

Engineering Services Codes Committee
Review Summary

ISSUE: What criteria are appropriate for determining fire flow and water storage requirements to protect the new Kayenta Health Center?

REFERENCE: National Fire Protection Association (NFPA) 101 – Life Safety Code
NFPA 1 - Uniform Fire Code
NFPA 13 – Standard for the Installation of Sprinkler Systems
NFPA 1142 – Standard on Water Supplies for Suburban and Rural Fire Fighting
OEHE Technical Handbook, Vol. III, Chapter 24-11, "Installation of Fire Sprinkler Protection in Indian Health Service Owned Installations"
IHS–Engineering Services Architect/Engineer Design Guide (Mar2005)
NTUA letter re: Water System in Kayenta for SSER II [December 30, 2003]
IHS - Engineering Services Code Decision No. 2006.001 [June 12, 2006]
Bohannan & Huston letter report: Kayenta Health Center – Required Fire Flows [February 25, 2009]
Bohannan & Huston letter report: Kayenta Health Center – Fire Storage Tank Capacity [March 4, 2011]
E-mail Exchange between J. Parker and J. Bausch [Sept. 10, 2013]
Dekker Perich Sabatini letter re: proposed reduction with the Navajo Nation Fire Marshall [March 2011]

LOCATION: Kayenta Health Center, Kayenta, AZ

BACKGROUND:

The new Kayenta Health Center (KHC) is under construction. The Project's Civil Engineer has designed a water storage tank for fire protection meeting the requirements of both NFPA 1 – Uniform Fire Code (2009) and the fire flow requirements of NFPA 13 – Standard for the Installation of Sprinkler systems (2007 and 2010)

A Code Interpretation request was forwarded to the Indian Health Service (IHS) Division of Engineering Services Codes Committee (Committee) in September 17 2013 e-mail from Joe Bermes, ES-Seattle Branch Chief. Mr. Bermes requested clarification of the appropriate NFPA code(s) to be used in sizing a fire water storage tank at KHC by posing the three following questions:

1. What is the appropriate NFPA code to determine whether a fire water storage tank is required?
2. If a fire water storage tank is required, what is the acceptable reduction in that storage requirement IHS's Authority Having Jurisdiction (AHJ) will authorize for KHC?
3. May NFPA 1142 be used to size the fire water storage requirement for KHC?

PRECEDENT:

The Committee previously considered the issue of appropriate criteria for determining required fire protection flows for IHS facilities (Interpretation No. 06-001, June 19 2006). In June 2006, Committee members unanimously agreed:

- To reaffirm the IHS AE Guide's directive to utilize NFPA 101 requirements in determining required fire protection flows; and
- To recommend the determination of fire flow requirements for all (IHS) facilities be made as directed by NFPA 101, using the appropriate installation standard – NFPA 13, 13D or 13R – as required; and
- NFPA 13 (2002) provided all necessary design approaches and appropriate fire flow calculations based on the building's hazard classification.

PROJECT HISTORY:

During the Phase II Site Selection, the Navajo Tribal Utility Authority wrote they could not guarantee the provision of fire flow to KHC (December 30 2003 NTUA letter to IHS). In the same letter, they stated that the tanks serving Kayenta are normally kept 80 percent full, with two days of reserve storage in case of power outages or maintenance issues. Furthermore, NTUA stated that a new well and tank must be built to supply the new health center. Since that time, an additional well has been drilled, and 1 million gallons of additional storage has been added to the Kayenta system's South Pressure Zone. Additionally, IHS has run a 10 inch transmission line from the new storage tanks to the KHC site.

The IHS AE Design Guide (March 2005) directed the AE to design KHC to conform to the latest published edition (2006 in this case) of the National Fire Codes, with the exception of NFPA 5000, as published by the National Fire Protection Association. Thus, the design of KHC design conformed to NFPA 101, and NFPA 1 as well as all other relevant NFPA codes other than NFPA 5000. Note that while NFPA 1142 can be used if authorized by the AHJ, the AHJ did not authorize NFPA 1142's use on the KHC project.

