



**Tuesday e-Tech Alert**  
**March 13, 2007**  
*Number 78*

**Best Questions of February 2007**

We have selected the following questions as the “best of February 2007” answered by the engineering staff as part of the NFSA “Engineer of the Day” member assistance program:

**Question 1 – Restraint of Sidewall Sprinklers**

We have several questions regarding the intent of NFPA 13 Section 9.2.3.6 (2002 edition) related to the restraint of wall-mounted sidewall sprinklers. The section simply states "Wall-mounted sidewall sprinklers shall be restrained to prevent movement". However, there are no further details to explain what movement these sprinklers must be restrained to prevent. We note that this section is a subsection of 9.2.3, Location of Hanger on Branch Lines. We further observed that the terms "restraint" and "restrained" are also present in section 9.3.6, Restraint of Branch Lines, but this section is part of the earthquake protection criteria. Can you provide information regarding the intent of 9.2.3.6 to explain what movement is anticipated from the sprinkler? Can you provide information regarding how the sprinkler mentioned in 9.2.3.6 is to be restrained? Do sections 9.2.3.6 and 9.3.6 refer to two different types of movement that require different types of restraint (i.e. sprinkler operation versus seismic movement)? Please note that California is still using the 1999 edition of NFPA 13 standard, in which the sections noted above are 6-2.3.5 and 6-4.6.

**Answer:** The requirement for restraint on a sidewall sprinkler dates back to the 1987 edition of NFPA 13. Although the Committee settled on generic language the original proposal gives more insight into the issue that is trying to be addressed:

When sidewall sprinklers are installed in non-metallic pipe, the hangers shall be of a type which will restrict lateral movement of the pipe.

Exception: Sprinklers installed with a wall plate attached to the sprinkler by a positive means (not friction fit) which will prevent lateral movement of the sprinkler.

The change in the language to what we see today shows that the Committee did not want to limit restraint to sidewall sprinklers on nonmetallic pipe. However, the concern is clearly lateral movement of the sidewall sprinkler from the reaction to sprinkler operation. So while the requirement is not related to the earthquake protection provisions, it is actually similar to the requirement for prevention of upward movement of pendent sprinklers through a ceiling for pressures over 100 psi as in sections 9.2.3.4.3 and 9.2.3.5.2 (2002 edition). In most cases steel pipe has sufficient strength to resist the reactionary force created by an operating sprinkler provided the piping is supported near the sprinkler. Without specific requirements for the restraining of a sidewall sprinkler, there will be variations in how it is handled in the field. It is intended to be more of a performance requirement since the resistance needed will vary depending on the system pressure. Through the combination of piping materials, expected

pressure and calculations it is usually possible to show that no additional devices are required. If specially listed piping is used, installation instructions should be followed.

## **Question 2 – 3000 sq. ft. Rule for Combustible Space below Insulation**

Our office is at an impasse on how much minimum design area is required to be calculated when the following situation occurs. Is the answer 3000 square feet or not?

NFPA 13 (2007 edition) Section 8.15.1.2.16 includes the following when discussing “Concealed Spaces Not Requiring Sprinkler Protection”:

8.15.1.2.16. Concealed spaces formed by noncombustible or limited combustible ceilings suspended from the bottom of wood joists, composite wood joists, wood bar joists, or wood trusses that have insulation filling all of the gaps between the bottom of the trusses or joists and where sprinklers are present in the space above the insulation within the trusses or joists shall not require sprinkler protection. The heat content of the facing, substrate, and support of the insulation material shall not exceed 1000 Btu/ft<sup>2</sup>.

Figure A.8.15.1.2.16 shows “One Acceptable Arrangement of a Concealed Space in Truss Construction Not Requiring Sprinklers”.

The 3,000 sq. ft. minimum design area is specified in Section 11.2.3.1(3) and (4):

11.2.3.1.4(3). Unless the requirements of 11.2.3.1.4(4) are met for buildings having unsprinklered combustible concealed spaces, as described in 8.15.1.2 and 8.15.6, the minimum area of sprinkler operation for that portion of the building shall be 3000 ft<sup>2</sup>. The design area of 3000 ft<sup>2</sup> shall be applied only to the sprinkler system or portions of the sprinkler system that are adjacent to the qualifying combustible concealed space.

