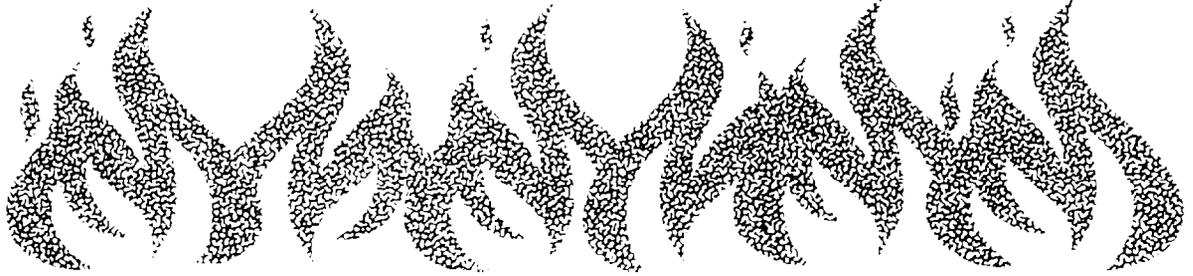


United States Fire Administration



Technical Report Series

Conservative Approach to Chemical Plant Fire Ventura County, California



Federal Emergency Management Agency



**United States Fire Administration
National Fire Data Center**

Conservative Approach to Chemical Plant Fire Ventura County, California (April 10, 1989)

Investigated by: J. Gordon Routley

**This is Report 029 of the Major Fires Investigation Project conducted
by TriData Corporation under contract EMW-88-C-2649 to the United
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Federal Emergency Management Agency



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U.S. Fire Administration Fire Investigations Program

The U.S. Fire Administration investigates selected major fires throughout the country. The fires investigated usually involve multiple deaths or a large loss of property. But the primary criteria for deciding to do an investigation is whether it will result in significant "lessons learned." In some cases these lessons bring to light new knowledge about fire -- the effects 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.

The investigation reports are sent to fire magazines and are distributed at national and regional fire meetings. The International Association of Fire Chiefs assists USFA in disseminating investigation findings throughout the fire service. On a continuing basis the reports are available on request from USFA.

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 sends an investigator into a community after a major incident only after having conferred with the local fire authorities to insure that USFA's assistance and presence would be supportive and 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 USFA's investigation report while it is in draft. The USFA investigator or investigation 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, 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 appreciates the cooperation received from the Ventura County, California Fire Department for this report. Particular thanks go to Chief Rand-Scott Coggan and Assistant Chief George E. Lund.

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Chemical Plant Fire
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Investigated by: J. Gordon Routley

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OVERVIEW

A fire in a chemical plant in Saticoy, California destroyed the plant and two adjoining occupancies and caused the community's 1,500 residents to be evacuated for 10 hours on April 10, 1989. Two firefighters were treated for exposure to toxic products, and 14 others were evaluated at a hospital for potential exposure. Clean-up and decontamination after the fire are expected to cost more than \$200,000, and involve removal of the entire contents of the plant and recovery of runoff and contaminated soil in the surrounding area.

The plant, which prepared chemical ingredients for pharmaceutical companies, had been the subject of legal actions resulting from efforts to enforce fire, building, and environmental health regulations. A fire inspector and a building safety inspector had been injured in an incident at the plant several months earlier when they were exposed to toxic products while conducting an inspection. After code enforcement actions had been initiated, the business and property owners had notified the Fire Department that its personnel would not be admitted without a warrant.

The Ventura County Fire Department took an extremely cautious approach to the incident, based on prior knowledge of the hazards inside the building. A policy directive had been issued to stay out of the building in the event of a fire, because of the known nature of the products involved.

