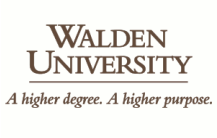

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The phenomenon of Living Close to Nuclear power Plants

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This is to certify that the doctoral dissertation by

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2019

Abstract

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by

Jacquelynn Miles

MA, Walden University, 2010

BS, Excelsior College, 1989

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Communities near nuclear power plants are at potential risk from natural and man-made failures at the nuclear power plants located within those communities. This study explored the concerns and rationalizations of residents of a community who live within a 10-mile evacuation zone of the nuclear power plant located there. Using the general theory of deliberative democracy, the purpose of this qualitative study was to understand and explore why individuals continue to live close to nuclear power plants. Data were collected through semi-structured interviews with 15 individuals who live within a 10-mile radius of a nuclear power plant in the western US. These interviews were transcribed, coded, and analyzed using a modified Van Kaam procedure. Findings indicated that members of the community had concerns that natural or man-made disasters could lead to catastrophic failure of the nuclear power plant but rationalized living in proximity. Another key finding was that the community itself was supported by the revenue generated from the plant which led many of the participants to live in the community and this contributed to their rationalizing for why they should live close to the plant. The social change implications of this study included recommendations to mayors, city councils, and regulatory bodies to provide more information about nuclear power plants to communities to help them cope with fear and feelings of helplessness. Residents living near nuclear power plants would benefit from the recommendations made in this study because it would help them understand the risks of living near nuclear power plants.

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Table of Contents

List of Tables

List of Figures

Chapter 1: Introduction to the Study

Individuals living within the 10-mile evacuation zones of nuclear power plants in the United States have held distinct perceptions regarding safety risk. These perceptions have derived from how individuals have rationalized their thoughts. Reasoning and justification of thoughts to others are only a few of the many ways that individuals rationalize a situation or phenomenon. Using justification, reasoning, ethics, and communication to help rationalize the perception of safety risk can be beneficial within a community. Fears regarding nuclear power plants' safety began to decline in the 1970s. This was mainly due to the accelerating demand for electricity (Csereklyei, Thurner, & Bauer, 2016). An understanding of perceptions about nuclear power plants requires some background of the history and terminology surrounding the phenomenon.

Background

Throughout the 20th century, the population associated nuclear power with radiation, atomic bombs, and nuclear power plants. The word nuclear is related to the word nucleus and can be used interchangeably with the term atomic. The word atom originated in ancient Greek, but its primary use today stems from research conducted by scientists in the 1900s. The terms became interchangeable after the later discoveries of the atom (Lang, 2016). Ionization is the process whereby the orbit of an electron is removed from the parent nucleus to create radiation; atomic radiation, on the other hand, affects the structure of the atom but not the nucleus (Charlesby, 2016).

Curie discovered radioactivity in 1896, with radiation being the key ingredient (Weart, 2012). Rutherford discovered the nucleus in 1911 along with the “planetary model of the atom” (Monk, 2012, p. 89). Rutherford also discovered that the atom had a positively charged nucleus with negatively charged electrons orbiting it. Radiation was understood to originate in nuclear decay or splitting, and not by any atomic process. After Rutherford's discovery, studies of the nucleus became known as nuclear physics, a phenomenon that eventually led to the splitting of the atom (Lanouette, 2013). These early discoveries brought about new questions from chemists about the atom and nucleus, and they constituted the beginning of the nuclear energy era of the 20th century. In 1939, a new type of power was discovered that would change the course of history.

In 1939, Hahn and Strassman bombarded solutions of uranium salts with neutrons. After irradiating uranium with neutrons, they were surprised to detect barium, an element with only about half the atomic mass of uranium (Lanouette, 2013). Repeated tests convinced them that barium was produced. Meitner and Frisch solved this puzzle within a few weeks. The conclusion was inescapable: they had split the uranium atom into two parts (Monk, 2012) and discovered the process known as nuclear fission. The process of splitting an atom decreases mass, which is converted to kinetic energy. This fission creates more neutrons, which leads to more splitting and more kinetic energy. The result is an explosive chain reaction: a highly explosive bomb (Monk, 2012).

During World War II, the threat of a bomb built by Russia that could destroy the United States created a fear that led the government to establish the Manhattan Project,

which led to the creation of the atomic bomb. The outcome was the dropping of two atomic bombs, on the cities of Hiroshima and Nagasaki, which resulted in the death of over 70,000 civilians (Lanouette, 2013). The backlash from this decision led the United States to try and find a more ethical, productive, and peaceful way to use nuclear power (Weart, 2012). After World War II, the general public associated nuclear energy with the atomic bomb. However, with the combination of increased demand for electricity and the discovery of more productive ways to use nuclear power, investments leaned toward nuclear energy (Weart, 2012). Nuclear power plants began to be built in the mid-1950s as a new source for generating energy (World Nuclear Association, 2017). Most the country's nuclear power plant construction ended in the 1970s (Keller, Visschers, & Siegrist, 2012).

In 1970, the U.S. population was 205,050,000; by 2015, it had increased to 320,220,000 (United States Census Bureau, 2015). Thus, while nuclear power plants' lifetime functionality has declined, the demand for electricity has increased (Keller et al., 2012). The 1986 nuclear-power-plant accident in Chernobyl, Ukraine, the 2011 earthquake and tsunami that damaged the nuclear power plant in Fukushima, Japan, and environmental concerns about disposal of radioactive waste from nuclear power plants have all resulted in decreased demand to produce nuclear power plants (Keller et al., 2012). Nonetheless, electricity has continued to be in high demand, and its production from fossil fuels has become an ever-increasing concern.

Fossil fuel consumption causes global warming and climate change. Fossil fuel is a natural fuel, such as coal or gas, formed in the geological past from the remains of living organisms (Bauer et al., 2013). Climate change develops when fossil fuel combustion, an energy source for making electricity, emits greenhouse gases (Pearce, 2012). Fossil fuel combustion emits carbon (primarily in the form of carbon dioxide) into the air (Andres et al., 2012). Nuclear power is a carbon-free technology capable of replacing large coal-fired power plants and a possible means to slow climate change (Pearce, 2012). Nuclear power plants also cost one third of the price of fossil-fuel-fired power plants to run and do not require the burning of coal; however, building two reactors would cost close to 9,000,000,000 U.S. dollars (World Nuclear Association, 2017).

Despite the potential advantages of nuclear power, the expenses relating to the production of new plants have not made it a cost-effective solution in recent times. In the wake of Chernobyl, purchasing full liability and indemnity insurance has become expensive because of the constant threat of radioactive exposure (Pearce, 2012). In addition, the federal government has been responsible for the disposal of high levels of radioactive material (Heffron, 2013). The nuclear industry has been subsidized by the U.S. government since World War II (Pearce, 2012), and the government has played a role in the production of existing and planned plants. The determining factor of future production will be storage of radioactive waste (Heffron, 2013).

Problem Statement

Radiation has created a range of health problems for U.S. citizens living near nuclear power plants, and these communities may not have been safe from radioactive waste stored in spent-fuel containers. Nuclear power imposes a finite danger because the probability of an incident is real and measurable (Pearce, 2012). However, the storage of radioactive waste has been one of the biggest unresolved problems, because the life cycle of spent fuel is close to 25,000 years (Pearce, 2012). Spent-fuel containers have not been guaranteed to hold up for that long. The overall safety risk to the environment, the consequences of a nuclear accident, the maintenance of the reactors, and the high cost of adapting to climate change operations of nuclear power plants should all be considered in decision making and administration by the government (Pearce, 2012).

The United States Nuclear Regulatory Commission (USNRC) has been responsible for providing safety to U.S. citizens from any nuclear threats. In the case of an emergency, the USNRC has organized a protective strategy based on the concept of an emergency planning zone (EPZ). There are two types of EPZ protections. The plume exposure pathway EPZ is located within a 10-mile radius of the nuclear power plant, and it reduces the potential for exposure to radioactivity in case of an accident (USNRC, 2014). The ingestion exposure pathway EPZ is located within a 50-mile radius from the nuclear power plant: This area is a protection against ingestion of radioactive material, which includes ingesting food or water within the 50-mile radius (USNRC, 2014). The USNRC has allowed the public to keep abreast of regulatory meetings by providing a

schedule of when they occur. These meetings have been a resource for citizens to use to rationalize and reason about the phenomenon of living in the evacuation zones.

There has been a gap in the literature regarding why citizens decide to live in the 10-mile evacuation zone of a nuclear power plant, including the dangers that citizens perceive to exist and citizens' notions of how safe they are leading up to the actual preparation for evacuation. Within this study, I explored in depth the conscious thoughts of such individuals regarding which survival priorities are the most significant. I wished to investigate whether members of communities within evacuation were aware of all the risk factors that exist. There may have been other higher priority risk factors, because federal nuclear safety regulations have had many problems (Union of Concerned Scientists, 2011).

At the outset of my study, there were many possible reasons why some people continued to live comfortably near the Diablo Canyon nuclear power plant, my research site. Possible reasons included that it is a beautiful beach community and that it has low crime rates. Many individuals living in these communities had not seen the nuclear power plants as a threat to their wellbeing or health. I also wanted to ask the participants, during interviews, what degree of trust they had in their elected officials.

The strategies of the United States government for protecting the public from nuclear power plants have not been altered since their execution in the early 1980s. The population has become denser in the areas around nuclear power plants (Hammond, 2015). However, the main factors influencing the views of members of the public

concerning nuclear power plants have been psychological. Knowledge on the topic of nuclear power plants has been influenced by political attitudes, worldview, and value orientation. Trust of nuclear power has been intertwined with the debate on climate change. The polls have fluctuated regarding which politician is right or wrong on the safety risks of nuclear power plants (Keller, 2012).

Purpose of the Study

The purpose of this phenomenological study was to gain a better understanding of why individuals continue to live within the 10-mile radius of a nuclear power plant. Past nuclear disasters, such as Three Mile Island in Pennsylvania, Chernobyl in Ukraine, and Fukushima in Japan, have raised concerns about the safety hazards of nuclear reactors and the potential danger for neighboring communities living in the 10-mile-radius evacuation zone. During all three of the above incidents, communication and strategies of evacuation for the communities were problems (Hammond & Bier, 2014). These three incidents have led U. S. citizens to raise questions about nuclear energy, resulting in attitudes of mistrust toward the government and a reluctance to accept the presence of nuclear power plants in their neighborhoods. These incidents have also led to exploration of other energy resources as a way to abate global warming and climate change (Keller et al., 2012). Nonetheless, people still live close to nuclear power plants.

I aimed to explore the risk perceptions of people living within the evacuation zones, especially because the time needed to evacuate in the event of an accident (particularly in densely populated areas like New York) would cause mass chaos and a

substantial loss of life (Hammond & Bier, 2014). An individual's decision to live within one of these evacuation zones was of interest, because it might indicate an overextension of trust in outdated government safety policies and perhaps a false sense of security. The increase in population may justify changing the policy from a 10-mile evacuation zone to a 50-mile evacuation zone.

I also examined whether deliberative democracy played a role in the community members' reasoning, rationalization, and communication among themselves regarding safety policies. Deliberative democracy, a theory conceived by Rawls and Habermas, suggests that citizens make both ethical and moral decisions by using reasoning and rationalization through communicative actions (Benhabib, 1996; Bohman, 1996; Chambers, 1996, 2003; Cohen, 1993, 1997a, 1997b; Dryzek, 2000; Freeman, 2000; Gutmann & Thompson, 1996, 2004). Scholars have not addressed whether the use of deliberative democracy has been a source of rationalization among individuals living in the evacuation zones of nuclear power plants. I used the public reasoning and communicative role of deliberative democracy as my theoretical framework. This study also provided a better understanding of how the reasoning of community members aligns with their perceptions of their safety risk. The significance of the study lay in its elucidation of whether deliberative democracy can be a social safety tool for a community in this context.

Research Questions

Research Question 1 (RQ 1): What concerns do community members express about living in the evacuation zone of existing nuclear power plants?

Research Question 2 (RQ 2): How do rationalization and reasoning play a part in individuals' perceptions about their safety risk?

Research Question 3 (RQ 3): What do the community members perceive as the present and future benefits and disadvantages of existing nuclear power plants?

Theoretical Foundation

The theoretical foundation of my study drew on the work of two philosophers, Habermas and Rawls, and their theory of deliberative democracy. Rawls (1997) argued that political decisions can be derived not from personal incentives or the actions of government officials but through reasoning among citizens for the common good of the community. Following this theoretical framework, I explored how deliberative democracy within local communities influenced the makers of safety policies. Dialogue is vital for effective, deliberate, and democratic decisions on nuclear waste management, spills, and the minimization of health risks due to nuclear radiation. In this study, I focused on communication within local communities that used rationalization and reasoning. The purpose of the phenomenological approach was to explore the essence of the experience of individuals living close to a nuclear power plant and to create a descriptive foundation for understanding their perception of risks and conclusive reasoning regarding why they lived there.

Taking into consideration an individual's rationalization regarding self-preservation was not just a question of individual, private interest. Rationalization through communication could develop understanding within a community inside the 10-mile evacuation zone of a nuclear power plant. Rationalization can integrate and change the thoughts of community members who are influenced by religious leaders, political forces, or various forms of rhetoric (Habermas, 1984, p. 88). Deliberative democracy occurs when the inclusion of a group of deliberators (citizens) can be a binding justification of their motivations. