Case Study Review
19211 Watkins Mill Road

Gas Leak with Catastrophic Explosion
June 15-16,1993

Presented by: Lieutenant Bill Bindl &
Battalion Chief Barry C. Reid

19211 Watkins Mill Road
June 16, 1993

Injuries

- 7 Firefighters
- 2 WGL Employees

Performance Objectives

The participants will review the actions taken at the incident presented in this Case Study Review in order to understand the decision making process and the problems that were encountered, and to improve their own command and control skills.

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Overview

- Rules of Engagement
- The Building
- The Exposures
- The Fire
- The Command Structure
- Problems Encountered
- Actions Taken
- Communications
- Lessons Learned

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Rules of Engagement

- Be respectful
- Be accurate
- Be honest
- Be brief (don't beat a dead horse, please)

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10 Common Fireground Errors

1. Failure to establish a water supply
2. Failure to provide adequate coverage
3. Failure to address the objectives
4. Failure to request assistance soon enough
5. Failure to provide back-up lines
6. Failure to use large flows for large fires
7. Failure to adequately ventilate
8. Failure to coordinate the interior attack
9. Failure to maintain accountability
10. Failure to assign a safety officer

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"13" Fireground Indiscretions

1. Lack of pre-incident knowledge and information
2. Most significant problem not identified
3. Inappropriate operational mode
4. No plan formulated and communicated
5. Insufficient personnel
6. Absence of "tactical accountability"
7. Span of control out of control
8. Nobody watching the clock
9. Poor fire-growth management
10. Insufficient GPM for BTU
11. Fire officers operating at task level
12. Random undisciplined communication
13. No regular, periodic situation reassessment

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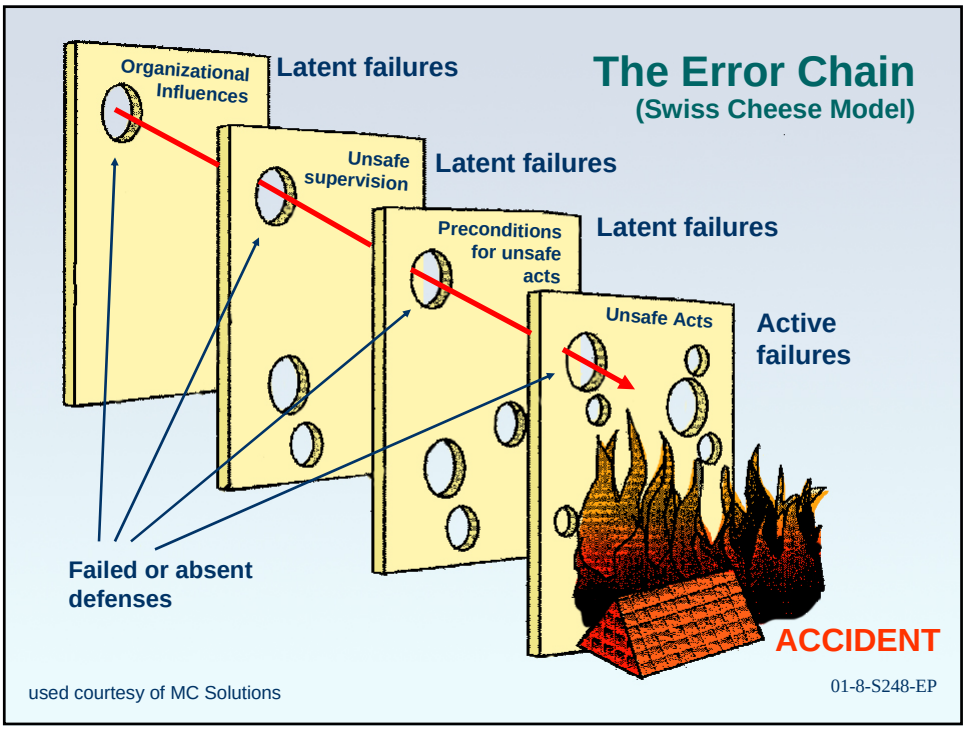
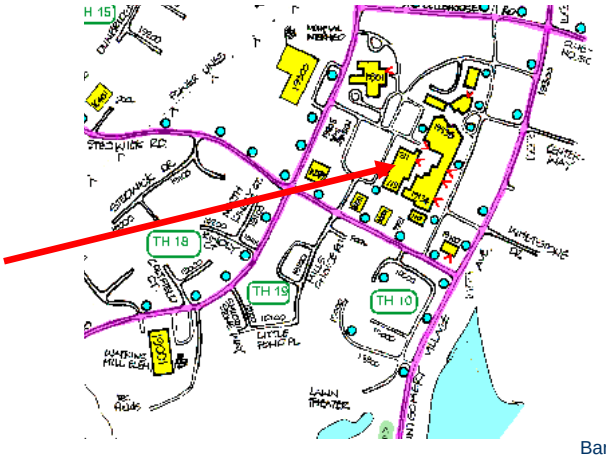


