

Environmental Justice Mini Case Study:

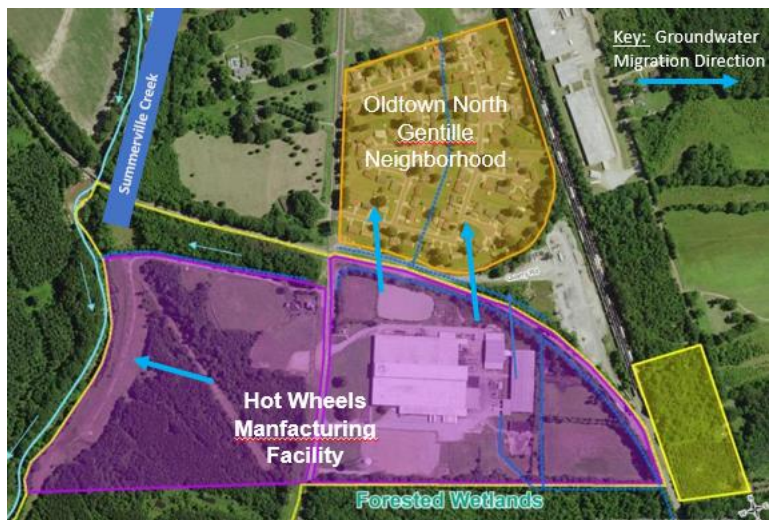
A Community-Engaged Approach for Evaluating Industrial Exposures in a Marginalized Community

Preface: It's strongly encouraged that the BtC students read this case study exercise in advance of the BtC conference. The 1-hour virtual exercise is planned for Day #2, April 21, 2020. The objective is to examine how exposure to adverse environmental factors can negatively impact children's health and to develop solutions to breaking this cycle to assure children have a more positive future. Each group of ~3 BtC students will be assigned the same environmental justice situation and will discuss and decide upon creative strategies to help achieve environmental justice. Afterwards, you will present to the larger group. The assignment begins on page 5.

This realistic-fiction exercise, uses characters, businesses, places, events, locales, and incidents in a largely fictitious manner; some aspects were taken from real-life events and modified.

Problem Overview

In Gentile County, state of Florolina, communities with low-income and minority demographics are near an industrial company, the Hot Wheels facility. Primary environmental challenges reported by the locals includes air, soil and water pollution as a result of this industry. To make matters worse with respect to cumulative impacts, a 40-year old coal-based power plant is located only 6-miles away and their air pollution (fine particulate, SOX, NOX, other pollutants) blows in the predominate wind direction towards Gentile.



Study Areas: TCE Vapor Intrusion

Community Demographics

The use of the EPA's EJSCREEN, an environmental justice mapping and screening tool was performed. The on-line tool (found at <https://ejscreen.epa.gov/mapper/>) is based upon nationally consistent data and an approach that combines environmental and demographic indicators in maps and reports. Using a 1.5-mile radius of the Gentile community which includes the communities at risk, as well as source of concern, the results are below:

SOURCE: EJSCREEN STANDARD REPORT							
Demographic Indicators	Value	State		EPA Region 11		USA	
		Avg %tile	Avg %tile	Avg %tile	Avg %tile	Avg %tile	Avg %tile
Minority Population	88%	40%	64	38%	72	39%	70
Low Income Population	60%	33%	71	37%	69	33%	67
Linguistically Isolated Population	20%	7%	75	3%	81	4%	82
Population with Less Than High School Education	30%	12%	70	13%	64	13%	69
Population under Age 5	14%	5%	72	6%	71	6%	71
Population over Age 64	25%	19%	75	16%	78	15%	79

The population of the target area is 8,000, which includes the fence-line communities, nearby communities nearby and the environmental source of concern. The EJSCREEN results show the minority and low-income populations (and other facts) are much higher than the state, the EPA Region 11 and USA averages and percentiles. Further demographic analysis tools have yielded the following: the two local census tract areas when averaged is 32% African American and 56% Hispanic (88% minority) and 12% Caucasian.

Community History and Background

The local companies provided a strong employment base for the area over the years for this mostly small town, but a 2015 hurricane wiped out many small businesses and homes. The local economy is now struggling. Recent data draws for the targeted area reveal that the community has an overwhelming unemployment rate that is three times the national average. Of those that have employment, 65% work in the low-paid agricultural or service sector and most lack benefits and full-time hours. The Hot Wheels facility has an employee-base that extends 75 miles away, however, does not include any fence-line or nearby community members. This has resulted in very low incomes within the greater community. More than a third of residents and more than half of all children live in poverty. In addition to pervasive poverty, residents of the targeted greater Gentile area are subjected to the highest crime rates in the state. According to 2018 FBI Uniform Crime Reporting Statistics, as reported to and published by state law enforcement, the crime rate per 100,000 population for Gentile is 6,025 whereas for the State, the crime rate is 2,565. Thus, the crime rate for Gentile, is more than double that of the state.

