

Real People – Real Stories

Glenola, NC (Randolph County)



Exchange Project
BECAUSE OUR ENVIRONMENT AFFECTS OUR HEALTH

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**The Exchange Project
Department of Health Behavior and Health Education
The University of North Carolina at Chapel Hill
Campus Box # 7506
Chapel Hill, NC 27599-7506
Fax: (919) 966-7955
Email: exchange_project@unc.edu
<http://www.ExchangeProject.unc.edu>**

Significance of Case

In 1997, Trinity American Corporation, Inc., a foam and fiber manufacturer in Glenola, North Carolina, was closed by the state in response to evidence of air and groundwater contamination far exceeding regulatory standards. Community members had begun reporting health problems and noxious fumes in 1981, though local officials didn't initiate monitoring efforts until the mid-1990s. State and federal agencies tested ambient air and wells surrounding the company, issued several public health notices, and ultimately forced the plant to close. This case marked the first time a North Carolina Health Director formally declared a company a public health nuisance.

Community History

Glenola is an unincorporated community in Randolph County, North Carolina along US Route 311. High Point, the nearest city, approximately eight miles northwest of Glenola, is the ninth largest city in North Carolina with a population of 85,839 people (Leavenworth & Warrick, 1996b; United States Census Bureau, 2000a). High Point is known as the "home furnishings capital of the world" and hosts the International Furniture Market, the largest trade show in the industry, which draws more than 80,000 manufacturers, retailers and designers from around the world twice per year (Blackwelder, 2002; High Point University, n.d.; NeighborhoodFind.com, n.d.). More than fifty percent of all furniture made in the United States is manufactured within 200 miles of High Point (Blackwelder, 2002). Glenola's economy, like that of many communities in the area, is tied up in furniture manufacture.

Newspaper articles from 1996 estimated Glenola's population as approximately 500 residents.¹ According to these articles, Glenola comprises several dozen houses, two churches, a mobile home park, several factories, and tobacco fields. Williams Hardware² was described as the "unofficial center of the . . . community" (Frago, 2000; Leavenworth & Warrick, 1996b; McKay, 1997; YellowPages.com, n.d.). According to the 2000 US Census, approximately 97% of Glenola residents are white and 65% have at least a high school level of education. The median household income is \$39,934 (United States Census Bureau, 2000b).³ In 2000, Randolph County was ranked 51st out of more than 3,000 counties in the

¹ According to the US Census, Glenola is contained in Census Tract 313.01, Block Group 1, which had a population of 7,165 in 1990 and 6,978 in 2000 (United States Census Bureau, 2000b).

² Referred to as Williams Grocery in some newspaper articles, but listed as Williams Hardware in phone book.

³ Statistics for 2000 Census tract 313.01, Census block group 1.

nation for releasing cancer-causing chemicals into the air and water. Nearby High Point ranked 20th in carcinogens released among American cities from 1987–2000 (Banks, 2003b).

Manufacturing employs 16.3% of the Glenola residents; other large employment sectors include education, health and social services (16.8%) and professional, scientific, administrative, and waste management services (15.8%) (United States Census Bureau, 2000b). In 2003, *Entrepreneur Magazine* ranked nearby High Point thirty-second among all cities in the nation for starting small businesses (NeighborhoodFind.com, n.d.).

Hazard

Two Guilford businessmen founded Trinity American Corporation (TAC), the parent company of Trinity Foam and Trinity Fiber, in 1977.⁴ TAC purchased its 15-acre site⁵ from Thomasville Products, Inc., another company that manufactured foam. Thomasville Products had regularly dumped solvent waste onto the ground and had used parts of the property as a landfill (Agency for Toxic Substances and Disease Registry. Division of Health Assessment and Consultation, 1997; "Trinity American Corporation v. The United States Environmental Protection Agency," 1998).

"They told us [TAC] was going to be a real nice neighbor, a proper industry, a real asset to the community," recalled resident Lawson Deaton (Leavenworth & Warrick, 1996b). However, beginning in 1981 and throughout following years, numerous residents complained about fires, spills, noxious odors, and flurries of fiber particles to various health authorities. Other residents noted first becoming aware of a problem when two family dogs died after playing in a nearby creek (McKay, 1997). Over time, these residents noted several dead animals with similar symptoms (bleeding from the mouth and nose) and saw rusted barrels of chemicals in the creek (McKay, 1997).

"We'd get this real strong odor. . . . It smelled like burning electrical wire and sewage mixed up together or something. And, now, this would happen and we didn't really associate it with the plant for a long time. We just thought, you know, hey, maybe it's our septic tank or something like that. And then as we were sort of becoming aware of the problem, there were reports in the media."
– Community Member

⁴ TAC v. US EPA states that TAC purchased the land and built the foam plant in 1980. Another source says TAC started manufacturing foam in 1981 (Agency for Toxic Substances and Disease Registry. Division of Health Assessment and Consultation, 1997).

⁵ Another source said TAC owned a total of 23 acres, but leased out 15 acres to Guilford Fabricators. TAC may have initially leased its property, subleasing a portion to Guilford Fabricators, and then, in 1991, purchased the property and continued to lease a portion of it to Guilford Fabricators (Agency for Toxic Substances and Disease Registry. Division of Health Assessment and Consultation, 1997; Leavenworth & Warrick, 1996b; "Trinity American Corporation v. The United States Environmental Protection Agency," 1998).