The Area



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The Building

- Strip Mall
- Anchor Store (Giant)
- Type 2 Construction
- Automatic Sprinklers

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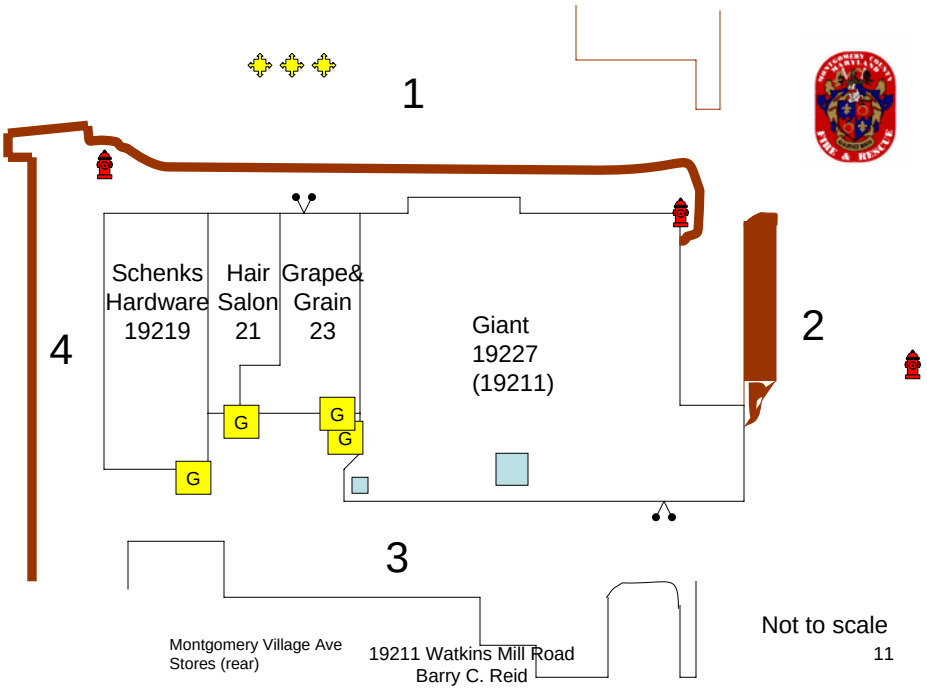

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1993 GIS Aerial Photo

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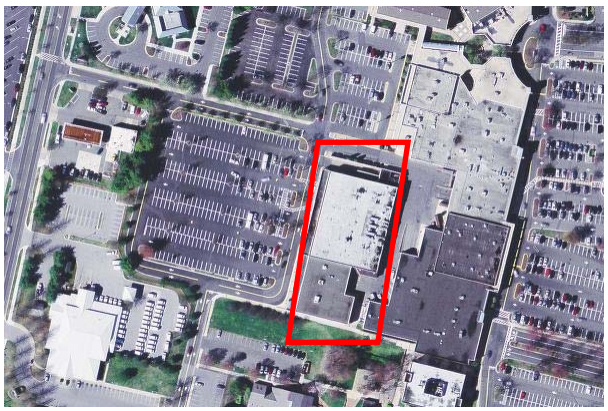
2006 Aerial Photo



