

Summary Investigation Report

Annandale Village Fire
Gwinnett County, Georgia
August 31, 1983

Prepared by

Tom Timoney
Fire Protection Specialist
National Fire Protection Association

In Cooperation with

Federal Emergency Management Agency/
United States Fire Administration

and

National Bureau of Standards/
Center for Fire Research

The substance of this investigation report is dedicated to the public. It may be freely reprinted with the customary crediting of the source. The author and publisher are solely responsible for the accuracy of statements or interpretations contained herein.

Introduction

The National Fire Protection Association (NFPA), with assistance from the Southern Building Code Congress International (SBCCI), investigated the Annandale Village, Gwinnett County, Georgia, fire in order to document and analyze significant factors that resulted in the loss of life.

The investigation of this incident was conducted under a major fires investigation agreement involving the Federal Emergency Management Agency/United States Fire Administration (FEMA/USFA), the National Bureau of Standards/Center for Fire Research (NBS/CFR), and the NFPA. The agreement, funded by the three organizations, provides for the investigation of technically significant fires by the NFPA Fire Investigations and Applied Research Division to document and analyze incident details and report lessons learned for loss prevention purposes.

The NFPA was assisted in data collection and analysis by the Southern Building Code Congress International (SBCCI) under an agreement between the NFPA and the three model building code organizations to investigate serious structural fires throughout the United States.

The NFPA became aware of the incident the morning it occurred through news media reports. Senior Fire Analysis Specialist, Richard Best and Fire Protection Specialist, Tom Timoney traveled to the scene that afternoon. Entry to the fire scene and data collection activities were made possible through the cooperation of the Gwinnett County Fire Department. This report documents the findings of the data collection and subsequent analysis effort.

This report is another of NFPA's studies of fires having important educational and/or technical value. The information developed is based on the best data available immediately following the fire and additional data obtained in subsequent follow-up.

The assistance and support of Assistant Chief Thomas S. Griffin and Assistant Fire Marshal J. Leo Miller of the Gwinnett County Fire Department is acknowledged and appreciated.

A special thanks to Mr. Gary W. Walker, P.E., SBCCI, for his on-site assistance in the data collection phase and for his input into the code analysis and the report writing process.

Abstract

Annandale Village, located approximately 30 miles Northeast of Atlanta in Gwinnett County, Georgia, is a community which provides a new concept in long-term care and an alternative to institutionalization for mentally handicapped adults.

Shortly before 2:00 a.m. on August 31, 1983, a staff member on the upper level of an unprotected wood frame village building housing 15 mentally handicapped adults and four staff members was awakened by the activation of a single station smoke detector. He determined that a well developed fire on the lower level was quickly spreading heat and smoke throughout the upper level via an open interior stairway.

Six mentally handicapped residents and the four staff members escaped the building unassisted. A seventh resident was rescued by a staff member who reentered the building. Eight mentally handicapped residents unable to escape, died as a result of the fire.

Significant factors identified during the investigation as contributing to the eight fatalities were:

- The wide use of highly combustible wood paneling in lower level interior wall assemblies;
- An open interior stairway connecting the lower level to the upper level;
- The corridor arrangement throughout both the lower and upper levels which did not provide access to at least two exits from each level;
- The incapability of single station smoke detectors to alert persons sleeping throughout both levels of the building to the developing fire.

BACKGROUND

Annandale Village is a community which provides an alternative to institutionalization and a new concept in long-term care for mentally handicapped adults. Annandale Village is located on 100 rural acres approximately 30 miles northeast of Atlanta in Gwinnett County, Georgia. At the time of the incident, Annandale Village was the home for approximately 100 mentally handicapped adults and 30 "live-in" staff.

The Village consisted of 10 buildings which included a barn, a dining hall and activities building, directors residence, administration building, and five buildings equipped with sleeping quarters.

On the night of the incident, the building in which the fire occurred was occupied by fifteen residents and 4 staff members. Eight residents were in bedrooms on the upper level and seven residents were in bedrooms on the lower level. One staff member occupied the staff bedroom on the upper level and two staff members occupied the attached staff apartment. The fourth staff member occupied the lower level staff apartment.

The level of mental handicap varies from resident to resident. In some cases the handicap has existed since birth, in other cases the damage is the result of vehicle accidents or drug abuse. The mentally handicapped adults who live in the Village were described by staff as capable of self-care and trainable to some productive attainments. Many of these residents hold daily full-time jobs outside of the Village in the surrounding community.