Adverse Community Health Concerns and Chemicals of Concern

Within the past year, after organizing the community into a non-profit group, two rounds of a door-to-door survey helped to identify, inventory and prioritize their highest health concerns, which they allege is related to the environmental sources of concern, they include: headaches, dizziness, nausea, asthma, infertility, miscarriage, birth defects and various cancers. To briefly summarize more of their research, working with environmental experts:

Environmental Source: Hot Wheels Facility (industry that used to conduct chrome plating of car wheel rims and has other current production lines).

Chemical of Concern: Trichloroethylene (TCE) (from contaminated groundwater below a neighborhood and a manufacturing plant, as well as surface water in a nearby creek).

Primary Exposure Routes: Vapor intrusion and air exposure routes affecting indoor air at residential homes, outdoor-ambient air and workers at the plant; additionally, exposures at a nearby creek are of concern (dermal exposure and fish consumption).

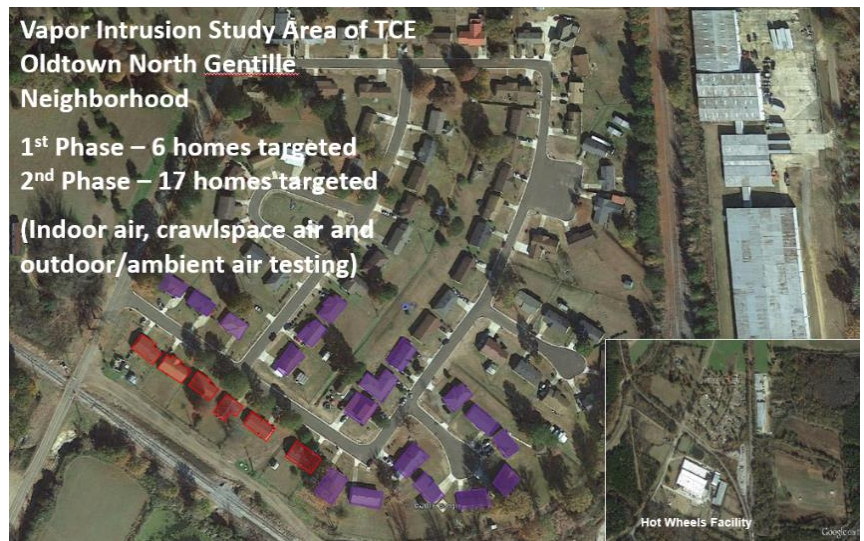
Sensitive/ Vulnerable Population and Effects: Women who are in the first trimester of pregnancy are most sensitive to TCE exposures. TCE exposures may increase the risk of heart malformations in the developing fetus. Human long-term exposures may increase an individual's risk of cancers of the kidney, liver and non-Hodgkin's lymphoma.

Primary Environmental Pollution Source of Concern

Hot Wheels Facility. This firm that formerly manufactured chrome wheel rims is now a metal stamping plant, making parts for cars and solar panels. During historic operations starting in 1970, spills and waste handling practices resulted in air, groundwater, surface water and soil contamination. The primary contaminant of concern (COC) is the solvent trichloroethene (TCE). The firm used TCE for its former chrome plating operation (as a degreaser) and due to supply line breaks (under the concrete factory floor to the exterior TCE storage tank in 1980), TCE has been found in groundwater beneath the plant. The Hot Wheels facility reported that the TCE-contaminated groundwater plume likely migrated outside the facility property, past the fence-line into the neighborhood only in the past year to EPA. However, there's initial evidence suggesting the plume likely has been extended there for the past 5 years.

At this time, the TCE contaminant in the groundwater aquifer (about 10-20 feet deep) has thus far radiated out about 1 mile from the site in the northern direction of an adjacent neighborhood (Oldtown North Gentile Neighborhood; farther neighborhoods may also be at risk).

