U.S. Fire Administration/Technical Report Series

Seven Fatality Christmas Tree Fire

Canton, Michigan

USFA-TR-046/December 1990

FEMA

U.S. Fire Administration Fire Investigations Program

The U.S. Fire Administration develops reports on selected major fires throughout the country. The fires usually involve multiple deaths or a large loss of property. But the primary criterion for deciding to do a report is whether it will result in significant "lessons learned." In some cases these lessons bring to light new knowledge about fire--the effect of building construction or contents, human behavior in fire, etc. In other cases, the lessons are not new but are serious enough to highlight once again, with yet another fire tragedy report. In some cases, special reports are developed to discuss events, drills, or new technologies which are of interest to the fire service.

The reports are sent to fire magazines and are distributed at National and Regional fire meetings. The International Association of Fire Chiefs assists the USFA in disseminating the findings throughout the fire service. On a continuing basis the reports are available on request from the USFA; announcements of their availability are published widely in fire journals and newsletters.

This body of work provides detailed information on the nature of the fire problem for policymakers who must decide on allocations of resources between fire and other pressing problems, and within the fire service to improve codes and code enforcement, training, public fire education, building technology, and other related areas.

The Fire Administration, which has no regulatory authority, sends an experienced fire investigator into a community after a major incident only after having conferred with the local fire authorities to insure that the assistance and presence of the USFA would be supportive and would in no way interfere with any review of the incident they are themselves conducting. The intent is not to arrive during the event or even immediately after, but rather after the dust settles, so that a complete and objective review of all the important aspects of the incident can be made. Local authorities review the USFA's report while it is in draft. The USFA investigator or team is available to local authorities should they wish to request technical assistance for their own investigation.

This report and its recommendations were developed by USFA staff and by TriData Corporation, Arlington, Virginia, its staff and consultants, who are under contract to assist the Fire Administration in carrying out the Fire Reports Program.

The U.S. Fire Administration greatly appreciates the cooperation received from Canton, Michigan Fire Chief Mel Paulun and Fire Marshal Art Winkel and also from Officer Robert Kerr of the Canton Police Department.

For additional copies of this report write to the U.S. Fire Administration, 16825 South Seton Avenue, Emmitsburg, Maryland 21727. The report is available on the Administration's Web site at http://www.usfa.dhs.gov/

Seven Fatality
Christmas Tree Fire
Canton, Michigan

Investigated by: James David

This is Report 046 of the Major Fires Investigation Project conducted by TriData Corporation under contract EMW-90-C-3338 to the United States Fire Administration, Federal Emergency Management Agency.

FEMA

Department of Homeland Security
United States Fire Administration
National Fire Data Center

U.S. Fire Administration

Mission Statement

As an entity of the Department of Homeland Security, the mission of the USFA is to reduce life and economic losses due to fire and related emergencies, through leadership, advocacy, coordination, and support. We serve the Nation independently, in coordination with other Federal agencies, and in partnership with fire protection and emergency service communities. With a commitment to excellence, we provide public education, training, technology, and data initiatives.

FEMA

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Seven Fatality Christmas Tree Fire
Canton, Michigan
December 1990

Local Contacts: Mel Paulun, Fire Chief
Art Winkel, Fire Marshal
Canton Fire Department
1150 South Canton Center Road
Canton, Michigan 48188

Robert Kerr, Police Officer
Canton Police Department
1150 South Canton Center Road
Canton, Michigan 48188

OVERVIEW

On December 22, 1990, at approximately 11:10 p.m., a Christmas tree fire originated in the family room of the Dell'Orco home. The father, in the family room at the time of the fire, made futile attempts to remove the burning tree from the house. The mother called the fire department and removed one child. They escaped, with injuries. She tried to re-enter the home but could not because of heavy smoke and heat. The father abandoned the burning tree removal and attempted to rescue six of his children still in the home. The fire took the lives of the father and all six children.

