**

5
6 14 CFR Part 139.317 specifies the level of Aircraft Rescue and Fire Fighting (ARFF) as a
7 function of aircraft length and frequency. This level of protection is currently known as the Index
8 (and is proposed to be changed to "Category"). The Index specifies the amount of agent for fire
9 extinguishment and the number of vehicles to deliver the agent proportionate to the size of the
10 largest airplane using the airport. However, 14 CFR 139.315 currently allows for those
11 requirements to be adjusted based on the frequency of operations by the largest aircraft using the
12 airport. This reduction in Index is termed "remission."
13

14 The ARFFRWG did not reach consensus on this subject. A majority opinion of the Working
15 Group represented by the Air Line Pilots Association International, Aircraft Rescue and Fire
16 Fighting Working Group, Armen DerHohannesian and Associates, L.L.C., Aviation Cabin
17 Safety Specialists, Inc., Independent Pilots Association, International Association of Fire
18 Fighters, National Fire Protection Association, International Association of Fire Chiefs, and the
19 San Jose (Calif.) Fire Department recommends the elimination of 14 CFR 139.315(c)(1) and (2),
20 commonly referred to as the "remission factor". The current regulation allows limited operation
21 of the longest aircraft at an airport without requiring the necessary minimum level of ARFF
22 protection. It is important to understand how the level of aircraft fire protection (Index group)
23 was established and why a minimum is necessary. A 1971 study commissioned by the FAA
24 (*Minimum Needs for Airport Rescue and Fire Fighting Services*, Report No. AS-71-1, January

1 1971, hereafter referred to as the “Gage-Babcock Report”) distinguished between *minimum* (“the
2 least possible to achieve the goal”) and *adequate* (“fully sufficient for the purpose”)
3 requirements.

4
5 Indexes were determined by calculating the amount of extinguishing agent necessary to control a
6 given size pooled fuel fire. The first step was to define the size of the pooled fuel fire necessary
7 to control, and then to determine the amount of extinguishing agent necessary to control this
8 area. Extinguishing agent quantities were determined by establishing the heat threshold of an
9 occupant evacuating an aircraft within a specified distance from a fuel fire. An “escape corridor”
10 (defined as having a tolerable heat exposure) for the airplane occupants was then established and
11 agent quantities were determined necessary to provide fire control of the area to maintain this
12 “escape corridor”.

13
14 Following the establishment of the required agent quantity needed to protect the “escape
15 corridor” the quantities were then reduced by 1/3rd. The 1/3rd reduction was determined by
16 photographic history of 27 pre-1973 aircraft accidents contained in the Gage-Babcock Report.
17 Currently, 14 CFR 139.315 (c) (1) and (2) allows an even further reduction of fire protection
18 capability by one Index group if the longest aircraft departs less than an average of 5 times a day.
19 In theory, this means that an airport having an average of four departures of a Boeing 747 on a
20 given day would not be required to provide the above described protection, i.e. “escape
21 corridor”, determined to be necessary for a Boeing 747.

22
23 Allowing a reduction in Index predisposes responding ARFF units to failure and does not meet
24 the expectations of a standard level of care the aircraft occupants expect on a scheduled flight.
25 The unique “burnback” characteristics of a pooled fuel fire create demands beyond those of a
26 solid combustible fire. If a fuel pool fire cannot be controlled with the available extinguishing
27 agent, the fire could burn back, presenting aircraft occupants with the same initial fire threat.

28
29 Although NTSB reports have not referenced “remission” in specific language, the need for
30 ARFF can be graphically seen in the Quincy, IL accident. In this accident all occupants survived
31 the impact, but later died in the aircraft due to fire and no way to escape.

32
33 The ARFFRWG did discuss the need for airports to have options when seasonal travel or new
34 trip segments were to be added or deleted from that airport. Although, no consensus was
35 reached, the group understands that airports have the ability to apply for waivers with the FAA.

36
37 The consequences of a given accident/incident remain the same regardless of the frequency of
38 operation. Therefore, a majority of the Working Group found that removing the remission factor
39 is consistent with ICAO and the NFPA to provide ARFF protection at a Category group
40 appropriate to the aircraft size.

41
42 The majority opinion states that an airport must be prepared for an accident for the largest
43 aircraft that uses the facility without regard to the frequency of operation. The Port Authority of
44 New York and New Jersey abstained on this vote. The dissenting opinion, held by the Air
45 Transport Association, Airports Council International-North America, Allegheny County (Pa.)
46 Airport Authority, American Association of Airport Executives, and the Charlottesville-

1 Albemarle (Va.) Airport Authority holds that for thirty years the concept of remission has
2 worked without fail. In fact, in no NTSB official accident report has it been found that the
3 concept of remission has degraded safety in any way, or contributed to the increased loss of life
4 at an accident. The NTSB has made no recommendations to the FAA suggesting that this
5 regulation be changed. Additionally, the FAA, in earlier rulemakings, has held that the remission
6 concept is satisfactory and that it provides for “an acceptable level of protection” (see 37 FR
7 12278, June 21, 1972 and 52 FR 44278, November 18, 1987). In reviewing ARFF services at
8 smaller airports the FAA, at the request of Congress, issued a Notice of Proposed Rulemaking in
9 June 2000 that would extend the applicability of Part 139 to those airports serving passenger
10 carrying aircraft of 9 or more passengers. This rule is intended to prevent future loss of life in
11 accidents similar to the one that occurred in Quincy, Illinois, as mentioned above.
12

13 The current regulatory framework acknowledges the reality of a key principle of risk
14 management, specifically, that while it may not be possible to prevent all accidents it may be
15 possible to manipulate the circumstances that will minimize the overall impact of the accident. It
16 is this premise that is a key tenet of the acceptance of some form of remission. Also, while it
17 would be difficult to pinpoint an exact definition of the term risk, it is generally accepted to be a
18 function of both the severity of a given event and the probability of that event occurring. While
19 aircraft accidents have the potential to be truly catastrophic events, they also happen at an
20 extremely low order of probability.
21

22 The probability of a given type of aircraft being involved in a major accident is independent of
23 any other factor; accordingly, it can be argued that the hazard that type of aircraft presents at any
24 airport serving it is uniform and should be accommodated equally. However, this argument
25 disregards the role that frequency of operations plays in the overall risk equation. The hazard
26 posed by a given type of aircraft at a given location is dependent upon exposure, i.e., how often
27 that type of aircraft is present to pose the hazard in the first place. In fact, there are a number of
28 different equations developed by different government agencies that assess the risk of a certain
29 facility (airport or independent building) experiencing an aircraft accident.
30

31 In the rare instances where the low frequency of operations does not currently require a
32 comprehensive ARFF capability, “remission” has been a useful and accurate reflection of the
33 extremely low risk of an accident involving specific aircraft at specific locations. In fact, it
34 should be noted that remission does not mean that there is no ARFF coverage at an airport during
35 operations of larger passenger carrying aircraft. For example, “if an airport is served by five
36 Boeing 727s (Index C) and two Boeing 737s (Index B), the Index would be Index C. If the
37 number of Boeing 727 operations dropped to three departures, the Index required would be Index
38 B. If there is only one Boeing 727 departure, and not other departures by other air carrier aircraft,
39 then the Index would remain Index B, one below the specified Index for the aircraft.” A detailed
40 explanation can be found in FAA Order 5280.5B, Airport Certification Program Handbook. One
41 point often noted when talking about this remission factor is the drop in the amount of agent,
42 vehicles, and personnel required at airports. Given that there was full consensus amongst the
43 ARFFRWG to accept a movement from the current system of 5 indexes to a new system of 10
44 categories it is a reasonable assumption that the airport’s ARFF coverage (agent, vehicles, and
45 personnel) will not drop as much as it would have under the current regulatory structure.
46

1 Additionally, other recommendations made throughout this document reflect a significant
2 improvement over the 1970-era study and its two-dimensionally constrained fire protection
3 limitations. The more stringent response time standard offered in this proposal increases the
4 probability that first responders will arrive at the scene of an accident earlier in the development
5 of a fire, affording the responders a better opportunity for quick suppression and/or
6 extinguishment.

7
8 In conclusion, the dissenting opinion holds that the concept of remission permits a reasonable
9 and necessary degree of flexibility in the scheduling of different types of aircraft into different
10 locations. It also allows airports to accept small numbers of air carrier aircraft larger than their
11 designated Category without economic penalty. Requiring airports to be staffed and equipped
12 against the possibility of a "highest common denominator" driven by the landing of a single
13 aircraft in a day is neither reasonable nor economically defensible.

14
15 Sec. 139.317. Aircraft rescue and fire fighting: Equipment and agents -- significant changes
16 proposed.

17
18 ARFFRWG deliberations regarding extinguishing agent quantity for both primary agents and
19 complimentary agents were based on historical information from FAA, ICAO, NFPA and other
20 sources. The following technical discussion is essential to a complete understanding of the
21 reasons behind the changes proposed to this Section. It follows a narrative structure rather than
22 relating to the individual paragraphs proposed, and should be read on that basis.

23
24 (a) Types of Agents

25
26 Foams used for control and extinguishment of aircraft fires involving fuel spills are produced by
27 incorporation of air into a solution of foam concentrate and water. Their characteristics, as
28 indicated by expansion and drainage rate, are influenced by the amount of mechanical agitation
29 to which the water, foam concentrate, and air are subjected. They extinguish fire by physically
30 separating the fuel vapors from the heat and oxygen necessary for combustion, spreading over
31 the surface of the fuel to effectively suppress vaporization and secure an extinguished area by
32 protecting it from re-ignition.

33
34 Foam, being essentially water, cools the surface of fuel and any metal surfaces in the fuel. The
35 solution drainage from some foams forms an aqueous film on most aviation fuels. It is
36 advantageous for a foam blanket to reseal if disrupted, and essential that either the foam has
37 good thermal and mechanical stability or that provision is made to renew the foam blanket from
38 time to time during a lengthy rescue operation.

39
40 Foam liquid concentrates of different types or from different manufacturers should not be mixed
41 unless it is first established that they are compatible. Protein and fluoroprotein foam
42 concentrates, in particular, are generally not compatible with Aqueous Film Forming Foam
43 (AFFF) concentrates and should not be mixed, although foams generated separately from these
44 concentrates are compatible and can be applied simultaneously to a fire.

1 All foams used as primary agents are available for use at 3 percent and 6 percent concentrations,
2 usually in either fresh- or saltwater, and some are for use at other concentrations such as 1
3 percent or 5 percent. Foam can be produced in a number of ways. The method of foam
4 production selected should be carefully weighed, considering the techniques best suited for the
5 equipment concerned, the rates and patterns of discharge desired, and the manpower needed to
6 properly utilize the foam capabilities of the vehicles. The quality of water used in making foam
7 can affect the foam performance. Locally available water might require adjustment of the
8 proportioning device to achieve optimum foam quality. No corrosion inhibitors, freezing point
9 depressants, or any other additives should be used in the water supply without prior consultation
10 and approval of the foam concentrate manufacturer.

11
12 Converting aircraft crash fire-fighting and rescue vehicles to use a type of foam concentrate other
13 than that for which they were initially designed should not be accomplished without consultation
14 with the equipment manufacturer and without a thorough flushing of the agent and the complete
15 foam delivery system. Particular attention should be given to ensuring that the system component
16 materials are suitable for the particular concentrate being substituted and that, where necessary,
17 the proportioning equipment is recalibrated and reset.

18
19 AFFF achieve a level of performance consistent with MIL-F-24385, when the lowest discharge
20 rates/quantities in the regulation are used. Both the FAA and the NFPA have determined that
21 MIL-F-24385 (current edition) AFFF is the standard for the United States; it is a concentrated
22 aqueous solution of one or more hydrocarbon and/or fluorochemical surfactants that forms a
23 foam capable of producing a vapor-suppressing, aqueous film on the surface of hydrocarbon
24 fuels. The foam produced from AFFF concentrates is dry chemical compatible and, therefore, is
25 suitable for use in combination with that agent. ICAO has developed guidance that references
26 foam evaluation methods having significantly different test parameters such as test fuel,
27 application rate, and extinguishment density. The intent of the proposed standard is that primary
28 foam agents meet minimum performance criteria.

29
30 There are a number of chemical compounds offered on a proprietary basis that are referred to as
31 "dry chemical fire extinguishing agents." Historically, sodium bicarbonate-based compounds
32 were initially so described, but in recent years, a number of other chemicals have been tested and
33 potassium bicarbonate-based powders have proven most effective as a means of quickly
34 extinguishing flammable liquid fires when applied with a proper technique and at an adequate
35 rate. Potassium bicarbonate has good flooding characteristics and can penetrate to otherwise
36 inaccessible areas. Additionally, potassium bicarbomate is also recognized as an acceptable dry
37 chemical fire extinguishing agent. In NFPA 403, all three types (potassium bicarbonate,
38 potassium bicarbomate, and Halon 1211) are considered equal on a pound for pound basis. Dry
39 chemicals, as currently used in aircraft rescue and fire fighting, can be used to extinguish three-
40 dimensional liquid fuel or running fires where foam is present on the ground.

41
42 Some combustible metal extinguishing agents have been in use for years, and their success in
43 handling metal fires has led to the terms "approved extinguishing powder" and "dry powder."
44 These designations have appeared in codes and other publications where it was not possible to
45 employ the proprietary names of the powders. These terms have been accepted in describing
46 extinguishing agents for metal fires and should not be confused with the term "dry chemical,"

1 which normally applies to an agent suitable for use on flammable liquid (Class B) and live
2 electrical equipment (Class C) fires. After reviewing all the information on complementary
3 agents, the ARFFRWG determined that potassium bicarbonate, potassium bicarbomate, and
4 clean streaming agents are recognized as suitable for ARFF use.

5
6 Halogenated extinguishing agents are hydrocarbons in which one or more hydrogen atoms have
7 been replaced by atoms from the halogen series—fluorine, chlorine, bromine, or iodine. This
8 substitution confers not only nonflammability, but flame extinguishment properties to many of
9 the resulting compounds. Halogenated agents are used both in portable fire extinguishers and in
10 extinguishing systems. The three halogen elements commonly found in extinguishing agents are
11 fluorine (F), chlorine (Cl), and bromine (Br).

12
13 The extinguishing mechanism of halogenated agents is not clearly understood. However, there is
14 undoubtedly a chemical reaction that interferes with the combustion processes. Halogenated
15 agents act by chemically interrupting the continuing combination of the fuel radicals with
16 oxygen in the flame chain reactions. This process is known as "chain breaking."

17
18 Halon 1211 is a liquefied gas discharged as an 85 percent liquid stream that forms a vapor cloud
19 when in contact with the fire, which permits penetration of obstructed and inaccessible areas.
20 Halon 1211 leaves no agent residue and is the preferred agent for aircraft tire fires, engine fires,
21 interior aircraft fires, electrical component fires, and flight line vehicle or equipment engine fires.
22 Halon agent is, however, included in the Montreal Protocol on Substances that deplete the Ozone
23 Layer. Halon use should be limited to extinguishment of unwanted fire and should not be used
24 for routine training of personnel. Also, it is important that the compatibility of the foam and dry
25 chemical agents be established if they are to be used together. Halon 1211 is compatible with all
26 foams.

27
28 Although this agent is highly effective, the discharge of Halon 1211 may create hazards to
29 personnel such as dizziness, impaired coordination, reduced visibility, and exposure to toxic
30 decomposition products. In any proposed use of Halon 1211 where there is a possibility that
31 people may be trapped in or enter into atmospheres made hazardous, suitable safeguards should
32 be provided to ensure prompt evacuation of and to prevent entry into such atmospheres and also
33 to provide means for prompt rescue of any trapped personnel. Breathing apparatus should be
34 worn.

35
36 A variety of metals burn when heated to high temperatures by friction or exposure to external
37 heat. The most common combustible metals used in aircraft are magnesium and titanium.
38 The hazards involved in the control or complete extinguishment of combustible metal fires
39 include extremely high temperatures, steam explosions, hydrogen explosions, toxic products of
40 combustion, explosive reaction with some common extinguishing agents, breakdown of some
41 extinguishing agents with the liberation of combustible gases or toxic products of combustion,
42 and dangerous radiation in the case of certain nuclear materials.

43
44 Some agents displace oxygen, especially in confined spaces. Therefore, extinguishing agents and
45 methods for their specific application should be selected with care. Some combustible metal fires
46 should not be approached without suitable self-contained breathing apparatus and protective

1 clothing, even if the fire is small. Other combustible metal fires can be readily approached with
2 minimum protection.

3
4 Numerous agents have been developed to extinguish combustible metal (Class D) fires, but a
5 given agent does not necessarily control or extinguish all metal fires. Although some agents are
6 valuable in working with several metals, other agents are useful in combating only one type of
7 metal fire. Despite their use in industry, some of these agents provide only partial control and
8 cannot be classified as actual extinguishing agents. Certain agents that are suitable for other
9 classes of fires should be avoided in the case of combustible metal fires, because violent
10 reactions can result (e.g., water on sodium, vaporizing liquids on magnesium fires).

11
12 The clean streaming agents currently approved are Halotron and Halon 1211.

13 14 (b) Quantity of Agents

15
16 The ARAC ARFFRWG discussions regarding the quantity of agents took in to account historical
17 data from FAA, ICAO and NFPA. A key source of information came from the first Rescue and
18 Fire-Fighting Panel (RFFP-I), which was convened by the International Civil Aviation
19 Organization (ICAO) in Montreal, Canada, from March 10 to 20, 1970. At that time, the method
20 contained in Annex 14, Attachment C (5th edition), for the determination of the level of
21 protection (agent quantities and number of vehicles) to be provided at airports for fixed wing
22 aircraft was based on the fuel load and passenger capacity of the aircraft.

23
24 As a result of correspondence exchanged among the RFFP-I members there was general
25 agreement that a new or revised method for specifying the quantity of extinguishing agents and
26 rescue equipment to be provided was needed. The RFFP-I unanimously agreed that the concept
27 for determining the level of protection should be the “critical area.” This was an area to be
28 protected in any post-accident situation that would permit the safe evacuation of the aircraft
29 occupants.

30
31 The purpose of the critical area concept was not to define fire attack procedures. Instead, it
32 served as the basis for calculating the quantities of extinguishing agents necessary to achieve
33 protection within an acceptable period of time. Based on the logic that passenger capacity was
34 related to length, the RFFP-I also unanimously agreed that the critical area should be a rectangle
35 having as one dimension the length of the fuselage. However, a wide division of opinion existed
36 as to what width should be used.

37
38 The RFFP-I report documents five proposed means of defining the width of the critical area. It
39 was finally agreed that there was no single system that could be used to express the area to be
40 protected for all sizes of aircraft. In the end, the RFFP-I agreed that the critical area should be a
41 rectangle with dimensions relative to the length, width, and wingspan of the aircraft.

42
43 Using this approach, the aircraft in service at that time were grouped into a series of eight
44 categories. Beginning with category one, each successive category represented a logical
45 progression in aircraft length. The concept of using graduated aircraft categories as a means of
46 assessing fire protection needs has survived to the present time with only minor revisions to

1 reflect changes in the operating aircraft fleet. Both consensus standard-writing organizations and
2 national regulatory authorities have adopted this general concept worldwide.

3
4 By correspondence following RFFP-I, the members agreed that the use of the critical area
5 concept for determining the level of fire-fighting agents and equipment needed to combat an
6 aircraft accident fire was based on the following facts:

7
8 (1) The quantity of agent necessary to control or cover the fire area could be accurately
9 determined.

10
11 (2) The rate of application of the agents to control the fire in the most effective time
12 period could also be determined.

13
14 When RFFP-II convened in 1972, it confirmed the critical area concept where one dimension of
15 the area would be the length of the aircraft. However, there was no consensus as to the length of
16 the other side. In addition, the RFFP-I concluded that there was a need to distinguish between the
17 “theoretical critical area” (within which it might be necessary to control a fire) and a “practical
18 critical area” that was representative of actual aircraft accident conditions. Although the RFFP-I
19 did not agree on the dimensions, it did agree that the theoretical critical area should be defined as
20 follows: "Theoretical Critical Area. The theoretical area adjacent to an aircraft in which fire
21 must be controlled for the purpose of ensuring temporary fuselage integrity and providing an
22 escape area for its occupants."

23
24 The RFFP-II had the benefit of large test fire experiments conducted in 1972 by a member
25 country which were aimed at estimating the size of the theoretical critical fire area. This study
26 paid particular attention to the width on each side of the fuselage that would have to be secured
27 to protect the aircraft’s skin from melting under severe fire conditions. On the basis of the data
28 presented in this report, the RFFP-II members agreed that the theoretical critical area should be a
29 rectangle having as one dimension the overall length of the aircraft, and the other dimension
30 determined by the following:

31
32 (1) For aircraft with an overall length of less than 20 m (65 ft), 12 m (40 ft) plus the
33 width of the fuselage

34
35 (2) For aircraft with an overall length of 20 m (65 ft) or more, 30 m (100 ft) plus the
36 width of the fuselage.

37
38 The theoretical critical area serves only as a means for categorizing aircraft in terms of the
39 magnitude of the potential fire hazard in which they may become involved. It is not intended to
40 represent the average, maximum, or minimum spill fire size associated with a particular aircraft.
41 The data analyzed by RFFP-II in its effort to respond to the issue of TCA versus practical critical
42 area (PCA) appeared to indicate that the PCA was approximately two-thirds of the TCA. This
43 was verified by a study conducted by one of the member countries of actual spill fire sizes and
44 aircraft accidents.

1 Another analysis of aircraft rescue and fire-fighting operations conducted during RFFP-II did not
2 include a review of the PCA as compared to the TCA. However, that study did compare the
3 actual amount of water used for foam at those accidents with the amounts recommended by
4 RFFP-I. It was found that out of 106 accidents for which this information was available, in 99
5 cases (93 percent) the amounts recommended by RFFP-I were in excess of those required in the
6 actual aircraft accident. In light of the above, RFFP-II decided to use two-thirds of the TCA as
7 the PCA.

8
9 (c) Control Time.

10
11 After defining the critical area to be protected and developing a system of fire protection
12 categories, RFFP-I turned its attention to the issues of discharge rates and the extinguishing
13 agents to be applied to the critical area. The RFFP-I concluded that fire control time and fire
14 extinguishment time within the critical area should be considered individually and defined as
15 follows:

16
17 (1) *Control time* is the time required from the arrival of the first fire-fighting vehicle to
18 the time the initial intensity of the fire is reduced by 90 percent.

19
20 (2) *Extinguishment time* is the time required from arrival of the first fire-fighting vehicle
21 to the time the fire is completely extinguished.

22
23 RFFP-II confirmed these definitions and, based on an analysis of accident data furnished by
24 member countries, determined that the equipment and techniques to be used should be capable of
25 controlling the fire in the PCA in 1 minute. This concept has not only survived to the present
26 time, but it has, with minor revisions from time to time to update changes in the operating
27 aircraft fleet, been adopted worldwide by both consensus standards-making organizations and
28 national regulatory authorities.

29
30 RFFP-II was unable to identify a recommended time period for the extinguishment time. This
31 was due to the numerous variables involved at each aircraft accident such as the size of the
32 aircraft, area of fire, and three-dimensional fires.

33
34 (d) Discharge Rate.

35
36 At RFFP-I, the members agreed that discharge rates should be designed to achieve the lowest
37 possible fire control time that is consistent with the objective of preventing the fire from melting
38 through the fuselage or causing an explosion of the fuel tanks. The RFFP-I also agreed that the
39 equipment and techniques to be used should be capable of controlling the fire in the critical area
40 in 1 minute and of extinguishing the fire within another minute.

41
42 Using available fire extinguishment test data based on protein foam, the RFFP-I concluded that
43 for a single agent attack an application rate of 8.2 (L/ min)/m² (0.2 U.S. gpm/ft²) for 2 minutes
44 would be sufficient to meet the fire control and fire extinguishment time requirements. The
45 RFFP-I also agreed that when dual agent attack techniques were used (foam and dry chemical,

1 CO₂, or a halocarbon), a reduced application rate could be used. A minimum of 6.1 (L/min)/m²
2 (0.15 U.S. gpm/ft²) was recommended.

3

4 Based on the consideration that the lighter construction of small aircraft increased their
5 vulnerability to fire penetration, the RFFP-I also recommended that the same discharge rates be
6 used for small aircraft. Discussions and recommendations at RFFP-I were based on the
7 performance of protein foam only.

8

9 The RFFP-I report recognized the existence of both fluoroprotein and aqueous film-forming
10 foams and indicated that some member countries were starting to use them. However, the RFFP-
11 I generally agreed that there was insufficient documentation of performance upon which to base
12 recommendations. The report also indicated a general understanding among RFFP-I members
13 that the suitability of other agents and their relationship with protein foam would be considered
14 later.

15

16 At RFFP-II, the Panel confirmed the application rate for protein foam recommended by RFFP-I
17 and agreed that an application rate of 5.3 (L/min)/m² (0.13 U.S. gpm/ft²) for aqueous film-
18 forming foam was suitable. The members of RFFP-II could not agree on a suitable
19 recommendation for fluoroprotein due to the wide variety of foams. However, it did recognize
20 them as useful aircraft fuel fire-fighting foams and left the application rate to the authority
21 having jurisdiction, to be based on test data for the individual foams.

22

23 (e) Quantities of Agent to Be Provided.

24

25 By multiplying the TCA corresponding to the upper limit of the airport category times the
26 recommended protein foam application rate, times a factor of two for the recommended
27 discharge time, RFFP-I produced a table of recommended water quantities for foam production.
28 The table also included recommended weights for complementary agents and the recommended
29 discharge rates for both single and dual agent attack for eight airport categories.

30

31 At RFFP-II, the Panel agreed that when determining the amounts of extinguishing agents to be
32 provided, the amounts required to control and to extinguish a fire should be determined
33 separately. The quantities were named and defined as follows:

34

35 Quantity Q1. The quantity required to obtain a 1-minute control time in the PCA. The formula
36 for the water required for control (Q1) in the PCA can be expressed as $Q1 = PCA \times R \times T$, where:

37

38 PCA = practical critical area
39 R = rate of application for the specific foam
40 T = time of application

41

42 Quantity Q2. The quantity required for continued control of the fire after the first minute or for
43 complete extinguishment of the fire or for both. The RFFP-II concluded that the amount of water
44 required for Q2 could not be calculated exactly, as it depended on a number of variables. Those
45 variables, (expressed as f in the equation below) considered of primary importance by the RFFP-
46 II were the following:

- 1
- 2 (1) Maximum gross weight
- 3 (2) Maximum passenger capacity
- 4 (3) Maximum fuel load
- 5 (4) Previous experience (analysis of aircraft rescue and fire-fighting operations)
- 6

7 These factors were used by RFFP-II to generate Q2 values for each airport category where
8 $Q2 = f \times Q1$. The values of f ranged from 3 percent for Category 1 airports through 170 percent
9 for Category 8 airports.

10
11 (f) Current Situation.

12
13 The basic concepts developed by the ICAO RFFPs are still considered valid. However, the
14 variables mentioned above that are used to develop the f factor for Q2 have been refined over
15 time and are now expressed as follows:

- 16
17 (1) Aircraft Size. Aircraft size reflects the potential level of risk. This risk factor is a
18 composite of the occupant load, the potential internal fire load, flammable liquid fuel
19 capacity, and the fuselage length and width. Careful consideration of all these factors
20 allows the identification of a meaningful operational objective, that is, the area to be
21 rendered fire free (controlled or extinguished).
- 22
23 (2) Relative Effectiveness of Agent Selected. This is accounted for by the specific
24 application rate identified for each of the common generic foam concentrate types.
- 25
26 (3) Time Required to Achieve PCA Fire Control. Information from reliable large-scale
27 fire tests, empirical data from a wide variety of sources, and field experience worldwide
28 indicates that 1 minute is both a reasonable and a necessary operational objective.
- 29
30 (4) Time Required to Maintain the Controlled Area Fire-Free or to Extinguish the Fire.
31 An operational objective that provides a safety factor for the initial fire attack on the PCA
32 while waiting for the arrival of backup support or to complete extinguishment of
33 remaining fires outside the PCA.
- 34

35 The quantity of water for foam production required for 1-minute fire control of the PCA is still
36 referred to as Q1. However, data collected in the ensuing years now permits us to specify the
37 required application rates for foam types needed to extinguish fire in 1 m² or 1 ft² of the PCA as
38 follows: AFFF = 5.5 (L/min)/m² or 0.13 gpm/ft²

39
40 Over time, changes in aircraft size factor have required revisions to the values of both Q1 and Q2
41 and the introduction of a third component, Q3, which make up the total quantity of water (Q)
42 required for the production of foam. This addition of Q3 was put in place in NFPA documents
43 but was not accepted by ICAO.

44
45 Q1 changes as a function of the accepted foam application rates and the size of the operational
46 aircraft common to the various airport categories. Since Q2 is a function of Q1, it too is impacted

1 by changes in aircraft size and requires revision from time to time to accurately reflect the
2 changes in the operational aircraft fleet.

3
4 The operational significance of the components making up Q is substantial in that Q relates to
5 both the specific quantities of fire suppression agents required to control fire in the PCA and to
6 the requirement that the specified quantity of agent be applied to the PCA within a time frame of
7 1 minute. In turn, Q2 relates to the need to have sufficient fire suppression agents available to
8 maintain conditions that do not pose a threat to life in the PCA until such time as rescue
9 operations are completed. The secondary role of Q2 is to extinguish all fires in and peripheral to
10 the PCA.

11
12 The development of the requirement for these two quantities of water is based on exterior aircraft
13 fuel spill fire control parameters. Information from actual incidents in recent years has shown
14 that with increased aircraft crash worthiness, water for interior fire-fighting operations is also
15 necessary. This quantity of water, called Q3, is based on the need for hand lines to be used for
16 interior fire fighting.

17
18 Hence, the total quantity of water (Q) is defined by NFPA as follows: $Q=Q1 + Q2 + Q3$, where:

19
20 Q1 = water requirement for control of PCA

21 Q2 = water requirement to maintain control, extinguish the remaining fire or both

22 Q3 = water requirement for interior fire fighting

23
24 (1) The method for calculating the values for each component of Q are presented below.

25
26 Q1 = PCA x R x T, where:

27
28 PCA = (0.67) TCA, TCA = L (K + W), and

29 L = length of aircraft

30 W = width of fuselage

31 R = application rate of selected agent

32 T = time of application (1 minute)

33 K = values shown below

34
35 Feet

36 K = 39 where L = less than 39

37 = 46 where L = 39 up to but not including 59

38 = 56 where L = 59 up to but not including 79

39 = 98 where L = 79 and over

40 Meters

41 K = 12 where L = less than 12

42 = 14 where L = 12 up to but not including 18

43 = 17 where L = 18 up to but not including 24

44 = 30 where L = 24 and over

45

46

1 (2) The current values of Q2 as a percentage of Q1 have been determined to be as shown:
 2

Airport Category	Q2% Q1	Airport Category	Q2% Q1
1	0	6	100
2	27	7	129
3	30	8	152
4	58	9	170
5	75	10	190

9
 10 (3) The values of Q3 are based on accepted water flow requirements for the type of fire-fighting
 11 operations to be experienced when combating an interior aircraft fire. They are determined as
 12 follows:

Airport Category	Q3 Equals (U.S. gal)
1	0
2	0
3	60 gpm 5 min = 300 gal
4	60 gpm 10 min = 600 gal
5	125 gpm 10 min = 1250 gal
6	125 gpm 10 min = 1250 gal
7	125 gpm 10 min = 1250 gal
8	250 gpm 10 min = 2500 gal
9	250 gpm 10 min = 2500 gal
10	500 gpm 10 min = 5000 gal

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 25
 26 Through a detailed analysis of the ICAO history, it was found that ICAO had reduced Categories
 27 5 through 10 by 1000 gallons as an arbitrary decision in order to lessen the financial impact to
 28 airports. The ARFFRWG unanimously agreed that the FAA current quantities were not
 29 appropriate; however, there were differences of opinion among the ARFFRWG members as to
 30 the most appropriate adjustment to them. Furthermore, a consensus of the ARFFRWG concluded
 31 that the NFPA quantities were appropriate, while a dissenting opinion concluded that the ICAO
 32 quantities were appropriate with the 1000 gallons added back in.

33
 34 The following chart depicts the differences between each current standard. Since the
 35 ARFFRWG could not come to unanimous agreement on this issue, the consensus opinion is
 36 being proposed in the regulation with the dissenting opinion being offered for the FAA's
 37 consideration in Table 4.

Table 4 – Agent/Quantity Comparison

Category	Index	Water (U.S. Gallons)			Example Aircraft
		ICAO (Dissenting Opinion)	FAA	NFPA (Consensus Opinion)	
1	GA-1	61	—	120	Cessna 206
2	GA-1	177	—	200	Cessna 414
3	GA-2	317	—	670	Beech 1900
4	A	634	100	1340	DHC-8-100
5	A	2427*	100	2760	ATR-72
6	B	3087*	1500	3740	B737-300; Emb-145
7	C	4197*	3000	4880	B757
8	D	5808*	4000	7780	A300; B767-300
9	E	7419*	6000	9570	B747-200; A340-400
10		9533*	—	14260	AN-225; A380

NOTE: NFPA Agent Quantities include gallons required for Q3.

*NOTE: For ICAO categories 5-10 the ARFFRWG added back in the 1,000 gallons.

Sample Calculation Using Airport Category 4 and AFFF Foam

$$\begin{aligned} \text{TCA} &= L (K + W) \\ &= 77.9 (56 + 12.9) = 5360 \text{ ft}^2 \end{aligned}$$

$$\text{PCA} = 2/3 \text{ TCA} = 2/3 \text{ } 5360 \text{ ft}^2 = 3573 \text{ ft}^2$$

$$\text{Q1} = 0.13 \text{ gpm/ft}^2 \text{ } 3573 \text{ ft}^2 = 464 \text{ gal}$$

$$\text{Q2} = 58\% \text{ Q1} = 0.58 \text{ } 464 = 269 \text{ gal}$$

$$\text{Q3} = 600 \text{ gal}$$

now

$$\begin{aligned} \text{Q} &= \text{Q1} + \text{Q2} + \text{Q3} \\ &= 464 + 269 + 600 = 1333 \text{ gal} \\ &\text{rounded up to } 1335 \text{ gal} \end{aligned}$$

The example is given to illustrate the logic and the factors used to arrive at the quantity of water for foam production required for an airport Category 4. For example, the aircraft length (L) and the aircraft external cabin width (W) are the maximum length and width for Category 4. Table 6 provides comparisons of aircraft types and their measurements by Category.

The ARFFRWG took note of several issues related to the introduction of the Airbus A380, which will be sized and configured in such a manner as to raise questions regarding its occupancy load, evacuation slide deployment provisions, and the likely requirement for rescue operations to be conducted on the upper level of the aircraft.

There was full consensus of the ARFFRWG that the additional hazards of the ever increasing second level passenger deck of the B747 have been neglected over the years. The Working

1 Group has used actual accident data published by the NTSB to validate the proposals included
2 below.

3
4 Based upon the data from the March 2001 NTSB report, “Survivability of Accidents Involving
5 Part 121 U.S. Air Carrier Operations, 1983 – 2000,” the NTSB cites the following:

- 6
7 a) “19 of the 26 serious accidents involving Part 121 air carriers were at least partially
8 survivable...”
9 b) “76.6% of the occupants in these accidents survived.”
10 c) “15.4% of the occupants died from impact.”
11 d) “6.6% died from fire.”
12 e) “1.4% died from other causes.”

13
14 This report also noted that the majority of survivable accidents took place at, or in close
15 proximity to, departure or arrival airports.

16
17 Using the NTSB data, 6.6% of those occupants in a partially survivable accident were killed by
18 fire; it can be said that in a “worst case scenario” all 6.6% of the occupants of the aircraft could
19 be trapped in the upper level of the fuselage. Existing stair trucks cannot be used to meet this
20 need, since they are not capable of reaching above the lower level entryways of either the Boeing
21 747-400 or the forthcoming Airbus A380. Therefore, the ARFFRWG used 6.6% as a basis for
22 recommending the following:

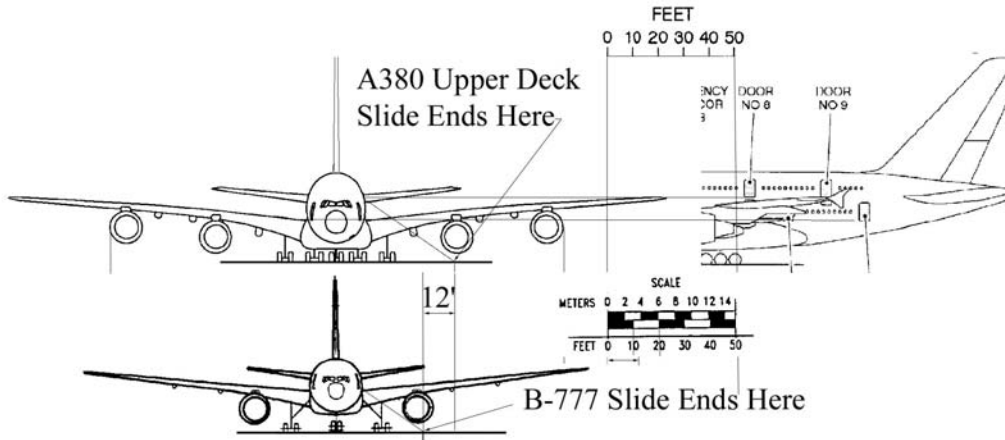
23
24 *For any airport serving aircraft with multiple decks, where the deck or decks above the*
25 *main deck are designed to accommodate 6.6% or greater of the total certificated*
26 *occupant complement, a specialized vehicle will be required at that airport that is*
27 *specifically designed to facilitate firefighter entry to the upper level(s) and aid in the*
28 *evacuation of occupants.*

29
30 The second proposal addresses an increase in fire fighting agent due to the increased hazards and
31 risks of these aircraft. For instance, the new A380 has a fuel capacity 44% greater than a B777
32 and 42% greater than a 747-400. Because of this there is a greater potential for a larger 2-D fuel
33 fire from a ruptured fuel tank. However the current calculations for the agent quantities
34 (TCA/PCA) would only require an additional 138 gallons of agent. This is due to the fact that
35 the multiple passenger level aircraft are not significantly larger in length and fuselage width but
36 increase in height and fuel load. Both factors are not figured into TCA/PCA.

37
38 Compounding this problem is the increase in number of emergency escape slides on these
39 aircraft. The upper level escape slides will deploy 12’ further on each side than the B777. This
40 will increase the area which will need to be protected to maintain an adequate escape path for the
41 occupants. With the additional slide deployments and the increased length of the upper level
42 slides it will be harder to make an effective fire attack on a 2-D fire that is under the fuselage
43 jeopardizing the integrity of the aircraft. Figure 1 illustrates the additional slide deployment
44 length.

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Figure 1. Upper level slide deployment lengths.



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Before Guyer’s (BG) large fire test Gage-Babcock determined what area needed fire protection and how big the area needed to be. The area needing fire protection was an area around the aircraft which would allow ambulatory occupants to exit the aircraft within tolerable heat conditions and move to a safe area. Dimensions were then determined (TCA-PCA) around the aircraft that would allow a clear escape path. With a known area to extinguish, TCA, Guyer’s large fire tests were then conducted.

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- The Airbus 380 is unique and challenging due to the amount of upper deck occupants and their need to evacuate when necessary.
- The Airbus 380 upper deck slide extends further from the fuselage than the largest single-deck airplane, the Boeing 777.
- The early work of Gage-Babcock continues to be relevant to post-crash occupant safety. The goal is not how large of an area of fire can be extinguished by a given quantity of extinguishing agent but how can we assure an area around the aircraft that would “allow ambulatory occupants to exit the aircraft within tolerable heat conditions and move to a safe area”. That being our mission the slide length does become a new and different challenge as the Airbus 380 enters service at our airports.

The following calculations demonstrate a method of using the NFPA accepted *K* factor table and modifying it with an additional factor to accommodate multiple passenger level aircraft.

K Factor Modification:

(*Q*) is now defined as follows: $Q = Q_1 + Q_2 + Q_3$

Where Q_1 = water requirement for control of PCA

1 Q_2 = water requirement to maintain control or extinguish the remaining fire or both

2 Q_3 = water requirement for interior fire fighting

3

4 The method for calculating the values for each component of Q are presented below.

5
$$Q_1 = PCA \times R \times T$$

6 Where $PCA = (0.67) \times TCA$,

7 $TCA = L \times (K + W)$

8 L = length of aircraft

9 W = width of fuselage

10 R = application rate of selected agent: AFFF = 0.13 gpm/ft²

11 T = time of application (1 minute)

12 K = values shown below:

K	Feet
	= 39 where L = less than 39
	= 46 where L = 39 up to but not including 59
	= 56 where L = 59 up to but not including 79
	= 98 where L = 79 and over

13

1 The current values of Q_2 as a percentage of Q have been determined to be as shown:

Airport Category	$Q_2\% Q_1$	Airport Category	$Q_2\% Q_1$
1	0	6	100
2	27	7	129
3	30	8	152
4	58	9	170
5	75	10	190

2

3 **Sample Calculation for A380 and AFFF Foam**

4 $TCA = L \times (K + W)$

5 $= 239 \times (98 + 21) = 28441 \text{ ft}^2$

6 $PCA = \frac{2}{3} \times TCA = \frac{2}{3} \times 28441 \text{ ft}^2 = 19055 \text{ ft}^2$

7 $Q_1 = 0.13 \text{ gpm/ft}^2 \times 19055 \text{ ft}^2 \times 1 = 2477 \text{ gal}$

8 $Q_2 = 190\% \times Q_1 = 1.9 \times 2477 = 4707 \text{ gal}$

9

10 $Q_3 = \text{add } 5,000 \text{ gallons}$

11

12

13 **Sample Calculation for A380 w/ additional 24' slide and AFFF Foam**

14 $TCA = L \times (K + W)$

15 $= 239 \times (98 + 21 + 24) = 34177 \text{ ft}^2$

16 $PCA = \frac{2}{3} \times TCA = \frac{2}{3} \times 34177 \text{ ft}^2 = 22898 \text{ ft}^2$

17 $Q_1 = 0.13 \text{ gpm/ft}^2 \times 22898 \text{ ft}^2 \times 1 = 2977 \text{ gal}$

18 $Q_2 = 190\% \times Q_1 = 1.9 \times 2977 = 5656 \text{ gal}$

19

20 $Q_3 = \text{add } 5,000 \text{ gallons}$

21

22

23

24 **Sample Calculation for A380 w/ modified K factor and AFFF Foam**

25 $TCA = L \times (K + W)$

26 $= 239 \times (122 + 21) = 34177 \text{ ft}^2$

27 $PCA = \frac{2}{3} \times TCA = \frac{2}{3} \times 34177 \text{ ft}^2 = 22898 \text{ ft}^2$

28 $Q_1 = 0.13 \text{ gpm/ft}^2 \times 22898 \text{ ft}^2 \times 1 = 2977 \text{ gal}$

29 $Q_2 = 190\% \times Q_1 = 1.9 \times 2977 = 5656 \text{ gal}$

30 $Q_3 = \text{add } 5,000 \text{ gallons}$

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New 5th *K* factor:

$K = 122$ where $L = 79$ and over with multiple passenger cabin levels. The new *K* factor is based on the increased slide area, which would need to be protected.

A dissenting opinion to the above discussion to the discussion above regarding large aircraft such as the A-380 is presented here: The use of slides for calculating the "Theoretical Critical Area" (TCA) is flawed. This area has always been independent of the slide deployment length. The actual area may be larger or even smaller than the rectangle created by where the slides are deployed. Originally, the TCA was based on large fire experiments conducted by George Geyer (1972) of the FAA. An organization like FAA should create new large scale fire data to determine an appropriate TCA for the new Airbus A-380.

TCA serves only as a means for categorizing aircraft in terms of the magnitude of the potential fire hazard in which they may become involved. Since the potential fire hazard is not impacted by the length of the slide, but relates to the potential fire size, slide length should not be part of the TCA calculation as it never was.

Table 6 – Representative Aircraft by Airport Categories

Airport	Category	Aircraft Type	Overall Fuselage Length		External Fuselage Width	
			ft	m	ft	m
1		Beech Bonanza 35	26.33	8.01	3.05	1.07
		Cessna 206	26.90	8.20	4.00	1.22
		Mooney M-20 2	4.90	7.60	3.70	1.13
2		Cessna 414	36.30	11.06	4.70	1.43
		Piper Aerostar	34.80	10.60	3.90	1.19
		Piper Cheyenne 2	34.70	10.60	4.30	1.31
3		Beech 1900	57.90	17.65	4.60	1.40
		Beech KingAir 200	43.80	13.35	5.80	1.77
		Lear 55	55.20	16.80	5.20	1.58
4		DHC Dash 8	73.00	22.25	8.83	2.69
		Fokker F-27 2000	77.30	23.56	8.86	2.70
		Short 360	70.90	21.60	6.40	1.95
5		ATR 72	89.10	27.16	9.40	2.87
		DHC Dash 7	80.70	24.60	8.50	2.59
		Embraer 135	86.32	26.33	7.48	2.28
6		Embraer ERJ-170	103.86	31.68	9.86	3.01
		BAE 146-200	93.67	28.55	11.68	3.56
		Bombardier CRJ-700	106.8	32.5	8.83	2.69
		Airbus A-320-300	123.27	37.57	12.96	3.95
		Boeing 737-300	109.60	33.40	12.34	3.76
7		Boeing 727-200	156.16	46.68	12.34	3.76
		Boeing 757	155.30	47.34	13.00	3.96
		Boeing MD-88	147.90	45.10	10.96	3.34
8		Airbus A300	175.90	53.61	18.50	5.64
		Boeing 767-300	180.30	54.96	16.50	5.03
		Boeing DC-10-40	182.23	55.54	19.75	6.02
		Lockheed L-1011	178.62	54.44	19.59	5.97
9		Airbus A340-300	208.90	63.67	18.50	5.64
		Boeing 747-200	230.99	70.40	21.40	6.50
		Boeing MD-11	200.90	61.24	19.90	6.07
		Boeing 777-300	242.29	73.9	20.29	6.19
10		Antonov AN-225	275.70	84.10	20.90	6.40
		Airbus A380-800	239.5	73	23.40	7.14

1 (g) Minimum Number of ARFF Vehicles.

2
3 There was majority of the ARFFRWG felt that the number of vehicles required by NFPA were
4 appropriate; a minority felt that the number of trucks required by ICAO were appropriate. The
5 number of trucks required is directly related to foam quantities, and is expressed in Table 7:
6

7 **Table 7 – ARFF Vehicle Requirement Comparison**
8

Category	Index	Vehicles			Example Aircraft
		ICAO	FAA	NFPA	
1	GA-1	1	NA	1	Cessna 206
2	GA-1	1	NA	1	Cessna 414
3	GA-2	1	NA	1	Beech 1900
4	A	1	1	1	DHC-8-100
5	A	1	1	2	ATR-72
6	B	2	1 – 2	2	B-737-300; Emb-145
7	C	2	2 – 3	3	B-757
8	D	3	3	3	A300; B-767-300
9	E	3	3	4	B-747-200; A340-400
10		3		4	AN-225; A380

9
10
11 Discussion on the number of trucks included the recognized fact that it is desirable to have more
12 than one vehicle available to facilitate attacking aircraft fires from more than one point or
13 quarter, as an aid to expedite rescue, to reduce the potential seriousness of vehicle breakdown,
14 and to minimize the “out of service” consequences when a vehicle is in need of routine
15 maintenance or repairs. Having at least two fire-fighting vehicles available is particularly
16 important when dealing with transport-type aircraft due to the need to rapidly cover any burning
17 fuel spill to protect the aircraft and its occupants from radiated heat during the evacuation and
18 rescue period, and to maintain the secure area around the fuselage to permit the safe evacuation
19 and rescue of the occupants.
20

21 The capacity of each vehicle with regard to fire fighting, rescue equipment, and personnel should
22 be compatible with the desired performance characteristics established for vehicles in the various
23 categories specified in FAA Advisory Circular 150/5210-10C and NFPA 414 Standard for
24 Aircraft Rescue and Fire-Fighting Vehicles. It is particularly important that the vehicle not be
25 overloaded so as to reduce the required acceleration, top speed, or vehicle flotation below the
26 acceptable minimums set forth in these standards.
27

28 The off-pavement performance capability of each ARFF vehicle should be established by tests at
29 each airport during the various weather and terrain conditions experienced at that airport to
30 establish, prior to an actual emergency, the capabilities and limitations of the vehicle for off-
31 pavement response to accident or incident locations. In addition, periodic tests should be
32 conducted to ensure that the performance requirements of the vehicle are as originally designed,
33 and that the skill levels of the driver/operator remain high.
34

35 Where climatic or geographic conditions exist that considerably reduce the effectiveness of
36 conventional wheeled vehicles, it is often necessary to carry extinguishing agents in a specialized

1 vehicle suitable for traveling the airport terrain, such as a tracked, amphibious, air-cushioned, or
2 high-mobility wheeled vehicle. Where these difficult operational conditions exist, experts should
3 be consulted to develop a vehicle specification that matches the vehicle's performance
4 capabilities to the unique conditions present at the airport.

5
6 The following equipment should be carried on each ARFF Vehicle.

- 7
8 (a) One NFPA approved 20-foot ladder of overall length appropriate to the aircraft using the
9 airport. This ladder is to be of lightweight alloy, aluminum, or magnesium, 16-in. (40.6-
10 cm) minimum width, mounted in quick-release brackets on the apparatus and readily
11 accessible. This ladder is not intended for evacuation use.
- 12 (b) Two portable rechargeable, weatherproof, hand-held lanterns having a minimum 25,000
13 beam candle power rating with carrying straps.
- 14 (c) One 6-lb crash axe with a serrated cutting edge and designed to prevent full penetration.
- 15 (d) One adjustable hydrant wrench capable of accommodating up to a 1.75-in. (4.4-cm)
16 pentagon nut and up to a 1.25-in. (3.2-cm) square nut.
- 17 (e) Carry all hose adaptors and connections necessary to accommodate hose thread and size
18 carried on airport-based and off-airport based apparatus that may need to tie into the
19 ARFF vehicle for supply hose or attack lines.
- 20 (f) Appropriate coupling wrenches for each size of hose carried on the vehicle.
- 21 (g) Two approved fire extinguishers having a minimum 80B:C UL rating of either dry
22 chemical or clean streaming agent.
- 23 (h) One 36-in. (91.4-cm) crowbar.
- 24 (i) One "D" handle pike pole with a shaft of fiberglass or other nonconductive material of
25 similar density.
- 26 (j) One rubber mallet suitable for removing long-handled pipe caps.
- 27 (k) One first aid kit ("jump kit"), containing at least the followings:
- 28 a. 12 – 4" x 4" sterile gauze
- 29 b. 6 rolls 4" sterile Kling
- 30 c. 4 – 5" x 9" ABD pads
- 31 d. 1 multi-trauma dressing
- 32 e. 2 triangular bandages
- 33 f. 2 instant ice packs
- 34 g. 1 set oropharyngeal airways
- 35 h. 1 bite stick
- 36 i. 1 ambu bag
- 37 j. 1 stethoscope
- 38 k. 1 sphygmomanometer
- 39 l. 1 penlight flashlight
- 40 m. 12 – 1" x 3" band-aids
- 41 n. 6 pair surgical gloves
- 42 o. 6 – N95 disposable masks
- 43 p. 2 pair eye shields
- 44 q. 1 plastic bottle sterile water
- 45

1 (l) One general-purpose cutter with capacity to cut up to 0.38 in. diameter hardened steel
2 (Bhn 300) bolts.

3 (m) Two Dzus fastener keys.

4 (n) One tool box to include at least the following equipment:

- 5 a. One aircraft cable cutter, 14-in. (35.6-cm), capacity to 1/4 in. (0.6 cm)
- 6 b. One lineman's pliers, heavy duty, 8 in. (20.3 cm) long
- 7 c. One grappling hook and rope sling, 40 in. (101.6 cm) long
- 8 d. One hacksaw frame, adjustable 8 in. to 12 in. (20.3 cm to 30.5 cm)
- 9 e. Three hacksaw blades, 10-in. (25.4-cm) steel
- 10 f. Six fuel line plugs: 3 hardwood, 3 neoprene
- 11 g. One rescue knife with "V" blade
- 12 h. One vise grip wrench, 10 in. (25.4 cm) long
- 13 i. One metal cutting saw, 20-in. (50.8-cm) blade
- 14 j. Two industrial grade slot-type screwdrivers [one 4-in. (10.2-cm) and one 6-in.
15 (15.2-cm) blade]
- 16 k. Two industrial grade Phillips screwdrivers [one 4-in. (10.2-cm) and one 6-in.
17 (15.2-cm) blade]
- 18 l. One hand axe with serrated face and insulated handle
- 19 m. One hydraulic rescue tool with cutters and spreaders should be on-scene within a
20 time determined by local task analysis.

21
22 (h) Communications

23
24 At those locations where the primary alerting authority (such as a control tower) is not
25 operational during all the hours that the airport is open to aircraft traffic, a secondary alerting
26 authority should be designated and trained. Appropriate communications and alarm control
27 devices should be available at the secondary alerting authority's operating location and be
28 operational during all times that the primary alerting authority is not available.

29
30 At those locations where a city or town or county off-airport fire department furnishes the airport
31 rescue and fire-fighting personnel, and the alerting/dispatch of those personnel for airport
32 emergencies is handled by an emergency direct-line telephone between the airport alerting
33 authority and the off-airport alarm room, the airport fire station alarm(s) should ring upon
34 activation of the direct emergency line. If possible, this type of "third party" dispatching of
35 airport fire-fighting and rescue services should be avoided.

36
37 Because the majority of the calls for aircraft ARFF services are initiated or first received by air
38 traffic controllers, the airport fire department alarm room and the control tower, the flight service
39 station or other air traffic control point should be linked by two-way radio and direct-line
40 telephone to enhance the response time of the fire and rescue crews.

41
42 The emergency direct-line telephone should not pass through any intermediate automated
43 switchboard or operator that could subject the alert calls to either delays or misinterpretation.
44 The tone of the emergency telephone bell (or buzzer) should be distinctly different from all other
45 communications signaling devices within hearing of personnel in the alarm room, on the
46 apparatus floor, or in living quarters as applicable.

1
2 Protection against delays due to telephone bell or buzzer failure should be provided by use of
3 redundant warning lights activated by the same input signal as the telephone ringer. The lights
4 should be strategically located throughout the alarm room, the apparatus floor, and living space
5 as dictated by the fire station design and the normal activities of the fire and rescue service
6 personnel.
7

8 The fire station alarm should be linked to the emergency telephone so that a call on the
9 emergency telephone circuit simultaneously actuates the audible alarm throughout the fire
10 station. Consideration should be given to having the alarm circuitry open the vehicle bay doors
11 in the fire station upon sounding the alarm. However, some climatic conditions can make this
12 impractical, or noise when doors are opened can interfere with hearing the dispatch.
13

14 The notification of all units designated to respond to an aircraft emergency should be
15 accomplished through the use of a “conference” circuit that allows simultaneous notification.
16 This “conference” circuit should include, as appropriate, the following units or offices:
17

- 18 (1) Control tower, flight service station, or other control point
- 19
- 20 (2) Rescue and fire fighting
- 21
- 22 (3) Airport police
- 23
- 24 (4) Airport management
- 25
- 26 (5) Airline station manager(s), as appropriate
- 27
- 28 (6) Military units (joint-use airports)
- 29
- 30 (7) Other authorities on or off the airport as required by the airport’s emergency plan
- 31
- 32 (8) Public safety communications center responsible for the airport (as appropriate)
- 33

34 At airports with several air carriers, the notification of the appropriate station manager might be
35 accomplished more effectively by the use of individual paging devices.
36

37 Fire stations where personnel are normally present for duty, but may be preoccupied with
38 housekeeping or training duties, should be equipped with a public address system. This is
39 particularly important in fire stations where the alarm room, training room, and living quarters
40 are physically separated from the apparatus floor. Such a system should significantly enhance
41 response time and fire fighter effectiveness by providing vital details of the emergency to each
42 fire fighter during response, for example, location of accident or incident site, type of aircraft,
43 number of persons involved, aircraft fuel load, preferred vehicle routing, and so forth.
44

45 At airports with a main fire station and one or more substations, an interconnected public address
46 system should be provided.

1
2 At airports employing dual function personnel or auxiliary fire fighters, an audible alarm should
3 be installed in all areas where auxiliary fire-fighting personnel are employed to notify them of
4 any emergency recall for fire and rescue duties. It should be a distinctly different sound and loud
5 enough to be clearly heard above the normal noise level.

6
7 At airports equipped with ground-to-air radio, the person authorized to receive in-flight
8 emergency messages should be provided with a device for actuating these alarms.

9
10 Alarm actuating stations should be provided near hangars, shops, fueling stations, and aircraft
11 parking areas.

12
13 Individual paging devices, although potentially more expensive, can be used. This method has
14 the advantage of notifying those persons with assigned rescue fire-fighting duties.

15
16 A reliable voice communications capability should be available between the airport rescue and
17 fire-fighting service and any off-airport organizations expected to participate in the
18 airport/community mutual aid plan.

19
20 Each emergency response vehicle on an airport should be equipped with two-way voice radio
21 communication between the alerting authority, all other aircraft rescue and fire-fighting vehicles,
22 and the designated command post.

23
24 On airports with a control tower the communications channel between vehicles and the tower
25 should be on the assigned standard ground control frequency, or as designated in the Airport
26 Emergency Plan Letter of Agreement between airport management, the control tower, and/or
27 flight service station.

28
29 On airports without a control tower but with another means of ground-to-air communications, the
30 rescue and fire-fighting vehicles should be equipped to communicate on a frequency common
31 with the control point.

32
33 Where practicable, the two-way radio capability on the airport fire and rescue service vehicle(s)
34 should not be tied into public service frequencies (city, county, or airport maintenance). This
35 independent communications network will help ensure interruption-free communication in an
36 emergency situation.

37
38 On-scene commanders (OSC) should have a communication capability while outside or remote
39 from their vehicle communications systems. Portable radios can be used by the OSC for direct
40 contact with the airport fire services and air traffic control services.

41
42 A reliable form of communication should be provided between the aircraft commander, the OSC,
43 ARFF services, and the airport alerting authority to preclude unnecessary aircraft emergency
44 evacuation or misunderstandings.

45

1 It has been demonstrated that effective communications between Tower Controllers/ARFF
2 Commanders/and Aircraft Cockpit crews can reduce emergency evacuations (and related
3 injuries). In addition, it creates a Unified Command link between these three groups during an
4 aircraft emergency that will better coordinate efforts, knowledge and resources. As such, a
5 Memorandum of Agreement should be established relative to a Discrete Emergency Frequency
6 in accordance with the provisions of FAA AC/150-5210-7C.

7
8 The aircraft rescue and fire-fighting service alarm facility should be designed and operated in
9 such a manner that an alarm can be received, evaluated, and acted on with a minimum of activity
10 or consultation.

11
12 For an alarm facility to serve its intended function, provisions should be made to ensure that all
13 personnel assigned to alarm facility duties are trained in communication equipment operations,
14 proper communication procedures, and local emergency plan implementation procedures.

15
16 Sec. 139.319 Aircraft rescue and fire fighting: Operational requirements -- significant changes
17 proposed.

18
19 Several changes are proposed to this Section. The following discussion addresses each
20 Paragraph in turn:

21
22 139.319(a) remains unchanged, except for replacing the term "index" with "category" as
23 described in section 139.315.

24
25 139.319(b) through (h) remain unchanged.

26
27 139.319(i) establishes ARFF response time requirements. The following discussion addresses
28 this issue in detail.

29
30 In the 1972 preamble of this Part, one paragraph reflected comments expressing concern that
31 ARFF vehicles "as a group reach any air operations area within 3 minutes from the time of the
32 alarm to the time of initial agent application". This was eventually changed to a requirement for
33 one ARFF vehicle to meet the 3 minute response time, the next within 4 minutes, etc. This
34 paragraph also stated that for "demonstration purposes, the accident scene will be considered the
35 runway midpoint furthest from the vehicle's assigned post". Of interest is that "assigned post"
36 does not have to be on the airport. No background data, definitions or information is offered as
37 to how these criteria (response time and location) were reached.

38
39 In *Amendment 139-14*, published in 52 Federal Register 44278, 9 November 1987, the FAA
40 concluded that it is reasonable to require a 3-minute response time for larger ARFF vehicles,
41 when the selected option by the airport operator limits available ARFF equipment to that type.
42 This determination stemmed from concerns expressed by some commenters that ... "no
43 justification existed to support requiring a vehicle, carrying 1500 gallons of water and AFFF, to
44 respond within 3 minutes". Some commenters stated that sophisticated equipment and short
45 response requirement were not warranted. However, no background data was provided to
46 support the commenters' posture.

1
2 Some commenters opposed relaxing the response time for Index A airports, concluding that a
3 response time "is essential in order to provide an effective rescue capability". This theme has
4 been repeated in recent regulatory activity (see below).

5
6 The above discussion reflects the only text referencing ARFF response times and response
7 location in the original rule and subsequent amendments through 2000.

8
9 Throughout the first century of powered flight, there have been concerted and consistent efforts
10 toward reducing the frequency of accidents and increasing the survivability of such accidents as
11 still might occur. However, this same evolutionary trend in improved aircraft safety and
12 crashworthiness actually has significantly *increased* the need for a rapid, effective ARFF
13 capability. This is evident through an examination of mortality statistics, NTSB
14 recommendations, and changes to aircraft construction requirements embodied in FAR Part 25.

15
16 The key hazards to human life in an aircraft accident are *impact forces*, *smoke inhalation* and
17 *fire*. Over time, these conditions have been addressed individually and in combination by a range
18 of design and retrofit changes aimed at:

- 19
20
- 21 • attenuating crash forces;
 - 22 • improving seat retention;
 - 23 • preserving a "survivable volume" within occupied portions of aircraft;
 - 24 • reducing potential sources of ignition;
 - 25 • reducing potential sources of fuel and fire sustainment;
 - 26 • improving physical containment of in-flight fires;
 - 27 • slowing flame-front movement through on-board components and furnishings;
 - 28 • reducing sources of toxic by-products of combustion; and
 - 29 • reducing radiant heat emissivity of furnishings.

30 While all of these improvements have contributed greatly to the overall survivability of aircraft
31 accidents, their cumulative effect has been to shift when loss of life is most preventable from the
32 moment of impact to the post-crash period. Once death was no longer an instantaneous and likely
33 consequence of a crash, concern necessarily turned to the preservation of a survivable
34 environment within the aircraft following the crash. While several of the technological
35 advancements listed above support this goal, it is impossible for them to do so indefinitely, even
36 within a fuselage essentially uncompromised by initial impact.

37
38 Aircraft fire hazards can never be completely mitigated. The liberation of on-board fuel, coupled
39 with the presence of superheated engine components, always will present some risk of post-crash
40 fire. Ultimately, the persistence of fuel-fed fires and the typical quantity of fuel liberated in a
41 crash are such that design improvements can never be expected to do more than buy time by
42 delaying burn-through of an intact hull, or by slowing its propagation through compartments and
43 furnishings. In short, those who once would have died upon impact now are far more likely to
44 survive the initial crash, but still must be passively or actively protected from thermal injury until
45 they can be removed from the immediate vicinity of the aircraft.

1 As more is learned about post-crash fires and passenger survivability changes to regulations do
2 occur. The FAA researched this issue and released a report titled, Fuselage Burnthrough
3 Protection for Increased Postcrash Occupant Survivability: Safety Benefit Analysis Based on
4 Past Accidents (DOT/FAA/AR-99/57). The results of this research is leading to changes in
5 aircraft certification, which include: upgraded flammability standards for thermal and acoustic
6 insulation material used in transport category airplanes and new flammability tests and criteria
7 that address flame propagation and entry of an external fire into the airplane.

8
9 According to the FAA: "In a majority of survivable accidents accompanied by fire, ignition of
10 the interior of the aircraft is caused by burning jet fuel external to the aircraft. Therefore, the
11 integrity of the aircraft and its ability to provide a barrier against fuel fire penetration is an
12 important factor related to the survival of aircraft occupants. Fuselage burnthrough resistance
13 becomes particularly important when the fuselage remains intact following a crash, which occurs
14 frequently in survivable accidents. The burnthrough resistance may be simplistically viewed as
15 the time interval for a fuel fire to penetrate three fuselage shell members: aluminum skin, thermal
16 acoustical insulation, and the sidewall panel/cabin flooring. Flame penetration may occur in
17 other areas as well, such as windows, air return grills, and seams/joints. The burnthrough
18 resistance of the aluminum skin is well known. It takes only about 30 to 60 seconds for the skin
19 to melt, depending on its thickness. The thermal acoustical insulation becomes the next
20 impediment to burnthrough following the melting of the aluminum skin. In recent years, the
21 FAA conducted several outdoor fuel fire burn tests on surplus fuselages to determine the
22 mechanism and time frame for burnthrough. It was determined that the fiberglass insulation
23 provided an additional 1 to 2 minutes of protection, if it completely covered the fire area and
24 remained in place. Thus, the method of securing the insulation to the fuselage structural members
25 is important. Finally, the sidewall panels/flooring offer the final barrier to fire penetration.
26 Sandwich panels comprised of honeycomb cores and fiberglass facings are effective barriers;
27 however, full-scale fire tests also show that the fire can penetrate into the cabin through air return
28 grills, seams/joints or window reveals. Moreover, some airplanes utilize aluminum sidewall
29 panels that offer minimal burnthrough resistance. As a result of the testing, the FAA has
30 determined that the thermal acoustical insulation is the most potentially effective and practical
31 means of achieving a burnthrough barrier."

32
33 This is extracted directly from the following FAA website:
34 <http://www.fire.tc.faa.gov/materials/burnthru/burnthru.stm> It provides good technical
35 information to determine the benefits of the thermal acoustical insulation versus the aluminum
36 skin with regard to burnthrough.

37
38 For this reason, *time* becomes the single most critical element in ensuring the survival of at least
39 some occupants of an aircraft involved in a major accident. This means:

- 40
- 41 • ARFF personnel must be alerted as rapidly and directed as efficiently as possible to
 - 42 where they are needed;
 - 43 • ARFF personnel must be capable of responding as quickly as possible with resources
 - 44 appropriate to the expected requirements of the emergency (personnel, equipment, and
 - 45 agent); and

- Every means possible should be employed to expedite the safe self-evacuation and rescue of aircraft occupants following a survivable accident.

The ARFFRWG distinguished between three distinct time constraints: the time required for the need for response to be recognized and transmitted to ARFF personnel; the time required for ARFF personnel to physically reposition from a specified geographical location; and the time prescribed and required for evacuation of the aircraft. The first of these is not governed by any existing regulation or standard, and therefore is not subject to objective measurement. The second constraint is set forth in FAR Part 139; the third is provided for in aircraft design (Part 25) and in terms of crew responsibilities and aircraft provisions (Part 121), but generally is not measured after initial certification unless an evacuation actually takes place.