Gwinnett County encompasses approximately 460 square miles with a growing population of approximately 205,000 people. Public fire protection for the county is provided by the Gwinnett County Fire Department. The Gwinnett County Fire Department is a Class IV department formed in 1971. A fully paid force of 300 men, man 18 stations and operate 18 engine companies, 4 ladder companies, and 3 heavy squads.

The Building

Construction of the building in which the fire occurred was completed sometime in late 1973 or early 1974. This was the oldest building in the Village. Since completion of the original construction, two significant modifications took place in the building. An apartment for use by staff was added to the northeast corner of the building where a car-port was formally located, and then, approximately a year to eighteen months prior to the incident, the lower level/basement was renovated to provide sleeping quarters for handicapped residents and a staff member apartment.

The building was of unprotected wood frame construction. The exterior walls were 4-foot by 8-foot plywood sheets attached to 2-inch by 4-inch wood studs. The roof assembly consisted of a 2-inch by 4-inch wood truss system with a plywood roof deck attached, which was covered with asphalt shingles.

The portion of the upper level of the building remaining after the fire was limited to the three front bedrooms which had 1/2-inch gypsum board walls and ceilings with tongue and groove wood floors. The remainder of the upper level collapsed during the fire and, due to the degree of destruction, identification of the construction features in these areas could not be determined.

The means of egress from the upper level was through the building's main entrance/exit located on the north wall of the upper level in the center of the building. The means of egress from the staff apartment attached to the upper level-northeast corner of the building was through an entrance/exit located on the north wall of the apartment.

Access to the outside from the upper level could also be gained through sliding glass doors located on the west wall of the bedroom on the northwest corner and through sliding glass doors on the south wall of the living room and dining room areas. Sliding glass doors are not recognized as exits by the Life Safety Code®.

The lower level resident bedroom and corridor wall partitions were 3/16-inch wood paneling attached on either side of 2-inch by 4-inch wood studs. The ceiling throughout these bedrooms and the connecting corridor appeared to be a drop ceiling with ceiling panels supported in an aluminium grid system.

The two furnace rooms on the lower level enclosed natural gas-fired hot air furnaces. A fire department building inspection conducted April 20, 1982, required these rooms to be enclosed in one hour fire rated wall and ceiling assemblies. Due to the many penetrations created by cable, conduit, ductwork, and piping, the fire department required automatic sprinkler protection supplied by existing domestic water piping be installed in each furnace room. In addition, it was recommended that the fire rated doors be equipped with locks and kept locked. At the time of the incident, the fire department had yet to be contacted by Annandale Village to review completed items from their April inspection report.

During the investigation, it was noted that the East furnace room which is located in a resident bedroom, had 3/16-inch wood panelling attached directly to the wood studs on the outer face. Furthermore, it was noted that the fire rated door assemblies in both furnace rooms did not appear to have been equipped with closers, knobs, latching mechanisms, or locks.

Detailed information on wall and ceiling materials were not collected for the lower level staff apartment. From the lower level staff member's account of the incident, the contribution of these materials to early fire growth and development appeared to be insignificant.

The floor throughout the lower level was concrete. Evidence of a carpet covering was noted in the resident bedrooms and the connecting corridor. Details of the carpet material as well as possible floor coverings in other areas of the building could not be collected due to the degree of destruction.

The means of egress from the lower level of the building was through a set of swinging glass doors located on the south wall in the center of the building.

Access to the outside from the lower level could be gained through an exterior door located on the west wall of the northwest corner bedroom. The Code recognizes this as an exit, only for occupants of that bedroom and not for any other lower level occupants who would have to travel from the corridor through the bedroom to utilize this door.

Access to the outside from the lower level could also be gained by travelling up the open stairs and out the main entrance/exit on the upper level. This is not approved as an exit from the lower level by the Code because the stairway is required to be enclosed in 1-hour fire rated construction with Class A or Class B interior finish.

Fire Protection Features

The building was equipped with 5 single station smoke detectors powered by the building's electrical system and located as shown in Figure 1. There was no documented detector maintenance or testing program and none was described during staff interviews.

Hand extinguishers were reported to be located in the building. The staff was unclear as to the type, size, and location of these extinguishers. There was no documented maintenance or training program involving hand extinguishers and none was described during staff interviews.