11.2.3.1.4(4). The following unsprinklered concealed spaces shall not require a minimum area of sprinkler operation of 3000 ft<sup>2</sup>.

(b) Noncombustible and limited combustible concealed spaces with limited access and not permitting occupancy or storage of combustibles. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

Our question is whether or not the “concealed space below truss bottom chords” as shown in Figure A.8.15.1.2.16 qualifies according to the exact writing of the code under 8.15.1.2.16 and therefore when calculating the area of application shall not require a minimum area of sprinkler operation of 3000 sq. ft.

**Answer:** Your basic question appears to be whether the 3,000 sq. ft. minimum area of application applies to the nonsprinklered combustible concealed space allowed by Section 8.15.1.2.16 of the 2007 edition of NFPA 13. The answer is that it does.

Using past editions of NFPA 13, there was a question as to whether additional sprinklers were required in the space under the insulation but above the suspended ceiling, or whether this space could be considered as adequately protected by the sprinklers above the insulation. When writing the 2007 edition of NFPA 13, the Committee clarified that the space is to be considered a separate combustible concealed space from which sprinklers can be omitted. However, this space was not included among those listed in Section 11.2.3.1.4(4) for which the 3,000 sq. ft. minimum area of

application is not required. As such, the 3,000 sq. ft. minimum applies. Any and all interpretations of prior editions of NFPA 13 are unimportant now that this situation has been specifically addressed. While it might be considered onerous, it should be recognized that the combination of dry system and pitched attic roof already brings the area of application of attic sprinklers to 2535 sq. ft. in many cases.

It should be noted that the space below insulation laid above wood joists or composite wood joists to which a ceiling is directly attached is separately addressed in Section 8.15.1.2.13, but this arrangement is specifically exempted from the 3000 sq. ft. minimum area by Section 11.2.3.1.4(4)(d).

You have also suggested that the wording of Section 11.2.3.1.4(4)(b) may allow one to ignore the 3,000 sq. ft. minimum, since it refers to noncombustible and limited-combustible concealed spaces with limited access and not permitting occupancy or storage of combustibles. However this subsection does not really apply, since it refers to spaces that would not be considered combustible concealed spaces. This is a bit confusing in the 2007 edition, because Section 11.2.3.1.4(3) clearly only requires application of the 3000 sq. ft. minimum to nonsprinklered COMBUSTIBLE concealed spaces. There is no need to exempt a noncombustible space from a rule that applies only to combustible spaces. The Committee created this situation by trying to formulate sections parallel to Sections 8.15.1.2.1 and 8.15.1.2.2, which clarify that sprinklers are not required in spaces with limited access and minimal combustibles. The better fit might be Section 11.2.3.1.4(4)(a) since it recognizes “minimal combustible loading”, but the new annex wording of A.8.15.1.2.1 clarifies that minor amounts of combustibles could include “nonstructural wood”. Within the intent of Section 8.15.1.2.16 the combustibles are the bottoms of the combustible wood joists or wood trusses and would not be considered nonstructural or minimal.

### **Question 3 – Beam and Girder Pocket Limitations for Obstructed Construction**

In NFPA 13 (annex section A.3.7.1(1) in the 2002 edition), the definition of beam and girder construction as a type of Obstructed Construction calls for “beams spaced 3 ft to 7-½ ft on center”. However the definition does not provide a maximum square footage for the beam and girder pocket. We have a building that has steel I-beams spaced 7'-6" apart but these beams sit on larger trusses, thus creating an air gap above the two ends above the truss. This being said, can we consider this Obstructed Construction?

**Answer:** Yes. As described, the trusses are perpendicular to the beams and provide their support. If the tops of the beams are at the ceiling and the trusses are below then the beams should be considered the primary ceiling structure. The sprinklers’ ability to collect heat and distribute a spray pattern is going to be affected most by the structural members directly below the ceiling. As you have noted, beam type construction spaced 3 to 7.5 feet on center is obstructed construction. There is no requirement that the beams frame into the trusses or that a maximum size of pocket be provided. The location of the trusses with regard to sprinkler spacing must be considered so that they do not create obstructions to sprinkler discharge patterns.