SUMMARY OF KEY ISSUES

Issues	Comments
Hazardous Chemical Reporting	<p>Property had prior history of haz mat incidents.</p> <p>Business was notified to cease operations in building. Owners refused to admit inspectors without a warrant.</p> <p>Prefire plan was to keep firefighters out of building. Well-communicated knowledge of unknown hazard reduced casualties.</p>
Cause	Undetermined.
Wind Shift	Decon area rendered unusable by wind shift.
Water Runoff	Diking and use of minimum water for suppression helped minimize runoff.
Firefighter Health and Safety	Crews need guidance on proper protective ensembles for a combination fire and haz mat incident.
Incident Command	Worked well during fire, but need to consider turnover of haz mat scene to civilian agencies and need for point of contact for press after fire department leaves scene.

The incident presents a strong case for requiring reporting of hazards for chemical occupancies. It also demonstrates the difficulties that are often encountered in attempting to enforce hazardous materials code requirements. The injuries sustained by personnel operating at the scene were minor, particularly in view of the hazards that were encountered.

BACKGROUND

Saticoy is a small, unincorporated community in Ventura County, bordering on the City of Ventura, with a population estimated at 1,500. Saticoy has a sector that could be described as a "low grade" industrial district, with numerous small businesses, storage yards, and warehouses. Several occupancies in the area use or store hazardous materials.

Pacific Intermediates occupied two bays of a multi-tenant building in a private industrial complex. The single story structure was divided into 12 bays of approximately 800 square feet each. The building was of ordinary construction with block walls and a wood roof structure. The building contained no fixed fire protection systems and there were no special features for chemical storage.

The company stored and mixed chemicals which were used as ingredients in drugs manufactured by pharmaceutical companies. The production of these ingredients is not regulated by the Food and Drug Administration.

The building housed an estimated 300 different chemicals in quantities ranging from hundreds of gallons to a few ounces. The substances included flammable liquids, toxic products, water reactive and photo sensitive chemicals, heavy metals, and corrosives. The interior of the building was crowded with chemicals stored in 55 gallon drums and many types of smaller containers, along with mixing vats, glassware, and other equipment used to mix and prepare end products for shipment. Many of the containers were unlabelled.

Several drums were stored outside the building and in a storage container in the parking area. A metal fence behind the container was heavily corroded from vapors escaping from the container or the drums stored next to it.

Fire protection in Saticoy is provided by the Ventura County Fire Department, a career department that protects the unincorporated areas of the county and several incorporated cities. An engine company provides the first due response to Saticoy on automatic aid. Both the County and City Fire Departments have trained and equipped hazardous materials response teams.

Pacific Intermediates had provided information to the County Fire Department on the types of materials present on the premises, as required by California Hazard Communications regulations. The report included several items that were known to be present in bulk quantities, as well as a long list of small quantity chemicals. The information supplied would basically comply with the SARA reporting requirements.

The Ventura County Fire Department distributed copies of the information package to the first due battalion, initial response companies, and the Hazardous Incident Response Team. The Ventura City engine company that responds to the location received a copy from the Battalion Chief. A copy was retained at Fire Prevention to be transported to the scene of an incident by an inspector. All Hazard Communications documents are managed in a similar manner.

REGULATORY ACTIONS

Attempts to regulate the hazards at Pacific Intermediates began in August of 1987, when the local engine company made a referral to the Division of Fire Prevention, based on the chemical storage that was visible outside the building. Following an inspection by a Fire Prevention Inspector and consultation with a Building Safety Inspector, the business owners were notified that they could not carry on their nature of business

in the type of building they occupied. It was suggested that the company hire a consultant to make an assessment and advise them on appropriate actions. A Notice of Violation was issued early in 1988, when the owner failed to respond to the letter of notification.

The chemical company then hired a consultant who determined that it could not meet code requirements in its present premises and advised seeking a new site to relocate. In June of 1988 the owners made a verbal commitment to relocate within 6 to 12 months. The owners would not make this commitment in writing, and the Fire Department could not obtain a copy of the consultant's written report. In July, the Fire Department determined that the company had severed its relationship with the consultant and that the consultant's fee had not been paid.