THE FIRE

Shortly before 2:00 a.m., the house parent sleeping in the staff bedroom on the upper level-southwest corner of the building was awakened by the activation of a smoke detector. He describes finding the floor of his room extremely hot yet only an insignificant amount of smoke had collected in his room. He dressed quickly while noting the glow of fire appearing on the grass

in the rear of the building. He then felt the walls and door of his room and found them hot. He did not believe the walls and door were hot due to "direct flame impingement" and thus decided to egress the building through the upper level corridors and out the front exit. He found the corridors charged with heat and black acrid smoke.

He exited the building and went to the staff apartment located on the upper level-northeast corner of the building where he alerted the two staff members sleeping there of the fire. One of these staff members then traveled across the Village complex approximately 100 yards and alerted the assistant administrator who telephoned the fire department.

While the house parent who was first awakened by the activation of a smoke detector was egressing the building through upper level corridors, he noted a resident who was attempting to egress had become disoriented and was somewhere in the living/dining room area. After alerting staff members sleeping in the upper level staff apartment, he reentered the building and assisted the disoriented resident in exiting the building. Upon his reentering of the building, he described finding elevated temperatures which he estimated to be "in excess of 200⁰F" and still being unable to locate the fire.

Fire Department Operations

The Gwinnett County Fire Department received telephone notification of the fire at 2:03 a.m. and dispatched a box assignment which included 3 engines, 2 trucks, a heavy squad, and a battalion chief. The "first in" engine company found heavy fire showing on both levels in the rear of the building and initiated search and rescue operations supported by a 2 1/2 inch handline. Fire fighters found a female resident in bed in the front bedroom located on the northeast corner of the building. This victim was pronounced dead at the scene. Approximately four to six minutes after the arrival of the "first in"

engine company, the building collapsed. Fire suppression operations were severely handicapped by a limited water supply in the Village hydrant system which fire department flow tests found to approximately total 200 gpm at 20 psi residual.

Damage to the Building

The entire lower level of the building was completely destroyed by fire. The lower level destruction included both interior and exterior wall assemblies, ceiling assemblies, and the severe deformation of the steel columns supporting the upper level joist system. In isolated cases, portions of the 2-inch by 4-inch studs from interior wall assemblies and 1-inch by 3-inch furring strips attached to the concrete foundation wall which formed the north face of the lower level, were the only components of the wall assemblies remaining.

Damage to the remaining upper level of the building which was built on grade included the ceiling and roof assemblies in which portions of the 2-inch by 4-inch wood truss system remained, penetration of the fire through sections of the floor assembly, and limited penetration into interior and exterior wall assemblies. The staff apartment attached to the northeast corner of the upper level suffered only smoke and water damage.

Survivors

Seven residents and the staff of four survived the fire. There is evidence that three of the four surviving residents on the lower level may have been aware of the fire before the staff member on the upper level was awakened by the activation of a smoke detector, but were unable to communicate their discovery to others in the building. These three residents were able to egress the building through an exit located in a bedroom in the northwest corner of the lower level. The fourth surviving resident of the lower level was able to egress up the open stairway and exit through the main entrance on the north

face of the upper level. The staff member sleeping in the lower level staff apartment was awakened by the activities of the staff member who was alerted to the fire and was attempting to alert the two staff members in the upper level attached apartment. When the staff member on the lower level opened his apartment door, which provided access to the lower level common area, he found this area to be charged with heat and smoke. He then closed this door and exited through the sliding glass doors on the south wall of his apartment.

Two of the surviving residents of the upper level, located in a bedroom on the northwest corner of the building, had direct access to safety through sliding glass doors on the west wall of their bedroom which they exited through. The staff member, who was sleeping in an upper level bedroom on the south side of the building, was alerted to the fire by the activation of a smoke detector and egressed through the corridor and out the main entrance. He then went to the staff apartment attached to the northeast corner of the building and alerted the two staff members sleeping there who egressed through their direct exit to the outside located on the north wall of their apartment.