Given the above, "response time" becomes a multidimensional problem:

- How long can an aircraft certificated under Part 25 be expected to protect its occupants from fire?
- Can or should ARFF response be designed to complement the occupant evacuation requirements of Part 121?
- Are existing notification processes and capabilities adequate given the criticality of response?
- How fast can responders reasonably be expected to arrive and engage in rescue and fire fighting operations, with and without prior warning?
- How fast do the occupants of an aircraft involved in fire need the responders to arrive?

Part 139 applies to the certification and operation of airports. However, it is within the FAA's statutory authority to set standards for safe operations at certificated airports that go beyond the current Part 139's scope. 49 U.S.C. 44706(b) states, "An airport operating certificate issued under this section shall contain terms necessary to ensure safety in air transportation." While that section goes on to mandate specific requirements for ARFF and runway treatment, it in no way constrains the Administrator from ensuring that all persons operating at a certificated airport are properly trained to interact effectively. In fact, there is an affirmative requirement for such action to be taken where required: "The Administrator of the Federal Aviation Administration shall promote safe flight of civil aircraft in air commerce by prescribing... regulations and minimum standards for other practices, methods, and procedure the Administrator finds necessary for safety in air commerce and national security." (49 U.S.C. 44701(a)(5))

Based on the foregoing, the FAA can and should compel agencies and individuals subject to the Federal Aviation Regulations, including aircrews and air traffic controllers, to conduct their respective activities so as to enhance the safety of operations at certificated airports. This lack of internal communication has resulted in regulations that are not mutually supporting. In the specific case of response time, the FAA's needs to harmonize the occupant protection requirements of its various regulations with the Orders under which the air traffic control system is operated. This lack of internal coordination has created a system where response time cannot be objectively measured prior to the point of confirmed receipt at the responder's location.

1 Given the dissimilarities of notification procedures and equipment across all airports, and even
2 within the small subset of higher-index airports, for the purposes of the current Sec.139.319, this
3 means that "response time" itself must be explicitly defined. Therefore, the ARFFRWG
4 proposed adding a specific definition of this term to Sec. 139.103: "*Response Time* means the
5 measurement of time for a timed response drill. This period begins with the activation of the
6 tower alarm, (tone or signal), followed by response information. This period ends with the initial
7 discharge of agent upon arrival of the first ARFF vehicle(s). Elapsed time is measured from Alert
8 Tone to Initial Discharge."

9
10 A related issue involves ambiguity in precisely how response time is used for measurement
11 purposes. There are three different circumstances under which the speed of an ARFF response is
12 measured:

- 13
- 14 (1) Initial airport certification;
- 15 (2) Annual certification evaluation; and
- 16 (3) Post-incident investigation.
- 17

18 In FAA Order 5280.5B, *Airport Certification Program Handbook*, the FAA considers the first
19 and second of these uses to be identical, in that they require a timed response drill for both initial
20 and periodic evaluations. However, long before the airport operator applies for a certificate, Part
21 139 response time and location criteria are used by airport planners and engineers to determine
22 where to site ARFF stations or garages.

23
24 To minimize variability, siting typically assumes ideal driving conditions between the assigned
25 position of the equipment and the designated end-point for timing purposes (runway midpoint,
26 runway end, etc.) The FAA also assumes ideal driving conditions for certification and
27 evaluation purposes in the interests of fire fighter and vehicle safety. Thus, the current method
28 of measuring response time is based solely upon worst-case response conditions (zero warning
29 time), but assumes ideal driving conditions.

30
31 Actual conditions encountered in real-world responses vary significantly from this model.
32 Numerous surveys over time indicate that the vast majority of aircraft-related responses
33 commence with advance warning of an emergency in progress and prepositioning ("staging") of
34 equipment. In the case of no-notice emergency responses (runway departures, undershoots, etc.),
35 the climatic conditions that often precipitate adverse event also hamper the response. For this
36 reason, and because the majority of declared emergencies are responded to by dispatching ARFF
37 vehicles to designated stand-by locations, the ARFFRWG concluded that a new response time
38 standard should be incorporated into Part 139. However, in creating this new standard, the
39 ARFFRWG took note of the need to ensure it did not create an undue burden on those airports
40 served by single vehicles and/or where extremely long runways are in use (such as at
41 decommissioned military airfields). It also saw a need to explicitly affirm that, due to the wide
42 variability of airport conditions and equipment capabilities, the new standard is to be used for
43 planning only – not as a testable criteria during airfield inspections.

44
45 The new standard will require pre-planned "staging" positions to be selected so that when prior
46 notification of an inbound emergency aircraft has given, at least one ARFF responding vehicle

1 can reach the end of the farthest runway within 90-seconds. This standard is intended to ensure
2 adequate emergency planning takes place to ensure efficient deployment of ARFF personnel
3 when advance notice of an emergency is available.

4
5 ARFF responses to emergencies do not take place in isolation. Many events serious enough to
6 warrant ARFF reaction also are serious enough to prompt flight crews to order the evacuation of
7 their aircraft. In such cases, Part 121 places a tremendous degree of responsibility for successful
8 evacuation in the hands of cabin crewmembers. However, a review of emergency evacuation
9 experience consistently points to the fact that:

- 10 (1) Potentially disabling injuries can and usually do occur whenever an evacuation is
11 attempted;
- 12 (2) Evacuees often do not move away from the aircraft, jeopardizing their own safety
13 and interfering with the proper positioning of responding emergency vehicles; and
- 14 (3) Anyone who has not already evacuated an aircraft involved in fire by the time the
15 first responders arrive is at grave risk, either from asphyxiation or thermal injuries.
16

17
18 As demonstrated repeatedly through research and supported by other Federal Aviation
19 Regulations, evacuation of aircraft occupants – both through self-evacuation and external
20 intervention – remains a critical factor in post-crash survival. Given the degree of protection that
21 may be expected even within a totally intact fuselage, it is clear that evacuations should be
22 initiated prior to or immediately upon the arrival of ARFF personnel whenever fire is present.
23

24 The FAA requires an evacuation demonstration to be performed on all new type certification of
25 new aircraft and modified type aircraft above a minimum seating capacity. 14 CFR 25.803(c)
26 states: “For airplanes having a seating capacity of more than 44 passengers, it must be shown
27 that the maximum seating capacity, including the number of crewmembers required by the
28 operating rules for which certification is requested, can be evacuated from the airplane to the
29 ground under simulated emergency conditions within 90 seconds.”
30

31 Once aircraft are certified as described above, the FAA requires Part 121 carriers to perform a
32 modified evacuation demonstration on all aircraft types in the fleet that contain 44 seats or more,
33 upon delivery. FAR 121.291 (1) states that the carrier must “demonstrate the effectiveness of its
34 crewmember emergency training and evacuation procedures by conducting a demonstration, not
35 requiring passengers and observed by the Administrator, in which the flight attendants for that
36 type and model of airplane, using that operator's line operating procedures, open 50 percent of
37 the required floor-level emergency exits and 50 percent of the required non-floor-level
38 emergency exits whose opening by a flight attendant is defined as an emergency evacuation duty
39 under §121.397, and deploy 50 percent of the exit slides. The exits and slides will be selected by
40 the administrator and must be ready for use within 15 seconds.”
41

42 The philosophy behind these regulations is to ensure that the aircraft and crews have the access
43 and the means to perform an evacuation within a critical amount of time to promote the
44 survivability of the aircraft's occupants. With a minimum response time set at 3 minutes for the
45 first arriving ARFF vehicle, in accordance with the philosophy of the above regulations, the
46 aircraft *should* be fully evacuated within 90 seconds from the initiation of the evacuation, i.e.,

1 fully 90 seconds prior to the required response time for the first ARFF vehicle to arrive at the
2 scene.

3
4 Given the above, it must be anticipated that evacuation of an aircraft may begin prior to the
5 arrival of ARFF personnel. In a real-time accident/incident, time is critical. Flight crews are
6 trained to begin the evacuation process once the aircraft has come to a complete stop, and cabin
7 crews are trained annually on their Carrier's evacuation procedures. If it is physically possible to
8 evacuate an occupant, crews will facilitate that evacuation. If the occupant is incapable of being
9 removed to a safe location, the ARFF challenge becomes one of extrication and longer-duration
10 protection of the surrounding environment.

11
12 Neither the current FAR Part 139 nor NFPA 403, *Standard for Aircraft Rescue and Fire-*
13 *Fighting Services at Airports*, directly address either evacuation or extrication. This is because
14 ARFF is viewed as a purely *active* task with clearly defined short-term, time-based goals, as
15 opposed to being an interactive task carried out at the same time as aircraft evacuation with the
16 potential for longer engagement in the immediate proximity of the scene. For example, NFPA
17 403 states, "The most important factors bearing on effective rescue in a survivable aircraft
18 accident are the training received, the effectiveness of the equipment, and the speed with which
19 personnel and equipment designated for rescue and fire-fighting purposes can be put to use."

20
21 Given the foregoing discussion, it is evident that while FAR Part 25 sets design standards for
22 evacuation and FAR Part 121 establishes crew and on-board equipment responsibilities for
23 evacuation, Part 139 currently treats ARFF operations as somehow being distinct from the actual
24 need to remove aircraft occupants from an accident scene.

25
26 With this common frame of reference, the ARFFRWG then turned to an examination of the
27 differences among current FAR Part 139, NFPA, and ICAO requirements for response time. If
28 optimum conditions are assumed, the most stringent of the three is NFPA 403:

29
30 "The demonstrated response time of the first responding vehicle to reach any
31 point on the operational runway shall be 2 minutes or less and to any point
32 remaining within the on-airport portion of the rapid response area shall be no
33 more than 2 1/2 minutes, both in optimum conditions of visibility and surface
34 conditions. Other ARFF vehicles necessary to achieve the [index-required]
35 agent discharge rate... shall arrive at intervals not exceeding 30 seconds."
36 (paragraph 7-1.3) [*"Rapid response area" is defined by NFPA as a rectangle*
37 *500 feet to either side of runway centerline and extending 1,650 feet beyond*
38 *each runway end, remaining within the airport property line.*]

39
40 ICAO's International Standards and Recommended Practices (SARPs) for Annex 14 to the
41 Convention on International Civil Aviation, *Aerodromes* (Amendment 4, January 11, 2001), sets
42 a slightly less ambitious goal:

43
44 "The operational objective of the rescue and fire fighting service shall be to achieve
45 a response time not exceeding three minutes to any point of each operational
46 runway, in optimum visibility and surface conditions." (paragraph 9.2.21)

1
2 This Standard was only recently promulgated. In the original release of the Third Edition of
3 Annex 14 in July of 1999, there only were "Recommendations" with respect to response time,
4 similar in most respects to those of NFPA. However, those Recommendations themselves were
5 modified in January 2001, slightly raising the amount of time allowed for the arrival of
6 secondary responders:

7
8 "The operational objective of the rescue and fire fighting service should be to
9 achieve a response time not exceeding two minutes to any point of each operational
10 runway, in optimum visibility and surface conditions. The operational objective of
11 the rescue and fire fighting service should be to achieve a response time not
12 exceeding three minutes to any other part of the movement area in optimum
13 visibility and surface conditions... Any other vehicles required to deliver the
14 amounts of extinguishing agents specified [by index]... should arrive no more than
15 one minute after the first responding vehicle(s) so as to provide continuous agent
16 application." (paragraphs 9.2.22 through 24 *passim*.)

17
18 *[ICAO also provides a supplementary Note, stating, "Response time is considered*
19 *to be the time between the initial call to the rescue and fire fighting service, and the*
20 *time when the first responding vehicle(s) is (are) in position to apply foam at a rate*
21 *of at least 50 per cent of the discharged rate specified [by index]." This*
22 *information is also available in ICAO Document 9137-AN/898, Airport Services*
23 *Manual, Part I: Rescue and Fire Fighting.]*

24
25 Taking into consideration the use of mandatory language ("shall") by NFPA and the less rigorous
26 "should" of the ICAO SARPs, three common elements may be discerned between these two sets
27 of criteria:

- 28
- 29 • Both call for ARFF personnel to arrive at the scene as quickly as two minutes after
30 notification.
 - 31 • Both recognize the need to specify the conditions under which the required response time
32 may be presumed to be achievable.
 - 33 • Both require responders to be able to travel at least to the end of the farthest operational
34 runway... not the "midpoint."
- 35

36 The United States has filed differences to ICAO Annex 14 with respect to response time that
37 restate existing Federal Aviation Regulation requirements while adding the Remark, "The United
38 States values a rapid response and the presence of professional fire fighters at the earliest
39 possible time to deal with incipient conditions." Notwithstanding this Remark, the current
40 language of FAR Part 139 is significantly less rigorous, from one perspective, than either of the
41 standards cited above, in terms of both time permitted for initial response *and* the geographic
42 location the responders are expected to reach in the allotted time:

43
44 "The response required by... this section shall achieve the following performance:
45 (i) Within 3 minutes from the time of the alarm, at least one required airport rescue
46 and fire fighting vehicle shall reach the midpoint of the farthest runway serving air

1 carrier aircraft from its assigned post, or reach any other specified point of
2 comparable distance on the movement area which is available to air carriers, and
3 begin application of [agent]; (ii) Within 4 minutes from the time of alarm, all other
4 required vehicles shall reach the point specified [above]... from their assigned post
5 and begin application of [agent]." (Sec. 139.319(i)(2))
6

7 Given that the fuel-fed burn-through of a fuselage may be expected to have already taken place
8 within two minutes, and evacuation is expected to have been completed by all capable of self-
9 evacuating within 90 seconds, a three-minute response time may be considered less than
10 satisfactory to the intrinsic life-saving purpose behind having ARFF capability in the first place.
11

12 As noted above, ICAO uses the term "optimum visibility and surface conditions" in its SARP.
13 This is defined as daytime, good visibility, and no precipitation, with the normal response route
14 free of surface contamination (water, ice or snow). NFPA does not define "optimum
15 conditions."
16

17 It is appropriate to note that the FAA required response times are used for "time trials" or "test
18 response times" to ensure that an ARFF department can meet, or exceed, the stated regulation,
19 and not necessarily as a performance standard for actual operational dispatch. Also, as stated
20 earlier, the implementation of response timing has been based on good visibility and dry surfaces
21 for driving. This will also enhance safe conditions for all parties involved in response time
22 testing.
23

24 It is only in the case of a post-accident/incident investigation that actual ARFF response times
25 are assessed against the conditions that existed at the time of the response. While this is
26 appropriate, such investigations sometimes tend to disregard adverse conditions threatening the
27 safety of the responders and inappropriately rely on the ideal response times set forth in Sec.
28 139.319.
29

30 The ARFFRWG concluded that, for the purposes of accountability as opposed to evaluation, it is
31 inappropriate to mandate a specific response time applicable to ARFF personnel responding to
32 an actual emergency within the regulation itself. An assessment of the responders' actual
33 performance, taking into consideration both the nominal times prescribed in the regulation and
34 the actual conditions under which the response was made, is the only objective means of making
35 judgments regarding the adequacy of that response.
36

37 It also was noted during the ARFFRWG's review of ARFF responses that the vast majority of
38 responses to aircraft emergencies take place with some warning. While Part 139 anticipates and
39 provides for ARFF personnel arriving at an accident/incident within a certain amount of time
40 without warning, actual experience indicates that typical responses occur in two phases: a
41 notification period, during which forces are deployed to predetermined positions ("staged") in
42 anticipation of an emergency aircraft's arrival, and a movement period during which the arriving
43 aircraft is pursued during its landing roll and afforded ARFF protection almost immediately upon
44 coming to a stop. This suggested to the ARFFRWG that staging itself should be provided for in
45 Part 139, and appropriate language has been proposed to that end. It also indicates that responses

1 in general need to be placed in their proper perspective as involving aircrew and air traffic
2 control in a coordinated, harmonized manner across FAA lines of business.

3
4 Consider the following scenarios:

5
6 *Scenario A: Declared Emergency --*

7
8 Aboard the aircraft:

- 9
10
- 11 • Need for ARFF response is identified
 - 12 • Expected need for evacuation after landing is assessed (ideally passed on to responders as well)
 - 13 • Passengers and crew are prepared for landing
 - 14 • Landing is accomplished and predetermined course of action regarding evacuation is carried out
- 15
16

17 At the airport:

- 18
- 19 • ATC receives and relays request for ARFF response
 - 20 • ARFF personnel pre-position (stage) to receive aircraft
 - 21 • ARFF personnel arrive planeside shortly after aircraft comes to a stop
 - 22 • Incident commander assists crew in determining if evacuation is needed (as required)
- 23

24 *Scenario B: No-Notice Emergency* (undershoot, veer-off, overrun, or landing off runway surface,
25 collision) –

26
27 As the event occurs:

- 28
- 29 • Need for ARFF response not identified until emergency is in progress; ATC or airport personnel may be first to recognize and relay need for response
 - 30 • ARFF personnel must be notified of aircraft in distress
 - 31 • Responders must don gear, board equipment, and exit station
 - 32 • An unknown distance must be covered to reach the aircraft
 - 33 • Possible need for evacuation must be assessed in real time (may not have opportunity to notify responders if required/ordered)
 - 34 • Depending on weather and lighting conditions, first responders may not know if evacuation is in progress until arriving planeside
 - 35 • Passengers will react unpredictably (although preparation of exit row occupants will help); crew must react based on training and experience
- 36
37
38
39
40

41 Scenario A is far less likely to be the result of environmental conditions (weather, lighting, etc.)
42 than Scenario B. However, those same conditions that often contribute to Scenario B-type
43 accidents consistently are seen to impede both external recognition of the emergency and the
44 efficiency of the subsequent response.

1
2 The "worst case scenario" in Scenario A involves an aircraft already known to be in distress; fire
3 may be presumed to be either already in progress or a possible result of a marginally controllable
4 landing. Staged ARFF personnel capable of reaching the aircraft within 90-seconds of its
5 coming to a stop – even at the end of the farthest runway – have an excellent chance of reducing
6 an existing fire or suppressing one that develops after touchdown, thereby sharply decreasing the
7 hazard to the aircraft's occupants and possibly rendering an immediate evacuation unnecessary.

8
9 Scenario B represents a worst-case scenario already in progress: the need for ARFF personnel
10 develops before they themselves become aware of it. This is the standard scenario against which
11 current Part 139 ARFF requirements are built. In short, two distinct timelines may be
12 constructed, beginning at two different points, which demonstrate the very different response
13 requirements associated with these response scenarios.

14
15 The issue of the locations to which ARFF should be expected to respond was examined in detail.
16 As noted elsewhere, there has been little documentation in previous preambles to support the on-
17 airport location that ARFF vehicles respond to in a test scenario. Thus, some research was
18 deemed necessary in order to attempt to find a pattern against which this issue could be assessed.

19
20 Currently, the designated response location for ARFF certification purposes is to the "mid-point
21 of the farthest runway serving air carrier aircraft from its assigned post, or reach any other
22 specified point of comparable distance on the movement area", etc. The ARFFRWG sought
23 documents that could validate or refute the basis for this requirement.

24
25 An FAA publication, *Location of Commercial Aircraft Accidents + Incidents Relative to*
26 *Runways*, 1 July 1990 (DOT/FAA/AOV 90-1) provided objective data germane to this issue.
27 This study summarizes NTSB and FAA information regarding the location, relative to the
28 runway regime, of commercial air transportation accidents and incidents that occurred in the U.S.
29 between 1978 and 1987. The study was limited to aircraft operating under Part 121, Part 129
30 and Part 135 (scheduled operations only).

31
32 Accidents and incidents were categorized as follows:

33
34 *Undershoot*: During landing the aircraft touches down within 2000 feet of the runway end.

35
36 *Landing Off*: During landing, any part of the aircraft's landing gear touches down off the runway
37 after passing the runway threshold.

38
39 *Veeroff*: During either landing rollout or takeoff roll, the aircraft runs off the side of the runway.

40
41 *Overrun*: During landing rollout or takeoff roll, the aircraft runs off the end of the runway, or
42 runs off the side of the runway but comes to rest beyond the departure end.

43
44 *Other*: During landing, the aircraft impacts the ground more than 2000 feet from the runway
45 threshold. During takeoff, the aircraft becomes airborne, but then impacts the ground prior to
46 making airborne power reduction, or reaching VFR pattern altitude.

1
2 For each event, the aircraft location was recorded in terms of the distance along the runway
3 centerline or extended centerline (X distance) and the perpendicular distance from the centerline
4 or extended centerline (Y distance).

5
6 While there were over 500 accidents and incidents recorded, only 246 were "identified as
7 relevant". (It is assumed that for the purposes of this discussion, those accidents and incidents
8 where the "X" and/or "Y" factor is "unknown" were not included in the 246 figure.) For those
9 accidents and incidents that were "relevant", this analysis divided the runway into quarters (e.g.,
10 0 to 25% being the first quarter from the runway end, 25% to 49% being the second quarter,
11 etc.). That is to say, the first and fourth quarters of the runway were categorized as the "runway
12 end". With that premise, the following figures were found:

13
14 Undershoots: 18
15 Landings Off: 7
16 Veer-Offs: 23

17
18 The study further defined the latter category in 3 sub-definitions:

- 19
20 • A = Distance to the point where the aircraft left the runway.
21 • B = Resting place, e.g., where the aircraft came to a stop.
22 • C = Distance to the point where the aircraft reentered the runway after veering off.

23
24 Of the 23 that occurred either within the first quarter or last quarter of the runway, 10 were in the
25 "A" category, 12 were in the "B" category and 1 in the "C" category.

26
27 Overruns: 33

28
29 All overruns came to rest within 1600 feet of the runway end, 30 of which stopped within 1000
30 feet of the runway end.

31
32 Other: 87

33
34 Because of the definition of "Other," it is correct to assume that all could be categorized as being
35 within the runway end.

36
37 Of the total of 246 accidents and incidents recorded in this Study, 52 did not have an "X" factor
38 (unknown), which meant the ARFFRWG could not determine where the aircraft came to rest in
39 relationship to the runway's length. This left a net of 193 accidents and incidents that could be
40 used for this analysis, i.e., attempting to determine where accidents/incidents occur in relation to
41 the runway.

42
43 Of the 193 figure, 150 qualified as being at (or before/beyond) the end of the runway, or some
44 77.7%. While it may be argued that the first and fourth quadrant of a runway does not qualify as
45 "runway end", it also could be argued that the 2nd and 3rd quarters do not qualify as the "mid-
46 point" of the runway.

1
2 Based on the information summarized above, the ARFFRWG concluded that this report provided
3 sufficient support to warrant moving the notional end-point for response planning purposes to the
4 farthest end of the farthest runway, as opposed to that runway's mid-point.

5
6 The ARFFRWG made separate recommendations to ARAC related to ARFF response time that
7 go beyond Part 139:

- 8
9
- 10 • Establishment of a minimum standard for notification time and method(s) between air
11 traffic control facilities and ARFF facilities.
 - 12 • Harmonization of Part 139 with FAR Part 25 to highlight the essential interaction
13 between occupant protection, the delay of fire penetration and propagation, self-
14 evacuation provisions, and external ARFF response.
 - 15 • Harmonization of Part 139 with FAR Part 121 with respect to essential interaction
16 between aircrew members and first responders.
 - 17 • Creation of a "two-track" time/distance certification standard that takes into consideration
18 the basic alternatives of no-notice and staged responses.
 - 19 • Revised criteria for the siting, construction, and equipping of ARFF stations and ARFF-
20 related airport infrastructure in AC 150/5210.15A.

21 Sec. 139.319(i) has been renamed "Protective Clothing and Personal Equipment." Tests have
22 shown that many toxic gases are produced when aircraft cabin interior finish materials are
23 burned or charred. These gases include carbon monoxide, hydrogen chloride, chlorine, hydrogen
24 cyanide and other cyanogen components, and carbonyl chloride (phosgene). A principal cause of
25 difficulty lies in the fact that the supply of breathing air is greatly reduced by combustion of
26 these cabin finish materials. It is therefore necessary that ARFF personnel who enter or operate
27 in the vicinity of an aircraft during the fire sequence be equipped with self-contained breathing
28 equipment. Helmets or hoods should be designed to accommodate the SCBA face piece without
29 interference; most existing proximity hoods do not have this provision. The ARFFRWG
30 identified NFPA and OSHA Standards that take into consideration all of the above factors, and
31 has added regulatory language making explicit reference to them to ensure the necessary level of
32 safety is achieved.

33
34 No consensus was reached by the ARFFRWG on this subject; not because of the technical
35 reasons associated with protective clothing and personal equipment, but on the issue of direct
36 reference to NFPA Standards within the regulatory language. A vote was taken on the subject
37 with the Air Line Pilots Association, Aircraft Rescue and Fire Fighting Working Group,
38 Aviation Cabin Safety Specialists Inc., Independent Pilots Association, International Association
39 of Fire Fighters, National Fire Protection Association, International Association of Fire Chiefs,
40 and the San Jose (Calif.) Fire Department voting in favor of the incorporation of NFPA standards
41 within the regulatory language.

42
43 This group defended their position by explaining, the NFPA standards are published with
44 advanced notification in the Federal Register. A request for comments is published in the Federal
45 Register through the Department of Commerce, National Institute of Standards and Technology

1 (NIST) on all NFPA codes and standards undergoing the revision process. Comments are
2 presented to the NFPA for consideration (see FR Nov. 14, 2003).

3
4 Additionally, NFPA makes every effort to get the word out. In addition to publishing in the
5 Federal Register, NFPA issues public notices in NFPA News, the American National Standards
6 Institute's Standards Action, and relevant national and international trade journals. These
7 notifications include a solicitation for input from interested parties. In reality, NFPA does much
8 more than is required as a minimum by the federal government.

9
10 OMB Circular A 119 (1998) clearly states that "All federal agencies must use voluntary
11 consensus standards in lieu of government-unique standards in their...regulatory activities,
12 except where inconsistent with law or otherwise impractical. In these circumstances, your
13 agency must submit a report describing the reason(s) for its use of government-unique standards
14 in lieu of voluntary consensus standards to the Office of Management and Budget (OMB)
15 through....NIST" All NFPA codes and standards are accredited by the American National
16 Standards Institute as voluntary consensus standards.

17
18 OMB Circular A 119 clearly states...when considering using a standard, your agency should
19 take full account of the effect of using the standard on the economy, and of applicable federal
20 laws and policies, including laws and regulations relating to antitrust, national security, small
21 business, product safety, environment, metrication, technology development, and conflicts of
22 interest. Your agency should also recognize that use of standards, if improperly conducted, can
23 suppress free and fair competition; impede innovation and technical progress; exclude safer or
24 less expensive products; or otherwise adversely affect trade, commerce, health, or safety. If your
25 agency is proposing to incorporate a standard into a proposed or final rulemaking, your agency
26 must comply with the "Principles of Regulation" (enumerated in Section 1(b)) and with the other
27 analytical requirements of Executive Order 12866, "Regulatory Planning and Review."

28
29 Since OMB Circular A 119 references Executive Order 12866, it seems obvious that the intent is
30 not for the executive order to preclude the use of voluntary consensus standards in lieu of
31 government-unique standards, but to the contrary, the two go hand-in-hand. To suggest
32 otherwise seems ludicrous.

33
34 More specifically, the objection is that the NFPA standards making process does not have to
35 follow Executive Order 12866, issued on September 30, 1993 by President Bill Clinton, which
36 stipulates, among other things, that for all regulations a detailed cost-benefit analysis must be
37 performed. Although this is a true statement it is extremely misleading in that the Executive
38 Order does not even address the use of voluntary consensus standards. Since Circular A 119
39 references Executive Order 12866, the agency considering the adoption of a voluntary consensus
40 standard must also conduct a detailed cost-benefit analysis. As part of the ARAC process a
41 detailed cost-benefit analysis will be conducted including when voluntary consensus standards
42 are to be considered in lieu of government-unique standards.

43
44 All federal agencies must use voluntary consensus standards in lieu of government-unique
45 standards in their...regulatory activities, except where inconsistent with law or otherwise
46 impractical. Executive Order 12866 does not preclude the use of voluntary consensus standards,

1 in fact, the reference by OMB Circular A 119 to Executive Order 12866 suggests that it is indeed
2 appropriate.

3
4 The dissenting opinion states: “The NFPA standards also provide reference to other NFPA
5 standards that may be written outside of the ARFF Technical Committee of which the aviation
6 industry is represented.” Although this is a true statement, it should not preclude any
7 consideration of the adoption by any federal agency of an NFPA standard. The NFPA process is
8 a fair and open process and does not preclude the participation of any interest group. The above
9 statement only implies that a special interest aviation industry group(s) has not pursued this
10 opportunity to participate in Technical Committees other than the ARFF Technical Committee.
11 A review of the records indicates that NFPA has actually pursued several aviation related
12 organizations to participate in the standards writing process. Additionally, the NFPA welcomes
13 the aviation industry organizations to be represented on the NFPA technical committees where
14 these groups have an interest.

15 Regarding guidance documents, the FAA should continue to use the 150 series advisory circulars
16 only to provide regulatory guidance. Advisory documents should not be used where regulations
17 are needed

18 The dissenting opinion held by the Air Transport Association, Airports Council International-
19 North America, Allegheny County Airport Authority, American Association of Airport
20 Executives, Charlottesville-Albemarle County (Va.) Airport Authority, and the Port Authority of
21 New York and New Jersey does not disagree with the importance of supplying ARFF personnel
22 with proper personal protective equipment. It is important to note that Armen DerHohannesian &
23 Associates (ADA) abstained from this vote. However, the dissenting opinion to the inclusion of
24 direct reference of NFPA standards in the regulatory language is based on the administrative
25 process for how these standards are developed. The NFPA standards writing process related to
26 ARFF are developed by a committee of fire fighting and aviation professionals. While the
27 process is open to the public and there is opportunity to comment, the process does not follow
28 the provisions of the Administrative Procedures Act. Additionally, the NFPA standard making
29 process does not have to follow Executive Order 12866, issued on September 30, 1993 by
30 President Bill Clinton, which stipulates, among other things, that for all regulations a detailed
31 cost-benefit analysis must be performed.

32 Additionally, the dissenters note that the NFPA standards also provide reference to other NFPA
33 standards that may be written outside of the ARFF Technical Committee of which the aviation
34 industry is represented. The dissenters do concede that the NFPA process does have its
35 advantages, with the primary one being that they are updated on a five year cycle.

36 Understanding the restrictions and advantage of the NFPA standards writing process outlined
37 above, the dissenting opinion suggests that the FAA continue its longstanding and successful
38 practice of using the 150 series advisory circulars to provide regulatory guidance to airport
39 certificate holders, rather than direct reference to NFPA standards in regulatory language to
40 ensure that a necessary level of safety is achieved.

41 Sec. 139.321 Handling and storing of hazardous substances and materials -- no change.

1
2 Sec. 139.323 Traffic and wind direction indicators -- no change.

3
4 Sec. 139.325 Airport emergency plan – The ARFFRWG reached full consensus on the
5 recommendation that the FAA should add both weapons of mass destruction (WMD) and
6 nuclear, biological, and chemical incidents (NBC) to the list of times for which the airport
7 emergency plan should address as outlined in 139.235(b).

8
9 The ARFFRWG also discussed changing section 139.325(g)(5), which states that each certificate
10 holder shall “hold a full-scale emergency plan exercise at least once every 3 years” to holding a
11 full-scale emergency plan exercise at least once every 2-years. The group could not reach
12 consensus.

13
14 The majority of the ARFFRWG, represented by the Air Line Pilots Association International,
15 Aircraft Rescue and Fire Fighting Working Group, Armen DerHohannesian and Associates,
16 L.L.C., Aviation Cabin Safety Specialists, Inc., Independent Pilots Association, International
17 Association of Fire Fighters, National Fire Protection Association, International Association of
18 Fire Chiefs, and the San Jose (Calif.) Fire Department held that the “full-scale airport emergency
19 plan exercise” should be harmonized with ICAO and NFPA standards, which state that the full-
20 scale exercise should be held every two years based upon the following discussion.

21
22 Full-scale emergency exercises should be required on a bi-annual basis consistent with ICAO
23 Annex 14, Chapter 9.1, Aerodrome Emergency Planning, subparagraph 9.1.12(a) and NFPA 403,
24 section 2-2, Emergency Preparedness, subparagraph 2-2.2. Accident history shows that a major
25 aircraft accident is manpower intensive requiring on-airport and large numbers of mutual aid
26 responders. ARFF provides a timely initial response, but the emergency response for life-safety
27 is not complete until the injured survivors arrive at an appropriate medical facility. Control of the
28 PCA (provide a “clear escape path”) is the initial phase of a multi-phase operation followed by
29 multiple needs such as access to the aircraft, removal of entrapped occupants and transport to an
30 appropriate medical facility.

31
32 With the exception of the full-scale emergency exercise there is no regulatory requirement for
33 mutual aid responders to receive hands-on training in areas such as aircraft/airport
34 familiarization, logistics, culture, communications and hardware issues.

35
36 Two year exercises increase the opportunity for both ARFF and mutual aid fire departments to
37 work with the other organizations and agencies involved in the Airport Emergency Plan. Also,
38 usually only the on-duty ARFF personnel will participate in an airport’s full scale exercise.
39 Conducting full-scale exercise on a two-year schedule will ensure that more of the airport ARFF
40 staffing will receive this valuable experience.

41
42 The minority, represented by Air Transport Association, Airports Council International-North
43 America, Allegheny County (Pa.) Airport Authority, American Association of Airport
44 Executives, Charlottesville-Albemarle (Va.) Airport Authority, and the Port Authority of New
45 York and New Jersey hold that changing the requirement from every three-years to every two-
46 years may not hold as much benefit as enhancing the expectations and review capacity of the

1 current requirement as well as providing greater guidance and expectations to airports to assist
2 them in complying with 139.325(g)(4). To hold a full-scale emergency response drill every two-
3 years poses a financial and organizational burden not only the airport but on the resources that
4 would also play part in the emergency exercise, i.e., mutual-aid, hospitals, ambulance
5 companies, airlines, etc. Enhancing the expectations for 139.325(g)(4) would have the expected
6 impact of providing greater cooperation amongst the emergency response entities without the
7 added organizational impacts that would be expected with a full-scale emergency response.

8
9 Sec. 139.327 Self-inspection program -- no change.

10
11 Sec. 139.329 Ground vehicles -- no change.

12
13 Sec. 139.331 Obstructions -- no change.

14
15 Sec. 139.333 Protection of Nav aids -- no change.

16
17 Sec. 139.335 Public protection -- no change.

18
19 Sec. 139.337 Wildlife hazard management -- no change.

20
21 Sec. 139.339 Airport condition reporting – no change.

22
23 Sec. 139.341 Identifying, marking, and reporting construction and other unserviceable areas --
24 no change.

25
26 Sec. 139.343 Noncomplying conditions – no change.

1 *The Proposed Amendments*
2

3 In consideration of the foregoing, the Federal Aviation Administration proposes to amend
4 Chapter I of Title 14, Code of Federal Regulations, as follows:

5
6 PART 139--CERTIFICATION AND OPERATIONS: LAND AIRPORTS SERVING CERTAIN
7 AIR CARRIERS

8
9 Subpart A--General

10
11 Sec.

12 139.1 Applicability.

13 139.3 Definitions.

14 139.5 Standards and procedures for compliance with the certification and
15 operations requirements of this part.

16
17 Subpart B--Certification

18
19 139.101 Certification requirements: General.

20 139.103 Application for certificate.

21 139.105 Inspection authority.

22 139.107 Issuance of certificate.

23 139.109 Duration of certificate.

24 139.111 Exemptions.

25 139.113 Deviations.

26
27 Subpart C--Airport Certification Manual and Airport Certification
28 Specifications

29
30 139.201 Airport operating certificate: Airport certification manual.

31 139.203 Preparation of airport certification manual.

32 139.205 Contents of airport certification manual.

33 139.207 Maintenance of airport certification manual.

34 139.209 Limited airport operating certificate: Airport certification
35 specifications.

36 139.211 Preparation of airport certification specifications.

37 139.213 Contents of airport certification specifications.

38 139.215 Maintenance of airport certification specifications.

39 139.217 Amendment of airport certification manual or airport certification
40 specifications.

41
42 Subpart D--Operations

43
44 139.301 Inspection authority.

45 139.303 Personnel.

46 139.305 Paved areas.

- 1 139.307 Unpaved areas.
- 2 139.309 Safety areas.
- 3 139.311 Marking and lighting.
- 4 139.313 Snow and ice control.
- 5 139.315 Aircraft rescue and fire fighting: Index determination.
- 6 139.317 Aircraft rescue and fire fighting: Equipment and agents.
- 7 139.319 Aircraft rescue and fire fighting: Operational requirements.
- 8 139.321 Handling and storing of hazardous substances and materials.
- 9 139.323 Traffic and wind direction indicators.
- 10 139.325 Airport emergency plan.
- 11 139.327 Self-inspection program.
- 12 139.329 Ground vehicles.
- 13 139.331 Obstructions.
- 14 139.333 Protection of nav aids.
- 15 139.335 Public protection.
- 16 139.337 Wildlife hazard management.
- 17 139.339 Airport condition reporting.
- 18 139.341 Identifying, marking, and reporting construction and other
- 19 unserviceable areas.
- 20 139.343 Noncomplying conditions.

21
22 Authority: 49 U.S.C. 106(g), 40113, 44701-44706, 44709, 44719.

23
24 Source: Docket No. 24812, 52 FR 44282, Nov. 18, 1987, unless otherwise noted.

25
26 Subpart A--General

27
28 Sec. 139.1 Applicability.

29
30 This part prescribes rules governing the certification and operation of land airports which serve
31 any scheduled or unscheduled passenger operation of an air carrier that is conducted with an
32 aircraft designed for more than 9 passengers. This part does not apply to airports at which air
33 carrier passenger operations are conducted only by reason of the airport being designated as an
34 alternate airport.

35
36
37 Sec. 139.3 Definitions.

38
39 The following are definitions of terms as used in this part:

40
41 *AFFF* means aqueous film forming foam agent.

42
43 *Air Carrier* means a person who holds or who is required to hold a Part 121 air carrier operating
44 certificate issued under this chapter while operating aircraft designed for more than 9 passengers
45 or with a maximum gross take-off weight of 33,000 pounds (15,000 kg) or greater.

1 *Air carrier aircraft* means an aircraft in excess of 33,000 pounds (15,000 kg) or having a
2 designed seating capacity of more than 9 passengers which is operated under Part 121 of this
3 chapter by an air carrier. A “large” air carrier aircraft is one with a passenger seating capacity of
4 more than 30 passengers or with a maximum gross takeoff weight of 33,000 pounds (15,000 kg)
5 or greater that is operated by an air carrier.

6
7 *Air carrier operation* means the takeoff or landing of an air carrier aircraft and includes the
8 period of time from 15 minutes before and until 15 minutes after the takeoff or landing.

9
10 *Aircraft rescue and fire fighting (ARFF) personnel* means trained personnel required to meet the
11 minimum response times and objectives as determined by regulatory language and task analysis.

12
13 *Aircraft size* means the aggregate of factors dictating both the ability of an aircraft to be
14 accommodated at a given airport and the potential level of risk to ARFF personnel that they
15 represent. It is described by fuselage length, width and height, occupant load, flammable liquid
16 fuel capacity, and potential internal fire load.

17
18 *Airport* means an area of land or other hard surface, excluding water, that is used or intended to
19 be used for the landing and takeoff of aircraft, and includes its buildings and facilities, if any.

20
21 *Airport operating certificate* means a certificate, issued under this part, for operation of an
22 airport serving scheduled operations of air carriers.

23
24 *Category* means an airport ranking determined by aircraft size, as provided in this part.

25
26 *Certificate holder* means the holder of an airport operating certificate or a limited airport
27 operating certificate, except that as used in Subpart D "certificate holder" does not mean the
28 holder of a limited airport operating certificate if its airport certification specifications, or this
29 part, do not require compliance with the section in which it is used.

30
31 *Entry Team* means a minimum of two firefighters specifically assigned, trained and equipped to
32 perform interior search and rescue.

33
34 *Helipoint* means an airport or an area of an airport used or intended to be used for the landing and
35 takeoff of helicopters.

36
37 *Limited airport operating certificate* means a certificate, issued under this part, for the operation
38 of an airport serving unscheduled operations of air carriers.

39
40 *Movement area* means the runways, taxiways, and other areas of an airport which are used for
41 taxiing or hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading ramps
42 and aircraft parking areas.

43
44 *Rapid Intervention Team (RIT)* means a minimum of two properly trained and equipped
45 personnel capable of initiating rescue of ARFF personnel. One member of this team may also
46 serve as the initial incident commander.

1
2 *Regional Airports Division Manager* means the airports division manager for the FAA region in
3 which the airport is located.

4
5 *Response Time* means the measurement of time for a timed response drill. This period begins
6 with the activation of the tower alarm, (tone or signal), followed by response information. This
7 period ends with the initial discharge of agent upon arrival of the first ARFF vehicle(s). Elapsed
8 time is measured from Alert Tone to Initial Discharge.

9
10 *Safety area* means a designated area abutting the edges of a runway or taxiway intended to
11 reduce the risk of damage to an aircraft inadvertently leaving the runway or taxiway.

12
13 *Personnel Task Analysis* means a process intended to identify the minimum number of personnel
14 required to undertake identified tasks before supporting external organizations are able to
15 effectively assist ARFF personnel.

16
17 *Timed Response Drill* means any test conducted at airports to determine that ARFF vehicles can
18 comply with the requirements of the regulation regarding response times.

19
20 *Wildlife hazard* means a potential for a damaging aircraft collision with wildlife on or near an
21 airport. As used in this part, "wildlife" includes domestic animals while out of the control of their
22 owners.

23
24 [Doc. No. 24812, 52 FR 44282, Nov. 18, 1987; 53 FR 4258, Feb. 12, 1988, as amended by
25 Amdt. 139-16, 54 FR 39295, Sept. 25, 1989]

26
27
28 Sec. 139.5 Standards and procedures for compliance with the certification and operations
29 requirements of this part.

30
31 FAA Advisory Circulars contain standards and procedures for compliance with Subparts C and
32 D. Some of these advisory circulars are referenced in specific sections of this part. The standards
33 and procedures in them, or other standards and procedures approved by the Administrator, may
34 be used to comply with those sections.

35
36
37 Subpart B--Certification

38
39 Sec. 139.101 Certification requirements: general.

40
41 (a) No person may operate a land airport in any State of the United States, the District of
42 Columbia, or any territory or possession of the United States, serving any scheduled Part 121
43 passenger operation of an air carrier operating an aircraft designed for more than 9 passenger
44 seats (or with a maximum gross takeoff weight of 33,000 pounds [15,000 kg] or greater) without
45 an airport operating certificate, or in violation of that certificate, the applicable provisions of this
46 part, or the approved airport certification manual for that airport.

1
2 (b) Unless otherwise authorized by the Administrator, no person may operate a land airport in
3 any State of the United States, the District of Columbia, or any territory or possession of the
4 United States, serving any unscheduled Part 121 passenger operation of an air carrier operating
5 an aircraft designed for more than 9 passenger seats (or with a maximum gross takeoff weight in
6 excess of 33,000 pounds [15,000 kg] without a limited airport operating certificate, or in
7 violation of that certificate, the applicable provisions of this part, or the approved airport
8 specifications for that airport.

9
10 [Amdt. No. 139-7, 55 FR 48214, Nov. 19, 1990]

11
12
13 Sec. 139.103 Application for certificate.

14
15 (a) Each applicant for an airport operating certificate or a limited airport operating certificate
16 must submit an application, in a form and in the manner prescribed by the Administrator, to the
17 Regional Airports Division Manager.

18
19 (b) The application must be accompanied by two copies of an airport certification manual or
20 airport certification specifications, as appropriate, prepared in accordance with Subpart C of this
21 part.

22
23 [Doc. No. 24812, 52 FR 44282, Nov. 18, 1987, as amended by Amdt. 139-16, 54
24 FR 39295, Sept. 25, 1989]

25
26
27 Sec. 139.105 Inspection authority.

28
29 Each applicant for an airport operating certificate or a limited airport operating certificate must
30 allow the Administrator to make any inspections, including unannounced inspections, or tests to
31 determine compliance with—

32
33 (a) The Federal Aviation Act of 1958, as amended; and

34
35 (b) The requirements of this part.

36
37
38 Sec. 139.107 Issuance of certificate.

39
40 (a) An applicant for an airport operating certificate is entitled to a certificate if—

41
42 (1) The provisions of Sec. 139.103 of this subpart are met;

43
44 (2) The Administrator, after investigation, finds that the applicant is properly and
45 adequately equipped and able to provide a safe airport operating environment in
46 accordance with—

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(i) Subpart D of this part, and

(ii) Any limitations which the Administrator finds necessary in the public interest; and

(3) The Administrator approves the airport certification manual.

(b) An applicant for a limited airport operating certificate is entitled to a certificate if—

(1) The provisions of Sec. 139.103 of this subpart are met;

(2) The Administrator, after investigation, finds that the applicant is properly and adequately equipped and able to provide a safe airport operating environment in accordance with—

(i) The provisions of Subpart D listed in Sec. 139.213(a) of this part, and

(ii) Any other provisions of this part and any limitations which the Administrator finds necessary in the public interest; and

(3) The Administrator approves the airport certification specifications.

Sec. 139.109 Duration of certificate.

An airport operating certificate or a limited airport operating certificate issued under this part is effective until it is surrendered by the certificate holder or is suspended or revoked by the Administrator.

Sec. 139.111 Exemptions.

(a) An applicant or a certificate holder may petition the Administrator under Sec. 11.25, Petitions for Rule Making or Exemptions, of this chapter for an exemption from any requirement of this part.

(b) An applicant or a certificate holder, enplaning annually less than one-quarter of 1 percent of the total number of passengers enplaned at all air carrier airports, may petition the Administrator under Sec. 11.25, Petitions for Rule Making or Exemptions, of this chapter for an exemption from all or part of the rescue and fire fighting equipment requirements of this part on the grounds that compliance with those requirements is, or would be, unreasonably costly, burdensome, or impractical.

(c) Each petition filed under this section must be submitted in duplicate to the Regional Airports Division Manager.

1
2 [Doc. No. 24812, 52 FR 44282, Nov. 18, 1987, as amended by Amdt. 139-16, 54
3 FR 39295, Sept. 25, 1989]

4
5
6 Sec. 139.113 Deviations.

7
8 In emergency conditions requiring immediate action for the protection of life or property,
9 involving the transportation of persons by air carriers, the certificate holder may deviate from
10 any requirement of Subpart D of this part to the extent required to meet that emergency. Each
11 certificate holder who deviates from a requirement under this paragraph shall, as soon as
12 practicable, but not later than 14 days after the emergency, report in writing to the Regional
13 Airports Division Manager stating the nature, extent, and duration of the deviation.

14
15 [Doc. No. 24812, 52 FR 44282, Nov. 18, 1987, as amended by Amdt. 139-16, 54
16 FR 39295, Sept. 25, 1989]

17
18
19 Subpart C--Airport Certification Manual and Airport Certification Specifications

20
21 Sec. 139.201 Airport operating certificate: Airport certification manual.

22
23 (a) An applicant for an airport operating certificate must prepare, and submit with an application,
24 an airport certification manual for approval by the Administrator. Only those items addressing
25 subjects required for certification under this part shall be included in the airport certification
26 manual.

27
28 (b) Except as provided in paragraph (c) of this section, each certificate holder shall comply with
29 an approved airport certification manual that meets the requirements of Secs. 139.203 and
30 139.205.

31
32 (c) A certificate holder with an approved airport operations manual on December 31, 1987, may
33 use the manual in lieu of the manual required by paragraph (b) of this section until December 31,
34 1988. Until the certificate holder has an approved airport certification manual, it shall comply
35 with Sec. 139.207 as if that section applied to its airport operations manual.

36
37 [Docket No. 24812, 52 FR 44282, Nov. 18, 1987; 53 FR 4119, Feb. 12, 1988]

38
39
40 Sec. 139.203 Preparation of airport certification manual.

41
42 (a) Each airport certification manual required by this part shall—

43
44 (1) Be typewritten and signed by the airport operator;

45
46 (2) Be in a form that is easy to revise;

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(3) Have the date of initial approval or approval of the latest revision on each page or item in the manual and include a page revision log; and

(4) Be organized in a manner helpful to the preparation, review, and approval processes.

(b) FAA Advisory Circulars in the 139 series contain standards and procedures for the development of airport certification manuals.

Sec. 139.205 Contents of airport certification manual.

(a) Each airport certification manual required by this part shall include operating procedures, facilities and equipment descriptions, responsibility assignments, and any other information needed by personnel concerned with operating the airport in order to comply with—

(1) The provisions of Subpart D of this part; and

(2) Any limitations which the Administrator finds necessary in the public interest.

(b) In complying with paragraph (a) of this section, the airport certification manual must include at least the following elements:

(1) Lines of succession of airport operational responsibility.

(2) Each current exemption issued to the airport from the requirements of this part.

(3) Any limitations imposed by the Administrator.

(4) A grid map or other means of identifying locations and terrain features on and around the airport which are significant to emergency operations.

(5) The system of runway and taxiway identification.

(6) The location of each obstruction required to be lighted or marked within the airport's area of authority.

(7) A description of each movement area available for air carriers and its safety areas and each road described in Sec. 139.319(k) that serves it.

(8) Procedures for avoidance of interruption or failure during construction work of utilities serving facilities or nav aids which support air carrier operations.

(9) Procedures for maintaining the paved areas as required by Sec. 139.305.

(10) Procedures for maintaining the unpaved areas as required by Sec. 139.307.

- 1
- 2 (11) Procedures for maintaining the safety areas as required by Sec. 139.309.
- 3
- 4 (12) A description of, and procedures for maintaining, the marking and lighting systems
- 5 as required by Sec. 139.311.
- 6
- 7 (13) A snow and ice control plan as required by Sec. 139.313.
- 8
- 9 (14) A description of the facilities, equipment, personnel, and procedures for meeting the
- 10 rescue and fire fighting requirements in Secs. 139.317 and 139.319.
- 11
- 12 (15) Procedures for complying with the requirements of Sec. 139.321 relating to
- 13 hazardous substances and materials.
- 14
- 15 (16) A description of, and procedures for maintaining, the traffic and wind direction
- 16 indicators required by Sec. 139.323.
- 17
- 18 (17) An emergency plan as required by Sec. 139.325.
- 19
- 20 (18) Procedures for conducting the self-inspection program as required by Sec. 139.327.
- 21
- 22 (19) Procedures for controlling ground vehicles as required by Sec. 139.329.
- 23
- 24 (20) Procedures for obstruction removal, marking, or lighting as required by Sec.
- 25 139.331.
- 26
- 27 (21) Procedures for protection of nav aids as required by Sec. 139.333.
- 28
- 29 (22) A description of public protection as required by Sec. 139.335.
- 30
- 31 (23) A wildlife hazard management plan as required by Sec. 139.337.
- 32
- 33 (24) Procedures for airport condition reporting as required by Sec. 139.339.
- 34
- 35 (25) Procedures for identifying, marking, and reporting construction and other
- 36 unserviceable areas as required by Sec. 139.341.
- 37
- 38 (26) Any other item which the Administrator finds is necessary in the public interest.
- 39

40 [Docket No. 24812, 52 FR 44282, Nov. 18, 1987; 53 FR 4119 and 4258, Feb. 12,

41 1988]

42

43

1 Sec. 139.207 Maintenance of airport certification manual.

2
3 Each holder of an airport operating certificate shall—

4
5 (a) Keep its airport certification manual current at all times;

6
7 (b) Maintain at least one complete and current copy of its approved airport certification manual
8 on the airport;

9
10 (c) Furnish the applicable portions of the approved airport certification manual to the airport
11 personnel responsible for their implementation;

12
13 (d) Make the copy required by paragraph (b) of this section available for inspection by the
14 Administrator upon request; and

15
16 (e) Provide the Administrator with one complete and current copy required by paragraph (b) of
17 this section.

18
19
20 Sec. 139.209 Limited airport operating certificate: Airport certification specifications.

21
22 (a) An applicant for a limited airport operating certificate must prepare, and submit with an
23 application, airport certification specifications for approval by the Administrator. Only those
24 items addressing subjects required for certification under this part shall be included in the airport
25 certification specifications.

26
27 (b) Except as provided in paragraph (c) of this section, each certificate holder shall comply with
28 the approved airport certification specifications that meet the requirements of Secs. 139.211 and
29 139.213.

30
31 (c) A certificate holder with an approved airport operations specification on December 31, 1987,
32 may use those specifications in lieu of the specifications required by paragraph (b) of this section
33 until December 31, 1988. Until the certificate holder has approved airport certification
34 specifications, it shall comply with Sec. 139.215 as if that section applied to its airport operations
35 specifications.

36
37 [Docket No. 24812, 52 FR 44282, Nov. 18, 1987; 53 FR 4119, Feb. 12, 1988]

38
39
40 Sec. 139.211 Preparation of airport certification specifications.

41
42 (a) Each airport certification specifications required by this part shall--

43
44 (1) Be typewritten and signed by the airport operator;

45
46 (2) Be in a form that is easy to revise;

1
2 (3) Have the date of initial approval or approval of the latest revision on each page or
3 item in the specifications and include a page revision log; and
4

5 (4) Be organized in a manner helpful to the preparation, review, and approval processes.
6

7 (b) FAA Advisory Circulars in the 139 series contain standards and procedures for the
8 development of airport certification specifications.
9

10
11 Sec. 139.213 Contents of airport certification specifications.
12

13 (a) The airport certification specifications required by this part shall include operating
14 procedures, facilities and equipment descriptions, responsibility assignments, and any other
15 information needed by personnel concerned with operating the airport in order to comply with--
16

17 (1) The following provisions of Subpart D of this part:
18

19 (i) Section 139.301 Inspection authority.
20

21 (ii) Section 139.303 Personnel.
22

23 (iii) Section 139.305 Paved areas.
24

25 (iv) Section 139.307 Unpaved areas.
26

27 (v) Section 139.309 Safety areas.
28

29 (vi) Section 139.311 Marking and lighting.
30

31 (vii) Section 139.339 Airport condition reporting.
32

33 (2) Any other provisions of Subpart D of this part, and any limitations, which the
34 Administrator finds necessary in the public interest.
35

36 (b) In complying with paragraph (a) of this section, the airport certification specifications shall
37 include at least the following elements:
38

39 (1) Lines of succession of airport operational responsibility.
40

41 (2) Each current exemption issued to the airport from the requirements of this part.
42

43 (3) Any limitations imposed by the Administrator.
44

45 (4) The system of runway and taxiway identification.
46

1 (5) The location of each obstruction required to be lighted or marked within the airport's
2 area of authority.

3
4 (6) A description of each movement area available for air carriers and its safety areas.

5
6 (7) Procedures for maintaining the paved areas as required by Sec. 139.305.

7
8 (8) Procedures for maintaining the unpaved areas as required by Sec. 139.307.

9
10 (9) Procedures for maintaining the safety areas as required by Sec. 139.309.

11
12 (10) A description of, and procedures for maintaining, the marking and lighting systems
13 as required by Sec. 139.311.

14
15 (11) A description of the facilities, equipment, personnel, and procedures for emergency
16 response to aircraft rescue and fire fighting needs.

17
18 (12) Procedures for safety in storing and handling of hazardous substances and materials.

19
20 (13) A description of, and procedures for maintaining, any traffic and wind direction
21 indicators on the airport.

22
23 (14) A description of the procedures used for conducting self-inspections of the airport.

24
25 (15) Procedures and responsibilities for airport condition reporting as required by Sec.
26 139.339.

27
28 (16) Procedures for compliance with any other provisions of Subpart D of this part, and
29 any limitations, which the Administrator finds necessary in the public interest.

30
31
32 Sec. 139.215 Maintenance of airport certification specifications.

33
34 Each holder of a limited airport operating certificate shall--

35
36 (a) Keep its airport certification specifications current at all times;

37
38 (b) Maintain at least one complete and current copy of its approved airport certification
39 specifications on the airport;

40
41 (c) Furnish the applicable portions of the approved airport certification specifications to the
42 airport personnel responsible for their implementation;

43
44 (d) Make the copy required by paragraph (b) of this section available for inspection by the
45 Administrator upon request; and

1 (e) Provide the Administrator with one complete and current copy required by paragraph (b) of
2 this section.

3
4

5 Sec. 139.217 Amendment of airport certification manual or airport certification specifications.

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9

(a) The Regional Airports Division Manager may amend any airport certification manual or any airport certification specifications approved under this part, either--

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15

(1) Upon application by the certification holder; or

(2) On the Regional Airports Division Manager's own initiative if the Regional Airports Division Manager determines that safety in air transportation or air commerce and the public interest require the amendment.

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20

(b) An applicant for an amendment to its airport certification manual or its airport certification specifications shall file its application with the Regional Airports Division Manager at least 30 days before the proposed effective date of the amendment, unless a shorter filing period is allowed by that office.

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23

(c) At any time within 30 days after receiving a notice of refusal to approve the application for amendment, the certificate holder may petition the Administrator to reconsider the refusal to amend.

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(d) In the case of amendments initiated by the Regional Airports Division Manager, the office notifies the certificate holder of the proposed amendment, in writing, fixing a reasonable period (but not less than 7 days) within which the certificate holder may submit written information, views, and arguments on the amendment. After considering all relevant material presented, the Regional Airports Division Manager notifies the certificate holder of any amendment adopted or rescinds the notice. The amendment becomes effective not less than 30 days after the certificate holder receives notice of it, except that prior to the effective date the certificate holder may petition the Administrator to reconsider the amendment, in which case its effective date is stayed pending a decision by the Administrator.

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(e) Notwithstanding the provisions of paragraph (d) of this section, if the Regional Airports Division Manager finds that there is an emergency requiring immediate action with respect to safety in air transportation or air commerce that makes the procedures in this paragraph impractical or contrary to the public interest, the Regional Airports Division Manager may issue an amendment, effective without stay on the date the certificate holder receives notice of it. In such a case, the Regional Airports Division Manager incorporates the finding of the emergency, and a brief statement of the reasons for the finding, in the notice of the amendment. Within 30 days after the issuance of such an emergency amendment, the certificate holder may petition the Administrator to reconsider either the finding of an emergency or the amendment itself or both. This petition does not automatically stay the effectiveness of the emergency amendment.

46

1 [Doc. No. 24812, 52 FR 44282, Nov. 18, 1987, as amended by Amdt. 139-16, 54
2 FR 39295, Sept. 25, 1989]

3
4 Subpart D--Operations

5
6 Sec. 139.301 Inspection authority.

7
8 Each certificate holder shall allow the Administrator to make any inspections, including
9 unannounced inspections, or tests to determine compliance with this part.

10
11 Section 139.303 Personnel

12
13 *NOTE: Two options for determining the number of ARFF personnel are presented, based on the*
14 *divergent opinions of the ARFFRWG on how best to determine the minimum required level of*
15 *ARFF staffing required to perform identified key tasks within specific time frames.*

16
17 *Option 1 reflects the majority opinion represented by Air Line Pilots Association, Aircraft*
18 *Rescue and Fire Fighting Working Group, Aviation Cabin Safety Specialists, Inc., Independent*
19 *Pilots Association, International Association of Fire Fighters, National Fire Protection*
20 *Association, International Association of Fire Chiefs, and the San Jose (Ca.) Fire Department.*

21
22 *Option 2 reflects the minority opinion represented by the Air Transport Association, Airports*
23 *Council International-North America, Allegheny County (Pa.) Airport Authority, American*
24 *Association of Airport Executives, Armen DerHohannesian and Associates, L.L.C.,*
25 *Charlottesville-Albemarle Airport Authority, and the Port Authority of New York and New*
26 *Jersey.*

27
28
29 **OPTION 1 - MINIMUM ARFF STAFFING & STAFFING TASK ANALYSIS**
30

31
32 (a) ARFF personnel shall be readily available during air carrier operations to staff required
33 ARFF and other emergency vehicles and to perform ARFF operations. The minimum number of
34 trained ARFF personnel capable of arriving at the furthest end of the farthest runway within the
35 times specified in 139.319(h)(2) shall not be less than that outlined in Table 1.

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Table 1, Minimum ARFF Personnel per ARFF Category

Airport Category	ARFF Personnel
1	*
2	*
3	*
4	3
5	6
6	9
7	12
8	12
9	15
10	15

4 Note: Categories 1-3 fall outside the applicability of this Part.
5

6 (b) Additionally, a staffing task analysis shall be performed by experienced ARFF personnel
7 and the certificate holder, to determine additional staffing requirements. The staffing task
8 analysis shall evaluate ARFF response to a worst case, aircraft/incident accident scenario at the
9 certificated airport. The analysis shall be supported by a risk assessment which examines the
10 risks to aircraft occupants.
11

12 **OPTION 2 - STAFFING TASK ANALYSIS**

13
14
15 (a) ARFF personnel shall be readily available during air carrier operations to staff required
16 ARFF and other emergency vehicles and to perform ARFF operations.
17

18 (b) A staffing task analysis shall be performed by experienced ARFF personnel and the
19 certificate holder to determine staffing requirements. The staffing task analysis shall evaluate
20 ARFF response to a worst case, aircraft accident/incident scenario at the certificated airport. The
21 analysis shall be supported by a risk assessment which examines the risks to aircraft occupants.
22

23
24 *The following Section 139.303 proposed regulatory language is consistent with and applicable*
25 *to both staffing options.*
26

27 (c) The following items shall be used to determine the basic contents of the staffing task
28 analysis:
29

- 30 • Description of the airport
- 31 • Current ARFF category
- 32 • Response criteria

- 1 • Current rate of aircraft operations
- 2 • Operational hours
- 3 • Current ARFF services structure and establishment
- 4 • Level of personnel
- 5 • Level of supervisors
- 6 • ARFF competence
- 7 • Extraneous duties of ARFF services
- 8 • Alerting system
- 9 • ARFF vehicles
- 10 • Extinguishing agents
- 11 • Special equipment
- 12 • Medical facilities
- 13 • Pre-determined attendance
- 14 • Other ARFF staffing sources
- 15 • Incident Task Analysis
- 16 • Appraisal of existing ARFF provision
- 17 • Future requirements
- 18 • Enclosures
- 19
- 20 (d) The results of the staffing task analysis shall be recorded with the following information:
- 21
- 22 • Time objectives – Beginning at initial response time and continuing until all
- 23 required tasks have been initiated.
- 24 • Tasks – Listing of all tasks and priorities
- 25 • Resources – Personnel and equipment required for each task
- 26 • Comments – Explanatory information
- 27
- 28 (e) Each certificated airport's staffing task analysis shall be subject to the approval of the
- 29 FAA and shall be included in the airport's Airport Certification Manual.
- 30
- 31 (f) All rescue and firefighting personnel are properly trained to perform their duties. Such
- 32 personnel shall be trained prior to initial performance of rescue and firefighting duties.
- 33 The training curriculum shall include initial and recurrent instruction in at least the
- 34 following areas:
- 35
- 36 (1) Airport familiarization.
- 37 (2) Practical ARFF vehicle operations in airport operating environment or approved
- 38 training device.
- 39 (3) Aircraft familiarization.
- 40 (4) Rescue and fire fighting personnel safety.
- 41 (5) Self Contained Breathing Apparatus.
- 42 (6) Emergency communications on the airport, including fire alarms.
- 43 (7) Incident command system.
- 44 (8) Use of the fire hoses, nozzles, turrets, and other appliances required for
- 45 compliance with this part.

- 1 (9) Use of aircraft rescue and safety equipment.
- 2 (10) Application of the types of extinguishing agents required for compliance with this
- 3 part.
- 4 (11) Emergency aircraft evacuation assistance.
- 5 (12) Interior/exterior aircraft fire fighting.
- 6 (13) Adapting and using structural rescue and fire fighting equipment for aircraft
- 7 rescue and fire fighting.
- 8 (14) Hazardous materials/dangerous goods incidents.
- 9 (15) Familiarization with firefighters' duties under the airport emergency plan.
- 10 (16) Evidence preservation

11
12 (g) All rescue and fire fighting personnel participate in at least one live fire drill every 12
13 months. Participation in the live fire drill shall consist of turret, hand line, and interior
14 fire fighting.

15
16 (h) All rescue and fire fighting personnel participate in recurrent training on at least a
17 monthly basis. All topics provided in section (f) of this part shall be addressed at least
18 every 12 months.

19
20 (i) All ARFF personnel shall be trained to and maintain certification in the U.S. Department
21 of Transportation's *First Responder: National Standard Curriculum*.

22
23 (j) Each certificate holder shall maintain a record of all training received by ARFF personnel
24 under this section. Such records shall be maintained during the course of the individual's
25 employment and for at least 12 months after the employment ends. Records shall
26 include, at a minimum, the name of the instructor, the date and duration of the training,
27 and description of the training received.

28
29 Sec. 139.305 Paved areas.

30
31 (a) Each certificate holder shall maintain, and promptly repair the pavement of, each runway,
32 taxiway, loading ramp, and parking area on the airport which is available for air carrier use as
33 follows:

34
35 (1) The pavement edges shall not exceed 3 inches difference in elevation between
36 abutting pavement sections and between full strength pavement and abutting shoulders.

37
38 (2) The pavement shall have no hole exceeding 3 inches in depth nor any hole the slope
39 of which from any point in the hole to the nearest point at the lip of the hole is 45 degrees
40 or greater as measured from the pavement surface plane, unless, in either case, the entire
41 area of the hole can be covered by a 5-inch diameter circle.

42
43 (3) The pavement shall be free of cracks and surface variations which could impair
44 directional control of air carrier aircraft.