On July 15, 1988, the Fire Inspector and a Building Safety Inspector visited the premises to determine if any corrective actions had been taken. While on the premises, they encountered a leaking drum of vinyl chloride which had been left outside the building, unlabelled, under a plastic sheet. Both inspectors had to be transported to an area hospital for treatment of respiratory distress resulting from this exposure, and the inspection turned into a 16 hour long hazardous materials incident. A private contractor had to be called in to safely remove the leaking container.

A second Notice of Violation was issued against Pacific Intermediates, and the Environmental Health and Planning Departments became involved in the case. Inspections by these agencies revealed several additional code violations relating to hazardous waste disposal and contamination of the area around the premises. The County Counsel was consulted, since it appeared that multiple violations were involved and the business was resisting enforcement efforts.

On October 21, 1988, the Fire Department received a letter from the business, asserting that the Fire Department lacked regulatory jurisdiction and claiming that previous inspections had been made in contravention of the owners' rights, as guaranteed by the Fourth Amendment. Similar letters were sent by the owners of the property and by another tenant who had been

cited for Fire Code violations. All claimed that they would deny access to any Fire Department representative who could not produce a warrant for entry.

After receiving this letter, the Fire Department issued a directive to companies to stay outside the Pacific Intermediates occupancy in the event of a fire or chemical emergency incident. This action was taken on the basis of unknown hazards within the occupancy and the denial of access for inspection or pre-fire planning.

With the active participation of the County Counsel, warrants were obtained and inspections were made by the Fire, Environmental Health, Building Safety, and Planning Departments. Formal charges were filed in late November, including 12 Fire Code violations, felony violations of the hazardous waste regulations, and other counts. The cases were still before the courts on the date of the fire, having been continued in court. On the day of the fire, the District Attorney had obtained a warrant for an additional inspection for environmental health requirements.

THE FIRE

At 1803 on Monday, April 10, 1989, the Ventura County Fire Department received a report of smoke coming from the Pacific Intermediates occupancy, from the proprietor of an adjoining business. A first alarm response of two engine companies, one ladder company, and a Battalion Chief was dispatched. The first arriving units reported smoke showing, and the HazMat teams from both Ventura County and Ventura City were requested, along with the inspector who had been managing the case. Entry was made to the adjoining occupancies to check for fire extension, but not into the chemical company.

The incident commander consulted with the HazMat teams and with the inspector to develop a plan of action. Three major concerns were addressed:

- Mixing of chemicals inside the building
- Airborne products of combustion
- Liquid runoff

A steady westerly wind of 7 to 8 mph was blowing the products of combustion into an unpopulated area, allowing operations to be set up on the west side of the building. After a detailed assessment of the situation, a decision was made to set up for a cautious entry from the upwind side, through the south adjoining occupancy, to stop extension in that direction. A decontamination area was established, and companies prepared to move in cautiously.

By the time the attack team was ready, the fire had vented through the roof of the building and was burning through the wall into the adjoining occupancy. The attack was initiated at 2030 and was successful in knocking down most of the visible fire in the Pacific Intermediates occupancy with a brief application of hose streams. As the situation appeared to be coming under control, the wind shifted, and the production of smoke and vapors increased dramatically. This made it necessary to abandon the established decon area and all of the equipment that had been assembled on the west side of the building. The attack teams were withdrawn quickly at 2058 and directed to a clear area.

With the decon area unusable, the attack team was gathered in a parking area to await decontamination. A considerable delay was encountered, during which time one of the company officers reported feeling ill and extremely fatigued. He was decontaminated with a hose stream and transported by ambulance to a hospital where he received treatment in a hyperbaric chamber. After decontamination, the remaining 14 members of the attack team and the property owner were transported to the hospital for evaluation. All of these individuals were tested and released, showing no symptoms of exposure injury.

The command post was rapidly relocated and a reassessment of the situation was made. The County Sheriff's representative was asked to begin evacuating the residential and business occupancies to the north at 2118. The evacuation took place in two phases, eventually involving 1,500

residents. Two additional HazMat teams were requested, from Santa Barbara and Los Angeles Counties, each responding from over 50 miles to the scene.

The fire became very spectacular as the large quantities of flammable liquids stored in the building became involved. Flames extended to the two occupancies north of the chemical company, and they were also totally destroyed. With most of the available fuel consumed, the fire died down at approximately 0200 hours. HazMat team members wearing B-level protective clothing over structural firefighting protective clothing made an entry into the fire area at that time to complete extinguishment.

Runoff from the fire was contained by diking the roads and parking lots around the building. In the process of diking, an additional Fire Department member reported symptoms of exposure to chemical vapors while assisting a backhoe operator. This member was also transported to the hospital and was released after evaluation.

The amount of water used by firefighters was held to a minimum, but a broken domestic water pipe added considerably to the runoff volume and to the concern with water reactive chemicals in the building. Hazardous waste contractors collected all of the liquid and contaminated soil after the site was turned over to Environmental Health authorities. Residents of the town were able to return to their homes at dawn, but several adjoining businesses remained inaccessible for several days.

Fire investigators were unable to determine the cause of the fire due to the total destruction of the area of origin.

LESSONS LEARNED

This incident provides emphasis for several important points that relate to incidents in hazardous materials occupancies and, in particular, to firefighter health and safety. It reinforced the three priority considerations for a hazardous materials incident:

1. Life Safety
2. Protection of the Environment
3. Protection of Property

Specific lessons learned include the following:

1. A fire department must be active in prevention, planning and information management to be prepared when a serious fire occurs.

In this fire, knowledge of the hazards involved was sufficient to keep firefighters out of the building and to reduce the risk of serious injury or exposure. The available information was managed well and proved to be extremely valuable. Although persistent efforts to enforce code requirements were unsuccessful, the Fire Department established that it tried to take the actions within its power to prevent this incident.

2. Access to reserves of specialized skills and equipment may be needed in a hazardous materials incident.

The availability of the inspector who had conducted code enforcement activities to respond to the incident proved very helpful to the incident commander. On the other hand, more trained decontamination personnel were needed, as well as a reserve of decontamination equipment and supplies. Assistance had to be requested from distant sources.

3. A finance officer should be assigned at incidents where the need for extensive accounting and cost recovery activities can be anticipated.

Several agencies and private sector organizations are currently involved in analyzing the financial outcome of this incident.

4. When evacuating an area, even businesses that appear to be closed need to be checked for occupants.

At least one occupant was found to have spent the night in an occupancy inside the immediate danger area, unaware of the fire. Also,

better perimeter control was needed to restrict access to the evacuated area and the area where operations were conducted.

5. The incident commander needs to develop a viable contingency plan, in case the primary plan proves unsuccessful.

A wind shift and a change in fire conditions made it necessary to abandon the original plan, relocate, and regroup. This process caused an excessive delay in decontaminating the entry team and could have had more severe consequences.

6. Procedures are needed to turn over control of the incident scene to other agencies after the Fire Department has completed its primary activities.

After the incident commander's function was terminated, there was no single source of information or direction with respect to the incident. A single post-incident point of contact is needed within the Fire Department, as well as clear identification of the agency assuming jurisdiction over the incident site. Other agencies involved in hazardous materials incidents are often not accustomed to assuming control of the scene in a structured manner.

7. Hazardous materials teams need guidance on the proper protective ensembles to wear when faced with a combination fire/chemical incident.

During the overhaul stage of this fire, the B-level protection over regular turnout clothing proved to be adequate. Normally, entry to this type of hazard would be made with A-level protection, but the current ensembles do not interface with fire protective clothing.

8. Safety officers and supervisors need to remain vigilant throughout every incident.

Extended duration incidents require constant observation by supervisors and safety officers to ensure that safety procedures are maintained.

APPENDICES

- A. Site Diagram, provided by Ventura County Fire Department.
- B. Photographs, provided by Ventura County Fire Department.

HAZ MAT & FIRE