Victims

Eight residents unable to egress the building died as a result of the fire. The victims ranged in age from 25 to 54 years old. Four of the victims were men and four were women. The four women all occupied single bedrooms on the upper level of the building. One of the women who slept in the bedroom on the northeast corner of the building was found in bed by fire fighters during search and rescue operations. A second female victim in an adjacent bedroom was in the rubble of the lower level following the building collapse. It is believed she was overcome while attempting to egress through the corridor outside her room. The third female victim was found in her bedroom on the west side of the upper level. Little is known about any actions she

may have taken during the fire. The fourth female victim slept in the bedroom on the southwest corner of the upper level. Her body was found in the bedroom on the northwest corner of the upper level. It is believed she either became disoriented attempting to egress through the corridor to the main entrance or she was attempting to exit through the sliding glass doors on the west wall of the northwest corner bedroom where her body was found. The fifth victim from the upper level slept in the center bedroom located adjacent to the open stairway, his body was found in the rubble of the lower level following building collapse. Little is known about any actions he may have taken in attempting to egress, however, his roommate was the survivor rescued by the staff member who reentered the building following his alerting of other staff members to the fire.

The remaining three victims slept in bedrooms on the lower level. Two of these victims slept in adjacent bedrooms on the south side of the building. Little is known about any actions they may have taken attempting to egress. Their bodies were found in the rubble of the lower level in the approximate locations of their respective bedrooms. The third victim was found at the base of the open stairway where it is believed he was attempting to egress up the stairs and out the main entrance when he was overcome. It is interesting to note his roommate successfully egressed by this route and survived the fire.

Discussion

This fire is another in a continuous chain of multiple loss of life fires occurring in buildings housing elderly and/or mentally handicapped persons which have been investigated by the NFPA. At the time of this report, the cause of this fire had not been determined. The initial fire department investigation established the origin of the fire to be in the southwest portion of the lower level of the building.

The Annandale Village community was specifically designed and built for use by elderly and/or mentally handicapped residents as an alternative living environment to institutionalization. This contrasts from the common scenario identified during many of NFPA's investigations of a building originally built as a large single family dwelling or hotel, then was converted to house the elderly and/or mentally handicapped.

This fire did, however, have similar contributing factors which link it to these other fires. Included in these factors was the rapid fire development enhanced by the use of highly combustible interior finish materials in lower level wall assemblies. The spread of heat and smoke throughout both levels of the building via an open interior stairway; the use of single station smoke detectors to provide alerting of residents on both levels of the building. And the absence of a structured building fire emergency program for both staff and residents which included exit drills.

While five single station smoke detectors were installed in the building, two on the lower level and three on the upper level, the fire was already well developed when a detector activated and awoke the staff member sleeping in an upper level rear bedroom. Identification of which detector awoke the staff member was never established. In addition, it was never established whether any other detector activated, and if so whether the activation of any of these detectors alerted any of the residents to the fire.

Despite the fact the "first due" engine company was less than 2 miles from the Village, there was little or nothing the fire department could have done to alter the final outcome of this fire.

ANALYSIS

Two preliminary judgements are required of code officials responsible for applying the Life Safety Code to buildings housing elderly and/or mentally handicapped adults such as those found in the Annandale Village. These are the evaluation of the residents as capable or incapable of self-preservation and the role of the staff in the daily lives of the residents.

The judgement of a building's residents as capable or incapable of self preservation is paramount in the classification determination. This judgement can get complicated when terms such as "capable of self care" or "high functioning" are used when referring to a mentally handicapped person's capabilities. The staff at Annandale used both these terms when describing the capabilities of the residents to NFPA investigators.

Part of the investigative effort included interviews with three of the seven surviving residents conducted by a social psychologist serving as a consultant to the NBS. The goal of the interviews was to reconstruct the residents actions during the fire and attempt to develop a picture of the residents response to the changing conditions within the building. In addition, detailed discussions were conducted with the staff addressing the capabilities of each of the 15 mentally handicapped residents in the building at the time of the fire. He concluded that one of the fifteen residents, a deaf-mute, was incapable of self preservation.

The staff at the Annandale Village described their role in the daily lives of the residents to include monitoring the residents awareness of appointments and responsibilities, supervision of the residents medication schedules, and the verification that each resident was in their room with lights out each night. In addition to those residents leaving the village for daily work in the community, residents were also allowed permission to leave the village to attend a wide range of events.