In older editions of NFPA 13, beams that framed into other beams to form pockets less than 300 sq. ft. were given special consideration as “panel construction”. Sprinklers were permitted to be placed further below the ceiling due to the greater capacity of panel construction to bank heat. While this type of construction is still defined in annex section A.3.7.1(4), there is no allowance for greater sprinkler deflector distances below the ceiling. This annex section can be used,

however, to justify obstructed construction deflector distances even where members are spaced more than 7.5 ft on center provided the ceiling pocket criteria is met. This can be useful in situations where there are multiple adjacent ceiling pockets.

#### **Question 4 – Entirely Filling a Space with Insulation**

Our project has open wood truss construction with 14 inches from finish floor to finish ceiling below, with approximately 12-½ inches of clear space. There will be ducts, electrical fixture housings, conduit, plumbing pipes, and sprinkler pipes within this space. The architect has requested to fill the void with 12-inch batt noncombustible insulation. Will this meet the criteria as described in NFPA 13 to allow this for elimination of sprinkler protection from within the space?

**Answer:** Section 8.14.1.2.7 of NFPA 13 (2002 edition) calls for the space to be "entirely filled with noncombustible insulation" to allow omission of sprinklers. However, as with other issues regarding tolerances, the tolerance level of "entirely filled" is decided by the Authority Having Jurisdiction. The AHJ might agree that, with only one-half inch of clear space remaining between the structure and the insulation in the concealed space, the amount of available air for combustion and resulting fire spread would be limited. The AHJ would weigh this against the knowledge that installation of sprinklers within very confined areas somewhat limits the benefits of sprinklers by restricting the ability of the spray pattern to develop fully.

#### **Question 5 – Use of Room Design Method with Dry Systems**

We have a situation where we are protecting dwelling units with dry pendent sprinklers off of a dry system using NFPA 13. Our question is this: are we required to calculate an area of 1950 sq. ft or can we utilize the room design method? The ceilings are all gypsum board and 8 ft in height. All requirements are being met to utilize the room design method other than it is a dry system.

**Answer:** NFPA 13 allows the use of the room design method with dry pipe systems. You are not required to use a design area of 1950 sq ft. You are permitted to supply the most demanding room. For a light hazard occupancy (which most dwelling units are) the requirement is for walls and ceilings in each room with a minimum 30-minute fire resistance rating. Two sprinklers must be added for every adjacent room where the door between the room in question and the adjacent space does not have an automatic door closer. Many people forget this rule and forget to pick up important extra sprinklers in their calculations in closets, bathrooms and other adjacent spaces, which rarely have automatic door closers.

#### **Question 6 – Exit Sign Obstructions**

Are exit signs considered an obstruction for sprinkler heads?

**Answer:** There are a few variables that will determine if an exit sign is an obstruction that needs to be noted for spacing issues. The variables include the type of sprinkler, the hazard classification and how close the exit sign is with relation to the sprinkler. For example, if you are using standard spray pendent and upright sprinklers then NFPA 13 section 8.6.5.2.1.4 (2002 edition) states, "For light and ordinary hazard occupancies, structural members only shall be

considered when applying the requirements of 8.6.5.2.1.3," which is more commonly known as the "Three Times Rule."

Each type of sprinkler has its own obstruction requirements. Not all types of sprinklers permit nonstructural obstructions to be ignored for spacing sprinklers. For example, ESFR sprinklers are extremely sensitive to all obstructions as they need to suppress the fire. Therefore, an exit sign near an ESFR sprinkler would be an obstruction and it would have to be handled accordingly.

Even in scenarios where an exit sign does not have to be a specified distance from the sprinkler, it is still an obstruction. If a scenario exists where the obstruction is up against the sprinkler there may still be cause for concern. Even a few inches will help to allow the sprinkler spray pattern to develop.

### **Question 7 – Variable Storage Arrangements**

We are working on a sprinkler system for a retail store. The stockroom of this store has a building height of 24 ft and contains 8 ft tall double row racks without solid shelving, with 12 ft aisles, and 12 ft high shelf storage. A portion of the stockroom has garment conveyers that are above racks and shelves. The tops of these conveyers are installed at 18 ft. The mechanical engineer has required that design criteria be used for Class IV commodity. What would be the basis of the recommended design criteria? The area has "racks" but they are only 8 ft tall. Should criteria for double row racks up to 18 ft be used? We have considered that option, but it seems like overkill.