Environmental regulatory officials have determined vapor intrusion is present, which is the process by which chemicals in soil or groundwater - especially Volatile Organic Compounds (VOCs), such as TCE - migrate upwards to the indoor air of buildings. Vapors may enter buildings by the path of least resistance, by any of a number of pathways including: cracks, seams, or openings in a building's concrete foundation or floor; or through the soil in a crawlspace up into a building above. Here at this



contaminated site, the air was found contaminated with TCE inside the manufacturing building, as well as in the adjacent North Gentile neighborhood's homes (of 100 homes, only 23 were tested so far). Levels of TCE have been found within indoor air of homes and the workplace, in the range of 6 – 90 $\mu\text{g}/\text{m}^3$. Note that the Risk Management Level (RML) for sensitive populations (women of child-bearing age) is 8.8 $\mu\text{g}/\text{m}^3$ and the RML for non-sensitive populations is 26.0 $\mu\text{g}/\text{m}^3$. Note that about forty percent (40%) of the nearby households and forty percent (40%) of the 350 workers working 24/7 shifts are young women of child-bearing age. EPA has ordered the responsible party, Hot Wheels, to pay for construction of vapor intrusion mitigation systems in all of the identified affected homes and the plant building ([refer](#)

[to website for more information](#)); full construction of those systems to depressurize, ventilate and reduce exposures is still about 6 months away. EPA officials conducting air monitoring in the outdoor air in the community have also found TCE detections above screening levels but below levels that require any emergency response actions. Additionally, the TCE-contaminated groundwater has migrated to a nearby stream and is daylighting (evaporating above ground) at nearby Summerville Creek. This creek is where children play, and many locals downstream depend upon subsistence fishing to feed their families. It is noted that groundwater from this aquifer is not a source for drinking water; the local area is on a city water supply system. Refer to [ATSDR Tox FAQs hazardous substance fact sheet on TCE](#).

Community Dynamics with Source of Concern

The community's tensions with the industrial sources of concern have risen over the past 10 years. The community has reported adverse community environmental health concerns to both the industry and the State/Federal regulatory officials, which ranges from birth defects in newborns and cancers in both children and adults. The relationship of the communities with the neighboring company is not strong, as exhibited by the fact the Hot Wheels facility: does not have a strong public relations presence; does not hold any emergency response drills with the community; does not hire locals within a 4-mile radius; and does not sponsor any Community Advisory Panels (as endorsed by industrial associations to promote dialogue between facilities and neighboring communities). The local citizens feel frustrated by the lack of transparency and responsiveness from the Hot Wheels facility; it is slowly regaining its trust with the federal and state regulated agencies about their environmental concern, thanks to some new enforcement actions. However, the locals have low trust with the local government after City Hall refused to hold special town meetings about environmental concerns and rebuffed citizens when they brought up the topic while attending City Council meetings.

Key Stakeholders

1. Community-Based or Supporting Groups and Individuals

● Rev. Ronnie Coleman – Local Leader - People Against Pollution (PAP)

As director of this grassroots organization that came together in the past year, the Reverend is very concerned for the health of the children and the adults of these environmental justice communities. He is upset about the lack of action by the city of Gentile and he desires faster progress from the regulatory agencies. Rev. Coleman has about 400 members that represent homeowners and workers. The Reverend is very emphatic that cancers, birth defects and other illnesses in the community have got to stop. He blames the City, the State and the EPA Region 11 Office for not preventing the TCE contamination and for not having stronger enforcement of environmental laws.

2. State and Federal Environmental Agencies

● Florolina State Department of Environmental Protection (FDEP) -- Barry Busbee - Commissioner

His organization believes that they have been very active in enforcing environmental laws in Gentile and expects the EPA will not find any discrimination in a recently filed EJ complaint months ago. He has several FDEP programs collaborating in an ongoing basis with the EPA program staff at the Hot Wheels facility; these efforts will be designed to assess, remediate, mitigate and prevent pollution. The state has been delegated some, but not all the federal environmental laws by the EPA. Due to recent water sampling findings that TCE is above

maximum contaminant levels (MCLs), the state issued a water contact advisory and a fact sheet for the lower segment of Summerville Creek (i.e., people are advised to avoid swimming, wading, drinking, fishing or eating fish from these waters).

● **U.S. Environmental Protection Agency Region 11 Office (covers 4 states, including the state of Florida) -- Daniel Champagne – Regional Administrator**

Mr. Champagne is the Senior Manager over the regional environmental programs that manage the federal aspects of laws over the local pollution concerns of Gentile. He is in charge over the Superfund program and the risk assessment program (involved at the Hot Wheels facility). In the past year, his staff have managed a series of independent environmental sampling events [i.e., groundwater, air monitoring (i.e., indoor, outdoor, crawlspace, sub-floor, soil-vapor), and surface water]. The contaminant of concern, TCE is subjected to [many regulations at the state and federal level](#). Mr. Champagne activated the community involvement coordinators inside the Superfund program and also environmental justice (EJ) staff to connect to and help the communities at-risk. The Region 11 office prides itself on its pursuit of EJ, so the top senior manager has put many “hands on deck” to address the issues in Gentile.