TAC used several toxic chemicals to manufacture foam and fiber for the furniture industry. In 1987, an environmental group released a report naming TAC as one of the state's largest polluters of cancer-causing chemicals (Leavenworth & Warrick, 1996b).⁶ Two of the most dangerous chemicals TAC used were toluene diisocyanate (TDI) and methylene chloride. TAC reported using 90 pounds of TDI per year, an estimate considered low by state officials. TAC also reported releasing approximately 500,000 pounds of methylene chloride fumes into the air annually (Leavenworth & Warrick, 1996a, , 1996b).

Flexible polyurethane foam has been the cushioning material of choice for furniture manufacturers during the last forty years, replacing latex foam rubber because it is a more affordable and higher quality alternative (Ewing, 1997). The foam-making process for slabstock polyurethane foam entails mixing a resin with TDI and water to cause a heat-releasing reaction. This mixture is poured onto a moving conveyer belt to rise, expand and form long slabs of foam that are cut into desired sizes and shapes to cure (set and cool). During the curing process, fans blow gases from the reaction through stacks that direct the emissions into the air outside the plant (Agency for Toxic Substances and Disease Registry. Division of Health Assessment and Consultation, 1997; Ewing, 1997). In the 1970's, foam manufacturers began using auxiliary blowing agents to create softer, less dense foam. Foam manufacturers typically opted for the auxiliary blowing agent methylene chloride (Ewing, 1997).⁷ Additional advances in the foam industry in the 1990's, such as the "quick-cure process" which required the use of more TDI, further facilitated the mass production of foam (Centers for Disease Control, 1998).⁸

Health Concerns

The two chemicals used in foam production, methylene chloride and toluene diisocyanate (TDI), are both known to cause a variety of health ailments. Methylene chloride, or dichloromethane, is a "colorless liquid that has a mild sweet odor (United States Department of Health and Human Services. Agency for Toxic Substances and Disease Registry, 2001)." Exposure to methylene chloride may occur via skin contact or through drinking contaminated water, but it happens most often through breathing contaminated air. Short-term exposure to the chemical can cause dizziness, headaches, lack of coordination, skin and eye irritation, and respiratory difficulties (United States Department

⁶ Exchange Project was unable to find the referenced report or determine which environmental group published the claim.

⁷ Others such as acetone and liquid carbon dioxide could also be used.

⁸ Some residents said their symptoms worsened when TAC switched, in 1993, to the "quick-cure" foam-making method which controlled the reaction with air suction over the cooling slab but resulted in bursts of emissions releases (Darcey et al., 2002).

of Labor. Occupational Safety and Health Administration, 1998). Methylene chloride has been shown to cause cancer in laboratory animals (Leavenworth & Warrick, 1996b). Studies show an association between workplace exposure to methylene chloride and some types of cancer, and the Occupational Safety and Health Administration (OSHA) classifies methylene chloride as a potential carcinogen (United States Department of Labor. Occupational Safety and Health Administration, 1998). In 1998, the Environmental Protection Agency (EPA) finalized its Maximum Achievable Control Technology (MACT) standard and gave foam manufacturers two years to reduce methylene chloride emissions by mandating the use of specific processes and equipment (The Green Polymers Buyers Group, n.d.). In 2003, the EPA banned the use of methylene chloride in all flexible polyurethane foam fabrication facilities (Banks, 2003b; United States Environmental Protection Agency, 2003).

The other main chemical used in foam production, TDI, is a volatile liquid often found in paint ingredients. TDI is a severe irritant that affects the mucus membranes in eyes and respiratory tract. Exposure via inhalation can cause euphoria, muscle coordination and vision problems, various forms of asthma,⁹ other respiratory problems, and lung damage (Agency for Toxic Substances and Disease Registry, 1998; Leavenworth & Warrick, 1996a; United States

“When you start having this, when your eyes start burning and you start having a little trouble getting your breath, you know. And other people are complaining on the street about itches and rashes that never seem to go away. . . . We knew something was wrong. You know, when we had this bad air day and your eyes start burning and you just feel bad. It took a while to connect it.”
– Community Member

Department of Health and Human Services. Agency for Toxic Substances and Disease Registry, n.d.). Individuals may also develop sensitivity to TDI after exposure which causes them to experience symptoms such as asthmatic attacks when exposed to even small doses (Agency for Toxic Substances and Disease Registry, 1998; United States Department of Health and Human Services. Agency for Toxic Substances and Disease Registry, n.d.).¹⁰ TDI exposure can be symptomatic at small doses because the chemical is so readily absorbed into the lungs. Irritation may occur at TDI exposure levels of 0.02 parts per million (ppm) and sensitivity increases after repeated exposures (Darcey et al., 2002). TDI does not have a noticeable odor until approximately 2.1 ppm (Agency for Toxic Substances

⁹ The forms of asthma include reactive airways dysfunction syndrome and irritant-induced asthma, both of which occur after one day or less of exposure.

¹⁰ TDI antibody tests are used as biomarkers of exposure, but they are not reliable predictors of disease, as many individuals who are exposed to TDI and carry TDI antibodies remain asymptomatic. Also, many exposed workers who develop occupational asthma do not test positive for TDI antibodies (Agency for Toxic Substances and Disease Registry, 1998).

and Disease Registry, 2004). Consequently, odor does not provide sufficient warning of exposure levels. Although the state officials said an "acceptable level" for TDI would be 1 ppm, levels as high as 10 ppm were reached while TAC operated ("State says air quality improves following plant shutdown; workers protest," 1997).