Response

- Adaptive
  - E81
  - E281
  - T8
- 1st Alarm
  - E291
  - E171
  - E172*
  - T29
  - RS9
  - A88
- 2nd Alarm
  - E311
  - E31
  - E231
  - E131
  - T31
  - T3
  - M89
  - AR1
- Command
  - D8 (Strock)
  - C29 (May)
  - C29x1 (Dmuchowski)
- After Explosion
  - C8x2
  - C200 (McLaughlin)
  - U3 (Adams)
  - U33 (Rooney – EMS)
  - C205 (Bickham)
  - K85 (Chaplin Gene Cummins)
  - Mulhall

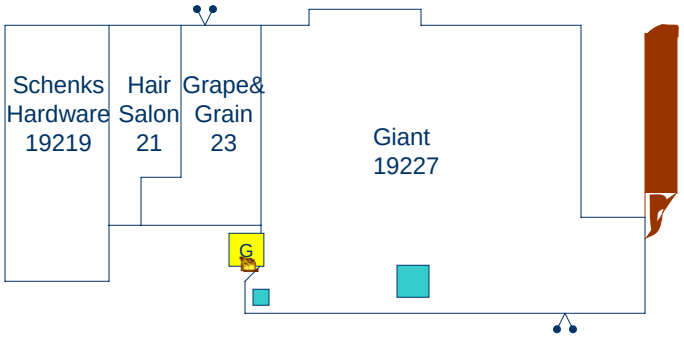
Exposures

- Side 1 (A) – None – Parking Lot
- Side 2 (B) – Commercial Building on the 2/3 corner across service road
- Side 3 (C) – Commercial structures addressed off of Montgomery Village Ave across common loading / service road.
- Side 4 (D) – Adjoining stores (19219-19223) Detached closest structure YMCA 10011 Stedwick Road

The Fire
23:11

- E81, E281 & T8 dispatched for odor of gas in the Giant Store.
- Found strong odor of gas in the store
- Exterior check found fire at the gas meter Side 4 Quadrant C
- Box Alarm Requested

The Fire



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The Fire 23:35

- Box Alarm 8-4 dispatched adding:
  - E291
  - E171
  - E172
  - T29
  - RS9
  - A88
  - Duty 8
  - Chief 29

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Initial Actions

- Command Established Side 1
  - Duty 8 (Captain Roger Strock) > CP
  - Chief 29 (Chief Mike May) > CP
  - Chief 29-1 (D/C Mike Dmuchowski) > Side 3
- Channel 3 assigned as the alternate channel
- A88 set up aide station
- Situation report given to command (Investigator, and Gas Co requested when box was requested)

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Initial Actions

- Plan was to protect areas around gas-fed fire (specifically, a wooden decorative structure above the brick wall) until arrival of Gas Company.
- T29 ordered to open roof (used scuttles and cut 4x4 hole)
- E291 directed to lay a line from the hydrant at the corner of sides 1 & 2 and advance a line in to the Giant to check for extension

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Initial Actions

- E291* did not lay out but carried out order – no extension found – crews came out.
- E171 completed a reverse lay later

* Note E134 (front mount pump similar to this photo) was running as E291.

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Initial Actions

- One of A88's crew members was directed to open up Exposure 4-1 (Beer & Wine) store and check for gas or extension – none found*.
- Giant was evacuated - other stores were closed.

* The beer store was checked with a Gas-Trac and frequently by firefighters who were using the store to move between the rear and front of the complex.

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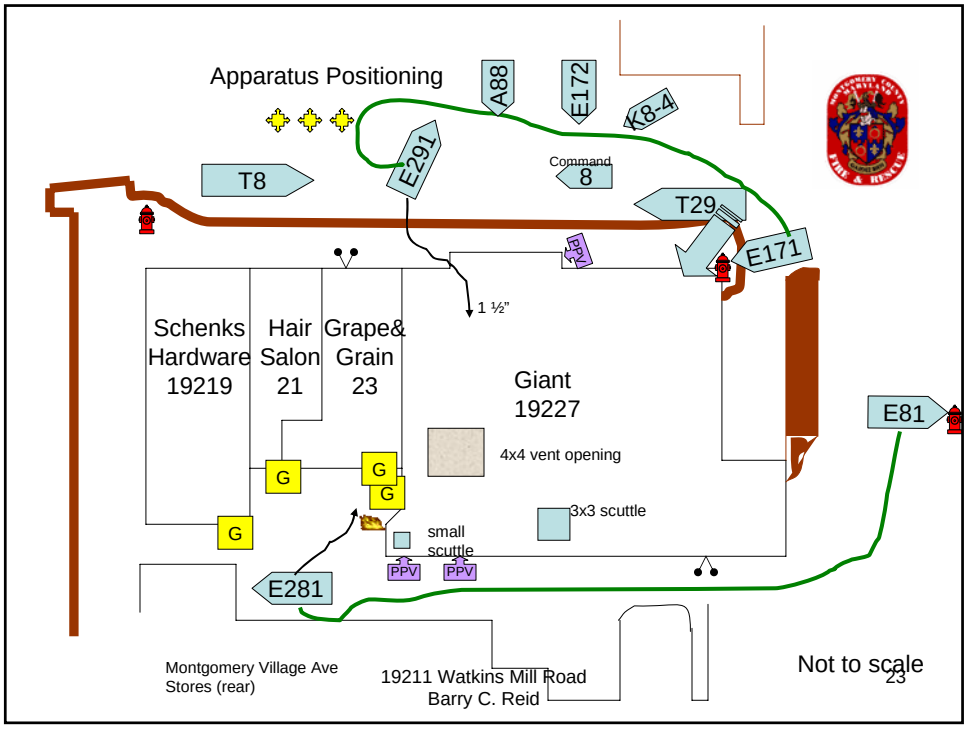

Gas Company Arrives

- At 00:01 Washington Gas arrives but has trouble finding the street valve.

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Continuing Actions

- At 00:15 T29 placed PPV fan at front door of Giant closest to Side 1 / 2.
- Additional fans later placed in rear
- At 00:25 T29 and RS9 entered the Giant in full PPE to displace ceiling tiles in an effort to clear the area above the suspended ceiling.

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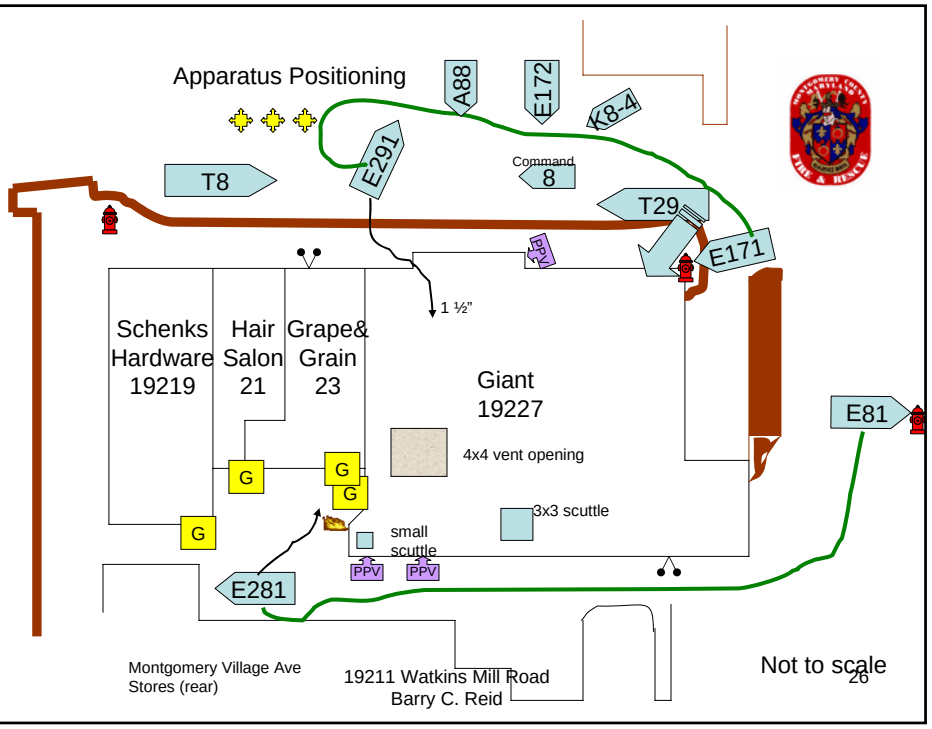