A Christmas tree fire can develop and spread throughout an entire home almost instantaneously. In this fire, the tree was dry, and overheated or defective lights provided the ignition source. This fire reached overwhelming proportions at lightning speed and left the family helpless to survive.

SUMMARY OF KEY ISSUES

Issues	Comments
Cause of Fire	Electrical lights ignited Christmas tree.
Casualties	Seven dead: six children, four years to twelve years old, and one adult. Two injured: one child, age six, and one adult.
Smoke Detectors	Smoke detector installed, condition and operation unknown. Smoke detector not installed in new addition to home.
Home Fire Escape Plan	Unknown, No evidence family had one, or had practiced.
Evacuation of Home	Occupant tried to put tree outside prior to evacuation. Mother and father each re-entered house during fire. None of the children attempted window exit.
Open Bedroom Doors	All bedroom doors were left open.
Christmas Tree	The live tree was purchased one week before it was set up and it was set up one week before the fire. Tree was noticeably dry one day prior to the fire.
Christmas Tree Lights	Purchased in 1990, first time used. Subsequent to the fire other reports of defective light sets had been received by the Canton Police and Fire Departments.

BACKGROUND

The property involved was a single story ranch house constructed of wood frame with a brick veneer front. The house was approximately 10 years old and was originally a three-bedroom with attached garage. The house had one addition along the back that included a master bedroom, family room, bath, and deck. (See Appendix A for floor plan.)

The home was occupied by the Dell'Orco family which consisted of Martin (father), Debbie (mother), four sons, and five daughters. The ages of the children ranged from four to sixteen years. At the time of the fire the two oldest children were not at home.

The neighborhood in which the Dell'Orco family lived is described as middle-class with homes ranging in size from 1,000 to 2,000 square feet. The subdivision was developed within the past 10 years so most of the homes are fairly new.

Twenty-five years ago the population of Canton was approximately 6,000 and today the population exceeds 60,000. Canton is 36 square miles in size of which 50 percent is farm and vacant land, 40 percent residential, and 10 percent commercial and light industrial.

The Canton Fire Department operates two fire stations staffed by 33 career firefighters assigned to three shifts. Fire station one consists of seven on-duty firefighters staffing one pumper, one rescue squad, a tanker, and a command vehicle. Fire station two consists of four on-duty firefighters staffing one pumper and one rescue squad. The usual staffing per unit or apparatus is two firefighters.

The Canton Fire Department provides public fire safety education to the community through fire prevention week school programs, safety town, and visits to the fire station which are based on exit drills in the home (Operation EDITH). Canton Fire Department also sponsors an annual fire prevention poster contest through the local Chamber of Commerce. Prior to this fire Canton Fire Department decided to purchase a Children's Fire Safety House. This fire certainly points out the need for such a purchase.

The Canton Fire Department evolved from its 1950 volunteer beginning to a career department in 1972 which, at that time, had nine full-time personnel. The Canton Fire Department responds to approximately 2,500 emergency incidents per year of which two-thirds are rescues and less than five are working fires.

THE FIRE

On Saturday before Christmas, December 22, 1990, at 11:10 p.m., the Canton Public Safety Dispatch Center received an emergency phone call from a hysterical caller giving a partial address and a seething request for help that translated into "baby not breathing." The caller's address was identified via enhanced 9-1-1 and two police cars and a rescue squad were dispatched. Twenty-six seconds later a second caller reported a house fire on the same street. Two pumpers, another rescue squad, and command were dispatched. Seconds later the police officers arrived at the scene and reported a house totally engulfed in flames.

The police officers were greeted with bystanders screaming that children were still in the house. The police officers approached the burning structure but could not enter due to the intense heat and heavy smoke. Some 30 seconds later the fire rescue squad arrived and reported "structure fire – code red" and indicated heavy smoke and flames coming out the north, south, and east sides of the house and heavy smoke from the garage area and flames through the roof.

In the next few seconds, command and the first pumper arrived. The pumper laid hose going into the scene and attacked the fire at the front door with a single 1-3/4-inch line. The firefighters were drive back by intense heat and flames. A quick re-group and a second attack was attempted and access was made six feet into the burning structure. Additional fire units arrived, two more 1-3/4-inch lines were placed in operation, and the fire was brought under control.

After the fire, the bodies of six children and their father were located amongst the charred remnants of the home. A four-year-old boy was found within the remains of the family room where the Christmas tree had been. The body of a female child was found at the archway into the family room. Three more children were found in a heavily charred bedroom adjacent to the family room. Another child's body was found just a few feet inside the front bedroom window that he was last seen entering.

The fire was discovered by the father, who at the time was with the four-year-old boy in the family room. The rest of the children who were at home that evening were in bed. The mother was in the master bedroom, which was adjacent to the family room, when she heard what she thought was her husband, in an alarming voice, telling the four-year-old to "get away" or stop that. The mother entered the family room and saw the top of the Christmas tree on fire and her husband trying to pull the tree down in an effort to get it out of the house.

The mother went into the kitchen, grabbed the phone, left the house through the kitchen door and called for help, via 9-1-1, from the outside on the deck. The mother saw her six-year-old son come running out from his bedroom and she stepped back into the home and directed the boy to the outside.

The husband then directed the mother to get the four-year-old out boy out of the family room. The mother re-entered the home, but the six-year-old followed. She returned the six-year-old outside to a neighbor and tried to re-enter the home for the four-year-old boy but was unable to because of thick smoke.

The mother went to the front of the house to attempt entry. The front door had been locked for the night and entry was not possible. She then opened the overhead garage door and kicked in the garage access door to the kitchen. She could not enter the kitchen due to the presence of heavy smoke.

The mother grabbed a carpenter's clamp from the garage and began to break out the bedroom windows from outside the house. She was unable to reach anymore of her children.

The fire extensively consumed the combustible furnishings, home fixtures, and structural components throughout the family room, dining room, kitchen, garage, and attic.

CASUALTIES

At the time of the fire, two of the nine children were not at home. The mother and six-year-old son escaped. The father, who had originally escaped, died as a result of re-entering the burning structure. Six children died from smoke inhalation or burns.

Fire Deaths:

Martin Dell'Orco	Age 38	Father
Bonnie Dell'Orco	Age 12	Daughter
Sara Dell'Orco	Age 9	Daughter
Katie Dell'Orco	Age 8	Daughter
Megan Dell'Orco	Age 5	Twin Daughter
Michael Dell'Orco	Age 5	Twin Son
Robert Dell'Orco	Age 4	Son

Fire Injuries:

Debbie Dell'Orco	Age 36	Mother – treated and released
Adam Dell'Orco	Age 6	Son – injuries not documented

FIRE CAUSE AND SPREAD

This investigation was conducted through a team effort between the Canton Fire and Police Departments. The fire department focus was on the fire and related aspects of fire investigation. The police department focus was on witnesses, suspects and related aspects of criminal investigation. This team approach works very well for Canton Township.

The Canton Fire Department has determined the origin of this fire to be a Christmas tree located in the corner of the family room adjacent to the dining room. The suspected ignition source of the fire was overheated or defective Christmas tree lights that were purchased this year and used for the first time. A contributing factor to the quick fire development was the unusual dryness of the Christmas tree. The fire consumed all available combustibles within the family room.

The horizontal fire spread was from the family room to one bedroom, dining room, kitchen, and garage. The fire consumed most of the combustible material in its path. Factors that may have influ-

enced the horizontal fire spread could have been the wind direction and ventilation of the fire. The wind direction during the fire was not documented by the investigators but the predominate wind in this area is from the west. The fire was vented by the occupants in their attempts to remove the burning tree and the various rescue attempts that left doors and windows open.

The vertical fire spread was from the family room into the concealed attic space and then through the roof to the outside of the home. The fire spread into the attic space was through an attic fan penetration of the ceiling, which was located in the master bedroom hallway a few feet off the family room. The fire then vented to the outside along the roof ridge above the kitchen. The structural components of the concealed space, including roof and ceiling structure, were partially consumed by fire. The structural components at the point of outside ventilation were consumed by fire.

Smoke and heat damage to the home was extensive. The remaining three bedrooms and the two bathrooms on the first floor along with their contents were not penetrated by fire. These rooms received extensive smoke damage and some heat damage as evidenced by heavy soot and minor pyrolysis of interior finishes. The basement of the home received some smoke damage and extensive water damage. The fire loss to the home is estimated by the Canton Fire Department to be 100,000 dollars to the structure and an additional 50,000 dollars to the home contents.

ESCAPE ROUTES AND OCCUPANT ACTIONS

The evening of the 22nd of December, just prior to the fire occurrence, seven of the nine children were home with their mother and father. Six of the seven children were in bed and whether they were awake or not is unknown. One child and the father were in the family room awake. The mother was awake in the master bedroom.

When the fire occurred, the father attempted to remove the burning tree from the home. The mother left the master bedroom, entered the family room, proceeded through the dining room and into the kitchen and exited the home. The mother on her way through the kitchen grabbed the phone and called the fire department from the outside deck. Their six-year-old son left his bedroom and walked into the dining room where he was met by his mother, who had re-entered the house. The boy was taken to the outside deck via the kitchen. The exact location of the remaining children was unknown, except for the four-year-old boy in the family room. The father re-entered the home via a front bedroom window.

The fire was extinguished by the Canton Fire Department and the bodies of the six children and the father were located. The body of the four-year-old boy was found in the family room, he apparently could not escape or did not know what to do. One child's body was found at the juncture of the master bedroom hallway and the family room, this child apparently left the bedroom and moved toward the fire.

Three of the children's bodies were found in the fire-consumed bedroom. One was located under the bed. Another was located at roughly the center of the room and appeared to have been crawling toward the child who was under the bed. The third was located between the center of the bedroom and the doorway.

One child's body was found in a heavily smoked front bedroom. This body was located along the edge of the bed in a head down dangling position. Apparently this child, after becoming aware of the fire, did not have time to escape.

The father's body was found in the other heavily smoked front bedroom. His body was located just a few feet from the front window. It appears that he had not gone very far in his rescue attempt.

It seems apparent, for these children, that the only means of escape from this fire was through their bedroom windows. The fire developed and spread at a rate which did not allow for sufficient warning for use of the normal interior escape routes.

SMOKE DETECTORS

Information provided by the Canton Fire Department indicated that one smoke detector was found in the home during the scene investigation. The smoke detector was located in the original portion of the home and had been severely damaged by the fire. There was no indication that an additional smoke detector was installed in the home addition. Because of extensive damage, it could not be determined whether the smoke detector was operational or functioned during the fire.

IMPACT ON FIREFIGHTERS

"Never in the history of Canton Township has such a tragedy ever occurred. Fire personnel are greatly devastated by this occurrence," said Chief Paulun in his staff report. The Canton firefighters had department chaplains available to them at the fire scene and for some days after. Some of the firefighters received traumatic stress counseling through these chaplains. Additional counseling was made available through the Township Employee Assistance Program.

LESSONS LEARNED

1. **The immediate evacuation of a structure is of cardinal importance during a fire.**

   Critical evacuation time is lost when occupants attempt to extinguish a fire. The larger the number of occupants the longer it takes to evacuate. The less the occupants know about self-evacuation the longer it takes to evacuate. Evacuation should be the primary concern of the occupants during a fire.

2. **A valid home fire escape plan must exist and each family member should know exactly what to do and not to do during a fire.**

   The home fire escape plan must include sleeping with bedroom doors closed, a planned response to smoke detectors, checking the primary exit, escaping through the secondary exit, accountability and reporting a fire.

3. **The fire escape plan must be practiced continually so each family member can execute their escape with a high degree of success.**

   Fire does not allow enough time for errors. Life depends on the performance of both the individual and the structure. Each person must be capable of self evacuation. The small child and the infirm will need help and directions which will place additional evacuation burden on those responsible. In terms of structure performance, doors needed to be closed and latched, smoke detectors needed to work properly, and windows needed to open easily. If any of these elements are not at peek performance, the fire will overwhelm.

4. Christmas trees can pose an extreme fire hazard to the home.

Christmas trees should be checked daily and at the first sign of dryness be removed from the home. The drier the tree the greater the fire hazard.

5. Public fire safety education needs to be up-scaled.

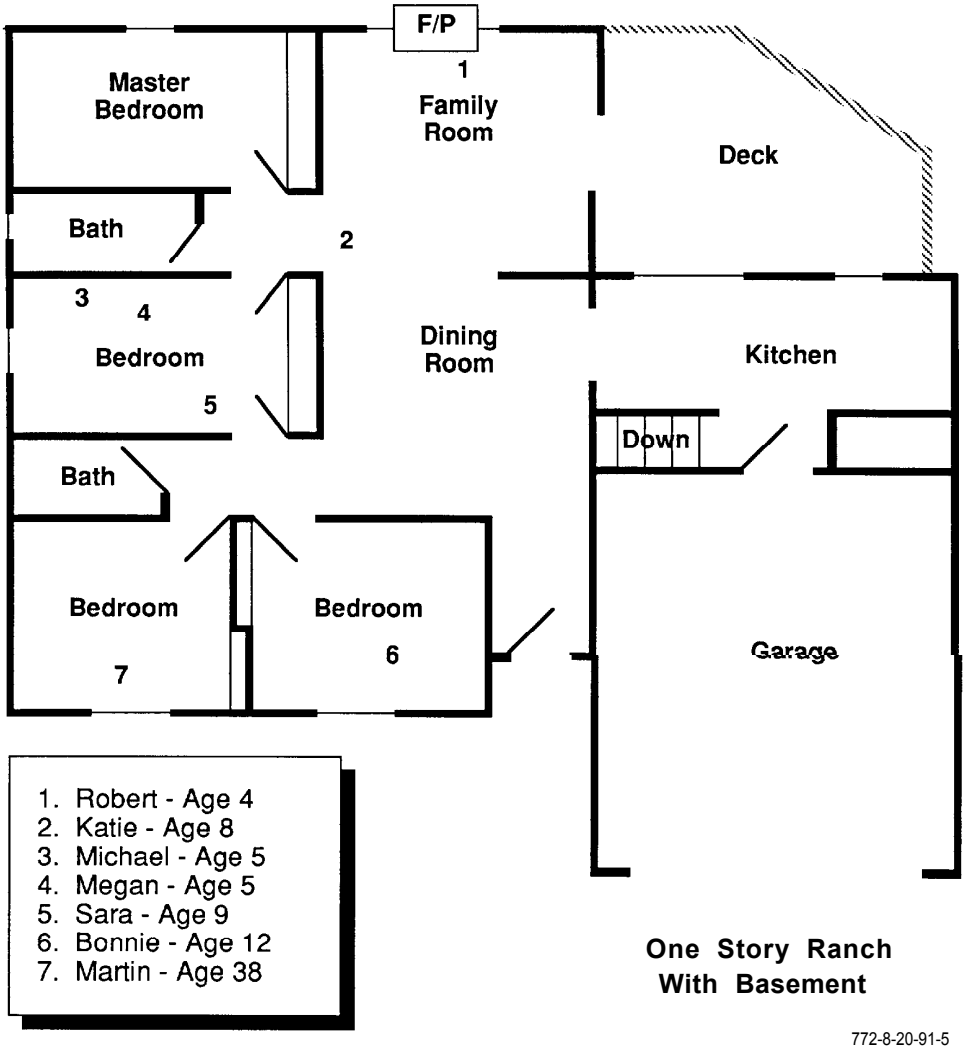
Fire departments should reach all school children at periodic intervals to teach and reinforce the fire safety behaviors necessary for successful home fire escape. Plan to Get Out Alive programs, Sesame Street, various school fire safety curricula and the more recent introduction of Children's Fire Safety Houses provide excellent ways of educating both children and their families.

APPENDIX A

Floor Plans Showing Fire Origin and Spread, and Location of Fire Victims

DELL'ORCO HOME

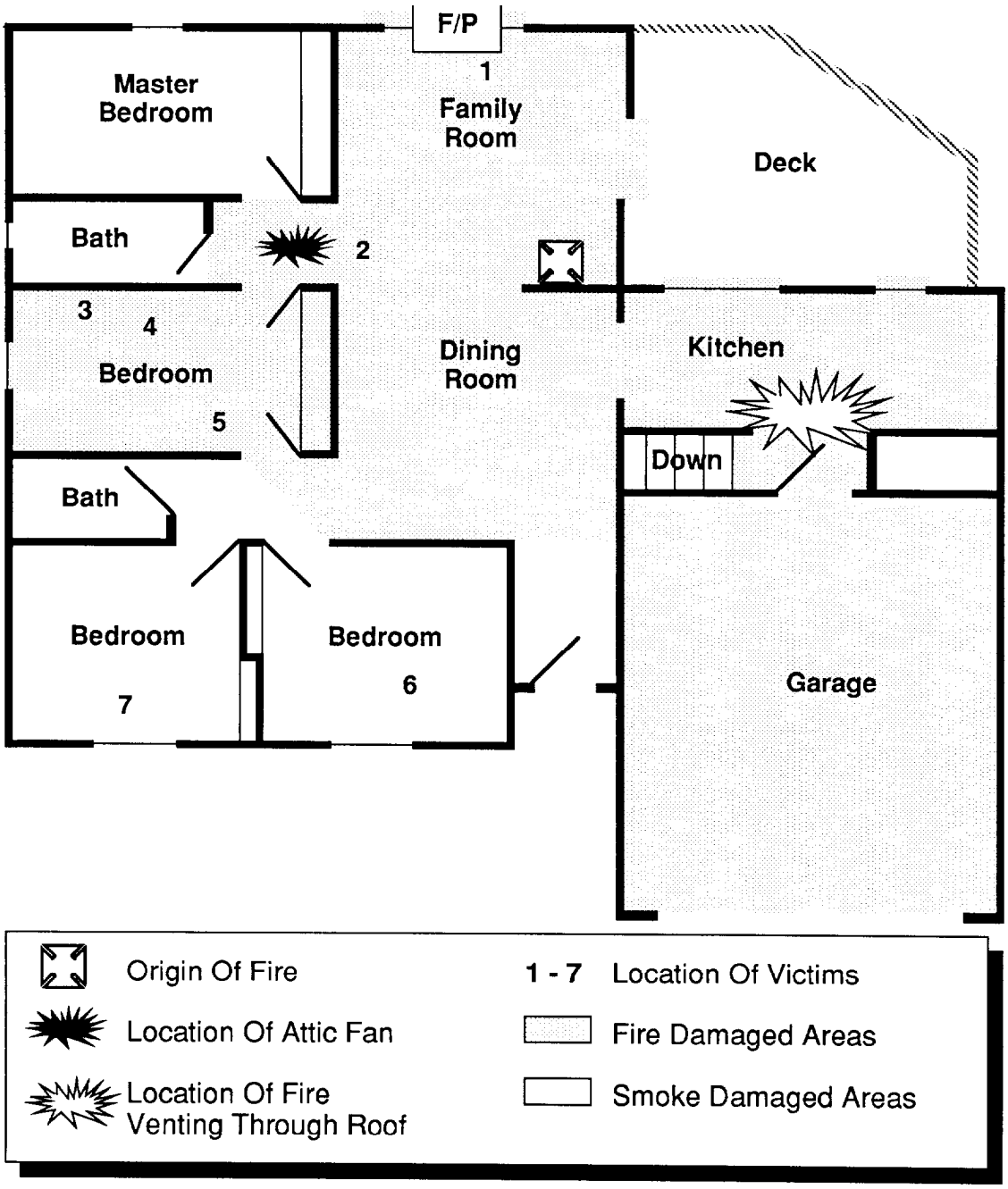
LOCATION OF VICTIMS



Appendix A (continued)