Some residents reported a variety of symptoms they believed to be connected to the toxic chemicals used in TAC's manufacturing processes. The symptoms included irregular heartbeats, breathing problems, nausea, severe headaches, eye and nose irritation, sore throats, rashes, and coughing (Darcey et al., 2002; Leavenworth, 1996a; Leavenworth & Warrick, 1996a). The most consistent concern, however, was the fumes emitted from the plant. "The smell is overwhelming . . . a sweet, burning odor. You take a breath and you can feel it going into your system," said one resident, Barbara Fulcher (Leavenworth & Warrick, 1996b).

At least several community members felt the health and quality of life concerns were serious enough to justify moving (Darcey et al., 2002; "Foam operator says his plant is safe," 1997; Warrick, 1996). In 1997, one family moved at the recommendation of their pediatrician because their two-year old son, living with autism, cerebral palsy and mental retardation, continuously banged his head against the wall in response to his heightened sensitivity to odors ("Foam operator says his plant is safe," 1997). However, it was not feasible for other community members to move since they believed their Glenola property had devalued too much to be able to sell. When asked if he might relocate, one resident responded, "Would you buy my property? We're sitting on a Love Canal here" ("Trinity bedeviled by vapor concerns," 1996).

"All of a sudden, it was like the odors that we smelled became much stronger and were coming much more often. It was getting to the point it was hard to deal with. . . . I was starting to get sick. I was starting to lose weight. I was starting to have stomach problems. . . . We'd be walking and I'd get really nauseated, really sick, but I thought that the best thing I could do was to keep going. Well, after we did this for a while we thought, well, that odor, when that odor is the strongest is when we feel the worst."
- Community Member

Approximately eight¹¹ foam and fiber manufacturing plants similar to TAC existed throughout North Carolina in the 1990s. Except for TAC, the rest were located in industrial parks rather than residential areas ("Trinity bedeviled by vapor concerns," 1996). One official called the situation, "a human lab experiment with people living so close to the factory" (McKay, 1997). According to TAC's estimation, approximately 100 people lived within three-quarters of a mile of TAC's facilities and drank water from wells supplied by an

¹¹ Sources vary in their estimates between 7-9 similar factories.

aquifer that ran under TAC ("Trinity American Corporation v. The United States Environmental Protection Agency," 1998). Another source put the number of people living within 1 mile of the plant at 500 (Leavenworth & Warrick, 1996a).

Research & Monitoring

The state began monitoring toxic chemical levels in the air around TAC facilities in 1995 in response to resident complaints. Health inspectors measured TDI levels as high as 10 parts per million (ppm), ten times higher than acceptable levels, and methylene chloride levels thirty-eight times higher than federal standards (Leavenworth & Warrick, 1996b; "State says air quality improves following plant shutdown; workers protest," 1997; "Trinity bedeviled by vapor concerns," 1996). During one of these inspections, a health worker lost consciousness while walking through a visible cloud of vapor ("Trinity bedeviled by vapor concerns," 1996). In addition to the high levels of toxic chemical emissions measured in the ambient air, traces of chemicals¹² were also found in the groundwater (Warrick, 1996).

"You actually have this feeling, 'Okay, we've got people up here and we're paying taxes. And we've got the Division of Air Quality. We've got people looking after us. Like, they're monitoring this place; they're making sure that they do things the way they're supposed to. But come to find out it's on the honor system."
-Community Member

Governmental researchers conducted numerous studies and monitoring projects on TAC's emissions. In 1996, the North Carolina Division of Air Quality (NC DAQ) measured the average daily concentrations of chemicals surrounding TAC and found methylene chloride levels at 27 times and TDI levels at 206 times their relative acceptable ambient levels (AALs) (Darcey et al., 2002). That same year, however, the North Carolina Department of Environment, Health and Natural Resources (NC DEHNR) reported no "unusual or unexpected patterns (of cancer) around Trinity" (Darcey et al., 2002; "State health officials, foam plant agree on emissions reduction," 1997). In the fall of 1997, the US Agency for Toxic Substances and Disease Registry (ATSDR) and the Randolph County Health Department conducted a biological exposure investigation for TDI antibodies and found that 10 of 113 participating residents living within one-fourth mile of TAC facilities tested positive for the antibodies. Researchers concluded that seven of these individuals may have developed the antibodies as a result of exposure to the plant's emissions (Agency for Toxic Substances and Disease Registry, 1998; Darcey et al., 2002).

From June 1997 through March 1998, the NC DEHNR contracted with the Duke University Medical Center to conduct a case series of clinical evaluations of Glenola

¹² Source specifically mentions TDI, but it is not clear which other chemicals were found or if methylene chloride was one of them.

residents. Residents reported the following symptoms attributable to emissions exposure: mucosal and upper airway problems (95%), headaches (92%), lower airway symptoms (90%), and an unspecified number reported nausea, skin rash, dizziness and memory or concentration difficulties, anxiety and depression (Darcey et al., 2002). Tests also showed that 22%¹³ of subjects exhibited symptoms of reactive airway disease, a disorder similar to asthma, and two residents tested positive for TDI antibodies (Darcey et al., 2002). The study's final report concluded that "the environmental exposure evidence [of this study] . . . coupled with the ATSDR's environmental and biologic monitoring results and the findings of the clinical assessments, suggest that not only were the community residents exposed to TDI, but they also suffered adverse health effects and a decreased quality of life as a result of living near a polyurethane and fiber plant" (Darcey et al., 2002).