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Continuing Operations

- Command maintained contact with Side 3 throughout the incident
- At 00:37 Washington Gas had found the correct valve and began to shut it down.
- The fire began to go out

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Explosion

- Units in the rear remember hearing some popping and rumbling sounds and began to evacuate as the explosion occurred.

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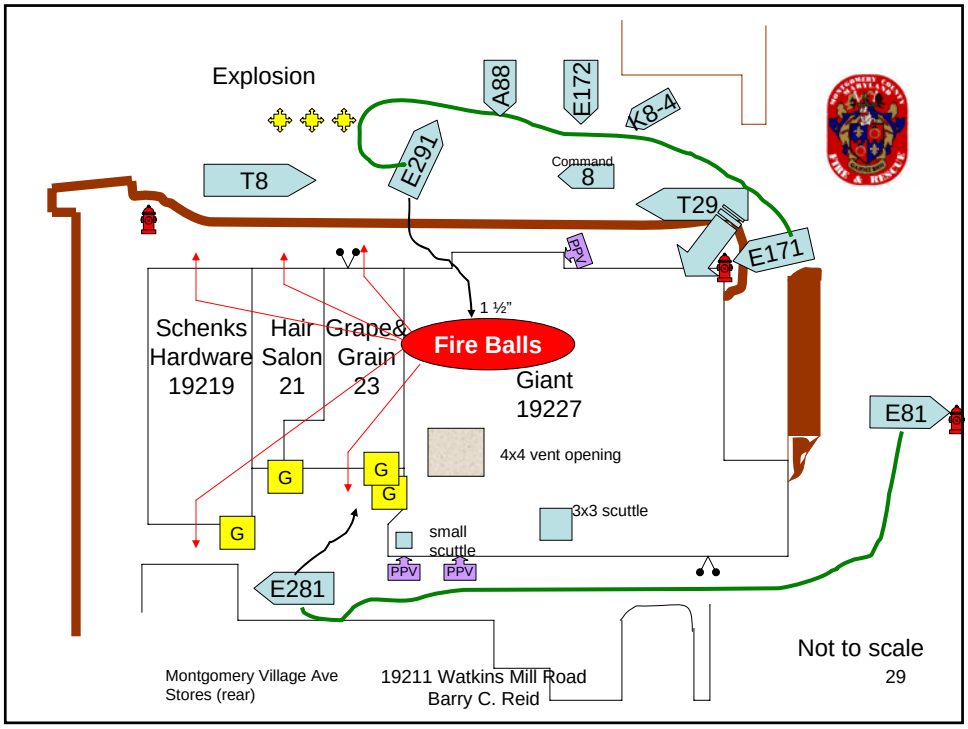
Explosion
A88
E172
K8-4
E291
Command
8
T8
T29
E171
1 ½"
Schenks Hardware 19219
Hair Salon 21
Grape& Grain 23
Fire Balls
Giant 19227
E81
4x4 vent opening
G
3x3 scuttle
small scuttle
PPV
E281
Not to scale
Montgomery Village Ave Stores (rear)
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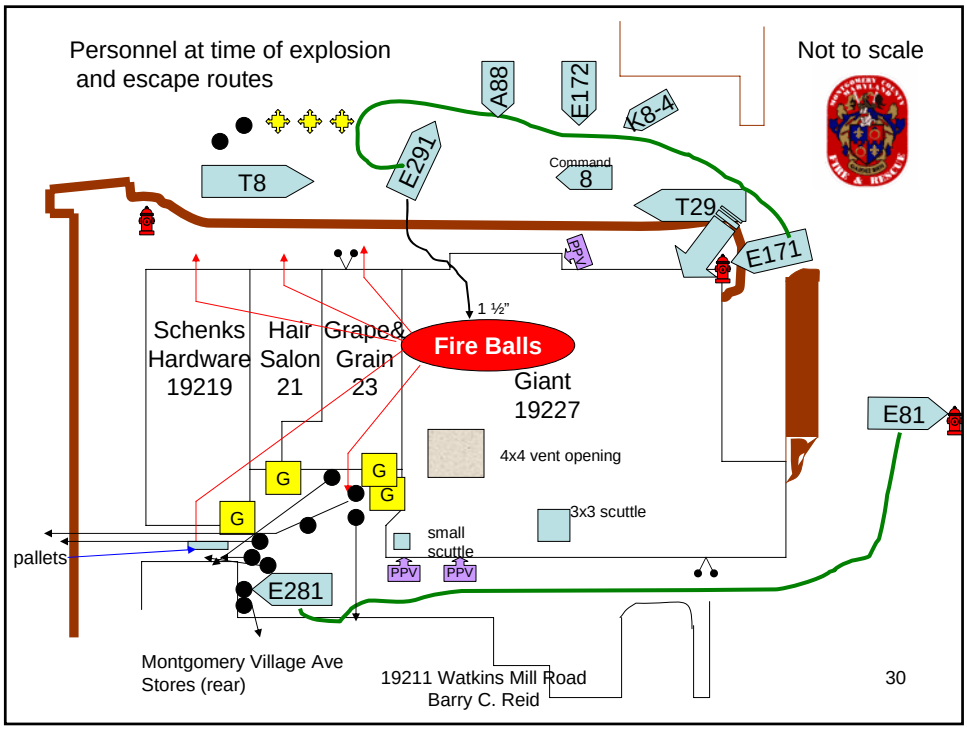
Personnel at time of explosion and escape routes
Not to scale
A88
E172
K8-4
E291
Command
8
T8
T29
E171
1 ½"
Schenks Hardware 19219
Hair Salon 21
Grape& Grain 23
Fire Balls
Giant 19227
E81
4x4 vent opening
G
3x3 scuttle
small scuttle
pallets
PPV
E281
Montgomery Village Ave Stores (rear)
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Truck 8 – Parked on Side One in front of the stores where explosion blew glass and debris approx. 200 feet into parking lot when the explosion happened.

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Side One of Grape & Grain Store – 19223 Watkins Mill Road

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Overview of Side One of stores affected by explosion. Note amount of debris that forcefully blew out front of stores.

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Overview of Side One of stores affected by explosion. Note amount of debris that forcefully blew out front of stores.

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Overhead view from top of Giant food showing Side 3 – Note walls at rear of hardware store – 19219 Watkins Mill Road – Walls posed significant post explosion collapse hazard

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Overhead roof shot from Giant showing damage to roof structure of the three stores involved. Note membrane roofing which moved due to stress of explosion.

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Area to right of center is rear of Grape & Grain – 19223 Watkins Mill Road – Gas leak & fire in corner to rear of that Store - note handline under debris

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Side 1 – 19223 Watkins Mill Road. Grape & Grain Store

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Side 3 – 19219, 21, 23 Watkins Mill Road – Giant Food store on right – injured firefighter/gas leak and fire found in corner Next to Giant – Note E281's handline under debris

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Side 4 of three stores involved in explosion

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Overhead view of area where some firefighters and one Washington Gas employee were operating at time of explosion. E281's handline was under the debris.