DELL'ORCO HOME

FIRE ORIGIN AND SPREAD



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APPENDIX B

Canton Fire Department Incident Report

PRELIMINARY INCIDENT REPORT — **CANTON TOWNSHIP FIRE DIVISION**

COMPLAINT NO. 2517-90

INCIDENT TYPE	FILE CLASS	GRID	DATE OCCURRED	TIME OCCURRED
Dwelling Fire	95010	NN00	12 / 22 / 90	2300 (estimate

LOCATION	RECEIVED	DISPATCHED	ARRIVED	CLEARED
43765 Proctor Rd., Canton. Mich. 48188	2312	2312	2313	0615

VICTIM'S NAME (LAST-FIRST-MIDDLE) SUPP ☐	RACE	SEX	D.O.B.	RESIDENCE PHONE	BUSINESS PHONE EXT
See Supplemental Reports				397-8379	

VICTIM'S ADDRESS	BUSINESS NAME & ADDRESS
43765 Proctor Rd. Canton, Mich. 48188	

REPORTING PERSON/WITNESS ☐	AGE	RESIDENCE ADDRESS	RESIDENCE PHONE	BUSINESS PHONE EXT
Multiple calls				

Lighting Condition: ☐ Day ☐ Dawn ☒ Night ☐ Dusk

Weather Condition: ☐ Clear ☐ Cloudy ☐ Rain ☐ Fog ☒ Sleet ☒ Snow

Scene: 1 ☐ Street or Hwy. 2 ☐ Gas Station 3 ☐ Conv. Store 4 ☐ Bank 5 ☐ Indust./Manuf. 6 ☐ Storage 7 ☐ Other Comm. 8 ☐ Public Bldg. 9 ☒ Single Res. 10 Other Res. 11 ☐ Aband. Struct.

CITY WATER YES ☒ NO ☐ — HYDRANT LOCATION: 120' West

NO. OF PERSONNEL RESPONDING: 9

NO. OF PERSONNEL CALLED BACK: 10

SUSP ☐ — Arson: 1 ☐ Structure 2 ☐ Motor Veh. 3 ☐ Other Mobile 4 ☐ Other Property

VEHICLE

MAKE	MODEL	YEAR	STATE	LICENSE	DAMAGED	INSURANCE COMPANY/LEIN HOLDER/BANK

NAME (LAST-FIRST-MIDDLE)	RACE	SEX	D.O.B.	AGE	PROPERTY TAG NO.	LOCATION PROPERT

ADDRESS	CITY	STATE	ZIP

STRUCTURE

STRUCTURE TYPE	OCCUPIED BY	VALUE	FIRE DAMAGE STRUCTURE
S.F.R. - 1 story	Owners	100,000.	$ 100,000

OWNER'S NAME	OWNER'S ADDRESS	FIRE DAMAGE CONTENTS
Dell'Orco, Martin & Deborah	S/A	$ 50,000

HOME PHONE	BUSINESS PHONE	BUSINESS	ADDRESS	PROPERTY TAG NO
397-8379				

EQUIPMENT

EQUIPMENT USED 017g-018g-021g-151g-158g-728g-880g-884g-951g-022r886r-154b-879b-852b-425r-72

EXTINGUISHER ☐ ___ SALVAGE COVERS ☐ ___ LIGHT PLANT ☒ ___ SMOKE EJECTOR ☒ ___ SQUAD ☒ ___

GROUND LADDERS ☒ ___ HYDRANT ☒ ___ TANKER ☐ ___ PUMPER ☒ ___ 1-1/2" ☒ ___ 2-1/2" ☒ ___

BOOSTER ☐ ___ MUTUAL AID ☐ ___ EDISON ☒ ___ GAS ☒ ___ P.D. ☒ ___ OTHER ___

NARRATIVE

ACTION TAKEN/PROBABLE ACT OR OMISSION

INVESTIGATION ☒ YES ☐ NO Rec'd report of a baby not breathing on initial report, a subsequent reported a Dwellin Fire at the same location from Central Dispatch . While enrou additional information stated children in the bldg. Upon arrival 1103 gave a condition "Rec Smoke and flames coming out the north and south and east side of house and heavy smoke from the garage area and flames through the roof.1102 laved a forward lay from the hydrant and proceeded to the fire bldg. A preconnected 1 and 3/4" line was stretched to the front door on the initial attack and could not make entry account heat and flame. Two firefighters wer forced back from the front doorway with fire around them. A second attack was initiated

REPORTING PERSON	I.D.#	O.I.C.	REVIEWED BY
Lt. Adams	-15- 017g	017g	15

Appendix B (continued)

SUPPLEMENTARY REPORT **TYPE OF INCIDENT**

CANTON FIRE DEPARTMENT PAGE NO. 1	Original Date 12/22/90	Incident No. 2517-90
	Date of Supplementary Report 12/23/90	File Class 95010

Narrative cont:

through the front doorway and entry was made to approximately 6' into the interior of the bldg. A second 1½" line was placed in operation with little effect and subsequently a thrid and fourth line (1½") were placed in operation and control was established on the fire. Spectators stated that numerous children and their father were in the bldg. Search procedures were initiated once firefighters could gain entry into structure and a total of six (6) children were found and one adult male after a through search of the bldg. all seven (7) had expired. A total of 10 personnel were called in from off duty including V-1, 1100, & 1106 and the Fire Investigation Team. Cause and Origin of the fire is being investigated by the Fire Investigation Team. Utilities and Board up crew notified along with Medical Examiner.

Reporting Officer	Reviewer
Lt. Adams -16-	

APPENDIX C

Photographs

Photographs are included with the master report at the USFA. These photographs were taken by James David two weeks after the fire. (Photographs taken by the Canton Police and Fire Departments were not available at the time of this investigation.) The items asterisked below are presented on the following pages.

*1. Front view of the Dell'Orco home, with evidence of fire venting through the garage door opening.

2. Front view of the home. Evidence of no fire venting through the front windows.

3. Front view of the home. Pile of fire debris removed from the home.

4. Front view of the home. Front entrance door.

*5. Front view of the home and exposure side two.

6. Exposure side two view of the home. Evidence of fire venting through the attic vent and the burned out bedroom.

*7. Rear view of the home, with no evidence of fire venting through the rear bedroom window.

8. Rear view of home. Evidence of fire venting through the fireplace window.

9. Front view of the home.

10. Front and exposure side four view of the home. Evidence of fire venting through the garage door opening and the attic vent.

11. Exposure side four view of the home.

12. Exposure side four view of the home. Evidence of fire venting attic vent and the roof above the kitchen.

*13. Rear deck. The French door opening to the family room is on the right, and the doorwall to the kitchen on the left.

14. Rear and exposure side four view of the home. Evidence of fire venting through the fireplace window.

15. Rear deck view of the home. Evidence of fire venting through the family room French door.

16. Rear deck view of the home. Evidence of fire venting through the kitchen doorwall and window.

17. Rear deck roof view of the home. Evidence of fire venting through the roof over the kitchen.

18. Front yard of the home. A memorial, placed by neighbors, to the deceased members of the Dell'Orco family.

*19. View of the neighborhood around the Dell'Orco home.

20. A neighborhood view.

Front view of the Dell'Orco home, with evidence of fire venting through the garage door opening.

Front view of the home and exposure side two.

Rear view of the home, with no evidence of fire venting through the rear bedroom window.

Rear deck. The French door opening to the family room is on the right, and the doorwall to the kitchen on the left.

View of the neighborhood around the Dell'Orco home.