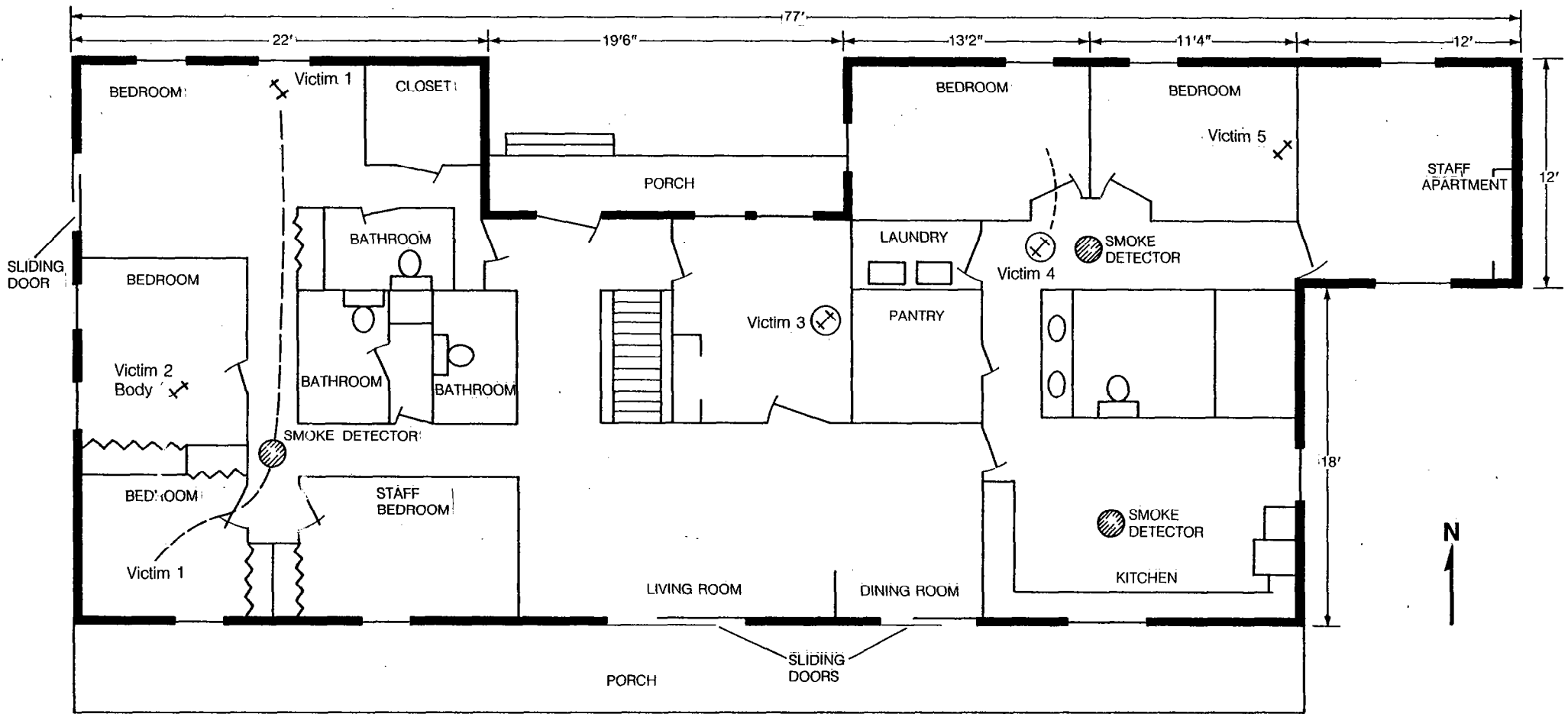
Coupling the information developed on the capability of the residents with the role of the staff in the daily lives of the residents, the Annandale Village building was classified as a Supervisory Care Facility under the guidelines of Chapter 13 of the Life Safety Code - Existing Health Care Occupancies.

Regardless of the final determination of the classification of this facility, either as a supervisory care facility or as a dormitory, under Chapter 17, fundamental fire protection problems existed in this facility at the time of the fire. These fundamental problems, identified during the investigation as significant contributing factors in the outcome of the incident were:

- The wide use of highly combustible wood paneling in lower level interior wall assemblies;
- An open interior stairway connecting the lower level to the upper level;
- The corridor arrangement throughout both the lower and upper levels which did not provide access to at least two exits from each level;
- The incapability of single station smoke detectors to alert persons sleeping throughout both levels of the building to the developing fire.

Applying the 1981 edition of the Life Safety Code for existing supervisory care facilities found in Chapter 13, the following fire protection features would have been required in the Annandale building:

- Complete automatic sprinkler protection.
- One hour fire rated construction enclosing the open interior stairway.
- Class A or B interior finish materials in lower level interior wall assemblies. (Class C if provided with complete automatic sprinkler protection.)
- Corridor arrangement throughout the building which would provide access to at least two exits.
- An automatic smoke detection system within the building's corridors system which would sound a general building alarm and automatically transmit an alarm to the fire department upon activation of any detector.