**Answer:** The answer to your question depends on the owner's intent with the building. The mechanical engineer specifying the protection should be acting as the owner's agent. There is a need for the owner to consider if there is any desire for future flexibility or if it is the intent that the racks will remain maximum 8 ft and vertical expansion is unlikely. The Owner's Certificate (Section 4.3 in both the 2002 and 2007 editions of NFPA 13) should be completed by the owner or the owner's agent to document intent.

If it is determined that the storage is expected to remain at 8 ft then it would be acceptable to plan that part of the sprinkler system based on the 8 ft height. The NFPA Sprinkler Installation Committee discussed this idea in preparation of the 2007 edition of NFPA 13. They added Section 12.1.3.3, which states, "The sprinkler system design shall be based on the storage height and clearance to ceiling that routinely or periodically exist in the building and create the greatest water demand..." The 8-ft maximum would then keep you in the section for rack storage up to 12 ft.

If flexibility is desired from the owner then there are multiple options. A worst-case arrangement would be 18 inches of clearance from the sprinklers (assuming standard spray sprinklers are being used) leaving 22.5 ft for storage. Depending on location and number of conveyers a lower height may be a reasonable worst-case scenario, but all of this will vary with the owner's plan for the building.

Where garment conveyers are located above storage, they can be treated as an obstruction, with additional sprinklers located below the conveyers as appropriate.

### **Question 8 – Heat Tracing of Branch Lines**

I have a question about heat trace on sprinkler branch piping. The only relevant mentions I found on heat trace are in NFPA 13R and in NFPA 502. Has heat trace been made illegal for keeping pipes from freezing in areas subject to freezing temperatures? Are antifreeze, preaction and dry pipe systems the only approved approaches in NFPA 13 for these types of areas?

**Answer:** The 2002 edition of NFPA 13 deals with heat tracing in Section 8.15.3.1.3. It is not specifically mentioned, but the corresponding annex section states that it was considered unacceptable practice to use heat tracing on branch lines, clarifying that heat tracing of mains was one of the acceptable means. In the 2007 edition, the wording has been modified:

8.15.3.1.4 Where listed heat tracing systems are used, they shall be supervised.

8.15.3.1.5 Where listed heat tracing is utilized for branch lines it shall be specifically listed for use on branch lines.

Delete existing annex material from Section 8.15.3.1.3.

The NFPA 13 Committee was advised that at least two companies are working toward product listings in this area.

### **Question 9 – Access Panels for Sprinklers in Concealed Spaces**

We recently completed a tenant fit up job. The construction is wood with sheetrock drop ceilings. We installed sprinklers above and below the ceilings because of the combustible concealed space. When the local Fire Marshal walked through the job he told the GC that they needed to install access panels beneath every upright sprinkler in the event that it had to be serviced. Can you give me any help with what I think is an unreasonable request?

**Answer:** You are correct that the request is ill-advised. NFPA 13 requires valves, gauges and drains to be accessible. Section 8.1.2 (2007 edition) states "System valves and gauges shall be accessible for operation, inspection, tests, and maintenance." However, there is no requirement for sprinklers to be accessible. In fact, the Committee requires them in concealed and inaccessible locations in some circumstances.

NFPA 25, the Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems, explains that sprinklers, piping and hangers in inaccessible areas do not require inspection. Section A.5.2.1.1.4 of the annex explains examples of these areas: "Examples include some floor/ceiling or roof/ceiling assemblies, areas under theater stages, pipe chases, and other inaccessible areas."

So, the NFPA standards do contemplate some sprinklers, piping, and hangers being installed in inaccessible locations.

### **Question 10 – Fire Department Connection and PIV Location**

Formal interpretation 80-5 on page 380 of the 1999 edition of the NFPA's *Automatic Sprinkler Systems Handbook* stated that a post indicator valve (PIV) can be installed between a fire department connection (FDC) in the yard and the sprinkler system. Does that still hold true for the 2002 and 2007 editions of NFPA 13?

**Answer:** Yes, the statement is still true. The NFPA retired the Formal Interpretation because section 8.16.2.4.4 (2002 edition) clearly allows the FDC to be tied into the system with valves (PIV or any other) between the FDC and the system. Therefore, they saw no need to continue printing a 20 year old interpretation.

