ABSTRACT

ODERA, MATILDA A. A Community-engaged Oral History Study as a Tool for Understanding Environmental Justice Aspects of Human Exposures to Hazardous Waste Thermal Treatment Emissions in Colfax, LA. (Under the direction of Dr. Jennifer Richmond-Bryant).

This study investigates environmental justice themes related to siting a hazardous waste treatment facility near a low-income community of color. Using oral history interviews, we investigated effects from living in proximity to a hazardous waste thermal treatment site through three aspects of environmental justice: recognitional, procedural, and distributive justice. The study involved the collection of oral history interviews from residents of Colfax, a town in Grant Parish, Louisiana which hosts an open burn/open detonation hazardous waste thermal treatment facility. The facility processes materials such as munitions, theme park waste, and contaminated soils from Superfund sites, and it increased its volume drastically in 2014. Local residents reported adverse health conditions and environmental exposures to air pollutants. We analyzed how the three themes of environmental justice emerged from the interviews using the NVivo coding software. We recorded narratives that described substantial changes around people's identity, health and social experiences following the facility's increase in operations. Some residents stated that the community had not been consulted when the facility was established in 1980 or when its operations were increased. Our study considers the just sustainability framework when analyzing how the community's social and environmental ecosystem has been disrupted by the facility's operations.

A Community-engaged Oral History Study as a Tool for Understanding Environmental Justice Aspects of Human Exposures to Hazardous Waste Thermal Treatment Emissions in Colfax, LA.

by
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DEDICATION

To all my teachers and everyone who's held my hand through my academic career. I have flourished on your belief in me.

BIOGRAPHY

Matilda Achieng' Odera was born in Busia, Kenya. After completing her schoolwork at St. Francis Rang'ala Girls' Secondary School in Siaya, Kenya, Matilda entered Meredith College, Raleigh, NC through a Zawadi Africa Education Fund scholarship and pursued a Bachelor of Arts in Environmental Sustainability and Bachelor of Science in Biology. During that time, Matilda completed summer internships at NC Sustainable Energy Association in Raleigh, NC and GreenMax Capital Advisors in Nairobi, Kenya and worked for Bowling Green State University. After graduating from Meredith College in 2018, Matilda worked for NC Museum of Natural Sciences as a citizen science specialist and later at Planned Parenthood South Atlantic as a training program coordinator. In January 2020, Matilda began the Natural Resources graduate program at North Carolina State University.

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I would like to thank my advisor, Dr. Jen Richmond-Bryant for her guidance throughout this process, my committee members for helping me with effectively structuring this study, Alyanna Wilson, Khushi Patel and Jessica Tran for their help with the research, and Sarah Slover and Dr. Shear for working with me on the administrative parts of maintaining my student status. I would also like to thank my teachers, family, friends, and guardians who've supported me through the journey that led me here.

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CHAPTER 1: INTRODUCTION

Studies across several decades have observed a disproportionate burden of solid and hazardous waste sites on low-income communities and communities of color (United Church of Christ 1987; Goldman 1993; Pulido 1996; Bell and Ebisu 2012; Konisky 2008; Perlin et al. 1999; GAO 1983). A pioneering environmental justice study by Bullard (1983) found that solid waste facilities were not distributed across the city of Houston but instead were concentrated within predominantly Black neighborhoods. Another study published in the same year by the GAO (1983) associated siting of hazardous waste facilities with predominantly Black and low-income communities. In a subsequent study of socioeconomic factors of populations living in close proximity to hazardous waste facilities, Been (1994) found that there was a disproportionate burden placed on predominantly low-income communities at the time of siting of hazardous waste facilities.

Agyeman (2008) developed the paradigm of just sustainability for considering the interconnectedness of environmental sustainability and social justice, beyond examining disparate impacts of environmental pollution. It is also a framework for policy that jointly supports both objectives. Just sustainability maintains that environmental sustainability and social justice are not independent of one another and that creating healthy, safe, and well-resourced communities necessitates affordable access to environmental benefits and addresses environmental injustice, a condition in which disparities in exposures to environmental threats persist (Agyeman 2008).

Environmental justice seeks to reform and execute environmental policies to eliminate inequitable distribution of environmental costs (Schlosberg 2007). It is comprised of three aspects: distributive justice, procedural justice, and recognitional justice (Agyeman 2008; Schlosberg 2007). Distributive justice occurs when exposures and health effects resulting from environmental pollution sources are minimized equitably regardless of population characteristics (Schlosberg 2007; Liu 1997). Procedural justice entails self-determination, including access and capacity of a community to participate in political decisions that affect them (Schlosberg 2007, Whyte 2011). In the context of environmental exposures, procedural justice would occur if affected communities lead environmental decision-making regarding siting and control of pollution sources and acquisition of environmental benefits. Recognitional justice ensures respect for the social, cultural, symbolic, and institutional fabric of different population groups (Preston and Carr 2019; Whyte 2011; Schlosberg 2007). The study of environmental justice or environmental injustices cannot be fully executed without considering the fulfillment of all three aspects on communities (Whyte 2011, Schlosberg 2007).

Oral history is the process of recording of an individual's narration of their life history. Common practice in oral history interviews is to guide the interview with a set of open-ended questions focused on past life events (Hernandez et al. 2017; Bruner 1991; Sommer and Quinlan 2002). Oral history provides an avenue for communities to define their social and cultural identity and to articulate their own lived experiences. As a primary source of data, oral history often complements other forms of data and personalizes environmental justice issues under study (Sommer and Quinlan 2002). For this reason, oral history can be a powerful tool to identify environmental injustices and how those narratives interact with community strengths and

vulnerabilities (Wood et al. 2019) and facilitates the incorporation of community concerns in scientific research and policy outcomes (Hernandez et al. 2017). Favorable distributive justice resulting from more advantageous environmental policies may be more likely to occur when community members can more accurately identify the costs of their exposures to environmental pollution (Carcari-Stone et al. 2014).

This study investigates the lived experiences of Colfax, LA residents whose homes are in close proximity to an open burn/open detonation hazardous waste thermal treatment (TT) facility. Oral history interviews of Colfax residents were collected and then analyzed with respect to all three aspects of environmental justice, eliciting several relevant themes. Through these narratives, we document how the town has changed over the last several decades, which includes the establishment and operation of the thermal treatment facility starting in 1980 and extending to the present.

CHAPTER 2: METHODS

Study Site

The study was conducted in Colfax, Louisiana, which is the county seat of Grant Parish. As of 2019, Colfax's population of 2,492 is 57.4% Black, 35.7% White, 2.9% Hispanic, 2.9% more than one race and 1.2% other races (US Census Bureau 2020). It has a median age of 29.7 years, unemployment rate of 8.6% and a homeownership rate of 43.7% (US Census Bureau 2020). 43% of the population have completed high school, and less than 20% have an associate degree or higher (US Census Bureau 2020). Since 2010, Colfax's population has declined by 7.7% (U.S. Census Bureau 2020). Approximately 5 miles north of the Colfax town center is The Rock community, a predominantly Black enclave just south of the TT facility. Historically, Colfax is well-known for the April 13, 1873 Colfax Massacre, that stemmed from Black voter suppression (Lane 2008; Keith 2008). Currently, Colfax hosts the annual Louisiana Pecan Festival which brings together people from Louisiana and all over the country (Louisiana Digital Library 2021).