Annandale Village
Suwanee, Georgia
Upper Floor

FIGURE 2

LEGEND:

† Victim

⊕ Victims found on lower level following building collapse

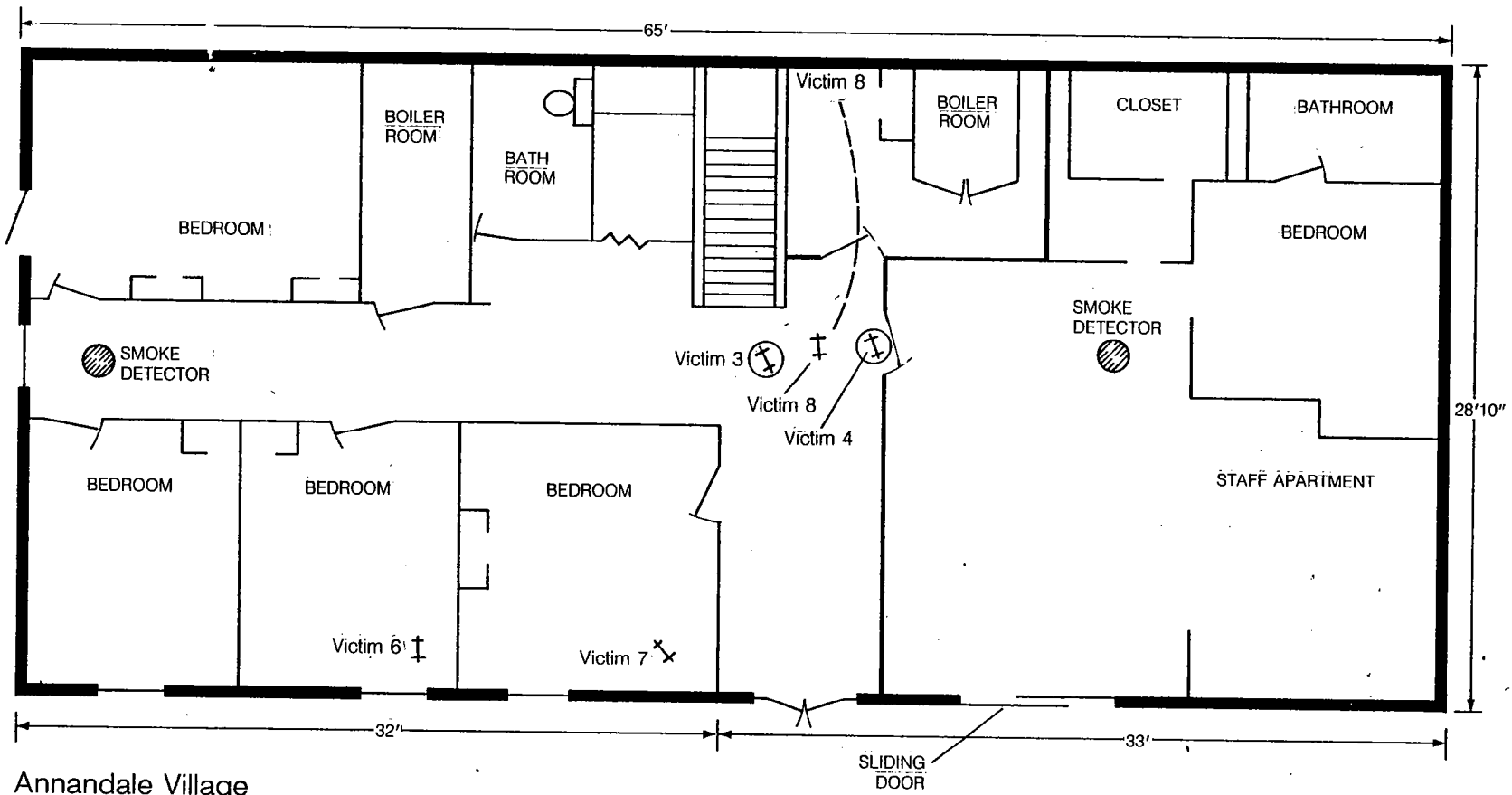


FIGURE 1