Regarding fire protection, KHC's construction documents were designed to conform to the following Codes, Standards and Guidelines:

- 2006 Life Safety Code (NFPA 101), NFPA 1 (2006) and NFPA 13 (2007)
- 2006 International Building Code (IBC); and
- 2005 IHS AE Design Guide

In a February 25, 2009 letter from AE's civil engineering consultant (Bohannon Huston) the stated requirement for the interior fire flow using NFPA 2006 and Type II Construction was 135,000 gallons (Kayenta Health Center – Required Fire Flows). (This 135,000 gallon requirement was incorporated within the 500,000 gallon tank size outlined below.) KHC's Final water storage tank requirements were provided by Bohannon Huston in a March 4, 2011 letter (Kayenta Health Center – Fire Storage Tank Capacity):

Based on all of the information gathered and reviewed to date, we recommend the following for approval by I.H.S.

- Building Area = 16,745 gross square meters
- Type of Construction – II (111)
- Per NFPA 1, Table 18.4.5.1
 - Fire Flow Required= 22,712 lpm
 - Duration = 4 hours
 - 65% Reduction = 7,949 lpm
 - Tank Size = 7,949 lpm x 4 hours x 60 min/hr = 1,907,848 liters**

The AE's recommendation was accepted by the IHS Contracting Officer's Representative, and the KHC water tank was sized accordingly (the 1,907,848 liter requirement yields a nominal tank size of 500,000 gallons).

RECOMMENDATION: The KHC Code Interpretation request asking to clarify the appropriate NFPA code(s) to be used in sizing a fire water storage tank at KHC included the three questions shown below. The Code Committee's responses are shown following each question:

1. What is the appropriate NFPA code to determine whether a fire water storage tank is required?

Committee Response: NFPA 101 and NFPA 13 provide the required fire water capacity for a reasonable degree of protection for life and property from fire. Per NFPA 101 Chapter 18: where the *replenishment of water supplies is not immediately available from on-site sources*, alternate provisions may be necessary. NFPA 1142 may be considered only if IHS (AHJ) intends to provide additional facility (property) fire protection, subject to discussions with the local fire department and utility provider.

2. If a fire water storage tank is required, what is the acceptable reduction in that storage requirement IHS's Authority Having Jurisdiction (AHJ) will authorize for the KHC?

Committee Response: While the Committee does not have any information regarding the water flow and static pressure available at KHC, it is assumed another water supply source will be needed to comply with the requirements of NFPA 101 and 13. Therefore, if a water storage tank is required, it must be sized to comply with NFPA 13; no reduction is allowed beyond the minimum requirements of NFPA 13.

3. May NFPA 1142 be used to size the fire water storage requirement for the KHC?

Committee Response: NFPA 13 provides a reasonable degree of protection for life and property. If the AHJ requires additional fire-fighting to protect the structure, NFPA 1142 may be used to size the fire water storage requirement for the KHC's

property protection. However, in no instance may the water supply be permitted to be reduced below the minimum requirements of NFPA 13.

SIGNATURES:

<input checked="" type="checkbox"/> Concur	<input type="checkbox"/> Do Not Concur	DATE: <u>11/19/2013</u>	<u>/Dwight Packer/</u> Dwight Packer, RA KS #3507
<input checked="" type="checkbox"/> Concur	<input type="checkbox"/> Do Not Concur	DATE: <u>11/19/2013</u>	<u>/John Bausch/</u> John Bausch, PE WA #28963
<input checked="" type="checkbox"/> Concur	<input type="checkbox"/> Do Not Concur	DATE: <u>11/19/2013</u>	<u>/Suresh Shah/</u> Suresh Shah, PE OK #13259
<input checked="" type="checkbox"/> Concur	<input type="checkbox"/> Do Not Concur	DATE: <u>11/19/2013</u>	<u>/Michael Young/</u> Michael Young, PE WA #38245
<input checked="" type="checkbox"/> Concur	<input type="checkbox"/> Do Not Concur	DATE: <u>11/19/2013</u>	<u>/Gerald Inglett/</u> Gerald Inglett, RA OK #1597