A commercial open burn/open detonation hazardous waste TT facility is located just north of The Rock community (Figure 1). The TT facility is a Resource Conservation and Recovery Act site. In 2020, the TT facility treated 275,177 pounds of net explosive weight and 784,598 pounds of other material including Superfund waste, fireworks, propellants, explosives, military ordnances, and ammonium perchlorate (LDEQ 2020). The TT facility consists of 20 burn trays and storage facilities. Based on the LDEQ permit, waste and accelerant are allowed to be burned or detonated for no more than five minutes, and then the waste material may smolder for an additional 45 minutes (LDEQ 2020). The TT facility was issued a Minor Source air permit for the time period July 8, 2019 – July 8, 2029.

Figure 2.1. (left) Map of Colfax, LA, and (right) image of black smoke during a burn at the thermal treatment facility.

Participant Interviews

Nineteen residents were interviewed. Seventeen participants were recruited through snowball sampling, and two were recruited by random selection from the phone book. Two residents participated in a shared interview by request, while all others were interviewed individually. We partnered with community organizers from the Central Louisiana Coalition for a Clean and Healthy Environment and the Louisiana Environmental Action Network to identify potential participants.

Institutional Review Board (IRB) approval was granted by North Carolina State University on May 18, 2020, with a reliance agreement to Louisiana State University to ensure the participants' rights were protected, as detailed in Richmond-Bryant et al. (2021). Researchers took measures to ensure inclusivity by conducting the interviews by phone (not all community members had a

computer that could be used for teleconferencing) and writing the consent forms at a second-grade reading level per advice from the IRB. Given that the Postal Service is not a secure transmission method and use of a courier risked undue cost and burden to the study participants, consent was obtained verbally. To reduce chances of interview fatigue, we broke the consent and interview into two different sessions unless participants preferred otherwise, communicated how long we estimated the interview would take, and communicated that the participant had the right to stop the interview at any point and cease participation in the project.

Questions to participants were open-ended to allow for independent reflection on life experiences by the participants. The questions explored participants' identity around family history and life in Colfax, their knowledge of the TT facility's operations, their experiences with exposures to burning and detonation, and alterations in their life due to operation of the facility. The interview questions are described in Richmond-Bryant et al. (2021) and are provided in Supplemental Figure S1.

Analysis

We generated a transcript from each interview audio file using Otter.ai (https://otter.ai/). Afterwards, we manually transcribed the interview while listening to the audio file to ensure that the text generated by Otter.ai matched the audio file. We made corrections where it was necessary. A second step of quality assurance involved two people other than the one who performed the initial correction reviewing the interview transcript while listening to the audio and making corrections as needed. During this second cross-check, we also made redactions of names according to IRB conditions set by each participant to protect their privacy.

We used NVivo (Release 1.0, Melbourne, Australia) to identify themes from the interviews. Codes were generated from literature review and consultation among the study team. Criteria for aspects of environmental justice were derived from Agyeman (2008), Whyte (2011), and Schlosberg (2007) and informed designation of the mother codes. Searches in PubMed [((hazardous air pollut*) OR HAP) AND ((environmental justice) OR EJ OR (environmental racism))] and Web of Science [All=(((hazardous air pollut*) OR HAP) AND ((environmental justice) OR EJ OR (environmental racism)))] informed content under children (i.e., subordinate) codes.

The codes were distributed thematically under the distributive, recognitional and procedural aspects of environmental justice. Codes are listed in Figure 2 and defined with corresponding references in Supplemental Table S1. The meanings for codes were informed by our literature review for recognitional justice (Agyeman 2008; Schlosberg 2007; Hernandez et al. 2017; Preston and Carr 2019; Bonds 2016; Martin et al. 2016; Whyte 2011; King et al. 2018; Been 1994; Schwirian 1983; Liu 1997; Pulido 2016; Farley 1975; Hornik et al. 2016; Marjadi et al. 2021); procedural justice (Schlosberg 2007; Cacari-Stone 2014; Mennis 2005; Morello-Frosch et al. 2002; Johnston and Gibson 2015; Zaksek and Arvai 2004; Wood et al. 2019; Konisky 2008; Whyte 2011; Cole and Foster 2001; Anderson and Sass 2004; Frankland and Tucker 2013; Stone 1995;Pulido 2016), and distributive justice (Schlosberg 2007; Cacari-Stone 2014; Mennis 2005; Moore and Hotchkiss 2016; Ou et al. 2018; Bonds 2016; Dodd et al. 1997; Liu et al. 2016; Jiang et al. 2018; Nagajyoti et al. 2010; Schintu 2004; Wang et al. 2021; Greenberg and Hughes 1993; Liu 1997; Been 1994; Taylor 2014; Pulido 2016). From literature addressing the three aspects of environmental justice, several codes emerged (Figure 2, Supplemental Figure S2).

Interview codes were added into NVivo by first listing mother codes (i.e., the three aspects of environmental justice), and then defining descendant codes under each mother code. We then imported an interview, read through it to familiarize ourselves with the information, and then began the coding process where the phrases, sentences, or paragraphs were associated with each code. Each transcript was coded twice. The primary author coded each transcript, and then another member of the team performed a second round of coding. The two versions of the codes were compared, and any disagreement was rectified through discussion to find consensus.

Recognitional justice – *what is the social, cultural, symbolic, and institutional reality of group affected by activities from the TT facility? Include all identifiers of participants.*

- Community demographics
  - Income
  - Race
  - Employment
  - Education
  - Homeownership
  - Land use
- Community values
  - Community
    - Connection to the land
      - Family
      - Community
    - Involvement
    - Recreation
    - Religion
  - Thermal Treatment Facility
- Situation
  - Culture
  - Community leadership
  - Pre-existing conditions

Procedural justice – *How was the Colfax community involved in decisions around establishment and expansion of operations by the TT facility/how did they participate in the decisions surrounding the TT facility's operations?*

- Communication
- Community Advocacy
- Enforcement

Distributive justice – *How has Colfax benefitted or bared the cost of environmental activities from the TT facility? How is it affecting the Colfax residents?*

- Financial support/reinvestment into the community
- Pollution
- Noise/vibration
- Health
- Averting behavior (i.e., avoiding outdoor activities to minimize pollutant exposure)
- Town depreciation (i.e., loss of value in property)

Figure 2.2. Mother codes and children codes used in the NVivo analysis.

CHAPTER 3: RESULTS

Among the nineteen oral history participants, twelve identified as Black and seven identified as White. The participants were between 45 and 74 years of age. Higher frequency of coding references indicated the importance of that issue to participants.