45

1 (4) Except as provided in paragraph (b) of this section, mud, dirt, sand, loose aggregate,
2 debris, foreign objects, rubber deposits, and other contaminants shall be removed
3 promptly and as completely as practicable.
4

5 (5) Except as provided in paragraph (b) of this section, any chemical solvent that is used
6 to clean any pavement area shall be removed as soon as possible, consistent with the
7 instructions of the manufacturer of the solvent.
8

9 (6) The pavement shall be sufficiently drained and free of depressions to prevent ponding
10 that obscures markings or impairs safe aircraft operations.
11

12 (b) Paragraphs (a)(4) and (a)(5) of this section do not apply to snow and ice accumulations and
13 their control, including the associated use of materials such as sand and deicing solutions.
14

15 (c) FAA Advisory Circulars in the 150 series contain standards and procedures for the
16 maintenance and configuration of paved areas.
17

18
19 Sec. 139.307 Unpaved areas.
20

21 (a) Each certificate holder shall maintain and promptly repair the surface of each gravel, turf, or
22 other unpaved runway, taxiway, or loading ramp and parking area on the airport which is
23 available for air carrier use as follows:
24

25 (1) No slope from the edge of the full-strength surfaces downward to the existing terrain
26 shall be steeper than 2:1.
27

28 (2) The full-strength surfaces shall have adequate crown or grade to assure sufficient
29 drainage to prevent ponding.
30

31 (3) The full-strength surfaces shall be adequately compacted and sufficiently stable to
32 prevent rutting by aircraft, or the loosening or buildup of surface material which could
33 impair directional control of aircraft or drainage.
34

35 (4) The full-strength surfaces must have no holes or depressions which exceed 3 inches in
36 depth and are of a breadth capable of impairing directional control or causing damage to
37 an aircraft.
38

39 (5) Debris and foreign objects shall be promptly removed from the surface.
40

41 (b) Standards and procedures for the maintenance and configuration of unpaved full-strength
42 surfaces shall be included in the airport certification manual or the airport certification
43 specifications, as appropriate, for compliance with this section.
44
45
46

1 Sec. 139.309 Safety areas.

2
3 (a) To the extent practicable, each certificate holder shall provide and maintain for each runway
4 and taxiway which is available for air carrier use—

5
6 (1) If the runway or taxiway had a safety area on December 31, 1987, and if no
7 reconstruction or significant expansion of the runway or taxiway was begun on or after
8 January 1, 1988, a safety area of at least the dimensions that existed on December 31,
9 1987; or

10
11 (2) If construction, reconstruction, or significant expansion of the runway or taxiway
12 began on or after January 1, 1988, a safety area which conforms to the dimensions at the
13 time construction, reconstruction, or expansion began.

14
15 (b) Each certificate holder shall maintain its safety areas as follows:

16
17 (1) Each safety area shall be cleared and graded, and have no potentially hazardous ruts,
18 humps, depressions, or other surface variations.

19
20 (2) Each safety area shall be drained by grading or storm sewers to prevent water
21 accumulation.

22
23 (3) Each safety area shall be capable under dry conditions of supporting snow removal
24 equipment, and aircraft rescue and fire fighting equipment, and supporting the occasional
25 passage of aircraft without causing major damage to the aircraft.

26
27 (4) No object may be located in any safety area, except for objects that need to be located
28 in a safety area because of their function. These objects shall be constructed, to the extent
29 practical, on frangible mounted structures of the lowest practical height with the frangible
30 point no higher than 3 inches above grade.

31
32 (c) FAA Advisory Circulars in the 150 series contain standards and procedures for the
33 configuration and maintenance of safety areas.

34
35
36 Sec. 139.311 Marking and lighting.

37
38 (a) Each certificate holder shall provide and maintain at least the following marking systems for
39 air carrier operations on the airport:

40
41 (1) Runway markings meeting the specifications for the approach with the lowest
42 minimums authorized for each runway.

43
44 (2) Taxiway centerline and edge markings.

45
46 (3) Signs identifying taxiing routes on the movement area.

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(4) Runway holding position markings and signs.

(5) ILS critical area markings and signs.

(b) Each certificate holder shall provide and maintain, when the airport is open during hours of darkness or during conditions below VFR minimums, at least the following lighting systems for air carrier operations on the airport:

(1) Runway lighting meeting the specifications for the approach with the lowest minimums authorized for each runway.

(2) One of the following taxiway lighting systems:

(i) Centerline lights.

(ii) Centerline reflectors.

(iii) Edge lights.

(iv) Edge reflectors.

(3) An airport beacon.

(4) Approach lighting meeting the specifications for the approach with the lowest minimums authorized for each runway, unless otherwise provided and maintained by the FAA or another agency.

(5) Obstruction marking and lighting, as appropriate, on each object within its authority which constitutes an obstruction under Part 77 of this chapter. However, this lighting and marking is not required if it is determined to be unnecessary by an FAA aeronautical study.

(c) Each certificate holder shall properly maintain each marking or lighting system installed on the airport which is owned by the certificate holder. As used in this section, to "properly maintain" includes: To clean, replace, or repair any faded, missing, or nonfunctional item of lighting; to keep each item unobscured and clearly visible; and to ensure that each item provides an accurate reference to the user.

(d) Each certificate holder shall ensure that all lighting on the airport, including that for aprons, vehicle parking areas, roadways, fuel storage areas, and buildings, is adequately adjusted or shielded to prevent interference with air traffic control and aircraft operations.

(e) FAA Advisory Circulars in the 150 series contain standards and procedures for equipment, material, installation, and maintenance of light systems and marking listed in this section.

1 (f) Notwithstanding paragraph (a) of this section, a certificate holder is not required to provide
2 the identified signs in paragraph (a)(3) of this section until January 1, 1995. Each certificate
3 holder shall maintain each marking system that meets paragraph (a)(3) of this section.

4
5 [Doc. No. 24812, 52 FR 44282, Nov. 18, 1987, as amended by Amdt. 139-15, 53
6 FR 40843, Oct. 18, 1988; Amdt. 139-19, 57 FR 15164, Apr. 24, 1992; Amdt.
7 139-20, 59 FR 7120, Feb. 14, 1994]

8
9
10 Sec. 139.313 Snow and ice control.

11
12 (a) Each certificate holder whose airport is located where snow and icing conditions regularly
13 occur shall prepare, maintain, and carry out a snow and ice control plan.

14
15 (b) The snow and ice control plan required by this section shall include instructions and
16 procedures for—

17
18 (1) Prompt removal or control, as completely as practical, of snow, ice, and slush on each
19 movement area;

20
21 (2) Positioning snow off of movement area surfaces so that all air carrier aircraft
22 propellers, engine pods, rotors, and wingtips will clear any snowdrift and snowbank as
23 the aircraft's landing gear traverses any full strength portion of the movement area;

24
25 (3) Selection and application of approved materials for snow and ice control to ensure
26 that they adhere to snow and ice sufficiently to minimize engine ingestion;

27
28 (4) Timely commencement of snow and ice control operations; and

29
30 (5) Prompt notification, in accordance with Sec. 139.339, of all air carriers using the
31 airport when any portion of the movement area normally available to them is less than
32 satisfactorily cleared for safe operation by their aircraft.

33
34 (c) FAA Advisory Circulars in the 150 series contain standards for snow and ice control
35 equipment, materials, and procedures for snow and ice control.

36
37 [Docket No. 24812, 52 FR 44282, Nov. 18, 1987; 53 FR 4258, Feb. 12, 1988]

38
39 Sec. 139.315 Aircraft rescue and fire fighting: Category determination.

40
41 (a) A Category is required by paragraph (c) of this section for each certificate holder. The
42 Category is determined by the length and width of an air carrier aircraft. If, after selecting the
43 category appropriate to the aircraft's overall length, the aircraft fuselage width is greater than the
44 maximum width of that category, the aircraft shall be the next higher category.

1 (b) For the purpose of Category determination, air carrier aircraft lengths are grouped as follows

2
3 (1) Category 1 includes aircraft less than 30 feet in length and maximum exterior width
4 up to but not including 6.6 feet.

5
6 (2) Category 2 includes aircraft 30 feet in length up to but not including 39 feet in length
7 and maximum exterior width up to but not including 6.6 feet.

8
9 (3) Category 3 includes aircraft at least 39 feet up to but not including 59 feet in length
10 and maximum exterior width up to but not including 9.8 feet.

11
12 (4) Category 4 includes aircraft at least 59 feet up to but not including 78 feet in length
13 and maximum exterior width up to but not including 13.0 feet.

14
15 (5) Category 5 includes aircraft at least 78 feet up to but not including 90 feet in length
16 and maximum exterior width up to but not including 13.0 feet.

17
18 (6) Category 6 includes aircraft at least 90 feet up to but not including 126 feet in length
19 and maximum exterior width up to but not including 16.4 feet.

20
21 (7) Category 7 includes aircraft at least 126 feet up to but not including 160 feet in length
22 and maximum exterior width up to but not including 16.4 feet.

23
24 (8) Category 8 includes aircraft at least 160 feet up to but not including 200 feet in length
25 and maximum exterior width up to but not including 23.0 feet.

26
27 (9) Category 9 includes aircraft at least 200 feet up to but not including 250 in length and
28 maximum exterior width up to but not including 23.0 feet.

29
30 (10) Category 10 includes aircraft at least 250 feet up to but not including 295 feet in
31 length and maximum exterior width up to but not including 25.0 feet.

1 Table 2. Airport Categories.
2

FAA Category	Aircraft Length (ft.)	Width up to but not including
1	<30	6.6'
2	30-39	6.6'
3	39-59	9.8'
4	<90	13.1'
5	<90	13.1'
6	90 – 126	16.4'
7	126 – 159	16.4'
8	159 – 200	22.9'
9	200-249	22.9'
10	250>	26.2'

3
4 (c) Except as provided in Sec. 139.319(b), the Category required by Sec. 139.319 is determined
5 by the largest air carrier aircraft serving the airport.

6
7 Sec. 139.317 Aircraft rescue and fire fighting: Equipment and agents.

8
9 (a) The airport certificate holder shall be responsible for ensuring the provision of ARFF
10 services on the airport as prescribed in this Section. Regardless of the functional control of ARFF
11 services on the airport, a high degree of mutual aid shall be prearranged between such services
12 on airports and any off-airport fire or rescue agencies serving the environs of the airport.

13
14 (b) Extinguishing Agents:

15
16 (1) Primary Agent. The following primary agent shall be used for aircraft fire fighting
17 involving hydrocarbon fuels. Aqueous film-forming foams (AFFF) must be 3% or 6%
18 Military Specification Foam (Mil Spec) # MIL-F-24385. Acceptable evidence of (Mil
19 Spec) compliance is the listing of the specific foam by brand, product and percentage on
20 the most recent Qualified Product Listing (QPL).

21
22 (2) Complementary Agents. One or more of the following complementary agents shall
23 be available for aircraft fire fighting:

24
25 (i) Potassium bicarbonate or potassium bicarbomate dry chemical.

26
27 (ii) Clean Streaming Agents currently approved are Halotron and Halon 1211.

(3) Quantity of Agents:

(i) Water and Complementary Agent Quantities. The minimum amounts of water for foam production, and the minimum amounts of complementary agents necessary shall be as specified in the table 3, based on the system of categorizing airports listed in Sec. 139.315.

Table 3 -- Minimum Extinguishing Agent Quantities and Discharge Rates

	AFFF		Potassium Bicarbonate or Potassium Bicarbomate		Clean Streaming Agent	
	Water	Discharge Rate	Discharge Rate		Discharge Rate	
Airport Category	U.S. gal	gpm	lb	lb/sec	lb	lb/sec
1	*	*	*	*	*	*
2	*	*	*	*	*	*
3	*	*	*	*	*	*
4	1335	390	300	5	300	5
5	2762	825	450	5	450	5
6	3744	1100	450	5	450	5
7	4877	1440	450	5	450	5
8	7778	1900	900	10	900	10
9	9570	2400	900	10	900	10
10	14264	3100	900	10	900	10

Note: Categories 1-3 fall outside the applicability of this Part.

(ii) Foam Concentrate Quantity. At a minimum, sufficient foam concentrate shall be carried on ARFF apparatus to proportion, at the prescribed percentage of foam concentrate to water, into double the quantity of water specified in the table above. At a minimum, sufficient quantities of foam concentrate shall be maintained at the airport to re-service 200 percent of the commensurate quantities required based on the water quantities required in the table above.

(iii) Replenishment Water Quantity. Water equal to 100 percent of that required by the table above shall be available to replenish the primary fire-fighting vehicle(s). The airport emergency plan must show the ability to replenish 100 percent of water required by the table above during active fire fighting evolutions.

(4) Compatibility of Agents. Chemical compatibility shall be ensured between different extinguishing agents where used simultaneously or consecutively.

(5) Combustible Metal Agents. Extinguishing agents for combustible metal fires shall be provided in portable fire extinguishers that are rated for Class D fires. At least one nominal 20-lb (9.1-kg) extinguisher shall be carried on each required vehicle.

(c) Rescue and Fire-Fighting Vehicles:

(1) Minimum Number of ARFF Vehicles. The minimum number of ARFF vehicles provided at each airport shall be as specified in Table 4.

(2) Each vehicle shall have a turret capability discharge rate in accordance with 150 series advisory circulars.

(3) Maintaining Minimum Number of ARFF Vehicles.

(a) The quantity of agent and the number of vehicles outlined in Table 4 shall be met at all times with the ability to have the largest vehicle out of service.

(b) All foam-producing ARFF vehicles shall be tested at least semi-annually. All complimentary agent systems shall be tested for system operation annually per applicable manufacturers' recommendations.

Table 4 – Minimum Required ARFF Vehicles per Airport Category

Airport Category	1	2	3	4	5	6	7	8	9	10
Number of ARFF Vehicles	NA	NA	NA	1	2	2	3	3	4	4

Note: Categories 1-3 fall outside the applicability of this Part.

(d) Foam discharge capacity. Each aircraft rescue and fire fighting vehicle used to comply with Category 4 or higher requirements with a capacity of at least 500 gallons of water for foam production shall be equipped with a turret.

(e) FAA Advisory Circulars in the 150 series contain standards and procedures for ARFF equipment and agents which, if followed, meet the intent of this regulation.

[52 FR 44282, Nov. 18, 1987; 53 FR 4120 and 4258, Feb. 12, 1988]

Sec. 139.319 Aircraft rescue and fire fighting: Operational requirements.

a) Except as provided in paragraph (c) of this section, each certificate holder shall provide on the airport, during air carrier operations at the airport, at least the rescue and fire fighting capability specified for the Category required by Sec. 139.315.

b) Any reduction in the rescue and fire fighting capability from the Category required by paragraph (a) of this section in accordance with paragraph (c) of this section shall be subject to the following conditions:

1. Procedures for, and the persons having the authority to implement, the reductions must be included in the airport certification manual.

2. A system and procedures for recall of the full aircraft rescue and fire fighting capability must be included in the airport certification manual.

- 1 3. The reductions may not be implemented unless notification to air carriers is
2 provided via Notices to Airmen (NOTAM), as appropriate, and by direct
3 notification of local air carriers.
4
- 5 c) Vehicle tactical communications. Each vehicle used for ARFF emergency response,
6 including those required under 139.317 shall be equipped with two-way voice radio
7 communications which provides for contact with at least—
8 1. Each other required emergency vehicle; and
9 2. Other stations, as specified in the airport emergency plan.
10
- 11 d) Air traffic control-capable radio requirements. Provide an interoperable, vehicle-mounted
12 radio in each vehicle which can communicate with the Control Tower or Flight Service
13 Center, as well as with the aircraft servicing the airport. The radio shall be tunable, i.e.,
14 capable of changing frequencies as directed by air traffic control or flight service specialists.
15
- 16 e) Vehicle marking and lighting. Each vehicle used for ARFF emergency response, including
17 those required under 139.317 shall—
18 1. Have lighting that conforms to 150 series Advisory Circulars.
19 2. Be painted or marked in colors to enhance contrast with the background
20 environment and optimize daytime and nighttime visibility and identification.
21 3. An electric or electronic siren.
22
- 23
- 24 f) Vehicle readiness. Each vehicle required under Sec. 139.317 shall be maintained as follows:
25 1. The vehicle and its systems shall be maintained so as to be operationally capable
26 of performing the functions required by this subpart during all air carrier
27 operations.
28 2. If the airport is located in a geographical area subject to prolonged temperatures
29 below 33 degrees Fahrenheit, the vehicles shall be provided with cover or other
30 means to ensure equipment operation and discharge under freezing conditions.
31 3. Any required vehicle which becomes inoperative to the extent that it cannot
32 perform as required by Sec. 139.319(h)(1) shall be replaced immediately with
33 equipment having at least equal capabilities. If replacement equipment is not
34 available immediately, the certificate holder shall so notify the Regional Airports
35 Division Manager and each air carrier using the airport in accordance with Sec.
36 139.339. If the required Category level of capability is not restored within 48
37 hours, the airport operator shall limit air carrier operations on the airport to those
38 compatible with the Category corresponding to the remaining operative rescue
39 and fire fighting equipment.
40
- 41
- 42 (g) Response requirements.
43
- 44 (1) Each certificate holder, with the airport rescue and fire fighting equipment required
45 under this part and the number of trained personnel which will assure an effective
46 operation, shall—

(i) Respond to each emergency during periods of air carrier operations; and

(ii) Demonstrate compliance with the response requirements specified in this section.

(2) The response required by paragraph (i)(1)(ii) of this section shall achieve the following performance under conditions of dry pavement under good weather conditions and exercised quarterly:

(i) For the purposes of timed response drills, within 3 minutes from the time of the alarm, at least one required airport rescue and fire fighting vehicle shall reach the furthest end of the farthest usable runway serving air carrier aircraft from its assigned post and begin application of the required extinguishing agent.

(ii) For the purposes of timed response drills, within 4 minutes from the time of alarm, all other required vehicles shall reach the point specified in paragraph (i)(2)(i) of this section from their assigned post and begin application of the required extinguishing agent.

(iii) When advance notification of a need for ARFF response is provided (i.e., an aircraft is inbound with a declared emergency or request to be met by emergency vehicles), the operational objective shall be for equipment to be pre-positioned in such a manner as to allow at least one major fire fighting vehicle to be capable of reaching the farthest end of the assigned runway within 90 seconds.

(h) Response time objectives

(1) ARFF services shall be capable of responding within the stated time objectives below and performing these tasks at the furthest point of the end of the farthest runway of the airport.

- i. Interior aircraft rescue and firefighting operations shall be performed in accordance with the procedures for interior structural firefighting in OSHA's Respiratory Protection Standard, 29 CFR 1910.134.
- ii. Emergency response operations for releases of, or substantial threats of release of, hazardous substances on or around aircraft shall be performed in accordance with the procedures for emergency response operations in OSHA's Hazardous Waste Operations and Emergency Response Standard, 29 CFR 1910.120.

(iii) ARFF services shall be capable of responding within the stated time objectives below and performing these tasks at the furthest end of the farthest runway of the airport.

- 1 Category 4 & 5 Airports
- 2 3 Minutes Begin discharge of required agent from first required vehicle
- 3 4 Minutes Begin discharge of required agent from all other required vehicles
- 4 Establish incident command system and request additional
- 5 resources
- 6 Initiate access to aircraft cabin
- 7 5 Minutes Begin interior aircraft rescue and firefighting
- 8 Establish rapid intervention team (RIT)
- 9 9 Minutes Establish second interior ARFF team
- 10 Establish emergency medical services
- 11 Establish water supply and resupply required ARFF vehicles

- 12 Category 6 & 7 Airports
- 13 3 Minutes Begin discharge of required agent from first required vehicle
- 14 4 Minutes Begin discharge of required agent from all other required vehicles
- 15 Establish incident command system and request additional
- 16 resources
- 17 Initiate access to aircraft cabin
- 18 5 Minutes Begin interior aircraft rescue and firefighting
- 19 Establish rapid intervention team
- 20 8 Minutes Initiate second access to aircraft cabin
- 21 Establish second interior aircraft rescue and firefighting team
- 22 Establish water supply and resupply required ARFF vehicles
- 23 Provide emergency medical services
- 24 10 Minutes Provide stationary vertical access to aircraft

- 25
- 26 Category 8, 9, & 10 Airports
- 27 3 Minutes Begin discharge of required agent from first required vehicle
- 28 4 Minutes Begin discharge of required agent from all other required vehicles
- 29 Establish incident command system and request additional
- 30 resources
- 31 Initiate access to aircraft cabin
- 32 5 Minutes Begin interior aircraft rescue and firefighting
- 33 Establish rapid intervention team
- 34 6 Minutes Initiate second access to aircraft cabin
- 35 Establish second interior aircraft rescue and firefighting team
- 36 Establish emergency medical services
- 37 Establish water supply
- 38 8 Minutes Establish third interior aircraft rescue and firefighting team
- 39 Establish second rapid intervention team
- 40 Resupply required ARFF vehicles
- 41 Provide stationary vertical access to aircraft
- 42
- 43
- 44

1 (2) For the response time objectives in item (1) above that involve a response to the
2 interior of an aircraft, the interior aircraft rescue and firefighting operations shall be
3 performed in accordance with the procedures for interior structural firefighting in
4 OSHA's Respiratory Protection Standard, 29 CFR 1910.134.

5
6 (3) For the response time objectives in item (1) above that involve emergency response
7 operations for releases of, or substantial threats of release of, hazardous substances on
8 or around aircraft, these operations shall be performed in accordance with the
9 procedures for emergency response operations in OSHA's Hazardous Waste Operations
10 and Emergency Response Standard, 29 CFR 1910.120.

11
12 (i) Protective Clothing and Personal Equipment. Personal protective clothing and equipment
13 shall conform to the following NFPA standards and regulations:

14
15 (1) NFPA 1981, *Standard on Open-Circuit Self-Contained Breathing Apparatus for Fire*
16 *Fighters*.

17
18 (2) NFPA 1975, *Standard on Station/Work Uniforms for Fire Fighters*.

19
20 (3) NFPA 1976, *Standard on Protective Clothing for Proximity Fire Fighting*.

21
22 (4) NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*,
23 Chapter 5.

24
25 (5) 29 CFR 1910.120, *Hazardous Waste Operations and Emergency Response* and
26 related Interpretive and Compliance Letters.

27
28 (6) 29 CFR 1910.156, *Fire Brigades* and related Interpretive and Compliance Letters.

29
30 (j) Emergency access roads. Each certificate holder shall ensure that roads which are designated
31 for use as emergency access roads for aircraft rescue and fire fighting vehicles are maintained in
32 a condition that will support those vehicles during all-weather conditions.

33
34 [Docket No. 24812, 52 FR 44282, Nov. 18, 1987; 53 FR 4258, Feb. 12, 1988, as
35 amended by Amdt. 139-15, 53 FR 40843, Oct. 18, 1988; Amdt. 139-16, 54 FR
36 39295, Sept. 25, 1989]

37
38
39 Sec. 139.321 Handling and storing of hazardous substances and materials.

40
41 (a) Each certificate holder which acts as a cargo handling agent shall establish and maintain
42 procedures for the protection of persons and property on the airport during the handling and
43 storing of any material regulated by the Hazardous Materials Regulations (49 CFR Part 171, et
44 seq.), that is, or is intended to be, transported by air. These procedures shall provide for at least
45 the following:

1 (1) Designated personnel to receive and handle hazardous substances and materials.

2
3 (2) Assurance from the shipper that the cargo can be handled safely, including any
4 special handling procedures required for safety.

5
6 (3) Special areas for storage of hazardous materials while on the airport.

7
8 (b) Each certificate holder shall establish and maintain standards for protecting against fire and
9 explosions in storing, dispensing, and otherwise handling fuel, lubricants, and oxygen (other than
10 articles and materials that are, or are intended to be, aircraft
11 cargo) on the airport. These standards shall cover facilities, procedures, and personnel training
12 and shall address at least the following:

13
14 (1) Bonding.

15
16 (2) Public protection.

17
18 (3) Control of access to storage areas.

19
20 (4) Fire safety in fuel farm and storage areas.

21
22 (5) Fire safety in mobile fuelers, fueling pits, and fueling cabinets.

23
24 (6) After January 1, 1989, training of fueling personnel in fire safety in accordance with
25 paragraph (e) of this section.

26
27 (7) The fire code of the public body having jurisdiction over the airport.

28
29 (c) Each certificate holder shall, as a fueling agent, comply with and, except as provided in
30 paragraph (h) of this section, require all other fueling agents operating on the airport to comply
31 with the standards established under paragraph (b) of this section and shall perform reasonable
32 surveillance of all fueling activities on the airport with respect to those standards.

33
34 (d) Each certificate holder shall inspect the physical facilities of each airport tenant fueling agent
35 at least once every 3 months for compliance with paragraph (b) of this section and maintain a
36 record of that inspection for at least 12 months. The certificate holder may use an independent
37 organization to perform this inspection if it prepares a record of its inspection sufficiently
38 detailed to assure the certificate holder and the FAA that the inspection is adequate.

39
40 (e) The training required in paragraph (b)(6) of this section shall include at least the following:

41
42 (1) At least one supervisor with each fueling agent shall have completed an aviation fuel
43 training course in fire safety.

44

1 (2) All other employees who fuel aircraft, accept fuel shipments, or otherwise handle fuel
2 shall receive at least on-the-job training in fire safety from the supervisor trained in
3 accordance with paragraph (e)(1) of this section.
4

5 (f) Each certificate holder shall obtain certification once a year from each airport tenant fueling
6 agent that the training required by paragraph (e) of this section has been accomplished.
7

8 (g) Unless otherwise authorized by the Administrator, each certificate holder shall require each
9 tenant fueling agent to take immediate corrective action whenever the certificate holder becomes
10 aware of noncompliance with a standard required by paragraph (b) of this section. The certificate
11 holder shall notify the appropriate FAA Regional Airports Division Manager immediately when
12 noncompliance is discovered and corrective action cannot be accomplished within a reasonable
13 period of time.
14

15 (h) A certificate holder need not require an air carrier operating under Part 121 or Part 135 of this
16 chapter to comply with the standards required by this section.
17

18 (i) FAA Advisory Circulars in the 150 Series contain standards and procedures for the handling
19 and storage of hazardous substances and materials.
20

21 [52 FR 44282, Nov. 18, 1987; 53 FR 4120, Feb. 12, 1988, as amended by Amdt.
22 139-15, 53 FR 40843, Oct. 18, 1988; Amdt. 139-16, 54 FR 39295, Sept. 25,
23 1989]
24
25

26 Sec. 139.323 Traffic and wind direction indicators
27 .

28 Each certificate holder shall provide the following on its airport:
29

30 (a) A wind cone that provides surface wind direction information visually to pilots. For each
31 airport in a Class B airspace area, supplemental wind cones must be installed at each runway end
32 or at least at one point visible to the pilot while on final approach and prior to takeoff. If the
33 airport is open for air carrier operations during hours of darkness, the wind direction indicators
34 must be lighted.
35

36 (b) For airports serving any air carrier operation when there is no control tower operating, a
37 segmented circle around one wind cone and a landing strip and traffic pattern indicator for each
38 runway with a right-hand traffic pattern.
39

40 [Dkt. 24812, 52 FR 44282, Nov. 18, 1987, as amended by Amdt. 139-18, 56 FR
41 65664, Dec. 17, 1991]
42
43
44
45
46

1 Sec. 139.325 Airport emergency plan.
2

3 (a) Each certificate holder shall develop and maintain an airport emergency plan designed to
4 minimize the possibility and extent of personal injury and property damage on the airport in an
5 emergency. The plan must include—
6

7 (1) Procedures for prompt response to all of the emergencies listed in paragraph (b) of
8 this section, including a communications network; and
9

10 (2) Sufficient detail to provide adequate guidance to each person who must implement it.
11

12 (b) The plan required by this section must contain instructions for response to—
13

14 (1) Aircraft incidents and accidents;
15

16 (2) Bomb incidents, including designated parking areas for the aircraft involved;
17

18 (3) Structural fires;
19

20 (4) Natural disaster;
21

22 (5) Weapons of mass destruction (WMD) events, to include nuclear, biological and
23 chemical (NBC) threats;
24

25 (6) Sabotage, hijack incidents, and other unlawful interference with operations;
26

27 (7) Failure of power for movement area lighting;
28

29 (8) Water rescue situations;
30

31 (9) Security threat level changes; and
32

33 (10) Hazardous materials events.
34

35 (c) The plan required by this section must address or include—
36

37 (1) To the extent practicable, provisions for medical services including transportation and
38 medical assistance for the maximum number of persons that can be carried on the largest
39 air carrier aircraft that the airport reasonably can be expected to serve;
40

41 (2) The name, location, telephone number, and emergency capability of each hospital and
42 other medical facility, and the business address and telephone number of medical
43 personnel on the airport or in the communities it serves, agreeing to provide medical
44 assistance or transportation;
45

1 (3) The name, location, and telephone number of each rescue squad, ambulance service,
2 military installation, and government agency on the airport or in the communities it
3 serves, that agrees to provide medical assistance or transportation;

4
5 (4) An inventory of surface vehicles and aircraft that the facilities, agencies, and
6 personnel included in the plan under paragraphs (c)(2) and (c)(3) of this section will
7 provide to transport injured and deceased persons to locations on the airport and in the
8 communities it serves;

9
10 (5) Each hangar or other building on the airport or in the communities it serves that will
11 be used to accommodate uninjured, injured, and deceased persons;

12
13 (6) Crowd control, specifying the name and location of each safety or security agency
14 that agrees to provide assistance for the control of crowds in the event of an emergency
15 on the airport; and

16
17 (7) The removal of disabled aircraft including to the extent practical the name, location
18 and telephone numbers of agencies with aircraft removal responsibilities or capabilities.

19
20 (d) The plan required by this section must provide for—

21
22 (1) The marshaling, transportation, and care of ambulatory injured and uninjured accident
23 survivors;

24
25 (2) The removal of disabled aircraft;

26
27 (3) Emergency alarm systems; and

28
29 (4) Coordination among air carriers, airport and control tower functions relating to
30 emergency notification.

31
32 (e) The plan required by this section shall contain procedures for notifying the facilities,
33 agencies, and personnel who have responsibilities under the plan of the location of an aircraft
34 accident, the number of persons involved in that accident, or any other information necessary to
35 carry out their responsibilities, as soon as that information is available.

36
37 (f) The plan required by this section shall contain provisions, to the extent practicable, for the
38 rescue of aircraft accident victims from significant bodies of water or marsh lands adjacent to the
39 airport which are crossed by the approach and departure flight paths of air carriers. A body of
40 water or marsh land is significant if the area exceeds one-quarter square mile and cannot be
41 traversed by conventional land rescue vehicles. To the extent practicable, the plan shall provide
42 for rescue vehicles with a combined capacity for handling the maximum number of persons that
43 can be carried on board the largest air carrier aircraft that the airport reasonably can be expected
44 to serve.

1 (g) Each certificate holder shall—

2
3 (1) Coordinate its plan with law enforcement agencies, rescue and fire fighting agencies,
4 medical personnel and organizations, the principal tenants at the airport, and all other
5 persons who have responsibilities under the plan;

6
7 (2) To the extent practicable, provide for participation by all facilities, agencies, and
8 personnel specified in paragraph (g)(1) of this section in the development of the plan;

9
10 (3) Ensure that all airport personnel having duties and responsibilities under the plan are
11 familiar with their assignments and are properly trained;

12
13 (4) At least once every 12 months, review the plan with all of the parties with whom the
14 plan is coordinated as specified in paragraph (g)(1) of this section, to ensure that all
15 parties know their responsibilities and that all of the information in the plan is current;
16 and

17
18 (5) Hold a full-scale airport emergency plan exercise at least once every 2 years.

19
20 (h) FAA Advisory Circulars in the 150 Series contain standards and procedures for the
21 development of an airport emergency plan.

22
23 (i) At least once every 12 months, all parties with whom the plan is coordinated shall review the
24 plan with all as specified in this paragraph. Ensure that all parties know their responsibilities and
25 that all of the information in the plan is current and hold a full scale airport emergency plan
26 exercise at least once every 2 years.

27
28 [52 FR 44282, Nov. 18, 1987; 53 FR 4258, Feb. 12, 1988]

29
30
31 Sec. 139.327 Self-inspection program.

32
33 (a) Each certificate holder shall inspect the airport to assure compliance with this subpart—

34
35 (1) Daily, except as otherwise required by the airport certification manual or airport
36 certification specifications;

37
38 (2) When required by any unusual condition such as construction activities or
39 meteorological conditions that may affect safe air carrier operations; and

40
41 (3) Immediately after an accident or incident.

42
43 (b) Each certificate holder shall provide the following:

44
45 (1) Equipment for use in conducting safety inspections of the airport;

1 (2) Procedures, facilities, and equipment for reliable and rapid dissemination of
2 information between airport personnel and its air carriers;

3
4 (3) Procedures to ensure that qualified inspection personnel perform the inspections; and

5
6 (4) A reporting system to ensure prompt correction of unsafe airport conditions noted
7 during the inspection.

8
9 (c) Each certificate holder shall prepare and keep for at least 6 months, and make available for
10 inspection by the Administrator on request, a record of each inspection prescribed by this
11 section, showing the conditions found and all corrective actions taken.

12
13 (d) FAA Advisory Circulars in the 150 series contain standards and procedures for the conduct
14 of airport self-inspections.

15
16 [52 FR 44282, Nov. 18, 1987; 53 FR 4120, Feb. 12, 1988]

17
18
19 Sec. 139.329 Ground vehicles.

20
21 Each certificate holder shall—

22
23 (a) Limit access to movement areas and safety areas only to those ground vehicles necessary for
24 airport operations;

25
26 (b) Establish and implement procedures for the safe and orderly access to, and operation on, the
27 movement area and safety areas by ground vehicles, including provisions identifying the
28 consequences of noncompliance with the procedures by an employee, tenant, or contractor;

29
30 (c) When an air traffic control tower is in operation, ensure that each ground vehicle operating on
31 the movement area is controlled by one of the following:

32
33 (1) Two-way radio communications between each vehicle and the tower,

34
35 (2) An escort vehicle with two-way radio communications with the tower to accompany
36 any vehicle without a radio, or

37
38 (3) Measures for controlling vehicles, such as signs, signals, or guards, when it is not
39 operationally practical to have two-way radio communications with the vehicle or an
40 escort vehicle;

41
42 (d) When an air traffic control tower is not in operation, provide adequate procedures to control
43 ground vehicles on the movement area through prearranged signs or signals;

1 (e) Ensure that each employee, tenant, or contractor who operates a ground vehicle on any portion
2 of the airport that has access to the movement area is familiar with the airport's procedures for
3 the operation of ground vehicles and the consequences of noncompliance; and
4

5 (f) On request by the Administrator, make available for inspection any record of accidents or
6 incidents on the movement areas involving air carrier aircraft and/or ground vehicles.
7

8 [Docket No. 24812, 52 FR 44282, Nov. 18, 1987, as amended by Amdt. No.
9 139-17, 55 FR 48214, Nov. 19, 1990]
10

11
12 Sec. 139.331 Obstructions.
13

14 Each certificate holder shall ensure that each object in each area within its authority which
15 exceeds any of the heights or penetrates the imaginary surfaces described in Part 77 of this
16 chapter is either removed, marked, or lighted. However, removal, marking, and lighting is not
17 required if it is determined to be unnecessary by an FAA aeronautical study.
18

19
20 Sec. 139.333 Protection of nav aids.
21

22 Each certificate holder shall—
23

24 (a) Prevent the construction of facilities on its airport that, as determined by the Administrator,
25 would derogate the operation of an electronic or visual navigational aid and air traffic control facilities on
26 the airport;
27

28 (b) Protect, or if the owner is other than the certificate holder, assist in protecting, all navigational aids on
29 its airport against vandalism and theft; and
30

31 (c) Prevent, insofar as it is within the airport's authority, interruption of visual and electronic
32 signals of navigational aids.
33

34
35 Sec. 139.335 Public protection.
36

37 (a) Each certificate holder shall provide—
38

39 (1) Safeguards to prevent inadvertent entry to the movement area by unauthorized
40 persons or vehicles; and
41

42 (2) Reasonable protection of persons and property from aircraft blast.
43

44 (b) Fencing meeting the requirements of Part 107 of this chapter in areas subject to that part is
45 acceptable for meeting the requirements of paragraph (a)(1) of this section.
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Sec. 139.337 Wildlife hazard management.

(a) Each certificate holder shall provide for the conduct of an ecological study when any of the following events occurs on or near the airport:

- (1) An air carrier aircraft experiences a multiple bird strike or engine ingestion.
- (2) An air carrier aircraft experiences a damaging collision with wildlife other than birds.
- (3) Wildlife of a size or in numbers capable of causing an event described in paragraph (a) (1) or (2) of this section is observed to have access to any airport flight pattern or movement area.

(b) The study required in paragraph (a) of this section shall contain at least the following:

- (1) Analysis of the event which prompted the study.
- (2) Identification of the species, numbers, locations, local movements, and daily and seasonal occurrences of wildlife observed.
- (3) Identification and location of features on and near the airport that attract wildlife.
- (4) Description of the wildlife hazard to air carrier operations.

(c) The study required by paragraph (a) of this section shall be submitted to the Administrator, who determines whether or not there is a need for a wildlife hazard management plan. In reaching this determination, the Administrator considers—

- (1) The ecological study;
- (2) The aeronautical activity at the airport;
- (3) The views of the certificate holder;
- (4) The views of the airport users; and
- (5) Any other factors bearing on the matter of which the Administrator is aware.

(d) When the Administrator determines that a wildlife hazard management plan is needed, the certificate holder shall formulate and implement a plan using the ecological study as a basis. The plan shall—

- (1) Be submitted to, and approved by, the Administrator prior to implementation; and

1 (2) Provide measures to alleviate or eliminate wildlife hazards to air carrier operations.
2

3 (e) The plan shall include at least the following:
4

5 (1) The persons who have authority and responsibility for implementing the plan.
6

7 (2) Priorities for needed habitat modification and changes in land use identified in the
8 ecological study, with target dates for completion.
9

10 (3) Requirements for and, where applicable, copies of local, state, and Federal wildlife
11 control permits.
12

13 (4) Identification of resources to be provided by the certificate holder for implementation
14 of the plan.
15

16 (5) Procedures to be followed during air carrier operations, including at least—
17

18 (i) Assignment of personnel responsibilities for implementing the procedures;
19

20 (ii) Conduct of physical inspections of the movement area and other areas critical
21 to wildlife hazard management sufficiently in advance of air carrier operations to
22 allow time for wildlife controls to be effective;
23

24 (iii) Wildlife control measures; and
25

26 (iv) Communication between the wildlife control personnel and any air traffic
27 control tower in operation at the airport.
28

29 (6) Periodic evaluation and review of the wildlife hazard management plan for—
30

31 (i) Effectiveness in dealing with the wildlife hazard; and
32

33 (ii) Indications that the existence of the wildlife hazard, as previously described in
34 the ecological study, should be reevaluated.
35

36 (7) A training program to provide airport personnel with the knowledge and skills needed
37 to carry out the wildlife hazard management plan required by paragraph (d) of this
38 section.
39

40 (f) Notwithstanding the other requirements of this section, each certificate holder shall take
41 immediate measures to alleviate wildlife hazards whenever they are detected.
42

43 (g) FAA Advisory Circulars in the 150 series contain standards and procedures for wildlife
44 hazard management at airports.
45
46

1 Sec. 139.339 Airport condition reporting.

2

3 (a) Each certificate holder shall provide for the collection and dissemination of airport condition
4 information to air carriers.

5

6 (b) In complying with paragraph (a) of this section, the certificate holder shall utilize the
7 NOTAM system and, as appropriate, other systems and procedures.

8

9 (c) In complying with paragraph (a) of this section, the certificate holder shall provide
10 information on the following airport conditions which may affect the safe operations of air
11 carriers:

12

13 (1) Construction or maintenance activity on movement areas, safety areas, or loading
14 ramps and parking areas.

15

16 (2) Surface irregularities on movement areas or loading ramps and parking areas.

17

18 (3) Snow, ice, slush, or water on the movement area or loading ramps and parking areas.

19

20 (4) Snow piled or drifted on or near movement areas contrary to Sec. 139.313.

21

22 (5) Objects on the movement area or safety areas contrary to Sec. 139.309.

23

24 (6) Malfunction of any lighting system required by Sec. 139.311.

25

26 (7) Unresolved wildlife hazards as identified in accordance with Sec. 139.337.

27

28 (8) Nonavailability of any rescue and fire fighting capability required in Secs. 139.317
29 and 139.319.

30

31 (9) Any other condition as specified in the airport certification manual or airport
32 certification specifications, or which may otherwise adversely affect the safe operations
33 of air carriers.

34

35 (d) FAA Advisory Circulars in the 150 series contain standards and procedures for using the
36 NOTAM system for dissemination of airport information.

37

38 [52 FR 44282, Nov. 18, 1987; 53 FR 4258, Feb. 12, 1988]

39

40

41 Sec. 139.341 Identifying, marking, and reporting construction and other unserviceable areas.

42

43 (a) Each certificate holder shall—

44

45 (1) Mark and, if appropriate, light—

46

1 (i) Each construction area and unserviceable area which is on or adjacent to any
2 movement area or any other area of the airport on which air carrier aircraft may
3 be operated;

4
5 (ii) Each item of construction equipment and each construction roadway, which
6 may affect the safe movement of aircraft on the airport; and
7

8 (iii) Any area adjacent to a navaid that, if traversed, could cause derogation of the
9 signal or the failure of the navaid, and
10

11 (2) Provide procedures, such as a review of all appropriate utility plans prior to
12 construction, for avoiding damage to existing utilities, cables, wires, conduits, pipelines,
13 or other underground facilities.
14

15 (b) FAA Advisory Circulars in the 150 series contain standards and procedures for identifying
16 and marking construction areas.
17

18
19 Sec. 139.343 Noncomplying conditions.
20

21 Unless otherwise authorized by the Administrator, whenever the requirements of Subpart D of
22 this part cannot be met to the extent that uncorrected unsafe conditions exist on the airport, the
23 certificate holder shall limit air carrier operations to those portions of the airport not rendered
24 unsafe by those conditions.
25



NATIONAL AIR DISASTER ALLIANCE/FOUNDATION

2020 Pennsylvania Avenue NW #315
Washington, DC 20006-1846
(888) 444-6232

President, Matthew R. Ziemkiewicz

Executive Director, Gail Dunham

June 8, 2009

U.S. Department of Transportation
Dockets
400 Seventh Street, SW., Room Plaza 401
Washington, DC 20590

**Re: Docket No. FAA-2003-XXXX ARFF Requirements Working Group (ARFFRWG)
Notice of Proposed Rulemaking FINAL RECOMMENDATION To ARAC Airport
Certification Issues Group 14 CFR Part 139 Subpart D March 2004**

It is the position of the *NATIONAL AIR DISASTER ALLIANCE/FOUNDATION*, a long standing member of the Aviation Rulemaking Advisory Committee, to agree with the proposed recommendations to improve Aircraft Rescue Firefighting (ARFF) operations, all of which seek to improve ARFF response and rescue operations which will undoubtedly save lives.

Special emphasis needs to be placed on assuring that sufficient personnel are on scene on the initial response to an incident. There is no question that minutes can mean the difference between life and death. Some examples of newer ARFF response equipment can be operated by only one crew member but fails to provide enough personnel to gain entry into an aircraft, evacuate victims, and suppress an interior fire. There is an identified need to have at least one crew member operate the ARFF vehicle, assure an interior fire attack crew, and exterior fire attack crew, a rescue forcible entry team, as well as a firefighter rescue team (Rapid Intervention Team RIT) are on scene within the first few minutes of a crash or event. Currently there is no clear guidance on staffing minimums. Regarding the minimum staffing requirements listed in "Table 1" the "*Incident Commander*" (IC) should not be listed as part of the ARFF operations staffing. The responsibilities of the IC are vastly different than that of an on scene ARFF operator.

Additionally all certified ARFF personnel should be trained as structural fire fighters as

1

well. This will facilitate suppression of an interior aircraft fire, or an event where a structure is involved with an aircraft. Currently this is not a requirement. ARFF standards do not require ARFF responders to enter an aircraft on fire. Occupants are expected to self evacuate and suppression is expected by application of foam from the ARFF truck turrets or upon arrival of an often municipal based structural fire department personnel.

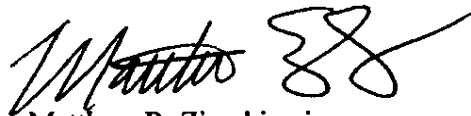
There is no question that air planes are getting larger, with more passengers and more cargo. The volume of air traffic is at an unprecedented high; it seems disproportionate that the ARFF response regulations have not kept up with this trend. Emergency responders initial response capacity must increase in order to maintain the high level of safety, rescue and fire protection the American people have come to expect.

The *NATIONAL AIR DISASTER ALLIANCE/FOUNDATION* was founded by air crash survivors and victims' family members to **raise the standard of Safety, Security and Survivability for aviation passengers, and to Support victims' families**. We address the short-term and long-range challenges to promote the highest levels of aviation safety and security so that others are not harmed. At times we are the only aviation safety group on record opposing unsafe practices. We incorporated as non-profits in 1995, have grown considerably since then.

NADA/F brings people together. We work with survivors, family members, victims' of terrorism, aviation professionals, emergency responders, government agencies, Congress, social service agencies, the news media and all those who share our goals for aviation safety, security and support for victims' families. We have made a difference, and together we can do more.

The *NATIONAL AIR DISASTER ALLIANCE/FOUNDATION* endorses the recommendations as proposed in the ARFF Requirements Working Group (ARFFRWG) Notice of Proposed Rulemaking FINAL RECOMMENDATION To ARAC Airport Certification Issues Group 14 CFR Part 139 Subpart D March 2004.

Respectfully submitted,



Matthew R. Ziemkiewicz,
President,
National Air Disaster Alliance/Foundation
mrz329@verizon.net