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Side one sidewalk area in front of store where explosion occurred.

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Side four – Hardware store wall

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Command Actions

- Second alarm requested
- Evacuation signal sounded
- Attempted to account for all personnel
- Channel 3 unreadable – ECC then assigned units to Channel 1 (repeated)
- T29 sent to Side 3 when command could not get a readable report from the area

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Command Actions

- Requested 3 BLS units and 1 ALS unit
- Established EMS Sector on Side 4 – YMCA parking lot
- Moved A88 and RS9 to EMS Sector for initial management
- Sgt Eileen Crittenden assigned EMS Sector Officer
- After repeated attempts to contact Side 3 – Captain Strock physically left the CP to check the welfare of crews. C29 remained at the CP

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Command Actions

- Moved crews and apparatus back from front of Giant
- Checked additional stores in surrounding area (Mall on Montgomery Village Ave, etc) – all found to be clear
- Command Bus Arrived – functions moved to same
- Rehab continued
- Port-a-potties ordered (extended operations)

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Command Actions

- FM's requested assistance from ATF
- Check of building continued throughout night – all remained clear.

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The Investigation
PPE/SCBA Survey

- Conducted by A/C Monte Fitch – District 5 & FF3 Richard Hoye (IAFF)
- Did not find any damage to gear being worn
- Found that some firefighters on Side 3 were not wearing the total protective envelope during the time hose lines were in operation.
- Injury data found cuts, bruises and abrasions – these may have been eliminated or less serious if full PPE was worn

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The Investigation
PPE/SCBA Survey

- Two SCBA units surveyed – no damage.
- One injury may have been attributed to the pack (harness) when he fell (possibly causing rib fracture)
- *Personnel were located outside at the time of the explosion. Had a fireball been lower or if firefighters had been inside the building, the use of SCBA (breathing air) would have offered the necessary respiratory protection.*

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Post Incident Analysis
Recommendations (Strock)

1. In complicated operations, sectoring needs to be extensively used. Establish the safety sector as soon as possible, and continue to expand the command staff.
2. Apparatus positioning on gas leaks.
3. Verify Utility companies are en route
4. Properly check exposures to include all rooms void spaces and particularly cocklofts

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Post Incident Analysis Recommendations (Strock)

5. Put in a county-wide system for accountability
6. Number of personnel operating in danger area must be limited, strictly supervised, and monitored at all times
7. Enforce the protective clothing requirements at all times

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Post Incident Analysis Recommendations (Strock)

8. Move resting crews to a safe and quite location where they can remove PPE and relax
9. Officers must ensure orders are explicitly understood
10. Contain on-lookers (Police)
11. Get a police liaison in the CP on complex incidents

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Post Incident Analysis Recommendations (Strock)

12. A repeater system for Channel 3 is probably needed
13. Consider evacuation if gas can not be controlled quickly
14. Make sure someone is recording activity on an incident control board and knows the location of all crews.

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Post Incident Analysis Recommendations (Strock)

15. The incident commander should stay off the radio as much as possible and have an aide make the transmissions
16. Refresher training is needed on the Incident Command System. Some of the finer points are forgotten if not reviewed on a regular basis. For example, if a staging officer is not assigned, the first primary unit officer to arrive at the staging area will automatically become the staging officer

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Injury Investigation Team

- A/C Wm. Dennis McLaughlin (Team Leader)
- A/C Monte L. Fitch (Co-Leader)
- Capt. Dennis Urban (GWGFD)
- Lt. John Rooney (EMS Duty Officer)
- FFIII Richard Hoye (Local 1664)
- D/C Leslie D. Adams (ex-officio)

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Injury Investigation Team Recommendations

1. Develop and implement a uniform, countywide SOP for “Gas Leak Emergencies” to include sections on:
   - Proper placement of apparatus
   - Proper Ventilation Techniques
   - Properties of Natural Gas and Propane
   - Personnel Protection
   - Circumstances that warrant consideration of or dictate evacuation

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Injury Investigation Team Recommendations

1. Gas Policy (continued)
   - Checking of exposures, voids such as false ceilings
   - Determining/evaluating the level of hazard
   - General safety precautions
   - Personnel accountability, limiting possible exposure

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Injury Investigation Team Recommendations

1. Gas Policy (continued)
   - Proper use of detection equipment

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Injury Investigation Team Recommendations

2. Recommend that all Departments check preplans to ensure they include utility cutoffs, meters, etc. If they do not exist they should be developed as soon as possible. The IIT also recommends that all departments be required to develop accurate, uniform site plans and pre-plans for complex structures and that they be regularly updated.

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Injury Investigation Team Recommendations

3. Develop a standard format for inspection of personal protective equipment (PPE) and SCBA to conform with the needs of the IIT specified in P&P 812.

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Injury Investigation Team Recommendations

4. In such incidents where personnel are critically injured or several fire/rescue personnel are injured, a responsible person, preferably an EMS provider, should be designated to secure all PPE items used by the injured personnel for inspection by the IIT. SCBA bottle pressures of the injured should be noted immediately after the incident. If possible, gear should be bagged and tagged.

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Injury Investigation Team Recommendations

5. Install reflective name panels on the lower, back portion of all turn out coats.
6. Recommend that all station commanders verify that all gear is marked as required. Non-specific or non-existent gear markings made it difficult for the IIT to identify some gear.

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Injury Investigation Team Recommendations

7. Recommend that station officers have personnel don all protective gear to ensure that it fits properly and that personnel can readily move in their issued gear. Gear that does not fit properly, permitting rapid mobility, should be replaced.

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Injury Investigation Team Recommendations

8. The Bureau of Field Support Services should evaluate the reliability of Channel 3 communications for incident use.
9. Ensure that all primary units are equipped with gas detection equipment. For ease of operation, training, and maintenance, the units in use should be similar in design.

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Injury Investigation Team Recommendations

10. Recommend that consideration be given to using the third command officer responding on a box alarm as the Incident Safety Officer.
11. A standard form with basic questions to be asked of involved personnel should be developed to complement P&P 812.
12. Rehab areas should be located in a safe, distant area away from potential hazards, vehicles, etc. A defined policy and procedure should be developed to cover rehab.

Injury Investigation Team Recommendations

13. Command post staff should be expanded early to control all necessary functions. On such large scale incidents, the IC should consider Command Post security.

Injury Investigation Team Recommendations

14. Other involved agencies/companies should be requested to send a representative to the command post or designated location and have them remain until released. A problem occurred where the PEPCO rep showed up upon request (after some delay), turned off the power then left. He later had to be recalled to restore power to unaffected buildings (further delay). Police were present but did not have a rep at the CP to coordinate efforts.

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Injury Investigation Team Recommendations

15. All hazard areas should be clearly and distinctly marked using a defined method. Officers and personnel should be cognizant of the methods used and enforce keeping all personnel out of such areas until deemed safe.

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Injury Investigation Team Recommendations

16. Procedures and criteria are needed for the selection of, use and training of gas leak detection equipment. Strong consideration should be given to the provision and use of standard gas leak instrumentation for primary emergency vehicles in the county

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Injury Investigation Team Recommendations

17. Add additional procedures and detail to P&P 812 to cover
    - Impoundment of PPE
    - Examination procedures of PPE
    - Data to be maintained on PPE
    - Standard format for basis of statements of involved and witnesses
    - Consideration should be given to permitting the activation of an IIT periodically to review procedures and techniques of investigation, survey PPE, personnel accountability, etc

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Injury Investigation Team Recommendations

18. Current telephone lists for personnel and family contacts should be maintained on command units for all DFRS and corporation personnel.

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Review

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Questions or Comments?

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