We found that recognition (codes related to identity) comprised 393 references, distribution (codes related to coverage, costs and benefits to community) comprised 391, and procedure (codes related to community advocacy and participation in decisions pertaining establishment and operations of the TT facility) comprised 189 (Figure 3).

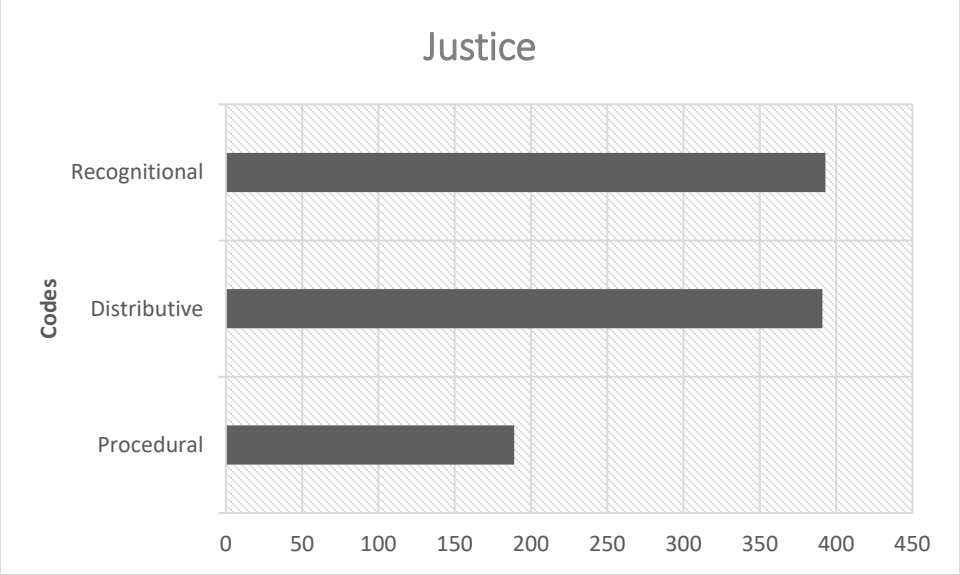

Figure 3.1. Frequency coverage for the three aspects of environmental justice included information about identity, participation in decision-making, and risks residents had been exposed to in the course of their life in Colfax.

Within recognition, 175 of the references included narratives pertaining to demographics, with interview participants discussing their family history and their land use in Colfax. Information about educational attainment, race, gender and length of time participants had stayed in Colfax

was also provided under demographics. Values held by the community comprised 141 of the references, with narratives about participants' connection to land and reasons for remaining in Colfax despite the pollution addressed most frequently. The situation of the community comprised 43 of comments via questions on the community's leadership, culture, and pre-existing conditions (Figure 4).

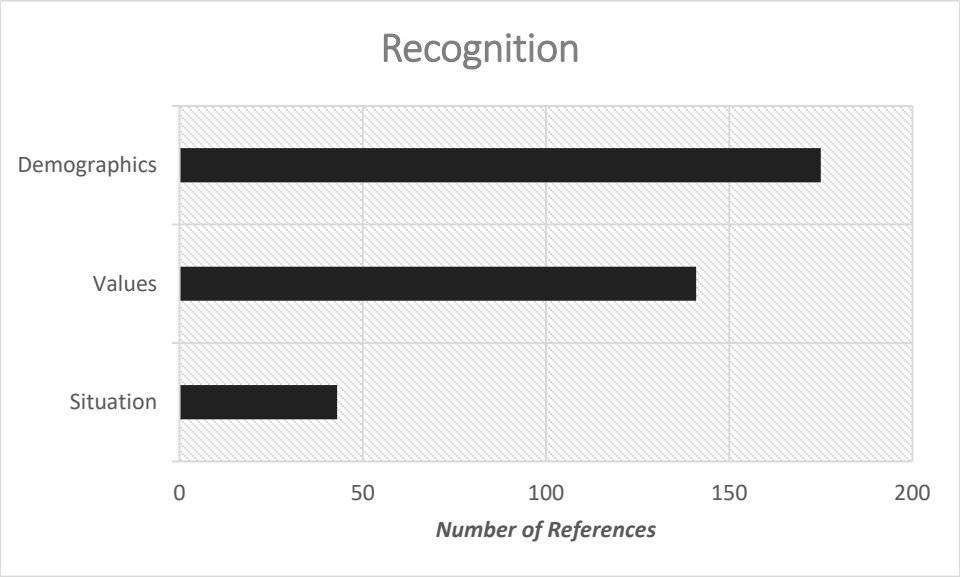

Figure 3.2. Community identity codes included information on race, sex, gender, education attainment, employment history, family history, homeownership status and land usage.

Within distribution, codes regarding negative impacts experienced by the community included pollution, health, town depreciation, noise or vibration, ecosystem services, and averting behavior. Statements regarding observation of pollution were most prevalent at 156 references. The next most frequently reported codes related to health at 133, then town depreciation at 77, noise or vibration at 66 and ecosystem services at 62 (Figure 5).

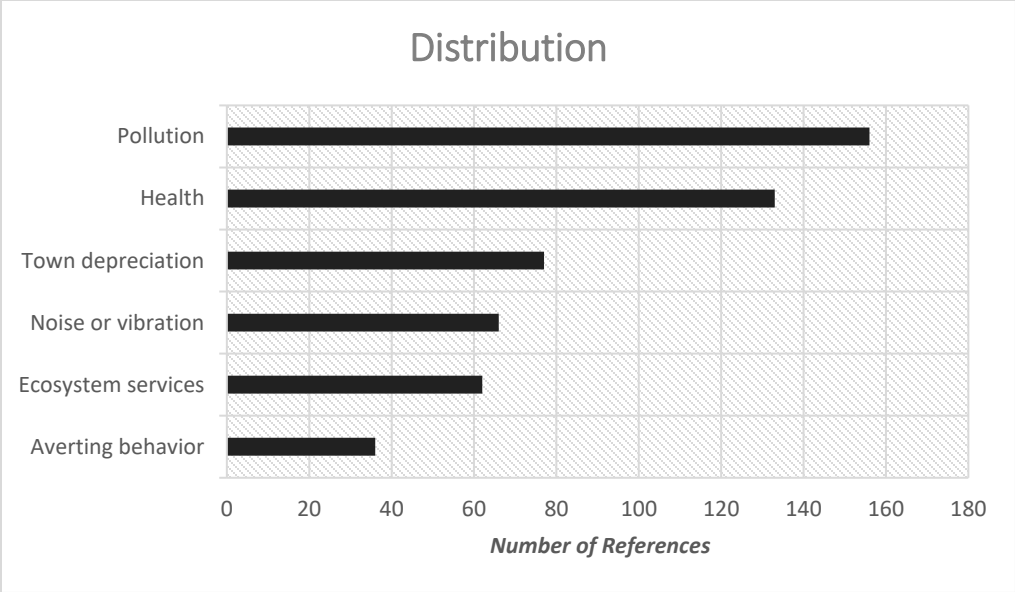

Figure 3.3. Perceived costs and benefits to the community from burning activities as a result of living close to the TT facility.

Narratives about health included fourteen symptoms and conditions. Difficulty breathing was mentioned most frequently and had 38 references followed by skin conditions with 21, then various forms of cancer with 19, other health conditions at 19, then thyroid issues with 12. (Figure 6).

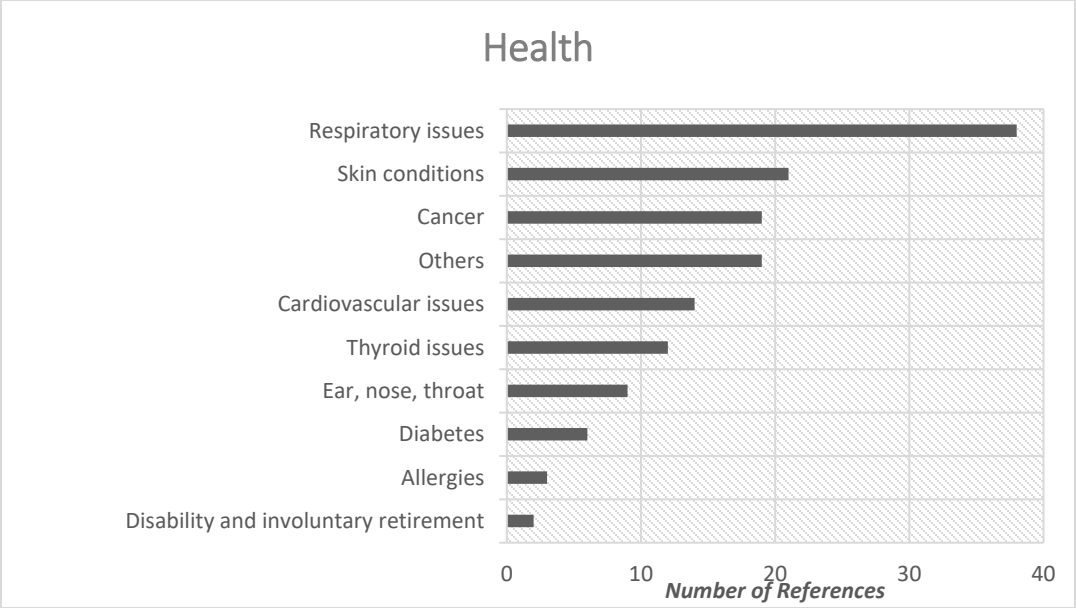

Figure 3.4. Health conditions reported following increase of facility operations.

Narratives about depreciation of assets within the town, or visible decline of the town, were most often attributed to domestic migration with 42 references and businesses leaving with 23 codes. Other factors leading to depreciation include brain drain at 14 references, food deserts at 10, house values reductions at 7, and house immobility at 4 (Figure 7).

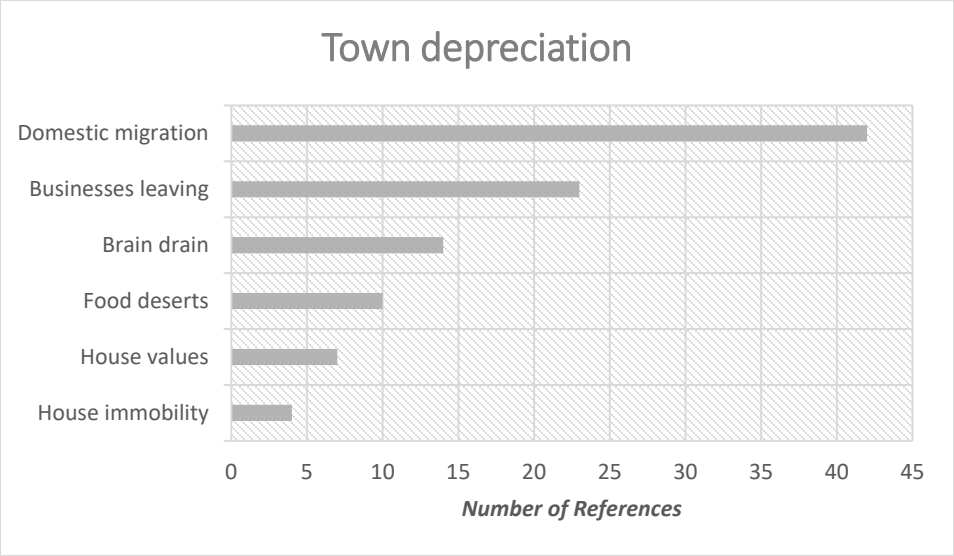

Figure 3.5. Changes experienced in town in participants' lifetime within the town of Colfax.

Narratives about how people have had to adjust their daily activities due to burning and detonation included avoided community gatherings at 12, movement of play indoors at 9, changes in fitness activities and gardening at 4 each, and fishing at 3 (Figure 8).

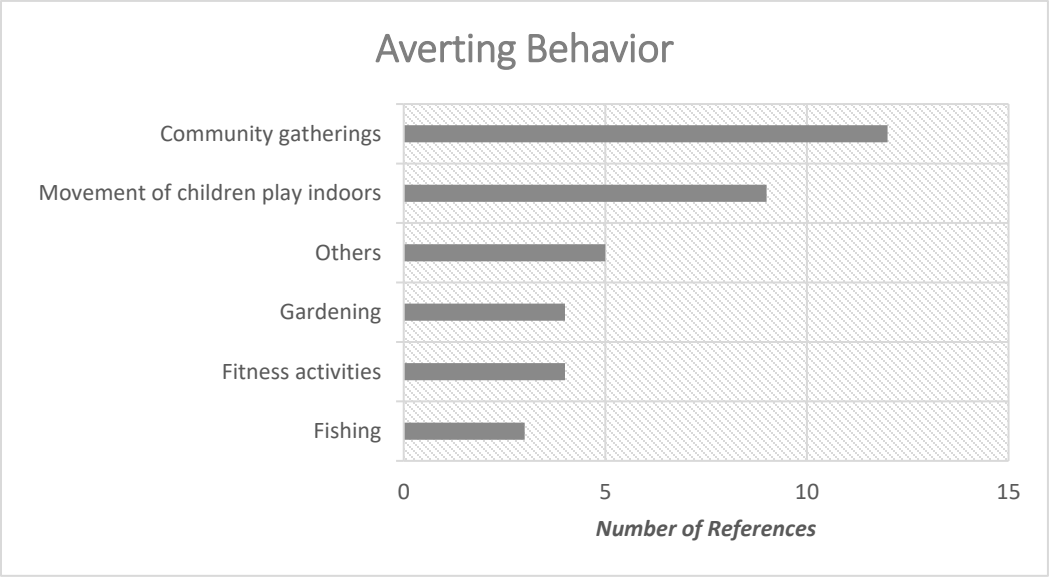

Figure 3.6. Changes in behavior reported to have been influenced by burning activities.

Participants described a limited or lack of access to ecosystem services with narratives about clean air comprising 35 of the references, clean water at 23, food access at 13, loss of Colfax's aesthetic value at 8, and loss of recreation activities at 4 (Figure 9).

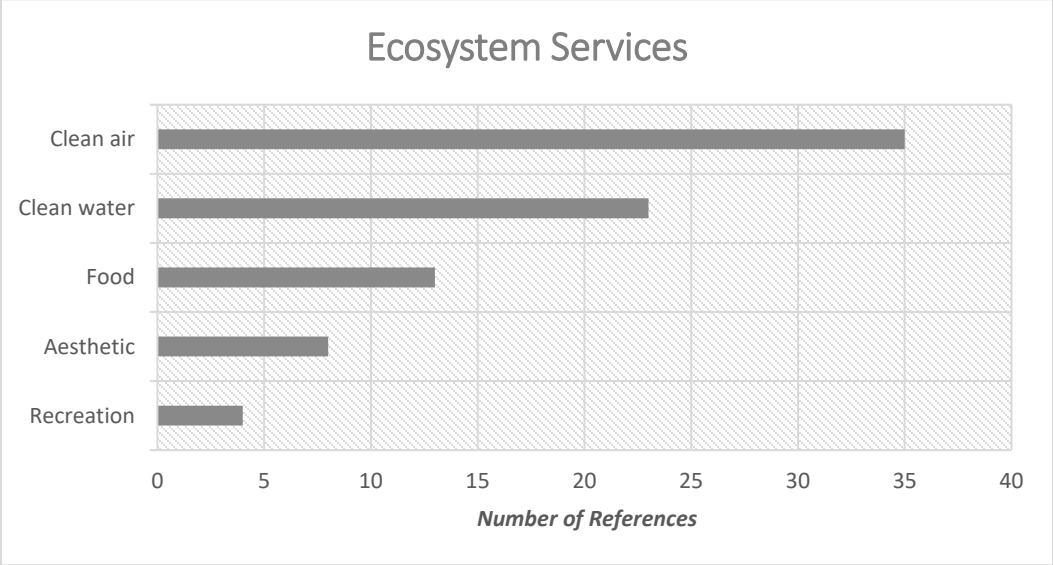

Figure 3.7. Effects to the town ecosystem services as seen by participants

Codes that were classified as procedural justice often related to exclusion from decision making around establishment and operations of the TT facility. Prior to community gatherings to oppose the operations, most community members learned of the facility's existence by hearing burn and detonation activities during operations. Organization around opposition of the thermal treatment facility within the local community came from individual actions, such as calling in complaints to the Louisiana Department of Environmental Quality, and group actions such as meeting at local churches to engage with each other. Forty-six references were recorded under communication, 41 under advocacy, and 17 under enforcement.

CHAPTER 4: DISCUSSION

Just sustainability merges the pursuit of environmental sustainability with equitable distribution of resources including investment in affordable housing, employment, schools, health, green space, and other features to ensure quality of living (Agyeman 2008). Just sustainability should balance the distribution of costs and benefits of environmental sustainability. Agyeman (2008) provides several community-level examples that accounted for both environmental sustainability and social justice through policies designed to account for complexities and vulnerabilities within communities and determined through equitable decision-making.

Oral history interviews of community members can help to highlight community-specific narratives, values, and concerns relevant to recognitional, procedural, and distributive justice for the advancement of just sustainability. Themes developed from interviews included the Colfax community's identity in history and current life, their awareness of the TT facility and their perceptions of its impacts, and the extent to which the community has participated (or been excluded) in decisions involving the creation and expansion of TT facility operations.

Distributive Justice

Narratives coded as distributive justice included effects of burning and detonation at the TT facility on the Colfax community, how life around the town had been altered as a result and if and how the TT facility was involved in the community.

Residents' experiences with air and water pollution were described in most narratives related to the impacts on the community from burn activities. Residents stated that they observed dark

plumes, sometimes having a yellow color. They also noted chemical odors and described concerns about the water being unsafe for drinking or fishing.

> *"You know, you got your water streamline being invaded by whatever the stuff that's falling from the sky. You can't go out and breathe the fresh air… people don't realize them unless you sit down and you talk to them and you tell them this."* – Deborah Clay

Similarly, Bonds (2016) described plumes from open burn pits observed near communities during the Iraq and Afghanistan wars. Bonds (2016) noted a misperception that burn pits only posed a hazard to military personnel, although civilians were also exposed.

Residents reported hearing loud noises and experiencing rattling or shaking of their property during burning activities.

> *"Well, when they're in operation they might be eight o'clock in the morning they start bombing and they're doing that until about ten, and then on about two o'clock it gets louder. That'll last and there used to be smoke, a lot of black smoke and stuff. Sometimes it gets so bad it looks like fog in the middle of the day. There's smoke and I got grandkids and I got one real terrified of it."* – Jimmy Small

Dodd et al. (1997) tested the impacts of high-energy impulse noise on sheep that have been anesthetized. They observed correlations between the maximum blast pressure and an index of lung injury. Decreased cardiac output and hypotension indicated concomitant cardiovascular

impacts from noise. Dodd et al.'s (1997) research suggests a similar effect might be experienced by people exposed to high-energy impulse noises.

Several community members described an increase in health issues following the increase of facility operations. Self-reports of health effects included cancer, respiratory issues, heart conditions and thyroid issues.

> *"…I've had skin cancer three times in the last two years. And I've had basal cell and squamous cell carcinoma. Basal cell I've had several hundred place. Over my arms and my face (inaudible) some on my back. And I've had melanoma about three times in the last two years."* – Rep. Terry Brown

> *"And, my mom's on thyroid medications, I'm on thyroid medications. You know, out of about seven people and the four homes here along our little road. We know of one, two, three, four, five. Five out of seven or eight people I guess they're on thyroid medication. That's a pretty high percentage."* – Karen Richardson

Studies on possible health effects from proximity to hazardous waste sites have recorded higher incidence rate of respiratory issues such as asthma, acute and chronic bronchitis, and pneumonia (Moore and Hotchkiss 2016). U.S. soldiers deployed during the wars in Iraq and Afghanistan and residents who had prolonged burn pit exposures had a higher risk of respiratory and cardiovascular diseases (Liu et al. 2016).

Access to key ecosystem services like clean air, clean water, greenness, and agricultural production was stated by community members to have been hindered by burn activities. Residents reported observing the decline of moss production and suspecting that pollution also caused contamination of fish caught in surrounding lakes and bayous.

> *"But the moss that grows on the tree has really, really, really decreased… I went to some places, a lake called Nantachie that is northwest of the facility. And you can find areas up there that has beautiful moss on the tree. Really pretty. But it looks kind of scrubby around here."* – Brenda Vallee

> *"Well, I feel... I'm worried about the fishing because not too far from that facility you have two lakes. You got Iatt Lake and you also have Nantachie Lake,s and both of those lakes are somewhat in conjunction with Red River which you got different bayous running you know, that kind of ties in with that. But if burn material, especially coming from those explosives, and depends on how much of that junk they are really burning. If it is getting into the water stream, not only is it killing fish, it's killing some of that wild game because they're going to be drinking it, like the deer, the squirrels, the rabbit, you know, things like that. It's going to have a total effect on them and everything else that exists within those bayous and waterways. So I don't... I haven't really been fishing in lately a lot…"* – Anonymous

Moss has been used as a bioindicator for different areas' pollution, its decline signaling the presence and concentration of heavy metals in deposits from the air (Jiang et al. 2018; Nagajyoti

et al. 2010; Schintu 2004). Deposited metals in PM, like those emitted from the TT facility, are toxic to plants and animals. This in turn has a negative impact on ecosystem services provided by an area.

Interview participants reported several indicators of population and economic decline in the town. Interviewees stated that younger residents move to opportunities beyond the town after graduating high school, if the youth have opportunities to go to college or seek employment outside of Colfax. Participants mentioned that Colfax offers very few jobs and that businesses have foundered. They also noted that land values are declining, attributing those declines to a lack of upkeep.

> *"A lot of those businesses began to fail. Started moving, different places, different states. A lot of people started moving, getting educated and moving. A lot of their businesses failed."* – Rev. Louis Swafford

> *"Abandoned, I said abandoned homes, abandoned property grows over you know. The property is not kept up. You got overgrowth, and just, you know, grass growing up high and it's like that throughout Colfax now on both the Black and White side of town. Now let me address that, too. We have less of a line of demarcation now, because growing up here, I remember a little boy growing up here, you know, come dark as we used to say come nighttime you don't want to be caught on the wrong side of the track. You know what I'm saying? But now Blacks and White live on both sides of the tracks. Now it's always like that line of demarcation is disappearing in the town of Colfax now. Yes, it is.*

> *But the sad part of it is that we are seeing the same thing and you got abandoned places over and over across the track now, and we've experienced White flight here. Colfax is now a predominantly Black community. And so we've experienced White flight. But again, that's no different than when it was on the Black side of town here because again, a lot of people here went off to school or went off to the military and just never came back. So that's the town we have now. We have a very low tax base now..."* – Kathy Littlepage

Studies on the link between property value and environmental quality found that areas in close proximity to pollution sources had lower property values compared to areas further away (Wang et al. 2021; Schütt 2021; Greenberg and Hughes 1993). In a study about possible forces behind neighborhood changes due to hazardous waste treatment facility siting, presence of hazardous waste facilities and related concerns about water and air quality contributed to the undesirability of an area (Liu 1997; Been 1994). This could explain the decline in population and subsequent decline of property value in the town.

Interviewees shared that the TT facility has just recently started contributing financially towards Grant High School, the Sherriff's department, and the annual Pecan Festival. Asked about the facility's employment of the community, participants expressed having no knowledge of anyone from the local community being employed at the facility.

> *"Well, and they've never, they've never been part of the community, until our coalition started to put pressure. Now they give money to Grant High and give money to the Pecan Festival that we have in Colfax."* – Carl Ray Lasyone

Some of the participants thought the TT facility's involvement in the community was a tactic to garner support from the community and felt that to a degree, the facility has been successful.

> "*There are people who support them. And their efforts and they talk about jobs and they know, they did not really start doing anything in this community until we started protesting them. Now all of a sudden, you see the facility sponsored this and the facility sponsored that, but … for the 20 some odd years they were out here, they did absolutely nothing in this community.*" – Rev. Avery Hamilton

> *"And we've divided up communities in some ways, but we've gotten stronger and people who used to not think anything about it now are very much concerned… we have people who are on one side, that are in the family, people who are on the other side. So it's caused, it's caused some dissent from the community, because there's some who think that the money that they're giving to a church or two, or a school or two, or a community activity or so is extremely important that they don't lose that."* – Rep. Terry Brown

Hazardous waste facilities sometimes contribute to local sustainability efforts by financially supporting social amenities like nature parks, procuring jobs, scholarships, and funds for economic development programs (Taylor 2014). When a hazardous waste facility provides jobs

or financial support in a community it pollutes, a dilemma is created for residents who must choose between opposing the burdens associated with the facility's presence and benefitting from the infusion of money into the community. For example, a "jobs vs. health" debate arose in Emelle, AL when a hazardous waste treatment facility employed several town members, complicating public opposition (Taylor 2014). Advocacy efforts against the hazardous waste facility fractured because some White residents wanted the facility closed or its operations monitored, while many Black residents wanted the advocacy efforts grounded in social justice (Taylor 2014). This example shows how such differences may work to undermine a community's pursuit of favorable environmental conditions.

Recognitional Justice

Narratives that touched on social, cultural, and/or institutional aspects of the interviewees' lives in Colfax were included under recognitional justice codes. Recognition occurs when policy makers take into consideration a community's specific needs and identities in conjunction with the environmental costs of activities (Martin et al. 2016). Whyte (2011) explored the role of recognition, above and beyond distributive and procedural justices, in environmental injustices experienced by Tribal communities exposed to hazardous and nuclear wastes. In these instances, disruption to the Tribes' cultural values and experiences coincided with exposure to chemical and physical stressors.

When participants were asked about what Colfax meant to them, they talked about the intrinsic value of Colfax based on their family history and cultural practices. Participants related Colfax providing a sense of security, connection, and pride. Land ownership is especially a source of

gratification and autonomy for residents who remember having family who had been sharecroppers or grew up in the sharecropping system.

> *"…in some of those sharecropper situations. So you really basically all work for free for the most part, because, you know, the way that system worked you ended up owing near more than you ever really got… And he [Rev. Hamilton's father] was put out of the home of my… He was put out of his mother's home by the man who owned the um, farm, or plantation as they called them. Because he left and went and got a job outside of the farm... he made a bargain with God as he said, you know, one day he would go back and get his mama and his brothers and sisters, off that plantation and exact, that exact… Before my father turned 30 years old. He had bought a land and built a home for himself, and his family bought land and built a home for his mother and his other nine siblings. And went and got them off that same plantation, or a different one rather, and moved them into town, and out and off that uh, of the, off the little farm that they were working there."* – Rev. Avery Hamilton

An oral history of the meaning of land to Black rural landowners in Mound, Louisiana, revealed that to some residents, owning land created a sense of belonging and self-determination for them as they could reference it among the things that were truly theirs; they contrasted this ownership to the sharecropping period when their relatives were kept indebted to the landowner and former slaveholder (King et al. 2018).

In narratives about cultural values, interviewees indicated the importance of community cohesion. They recounted grandparents caring for grandchildren while parents worked, community members sharing resources in times of need, and demonstrations of support when a community member became ill.

> *"It was a real healthy place to grow up, I would say. It was, it's a supported, or a supportive community of people, where they care about each other, and they take care of each other. If people became ill, or they needed extra help, there's always somebody who'll bring food by and help them out. It's just, it would, it's always been a real good little community to, to live in."* – Kathy Littlepage

Some participants expressed that this interconnection is threatened by activities at the TT facility, as the quality of life in Colfax has been diminished by burn activities.

> *"Well, that's what [the TT facility] took, is taking away from us. I guarantee if investigated, the property value right around [the TT facility] has fallen to nothing because of the contamination. And like I said, they're taking away what Grant Parish has to sell, and that's clean air. And good, easy religious living. Living. That's what they're taking away from us."* – Carl Ray Lasyone

The implication of this quote is that pollution has made Colfax undesirable for people to stay or as a place to move, loosening community ties. Been (1994) studied factors contributing to neighborhood changes and found that when faced with pollution, households that can afford to

move will migrate, removing wealth from the community while weakening the community fabric. Other studies link environmental pollution with weakening or severing of social norms and practices (Whyte 2011; Schlosberg 2007).

Participant placement of Colfax in historical context revealed that most of them were students when school desegregation occurred between the 1950s and 1970s.

> *"I was born in the midst of the civil rights movement, and, of course, which encompasses the school desegregation, and so I attended the all Black school here in Colfax which was named Mary Graham. But I did not complete my education there because as I stated before, the desegregation order came down, and we started consolidating the schools. And so I started at Mary Graham, but then I transferred to what was called Colfax Elementary, which was an all-White school. In fact, what they did was close the two Black schools and transfer the children out to the White schools…And then went to junior high in a place called Dry Prong, Louisiana, which is another little town here in Grant Parish. And then I went to what was called Grant High School, which was a new four-year that they built, I'm sure as a result of the desegregation and there I graduated from Grant High School."* – Rev. Avery Hamilton

Some participants remembered when railroad tracks separated White people from Black people and with the removal of the residential segregation practices, a lot of White people moved elsewhere.

> *"They had a railroad track. Black people on one side. White people on the other. And so now the White people have moved out, and the Black people have moved over to the other side. So you do got a few White people. Yeah, a few White people on one side, but there's Black people living among them now… And then as for the others, the Black people start moving in. And so when they did, they moved out. So it's one of those areas.*" – Anonymous

These changes have been followed by adverse socioeconomic changes, limited job options, substance and drug abuse and crime being among them, which signals the downturn the town economy has taken.

> *" There's nothing to do. There's no economy, there's no, I mean, there's not that many jobs. And unfortunately, there's so many jobs that whatever you get, you try to make the best of it. … But it's hard to find something that's going to take care of both you and your family. It is hard to try to do something like that. And I understand from their point of view, but there is no jobs, because no jobs there's nothing to do, and there's nothing to keep the young kids entertained. So they go resort to things they shouldn't be doing: drugs, crime, whatever, because you know, idle hands are the devil's workshop. " -* Anonymous

Some research into the causes of environmental inequality points to neighborhood factors that make it easier for a facility like the TT facility to move into a neighborhood. The Invasion-Succession Model (Schwirian 1983) depicts the phenomenon where a new culture or entity

enters a location, and the group associated with the previously dominant culture moves elsewhere. Using the Invasion-Succession Model, prejudices against Black people drive White people out of the area when Black people move into a neighborhood ("White flight") (Liu 1997). Removal of some residential segregation practices, that enabled movement of Black people to areas that were exclusively resided by White people, and school desegregation contributed to mass movement of White middle-class people from areas that were becoming racially diversified (Pulido 2016; Farley 1975), draining of town taxes that would in turn be used for town upkeep (Liu 1995; Pulido 2016). The Push-Pull Model complements the Invasion-Succession Model, explaining that a town's environmental conditions may contribute to its inability to attract a population that can add revenue. This condition makes it easier for people with money to exit, causing further loss of local services through depletion of the tax base (Been 1994) and removes the social capital that would be used to advocate against unfavorable environmental conditions infiltrating the neighborhood. These conditions indicate a negative feedback loop, where the TT facility may act to accelerate the town's economic decline while the town's economic decline may have enabled the TT facility to expand its operations. This has been seen in other cases where environmental and social factors have interacted to exacerbate local social and environmental conditions (Hornik et al. 2016; Marjadi et al. 2021).

Procedural Justice

Procedural justice codes applied to narratives that related to community participation in or exclusion from decisions around establishment and expansion of the TT facility's operations. Procedural justice considers who gets to participate in decisions and to what extent they are allowed to participate (Whyte 2011). Cacari-Stone et al. (2014) link a community's capacity to

participate in decisions on environmental policies that affect them with having favorable environmental and health conditions. Coding for procedural justice looked at community exclusion or inclusion from decision making, how neighbors within the community interfaced, and organization around issues linked to the TT facility.

Questions about community participation in the TT facility operations yielded participants not remembering having an awareness of the facility's establishment or when increase in operations occurred.

> *"And whatever form they were in here before, no one really paid attention to what was going on up there because it wasn't disturbing the community in the way that the facility is doing now, not that I'm aware of. If they wer,e we were just completely oblivious to it. But at some point in time, you know, again, I don't remember the year or time but I just remember I started hearing explosions that I did not hear going obviously, prior to…it was almost like they came in here in the dead of night and we woke up to explosions or something, you know. I don't know anyone who knew anything about the facility coming in here."* – Rev. Avery Hamilton

Participants indicated that there have been deliberate efforts to exclude them from discussion about ongoing operations at the TT facility.

> *"Well, and one more thing that I can remember that day were scheduling a meeting over at the Town Hall. And we were supposed to attend the meeting. We were not notified of*

the meeting. Date had been changed. So we didn't make the meeting. It was like they didn't want us in the meeting." – Deborah Clay

"Louisiana DEQ got involved and we started having advisory meetings with quote [the facility], to come on down; to find out what they were doing, and they actually applied several years ago to increase the components so they could uh, detonate, explode. And I guess. Because even when you know they run a public announcement in a newspaper, a lot of people don't read it because most of time you don't know what it's about anyway. If they say a permit and most of the time it is in a place you don't normally read or it is in small print." – Cephas Bowie

Increased operations were preceded by the explosion in Camp Minden which led to Colfax being chosen as the alternative for the Superfund wastes that were in store at the military camp. Participants' accounts are supported by a video recording of the discussions that led to Colfax being the host city of the military wastes that increased burn operations fivefold. Community input on whether Colfax was willing to host this increase in operations was lacking during this expansion process. The Colfax community experience is like the story of Kettleman City, a small rural farm-worker town in the San Joaquin Valley where residents learned from local newspapers about a nearby toxic waste site when the facility was fined for violating environmental regulations (Cole and Foster 2001). The Kettleman City facility had been established without their knowledge or permission and operated for more than five years before the nearby residents discovered it. Like Colfax residents, Kettleman City residents had not been invited to participate in discussions before the facility began its operations. Anderson and Sass (2004) attributed

limited access to information and time inconveniences for meetings as some ways hazardous waste facilities exclude community members from decisions that allow waste facilities to enter and operate near communities. Mennis (2005) attributes community involvement in decisions to hazardous waste facilities' adherence with state-level permitting conditions.

Most community members found out about the TT facility operations through communicating with neighbors. The community organizer and a few participants stated having learned about the pollution from a local newspaper. Most participants became curious about facility operations when they either heard noise from burn activities, saw dark plumes or started experiencing illnesses that they believed were linked to the facility operations. They talked to neighbors and learned from some that knew more than they did about the facility.

> "*So there was a newspaper article in the Alexandria paper that really brought all of this to our attention. And then we began really realizing what we had seen in the past."* – Brenda Vallee

> *"When they started burning stuff in [the TT facility]. And that stuff started...You know we didn't know what it was, we were even walking out by it, till [neighbor/community organizer] came and told us what was going on."* – Ray Boutte

Some Colfax residents have created petitions for people to sign on to address, among other issues, the TT facility.

> *"Now at different times we have passed petitions throughout the parish to get them to sign on different issues. I go to church at Hebrews Baptist Church. Those people have been very supportive of our group."* – Carl Ray Lasyone

Some believed that the indiscriminate effect the TT facility had on both the Black and White population necessitated the attention the opposition to the TT facility was getting.

> *"You know, as long as the poor Blacks were not saying anything or you know, were just like whatever. But now it's starting to affect people with power. White people. Not to say all White people have power. But no, I'm talking about they have the everyday average White people but then you have people like [neighbor/community organizer], who's got power and control in the area. Now, it's hitting her now. Now we got to do something about it, because it's hitting her, it's in her family, it's hitting everybody. Now we got a problem. But you know, the squeaky wheel gets the oil. But it has to happen to where it. You know, you know people are already suffering. But it had to hit the right people in order for things to now start getting better. If it can. But as long as it was the poor people? No problems. But now other people that are high up the bracket of money. Now there's a problem. And you can't buy good health."* – Anonymous

Louisiana is known for its pervasive industry, but many community groups have organized in opposition to industrial pollution throughout the state. Community members have organized locally and enlisted other neighbors to share their adverse experiences with pollution and their need for improved environmental conditions (Frankland and Tucker 2013). Many community

organizations are comprised of people with different expertise to the mobilize local residents. A community empowered by accurate and complete information will be more likely to organize effectively in opposition to hazardous waste facilities endangering their health compared with communities lacking accurate and complete information (Carcari-Stone 2014). Accurate information improves a community's chances of meaningful participation in environmental health decisions with a continuous flow of information from and to all affected stakeholders (Johnston and Gibson 2015; Stone 1995). Sometimes, however, even when communities do possess accurate and complete knowledge of pollution from local emitters, residents' complaints may be ignored (Pulido 2016).

Community advocacy among Colfax residents has involved personal vigilance actions like researching information on health effects of burn activities, personal monitoring of air quality through low-cost air pollution sensors, community engagement meetings, and calling in complaints to report their observations to the LDEQ.

> *"Oh, we do hear it. We hear the explosions. And then we see the plumes, like I've called it in I don't know how many times because once I found out what they're really doing, and that we can call DEQ about it, or whatever that is called. When I found out we could do that, well, I'd call it in and I'd tell them my name, I don't care. And I'd say, you know, the winds blowing today, they're not supposed to blow in the wind.*" – Anonymous

> *"Yes, I got one of those whatever you call it, the air? It checks the air? I got one of those at my house. And sometimes it picks it up. I could tell when it picks it up because looks to my ...It goes off."* – Jimmy Small

Some community members believe that reporting pollution to the DEQ has had an impact in the TT facility being compliant.

> "*But all this has been ceased since the DEQ started doing their job. And inspecting them and making sure that they abide by the what they're supposed to be doing…"* – Carl Ray Lasyone

The U.S. EPA encourages residents to call their city or state agencies to reports activities that are harmful to environmental health (EPA 2021), and various groups have followed suit over time (Pulido 2016). For example, residents of Flint, Michigan called in complaints about their observations of lead in drinking water, and this action helped spur local and state agencies to remediate the issue in part because they received negative national- level news for not responding to citizen complaints with sufficient speed (Pulido 2016).

Considerations for Study Interpretation

Some statements cut across multiple issues; they were coded and counted in more than one category. One participant's description of how the community came to the knowledge of the TT facility operations was, for instance, coded under procedure as communication (or lack thereof), and under distribution as noise or vibration.

> "*And these [the TT facility] people, when we realized what was going on, they brought it on themselves by the explosions. They were rattling doors. Here, I actually thought somebody was trying to kick my door in. And that's how loud, and I live three miles from this facility. But it was literally shaking the windows in my house. That's what brought attention to them."* - Carl Ray Lasyone

Some coded statements described issues in general and, while they were encapsulated by a mother code, they would not fit in any of the children codes. For example, a participant's recounting of the risks the community may have been exposed to because of burning and detonation activities fits under distribution as health but could not fit in any lower children codes.

> *"I don't know if there's anything that we could attribute directly… But there are a lot of health issues around here."* – Karen Richardson

The main limitation in this study was snowball sampling for recruiting most of the participants. The participants' opinion of the TT facility may have been different from those who did not volunteer. Most participants were identified from a list compiled by our community contact. There is uncertainty about their representativeness of the Colfax community and therefore may present a biased view of the TT facility's impact on Colfax residents. At the same time, we can consider the findings from our oral history study to be indicative of those negatively affected by the TT facility rather than a picture of the entire community's experience with the TT facility. Richmond-Bryant et al. (2021) lists other sources of data to substantiate complaints from

residents of Colfax which includes public comments submitted to LDEQ detailing residents' experiences with burning activities (LDEQ, 2018). It is also important to note that this study's intention was to document personal experiences of Colfax residents with air pollution to inform specific plans for measuring air pollutant concentrations and composition. Generally, oral history as a primary source of information about the community provides a basis for subsequent quantitative studies on environmental risks and stressors.

CHAPTER 5: CONCLUSIONS

We used oral history narratives to analyze the distributive, recognitional, and procedural justice dimensions of the impact of the TT facility on the Colfax, LA community. The just sustainability framework is appropriate for this case, because social and environmental factors strongly interacted through each of these dimensions. Residents clearly recounted impacts of the facility on their health and well-being. Long-time residents described an extensive history, going back to enslavement in the U.S. South, and the pride of homeownership and connectivity to the Colfax community to overcome the legacy of slavery. Despite these deep ties, participation of community members was often hindered by deliberately misleading residents about opportunities to provide testimony about their experiences.

This study was designed to inform our field measurements of air pollutant concentrations and composition in Colfax. Learning the nature of the residents' health effects informs decisions about which classes of pollutants to analyze and where to place samplers. In turn, air pollution measurements may help substantiate participants' experiences with physical measurements.

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