Regulatory Framework

According to at least one environmentalist at the time of TAC scrutiny, North Carolina's toxic emissions laws were insufficient, even though they were more stringent than other states' laws and federal regulations. The North Carolina Department of Environmental Management (NC DEM) is responsible for enforcing both state and federal toxic emissions laws; however, regulatory gaps allowed companies (e.g. TAC) that emitted highly toxic chemicals that are not precursors to ozone to escape the permit requirement (Leavenworth, 1996b). As a chairperson of the Sierra club said at the time, "North Carolina's air program is better than some states, but it was designed to be weak and it has gotten weaker with each attack by industry. . . . Basically, things have to reach a crisis situation before the state can act" (Leavenworth, 1996b). In the early 1990's, North Carolina had initiated a new air toxics program with "health-based" limits on industrial emissions that occurred below levels known to cause harm. OSHA and the National Institute for Occupational Safety and Health (NIOSH) set TDI exposure standards at 0.02 ppm in 1996 (Centers for Disease Control. National Institute for Occupational Safety and Health, 1996).¹⁴ Congress, however, only required that each industry use the "most effective technology available to reduce those emissions" and that rules be set for individual industries rather than emissions limits based on toxic chemicals' known potential for harm. Consequently, the EPA was faced with the task of writing regulations for each individual

¹³ Cited article states the prevalence of clinical hyperreactive airway disease was 8/38. Another source said that 19 of 20 subjects presented symptoms for reactive airway disease (Shiffer, 1997).

¹⁴ NIOSH specified this amount for any 10-minute period.

industry over the next decade and the state softened its regulations while waiting for the federal standards (Wireback, 1994).¹⁵

Response

State Response

State officials responded to TAC's polluting practices shortly after the company opened. In the 1980's, state regulators fined TAC \$6,000 for discharging a chromium solution, classified as hazardous waste, into a local creek without a permit ("Trinity American Corporation v. The United States Environmental Protection Agency," 1998). The North Carolina Department of Environment, Health and Natural Resources (NC DEHNR) also issued a warning to TAC for "improper storage of hazardous latex waste and fiber particles" and fined the company for dumping diesel fuel ("Trinity American Corporation v. The United States Environmental Protection Agency," 1998). In 1994, the state health department sampled water from two TAC wells and found toxic chemical contamination exceeding Environmental Protection Agency (EPA) standards.¹⁶ Further assessment demonstrated that TAC's own drinking water, water extending off the TAC site and the wells of a nearby business were also contaminated. In response, TAC provided bottled water for its employees, installed a new treatment system and suggested that the nearby business stop using its well ("Trinity American Corporation v. The United States Environmental Protection

"We . . . lit a fire under their butts to make them do something 'cause we had found out that they only responded to . . . the money that they get and . . . the people who helped put them and keep them in office. . . . I mean, you go, you talk to them and they don't look you in the eye. And they say all kinds of nice things, but they won't do anything unless you make them."

- Community Member

Agency," 1998). The county health department issued a "final notice" to TAC to stop improperly disposing sewage and waste water. However, when additional violations were discovered after the warning, no fines or penalties were issued to TAC and the company did not attempt to remedy the issues. It was not until several years later that the company, under an agreement with the state, agreed to reduce its pollution in exchange for being allowed to remain open ("Trinity American Corporation v. The United States Environmental Protection Agency," 1998).

¹⁵ TDI was one of 135 chemicals controlled by state air toxics regulations during the period in which TAC was being scrutinized, but it was not included in the federal Toxic Release Inventory and there were no established safe levels of exposures ("Trinity bedeviled by vapor concerns," 1996).

¹⁶ Chemicals found included dichloroethene and trichloroethene ("Appeals court upholds EPA order requiring Trinity to test wells," 1998)

Preston Howard, then Director of the North Carolina Department of Environmental Management (NC DEM), issued the state's first toxics call¹⁷ in 1995 after health officials found through monitoring that methylene chloride levels significantly exceeded established standards of safety. After the 1995 toxics call, legislative counsel for Glenola's state representative, then House Speaker Harold Brubaker (R), met with state officials to ask why TAC had not been warned in advance of the announcement.

Although Brubaker explained this meeting as a natural response to a "normal constituent request," campaign contributions from Trinity officers brought suspicion of his being partial to industry (Leavenworth & Warrick, 1996b). Community members reported having written to Representative Brubaker with their concerns for years without receiving any response (Leavenworth & Warrick, 1996b). One resident, Barbara Fulcher, expressed frustration that her representative

"We found out that the well we had all been on was horrible! . . . We were told, 'Before you get another water supply, if you shower, keep your bathroom window open and hold your breath. . . . It is dangerous to use your well water even to shower. But if you have to do it, until we can figure out something, you know, open your windows, hold your breath. Take a quick shower, okay?'"
-Community Resident

responded to TAC rather than community members, "It concerns me greatly that . . . you so quickly began to question the state's procedures in this matter while my voice and the voice of my neighbors seemed to be ignored" (Leavenworth & Warrick, 1996b).

TAC and its trade association, the Halogenated Solvents Industry Alliance, claimed that the state's toxics call unnecessarily alarmed the public. The company appealed the toxics call and initiated a study in response (Leavenworth & Warrick, 1996b). The NC DEM reacted to TAC's appeal by negotiating a settlement that required TAC to gradually cut emissions fifty percent by the end of 1996, install new foam manufacturing equipment not reliant on methylene chloride, and clean up tainted ground water around the facilities (Leavenworth & Warrick, 1996b).¹⁸ TAC reportedly considered the settlement a fair compromise, however some community members and health officials felt it would serve as inadequate protection against emissions known to cause serious health problems (Leavenworth, 1996b; Leavenworth & Warrick, 1996b).

¹⁷ The state Environmental Management Commission had created rules in 1989 that provided for "toxic calls" to mandate companies to either acquire permits and lower their pollution or conduct studies to demonstrate that their emissions levels are safe (Leavenworth, 1996b). One source mentions a December 1995 "health advisory" (Leavenworth & Warrick, 1996b) while another source mentions a 1995 "toxics call" (Leavenworth, 1996b), but it is not clear if this is the same announcement or if the toxics call was issued earlier in the year and the health advisory was announced in December. Most sources don't mention actions taken by the health department in 1995. Another source refers to four orders to abate a public nuisance 1995 - 1997 (Darcey et al., 2002).

¹⁸ Emissions are not specified in any of the articles (e.g. TDI or methylene chloride).

On April 4, 1996, just as the TAC settlement was nearing finalization, then State Health Director Ron Levine issued an "order of abatement of a public health nuisance" (Leavenworth & Warrick, 1996a). This order marked the first time North Carolina had ever declared a company a public health nuisance and it mandated that TAC cease "all manufacturing processes that could release TDI" (Leavenworth, 1996b). Under the order, TAC was required to establish and pay all costs related to a TDI monitoring system and was prohibited from using the chemical until it presented a plan for reducing emissions to a safe level.¹⁹ Though the state had previously monitored and found high levels of methylene chloride, it hadn't monitored toluene diisocyanate (TDI) levels around the plant because the tests were considered too expensive (Leavenworth & Warrick, 1996a). TAC was allowed to produce foam with TDI for one hour per day under close supervision shortly after the order of abatement. However, when tests then showed levels of TDI four times higher than the state standard, TAC President Jerry Drye, voluntarily closed the facilities for several weeks to install new smokestacks that vented emissions higher and dispersed them over a wider area (Warrick, 1996).

Several months after the order was issued, TAC was allowed to resume full production after installing blowers and 60-foot smokestacks. Glenola residents expressed concern that these additions would be ineffective, but the State Health Department said they were obliged to withdraw the order since its stated requirements had been met. One health official said, "We can always shut them down again" (Warrick, 1996). The NC DEHNR came to an agreement with TAC that would allow the company to remain open while addressing specified environmental problems, and the abatement of public nuisance order was officially withdrawn in January 1997 ("Health order withdrawn at foam-making plant," 1997).²⁰

In an attempt to address water quality concerns resulting from TAC chemical contamination, the NC General Assembly appropriated more than \$1 million to connect Glenola to the water line in Archdale, a nearby town, along US 311 in September 1996. Connection fees were to be waived for as many as 60 Glenola residents; however, Archdale officials informed Glenola residents that they needed the county commissioners or a county-wide water task force to request funds to connect the water lines to affected homes off the main road ("NC to extend water line to aid town with tainted water," 1996). The Archdale City Council rejected a plan to extend sewer lines to Glenola in 1997 ("City rejects sewer for

¹⁹ The order specified that, once the company presented such a plan, it would have a 90-day trial period to prove that concentrations would never exceed .07 parts per billion within 24 hours.

²⁰ It is unclear if this agreement is based on the April 1996 order or if another was issued. The article did not specify what environmental issues were to be addressed.

foam plant," 1997), but Glenola was able to secure money from the state to extend the water lines shortly thereafter (Community member, personal communication, 7/20/2006).

Federal Response

Federal health agencies also investigated the TAC facility, at the request of residents and state and local health officials. Residents had written complaints to the EPA since the 1980's and the Agency began to investigate TAC after the April 1996 order of abatement ("Trinity American Corporation v. The United States Environmental Protection Agency," 1998). In its investigation, the EPA discovered an additional compound of TDI (2,6-TDI) in TAC's emissions.²¹ Correcting their measurement to account for the new form of TDI resulted in exposure estimates that were twice as high as previously believed. Accordingly, TAC agreed to reduce concentrations within approximately two weeks ("State health officials, foam plant agree on emissions reduction," 1997). The EPA also discovered contamination in two neighboring wells ("Trinity American Corporation v. The United States Environmental Protection Agency," 1998). When residents petitioned for the involvement of the Agency for Toxic Substances and Disease Registry (ATSDR) in 1996, the agency initiated environmental monitoring and established a "call-in line" that received approximately 200 calls (Agency for Toxic Substances and Disease Registry, 2001). The NC DEHNR also requested that the National Institute of Occupational Safety and Health inspect the plant in June 1997, but TAC refused to grant them access ("Plant denies access to federal inspectors," 1997).²²

The EPA issued an emergency order under the Safe Drinking Water Act in July 1997, based on its own investigation. This order required TAC to test the groundwater of all residents within three-fourths of a mile of facilities and provide bottled water to households whose water fell below federal standards ("Trinity American Corporation v. The United States Environmental Protection Agency," 1998). Tests demonstrated that at least one household's water was contaminated with more than ten times the safe amount of dichloroethene.^{23, 24}

²¹ The previously recognized compound of TDI was 2,4-TDI.

²² Trinity Foam president Jerry Drye explained his decision, saying, "We have absolutely nothing to hide, but after a while, this gets ridiculous." Attorneys for Trinity wrote, "The proposed investigation would be an undue burden on Trinity's attempts to operate its business," and added "At such time as there is a valid legal basis for NIOSH's entry, Trinity would willingly assist NIOSH in its investigation" ("Plant denies access to federal inspectors," 1997).

²³ Dichloroethene is another chemical used frequently in industry that affects the central nervous system and has been classified as a possible carcinogen (United States Department of Health and Human Services. Agency for Toxic Substances and Disease Registry, 1995).

²⁴ The EPA explained its order on the basis that "it had consulted with the state and local government regarding the information upon which (the) Emergency Administration Order is based and the state did not intend to take the actions that EPA determined were necessary to protect the health of persons who consume or use water from the

In late August 1997, ATSDR issued a report saying that Trinity Fiber²⁵ presented “a public health and safety hazard to exposed community members” (“Glenola plant ordered to close,” 1997). It was the release of this report, in part, that motivated state health director Levine to order another halt to TAC fiber production, stating, “I hereby find and declare that Glenola operations of Trinity American Corporation are a public health nuisance” (“Glenola plant ordered to close,” 1997). Levine said he made his decision after reviewing reports issued by NC DEHNR and ATSDR (“Glenola plant ordered to close,” 1997; “State orders plant to stop production,” 1997). Under this order, though Trinity Foam would remain open, Trinity Fiber was to be closed September 3, 1997.²⁶

In response to ATSDR tests finding high levels of hydrocarbons in the surrounding air, the Randolph County Health Department recommended that 100 residents voluntarily evacuate their homes the night before the planned closure of Trinity Fiber (“Residents around plant leave after air-quality reading,” 1997; “Trinity’s Glenola operations shut down after possible hazardous emissions,” 1997). About 60 residents chose to evacuate and stay in a shelter established at the Archdale Recreation Center. “He told us it was a voluntary evacuation,” Taylor said, “but when a fireman knocks on your door at 5 a.m. wearing a breathing apparatus, I take heed and leave” (“Trinity’s Glenola operations shut down after possible hazardous emissions,” 1997).

“The day before this evacuation there were at least three people on this street who got sick and felt bad, and I was one of them. My next door neighbor was another; the guy down the street was another . . . and I didn’t put it all together until it all happened.”
– Community Member

TAC claimed that the late night evacuation was not necessary based on the findings of an engineering firm that the company had hired, which found emissions at acceptable levels (“Trinity foam workers fear layoffs after forced shutdowns,” 1997). However, later that same day, the State Health Director re-issued the original order of abatement, including Trinity Foam as well as Trinity Fiber in the shut-down. The order said the plants would remain closed until “the facilities can operate without creating a public health nuisance” (“Trinity’s Glenola operations shut down after possible hazardous emissions,” 1997).²⁷

contaminated portion of the bedrock aquifer (“Trinity American Corporation v. The United States Environmental Protection Agency,” 1998).” TAC said they would comply with the EPA’s order but insisted that the testing methods were flawed (“EPA orders Trinity to test wells for contamination,” 1997).

²⁵ The article referred only to the fiber plant.

²⁶ The plant would then be reopened shortly thereafter in order to test its emissions (“State orders plant to stop production,” 1997).

²⁷ Levine stated, “The health problems have continued despite efforts by the company to modify its processes. No scientifically plausible source of the health problems other than emissions of Trinity America Corporation has been identified (“Trinity’s Glenola operations shut down after possible hazardous emissions,” 1997).”

After the order of abatement, Drye announced, "As soon as that inventory runs off, we're totally out of business" ("Layoff notices could come Monday for workers at closed Trinity Foam," 1997). From 1992 to 1997, TAC claims to have spent \$2,000,000 on emissions monitoring, water treatment and regulation compliance efforts (Polyurethane Foam Association, n.d.). The company gave employees two days off to protest its closure, and seventy TAC workers traveled to Asheboro, the county seat, and the state capital in Raleigh. However, TAC remained closed (Shiffer, 1997; "Trinity foam workers fear layoffs after forced shutdowns," 1997).

Soon after the closure, additional reports reinforced potential hazards posed by the TAC facilities. A TAC employee called state officials and reported that he had been fired after a company doctor diagnosed him with occupational asthma ("State says air quality improves following plant shutdown; workers protest," 1997). Duke University researchers announced that 19 of the 20 residents in an earlier study showed symptoms of reactive airway disease, possibly the result of exposure to toxic emissions from TAC. TDI antibodies were also found in the blood of two residents (Shiffer, 1997). In response to a North Carolina Department of Health and Human Resources announcement that the first of two resident's blood contained TDI antibodies, Drye said, "I am sorry to learn that one of our neighbors apparently has TDI in his blood. The state never told us of this development. Had we known, we might have been able to take action to remedy the situation of the particular individual" ("Trinity foam workers fear layoffs after forced shutdowns," 1997). After TAC production stopped Dr. Stan Music, an employee of the state Division of Epidemiology, noted that the levels of TDI in the ambient air had decreased to as low as 0 - 0.8 ppm ("State says air quality improves following plant shutdown; workers protest," 1997).

"To the very end we cared about people's jobs; I care about people's jobs today, but I know they all got good jobs in safer environments than they were in here. You're talking about our *health*. You cannot compare health to jobs. You can go find you another job, but once your health is stolen from you, taken from you, it's gone, never to be replaced."
- Community Member

Approximately one month after the shut-down, the EPA issued an Administrative Order prohibiting TAC from manufacturing foam or fiber based on the Clean Air Act regulations ("EPA issues Emergency Order to prohibit manufacturing operations at Trinity American Corporation and Trinity Fibers of Carolina, Inc. of High Point, NC," 1997; "EPA joins state in ordering closing of Trinity American's plants," 1997). This was followed, after several weeks, with another order from ATSDR, stating that its investigation strongly suggested TAC had been emitting hazardous materials into the air (and possibly other

environmental media like water and soil) at dangerous levels. (Agency for Toxic Substances and Disease Registry. Division of Health Assessment and Consultation, 1997).²⁸

Community Member Responses

Community member complaints and government reprimands against Trinity American Corporation (TAC) began during the company's initial years of business when neighbors reported company workers who were burying chemical drums in a swampy area of TAC property. In the ensuing years, community members issued complaints regarding severe headaches, nausea, eye irritation, dizziness, noxious fumes and a visible haze caused by the TAC plant. Community members formed Glenola Citizens for a Healthy Environment in 1995. Originally, five women joined forces to distribute fliers and publicize their meetings, and group membership fluctuated from 5 to 30 people at any given time (Community member, personal communication, 7/20/2006).

"While the state was telling the company 'You have to clean up the groundwater,' in the meantime, we were being told we were crazy. So we organized the Glenola Citizens for a Healthy Environment. Every time they would tell us, 'Oh this is the truth' we would go and do our homework and say, that's a lie - *this* is the truth."
- Community Member

However, not all community members felt that TAC's operations posed a health threat or wanted to see the factory closed. Some community residents believed that those people issuing complaints about TAC were out for money or vengeance (McKay, 1997). One neighbor, who lived across from Trinity for twenty years, stated, "As far as I'm concerned, Jerry Drye [president of Trinity] is as good a neighbor as you can get. I think he's getting a bad rap" (McKay, 1997).

"It's stressful. It's like a civil war . . . a war of nerves in the community. It's about intimidation. You have to be ready to be looked at, and not be spoken to at church, at the grocery market, in the community. It is important to fight and take the risks, not just sit back."
- Community Member

Many employees at TAC also opposed what they perceived as unfair targeting of their company. TAC provided employment to 170 people (Leavenworth & Warrick, 1996b) and was considered to have well paying jobs (McKay, 1997). Jim Weaver, who worked at plant from

1980-1997, told newspapers, "We can prove that people aren't sick as a result of what we make. Look at us. We are in the product every day, and no one is sick" ("Layoff notices could come Monday for workers at closed Trinity Foam," 1997). Similarly, Roger Schaefer,

²⁸ An ATSDR spokeswoman explained that their "warning was issued as a precaution should the foam plant be allowed to reopen ("Third agency issues warning about plant," 1997)."

who worked for 10 years making foam, said, "If it was something bad, wouldn't it have affected us? I've worked dead in the chemicals and I've never been sick" (McKay, 1997).

After the plant closed in 1997, over 50 workers picketed the Randolph County Health Department to protest the closing ("Layoff notices could come Monday for workers at closed Trinity Foam," 1997). In reference to a 911 call from a Glenola resident that led to the town's temporary evacuation in 1997 (McKay, 1997), protesters called 911 to report high levels of volatile organic compounds outside of State Health Director Levine's office, stating that levels were four times as dangerous level as those outside the factory ("State says air quality improves following plant shutdown; workers protest," 1997).

Company Response

The management of TAC believed that it was the victim of a small group of vocal activists and political grand-standing on the part of state health officials. TAC President Jerry Drye said a year before the plant closing, "We are above the state limits [of methylene chloride] at our property line, but so are eight other foamers around the state. . . . Methylene chloride is the product of choice for our industry. It's something we have to use" (Leavenworth & Warrick, 1996b).

As the company found itself repeatedly cited for violations of regulations, Drye expressed his belief that the company had gone above and beyond state requirements. He told papers in 1997, "We have done everything we have been asked to do by the state and more so. . . . Still we are getting these sorts of readings. To be honest, I don't know what else to do" ("Residents around plant leave after air-quality reading," 1997).

Finally, when the plant was closed down, Drye portrayed TAC as a victim of political maneuvers and an industry-hostile state administration, saying, "I think this is a frightening time for business in North Carolina. . . when a company meets regulatory standards, signs written agreements to protect public health, spends \$2 million on improvements, and regulators still shut it down and force the layoff of 140 employees" ("EPA joins state in ordering closing of Trinity American's plants," 1997).

Legal Action

Several Glenola residents took their complaints against TAC to court. At least one of these suits, filed in 1995, was settled in 1998 (McKay, 1997; "One year later, health effects of emissions still unclear," 1998; Warrick, 1996). Another family filed a civil tort against the NC Industrial Commission in April 1997 for "not being tough enough on the company" (McKay, 1997). In 1999, a couple sued TAC and asked for more than \$20,000 in damages.

"Do you know why we launched a suit? The state of North Carolina, and I could tell you who said it, but I'm not going to, said 'to get our attention, sue us.' And this was a really high up person in the state that told us to do that."
-Community Member

The following year, the mediation hearing was cancelled and the parties settled (Reese, 2000).

TAC also pursued legal action to appeal the orders issued by state officials. In response to the December 1995 toxics call, TAC hired attorney Charles Case, of Hunton & Williams, a firm known for its representation of the chemical industry. Case appealed the toxics call on the grounds that the state lacked the information and authority necessary to issue such a call (Leavenworth, 1996b). TAC also appealed the 1996 abatement of public health nuisance order, arguing that the state hadn't demonstrated a link between TDI exposure and symptoms reported by community members. TAC hired two medical experts, including Frank Mitchell, a retired ATSDR medical officer, to look over the state's case memos. In an affidavit, Mitchell called the state's findings "neither good science nor proper regulatory practice" (Leavenworth, 1996c). A Randolph County judge temporarily blocked the State Health Director's order, but a Superior Court judge upheld the order, forcing TAC to cease use of TDI in foam production in 1997.

"What really disappointed me about it was this whole attitude that money is more important than human life. . . . We had the foam plant supporters, you know, trying to keep their jobs, and trying to protect the furniture industry in High Point, and we had other people saying, 'Hey, we've got a right to breathe, you know!' . . . I feel bad that their management couldn't run this plant in a way that could protect their jobs and we wouldn't have this problem!"
- Community Member

In a case argued in the Fourth Circuit of the federal Court of Appeals, TAC sued the EPA for its 1997 Emergency Executive Order that require the company to tests surrounding wells. TAC claimed that some of the contamination was the fault of the previous land occupant and that they had not been aware of Thomasville's polluting practices until 1993, so they could not be held accountable for the previous landowner's actions. TAC also argued that no evidence demonstrated that it had contributed to the contamination and that the EPA did not have the authority to supersede North Carolina's existing orders. The court was not persuaded and ruled to uphold the EPA order ("Trinity American Corporation v. The United States Environmental Protection Agency," 1998).

Current Status/Updates

- Trinity Foal and Fiber did not reopen. Another foam manufacturer, Future Foam of North Carolina (FFNC), located in a nearby industrial zone, purchased equipment from Trinity American Corporation (NC Department of Environmental and Natural Resources. Division of Air Quality, 1999). The Division of Air Quality (NC DAQ) and the City of High Point both reviewed plant plans and FFNC requested a public hearing on its permit. FFNC opted to use acetone rather than methylene chloride as its blowing agent and planned to control TDI emissions with carbon absorbers. "What we've done is, we've put a plant together that as far as urethane foam manufacturing plants go it's the most environmentally friendly one in the world. . . . We want to be good neighbors in High Point, and we will take every step we can to accomplish that goal," said Jerry Pool, FFNC Project Manager ("Iowa-based Future Foam plans High Point, NC production facility," 1999).

"Since they shut that thing [TAC] down, we've never had another bad air day."
-Community Member
- In December 1999, the NC DAQ gave four foam plants six months to submit plans for reducing their TDI emissions. This crackdown was likely tied to Trinity's closure (North Carolina Department of Environment and Natural Resources. Division of Air Quality, 1999; Raleigh, 1999).
- Even as Trinity was being closed, another North Carolina foam manufacturer was phasing out use of methylene chloride in all of their North Carolina plants, replacing it with acetone, a less hazardous substance that also appears to be 40% more efficient than methylene chloride (North Carolina Department of Environment and Natural Resources, 1998).
- Unemployment officials indicated that TAC workers found new jobs quickly after the last plant closure (Feinsilver, 1998).
- In July 2001, ATSDR released a report announcing findings based on interviews and diagnostic evaluations conducted from 1998 to 1999. The report indicated that 15-40% of children who grew up near TAC facilities developed asthma (Agency for Toxic Substances and Disease Registry, 2001).
- A study funded by the American Chemistry Council's Diisocyanates Panel²⁹ concluded in 2001 that "flawed methodology, including poor quality assurance and improper

²⁹ The American Chemistry Council's Diisocyanates Panel was formed in 1988 to monitor regulations associated with toluene diisocyanate (TDI) and methylene diphenyl diisocyanate (MDI). It lists as one of its accomplishments contributing information that led to EPA's removal of MDI from the Agency's proposed list of

interpretation of the data, may have led to improper conclusions and the inappropriate closing of the factory” (Levine, Redinger, & Robert, 2001). The American Chemistry Council is a lobbying group that represents and is funded by chemical companies that supply 90% of the chemical products used in the United States (Zuckerman, 2002-03).

- The North Carolina Division of Public Health, led by head investigator Dr. Ricky Langley, planned a new study in 2003 with 200 people living near foam factories throughout the state, building on the 1997 ATSDR study and attempting to determine whether residents have TDI antibodies in their blood (Banks, 2003a). In early 2007, this study was just getting underway (R. Langley, personal communication, 1/16/07).
- United Furniture Company, which makes upholstered furniture, is currently located at the site of the previous TAC facilities. In February 2005, the company excavated several truckloads of contaminated soil in order to build a new loading dock and piled the dirt at the edge of the stream (Wireback, 2005). Community members discovered the polluted soil after noticing a “strong scent of fuel” and discolored water in the creek, so the company took the dirt to Winston-Salem for decontamination. The company said it did not realize the soil was tainted. The contaminated soil is believed to have resulted from an underground tank used by TAC that had been removed years earlier (Wireback, 2005).

Acronyms

AAL	Acceptable Ambient Levels
ATSDR	Agency for Toxic Substances and Disease Registry
EPA	Environmental Protection Agency
MACT	Maximum Achievable Control Technology
NC DAQ	North Carolina Department of Air Quality
NC DEHNR	North Carolina Department of Environment, Health and Natural Resources
NC DEM	North Carolina Department of Environmental Management
NIOSH	National Institute for Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
TAC	Trinity American Corporation
TDI	Toluene diisocyanate

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