3. Local Government

● **Mayor Maria Roberts - City of Gentile**

The city feels that they have enforced the laws fairly and thinks that they have mediated well between the interests of the community and the industries. They point to the fact that one small recycling industry (i.e., which had many citizen complaints about pollution and noise) disbanded its operations when it failed to meet city pollution control standards. She hasn't let the citizens speak on this issue at City Council meetings in fear of offending the Hot Wheels industry, which means so much for the City's tax revenue, jobs and City reputation. Mayor Roberts has sat down with the community group and has attended only a few of their meetings.

4. Non-Profit Health-based Organization and Benefactor

● **Health First, Inc. (non-profit) and Billionaire-Benefactor Joe Dorsey (who grew up in Gentile and owns the Dunkin Bagel empire).**

The organization has just been activated upon request from the local group, PAP headed by Rev. Coleman. The Health First non-profit is dedicated to serving poor and minority EJ communities facing health disparities. It also has a children's environmental health focus. They have a team of experienced health specialists, which work closely with the local PAP community group, which includes the BtC students, to recommend various customized strategies and solutions to the EJ challenges at hand.

One of their key persons on their Board of Directors is Joe Dorsey, who made his fortune opening Dunkin Bagels shops across the country. Mr. Dorsey's desire is to help his hometown of Gentile by providing funding to help ameliorate the high incidence of adverse human health effects caused by environmental factors. Mr. Dorsey wants to disburse \$250,000 to address the problem, so that citizens can be better educated, collaborate and overcome their health disparities.

BtC Assignment Instructions

PREFACE: The impacted EJ communities of Gentile have decided to take power into their own hands. The bottom line is that it is in the best interests of the Hot Wheels industry and the residents of Gentile work together to control, remediate, prevent pollution and maintain jobs.

The new community groups have learned from more experienced EJ groups that it's better to have a relationship of goodwill and unity than one of antagonism and division. *At the current time, the Hot Wheels company, however, needs strong encouragement/persuasion to move in that direction; if not they could be subject to greater liabilities.* At this point in time, the community welcomes the opportunity to work with the non-profit Health First and you as a BtC student researcher.

ASSIGNMENT: Due to the time limitation, each BtC team should focus only on one of each of the three (3) Strategy sub-headers below and develop one environmental justice strategy (from the multiple choices). Keep in mind that the Health First non-profit has a donation of \$250,000 from billionaire, Joe Dorsey, to help your BtC efforts. Think of a logical strategy within your assigned category and how best to spend your money.

a. Strategy: Educate and Build Capacity of EJ Community and Key Stakeholders

1. Mobilize and educate your concerned citizens. The students should consider the challenges of mobilizing underserved, disadvantaged, low-income and minority citizens who are adversely affected: and recognize that many of them have more than one job to make ends meet, therefore, fitting in a meeting when they have limited personal time apart from their job and family responsibilities may be challenging. Think about your methods to perform outreach to get them more involved and educated about the issues and what is at stake (e.g., their children's health). Would you use radio, flyers, social media or other methods, and if so, what would be the messaging and educational goals? How would you best conduct targeted outreach about reducing household, workplace, outdoor and Summerville Creak exposures from TCE?

2. Educate and get the attention of the news media. The students should consider the challenges and strategies of how to get the local, regional or national news media involved. What would be the timing; would you want to phase heightened news media coverage? By you doing so, would it alienate the industry or state/federal government officials that you might be trying to collaborate with: How would you go about building a relationship with the news media? What facts would you present to them, considering solid facts are essential for them to carry your message? To both get in the news and mobilize your community, if you stage a protest at City Hall, the plant, or at the State Capitol, what would be the benefits and downsides?

b. Strategy: Collaborate

1. Try to Work it Out with the Individual Industries (polluters). The students should evaluate whether they (and the community groups) want to sit down at the table with their assigned industries in order to construct a positive, proactive vision of the future. Rather than fighting each other -- pouring time and resources into costly, energy-draining battles -- do they have a chance to work together to fight the common problems they share? How would you go about it? How would you artfully begin to build positive relationships with the industries, when the community groups and citizens feel so hurt? What would be the goals and expectations of this collaboration? What would be your "make or break" request to the industries?

2. Lobby the local public officials and elected state/federal representatives. The students should evaluate the benefits of lobbying and working with local/state/federal elected representatives. Is it worth your time? Discuss if letter writing or meeting with them worth your

precious time? Can they provide a strong strategic role to achieve environmental justice; if so, what would that look like? Consider the time frame and energy levels you'd have to invest to get them on board and on your side; is it worth the benefits, if you succeed?

3. Lobby the State and Federal Environmental Agencies to Intervene in Stronger Manner.

The students should evaluate the benefits of investing in building relationships with the key persons in the agency programs, who are driving the environmental assessments, enforcement and interventions. Should you leave them alone to do their own business? How should you interact with them (e.g., only call them; only email them; only meet with them when they visit the community; drive to their offices to meet with senior management or only program staff). Would you want to contact their Headquarters offices at the State Capitol or Washington, D.C. to get more local agency attention and priority placed on the environmental resolutions? What would be your purpose in collaborating with them? What kinds of input into their environmental decision-making do you want to share (e.g., sense of urgency, local survey of adverse health effects, or medical testing results, etc.)? What kinds of local research can you do to assist them or help prioritize their work? What would you hope to accomplish by collaborating with these environmental agency officials? How often would you request them to update the community on progress they're making and by what means?

4. Find allies with legal and scientific expertise. The students should consider what additional experts are you missing at this time. What kinds of experts would you get to provide pro-bono (volunteer) or paid services? Brainstorm on legal, medical and environmental experts you would want to enlist and how would you wish for them to participate? What kind of other EJ collaborators would you reach out to, to learn lessons from or get things done and why? Are there universities within the state that could lend expertise? How would you go about locating these experts, who may have worked with similar communities facing similar challenges?

c. Strategy: Interventions

1. Launch environmental exposure assessment of community members or medical testing to expand the evidence and outline potential health interventions. The students should evaluate what environmental and medical testing needs to be undertaken. Consider the potential exposures from the TCE from vapor intrusion at homes and the workplace, outdoor air, children interface with the TCE-contaminated Summerville Creek and the subsistence fish consumption habits from there. Evaluate what kind of key environmental and/or medical testing, toxicological surveys, etc. do you need to build the foundation of facts your team requires? Present your recommended strategies in a logical manner. Keep in mind that there is a contentious history between residents of Gentile and local government and health care systems. How might this affect the number of residents willing to participate in various intervention efforts? How might you overcome this hurdle and get citizens to cooperate? As needed, refer to the Appendix and these references: [PEHSU Fact Sheet on TCE](#); [ATSDR ToxGuide for TCE](#).

PRESENTATION

Each of the BtC break-out groups will report-out on their overall objective and how their selected strategies serve that purpose to reduce or prevent adverse environmental exposures negatively impacting children's health, and to help assure the children of Gentile have a brighter and positive future.

APPENDIX

For Use in Exposure Estimation or Clinical Assessment from Biomarkers:

Advantage(s): Confirms absorption into human body. Measures integrated exposure from all routes and all sources. Estimates personal/individual exposure and health indicators.

Disadvantages(s): Does not identify source of exposure. Sample collection may be invasive. Requires expensive laboratory analysis of samples. Most Expensive Approach – analyses can cost \$15-\$20 sample or \$1,000-\$2000 per sample.

1. Breath	<p>Exposure Assessment: Total internal dose for individuals or population (usually indicative of relatively recent exposures).</p> <p>Clinical Assessment: Potential indicators of chronic disease in severe cases (diabetes, kidney disease, liver failure). For TCE, needs to be taken right after an exposure.</p>
2. Blood	<p>Exposure Assessment: Total internal dose for individuals or population (may be indicative of either relatively recent exposures to fat-soluble organics or long-term body burden for metals).</p> <p>Clinical Assessment: Identify: heavy-metal poisoning; inflammation; cholesterol levels; hormone levels, cancers, diabetes, etc. For TCE, some blood profile indicators can indicate measures of kidney and liver function.</p>
3. Adipose	<p>Exposure Assessment: Total internal dose for individuals or population (usually indicative of long-term averages for fat-soluble organics).</p> <p>Clinical Assessment: Indicators of inflammation; obesity; cardiovascular diseases.</p>
4. Nails, Hair	<p>Exposure Assessment: Total internal dose for individuals or population (usually indicative of past internal exposure in weeks to months range; can sometimes be used to evaluate exposure patterns).</p> <p>Clinical Assessment: Indicators of trace elements (e.g., zinc, calcium) as predictors of chronic disease.</p>
5. Urine	<p>Exposure Assessment: Total internal dose for individuals or population (usually indicative of elimination rates); time from exposure to appearance in urine may depend on chemical.</p> <p>Clinical Assessment: Indicators of hormones; kidney disease; diabetes and inflammation.</p>

Table adapted from Environmental Epidemiology: Volume 2: Use of the Gray Literature and Other Data in Environmental Epidemiology. Yellow-Highlights = Possible Testing for TCE Exposures.