### **Question 11 – Ceiling-Only Heat Detection for Freezer Rack Storage**

NFPA 13 2007 edition section 7.9.2.8.4 allows for ceiling-only heat detection for in-rack and overhead pre-action sprinkler systems when certain criteria are met. This section appears to be new in the 2007 edition. Is this a change from 2002, or is this merely a clarification of previous intent? We are working on a freezer project where one pre-action valve serves both the overhead and in-rack sprinklers, but the local Authority Having Jurisdiction has not yet adopted the 2007 edition of NFPA 13. We would like to install overhead-only heat detection, but we're not sure if that's allowed by NFPA 13 2002.

**Answer:** Under the 2002 edition of NFPA 13, there are no rules associated with the detection system for a pre-action system other than section 7.3.1.6, which requires that the detectors be installed in accordance with their listing. This means that you can do whatever you want as long as you don't violate the spacing requirements of the listing or other special requirements there are in the listing. To the best of our knowledge, there is no discussion in the listing of any detection device regarding the protection of rack storage from the ceiling or from the racks. For this reason, NFPA 13 chose to put some requirements in the 2007 edition in order to limit the possibilities. The rules were adapted from FM Global; the Authority Having Jurisdiction could consider them as an equivalent level of protection permitted under the 2002 edition of NFPA 13 by sections 1.5 and 1.6. Strictly speaking, you can do whatever you want under the 2002 edition, but now that the 2007 edition has been published, it would be unwise from a liability perspective to ignore the state of the art.

### **Question 12 – Size of Open and Closed Arrays**

I have a question on the definition of open and closed arrays. Specifically is there a minimum width to an array? We are looking at an arrangement of self-stacking plastic totes. The totes are approximately 4 ft x 4 ft and will be stacked to 18 ft in height with two rows placed back to back. There is an aisle space between every two rows of totes. If the back-to-back placing of the totes is less than 6 inches and there is less than 6 inches between sides of adjacent totes, can the arrangements of totes be considered a closed array? Since the plastic totes will contain very lightweight metal parts we are looking at the commodity classification as Group A plastic. The design criteria we are using is from Figure 12.2.3.1.1 (NFPA 13 2002 edition). For closed arrays, Section 12.2.3.1.7(3) permits the design area to be reduced to 2000 sq. ft. Is there a minimum width to an array structure to consider it being closed?

**Answer:** The short answer to your question is “no.” There is no limit. In fact, the bigger the piles of storage, the more like a closed array the storage becomes. However, this option must be used with caution, since it is difficult to promise that the totes are always going to be closer together than 6 inches. If the stacks are placed 7 inches apart, the rule no longer holds and the array needs to be considered an open array.

## **Upcoming NFSA “Business Thursday” Online Seminar – March 15th**

**Topic: How to Successfully Lobby Sprinkler Legislation**

**Instructor: Buddy Dewar, NFSA Director of Regional Operations**

**Date: March 15, 2007**

This seminar covers the political process; building the coalitions needed to overcome opposition to fire sprinkler legislation; the committee process; dealing with both chambers and the governor's office; identifying the political environment; understanding partisan and nonpartisan politics; lobbying tricks you can play or may be played on you; the power of numbers and lobby axioms.

Information and registration for this seminar is available at [www.nfsa.org](http://www.nfsa.org) or by calling Dawn Fitzmaurice at 845-878-4200 ext. 133 or email: [dawn@nfsa.org](mailto:dawn@nfsa.org).

## **Upcoming NFSA “Technical Tuesday” Online Seminar – March 20th**

**Topic: Changes to Design Approaches and Calculations**

**Instructor: Cecil Bilbo, Jr., NFSA Director of Technical Services**

**Date: March 20, 2007**

This program will cover the reorganization of Chapter 11 of NFPA 13 as well as significant changes that occurred in that Chapter. The program will also cover the significant change that did not occur, the “single-point density”. In addition, the program will cover the significant changes to the old Chapters 13 and 14, which have been renumbered as Chapters 21 and 22 respectively. One of the major changes that will be discussed is the new format that computer calculation programs are going to have to follow for their output, which will affect all new versions of the software, even if your local jurisdiction does not adopt the new standard for some time.

Information and registration for this seminar is available at [www.nfsa.org](http://www.nfsa.org) or by calling Dawn Fitzmaurice at 845-878-4200 ext. 133 or email: [dawn@nfsa.org](mailto:dawn@nfsa.org).

## **Additional NFSA Training Opportunities**

### **Two-Week Technician Training Seminars**

April 16-27	Orlando, FL
September 24- October 5	Kansas City, MO

These seminars also serve as starting points for the NFSA’s two-year Certificate Program for Fire Sprinkler Technicians. For more information, contact Nicole Sprague at 845-878-4200 ext. 149 or email: [Sprague@nfsa.org](mailto:Sprague@nfsa.org).

### **3-day Advanced Technician Training Classes**



July 24-26  
September 5-7

Chicago, IL  
St Louis, MO

For more information, contact Nicole Sprague at 845-878-4200 ext. 149 or email: [Sprague@nfsa.org](mailto:Sprague@nfsa.org).

### **NICET Inspector Certification Review Classes**

May 22-24	Anchorage, AK
June 19-21	Wilmington, DE
August 14-16	San Antonio, TX
November 6-8	Providence, RI

For more information, contact Nicole Sprague at 845-878-4200 ext. 149 or email: [Sprague@nfsa.org](mailto:Sprague@nfsa.org).

### **In-Class Training Seminars**

NFSA also offers in-class training on a variety of subjects at locations across the country. Here are some upcoming seminars:

Mar 20	Inspection, Testing & Maintenance////Hastings, MI
Mar 21	Sprinklers for Dwellings////Hastings, MI
Mar 22	Sprinkler Protection for Special Storage////Hastings, MI
Mar 27-28	Two-day NFPA 13 Overview & Intro to Plan Review////McFarland, WI
Mar 29	Hydraulics for Fire Protection////McFarland, WI
Apr 3	Plan Review Policies & Procedures////San Bernardino, CA
Apr 4	Sprinkler Protection for Rack Storage////San Bernardino, CA
Apr 5	Inspection, Testing & Maintenance////San Bernardino, CA
Apr 17	Sprinkler Protection for General Storage////Bozeman, MT
Apr 18	Sprinkler Protection for Rack Storage////Bozeman, MT
Apr 19	Inspection, Testing & Maintenance////Bozeman, MT
May 2	Foam Water Systems (1/2 day) (AM)////Las Vegas, NV
May 2	Advanced Pump Layout Procedures (1/2 day)(PM)////Las Vegas, NV
May 8	Inspection, Testing & Maintenance////Colorado Springs, CO
May 9	Residential Sprinklers Homes to High-Rise////Colorado Springs, CO
May 10	Underground Piping (1/2 day) (AM)////Colorado Springs, CO
May 10	Standpipe Systems (1/2 day) (PM)////Colorado Springs, CO
May 15-16	Two-day NFPA 13 Overview & Intro to Plan Review////Richmond, CA
May 17	Inspection, Testing & Maintenance////Richmond, CA
May 29-30	Two-day NFPA 13 Overview & Intro to Plan Review////Rogers, AR
May 31	Hydraulics for Fire Protection////Rogers, AR

For more information or to register, visit [www.nfsa.org](http://www.nfsa.org) or call Michael Repko at 845-878-4207 or email: [seminars@nfsa.org](mailto:seminars@nfsa.org).

*NFSA Tuesday e-Tech Alert is c. 2007 National Fire Sprinkler Association, and is distributed to NFSA members on Tuesdays for which no NFSA Technical Tuesday Online Seminar is scheduled. Statements and conclusions are based on the best judgment of the NFSA Engineering staff, and are not the official position of the NFPA or its technical committees or those of other organizations except as noted. Opinions expressed herein are not intended, and should not be relied upon, to provide professional consultation or services. Please send comments to Russell P. Fleming, P.E. [fleming@nfsa.org](mailto:fleming@nfsa.org).*

*In the promotion of the fire sprinkler concept, the National Fire Sprinkler Association represents all fire sprinkler industry interests including fire sprinkler contractors, manufacturers and suppliers of fire sprinklers and related equipment and fire protection professionals. Established in 1905, the National Fire Sprinkler Association provides publications, nationally accredited seminars, representation in codes and standards-making, market development, labor relations and other services to its membership. Headquartered in Patterson, New York, the National Fire Sprinkler Association has regional operations offices throughout the country.*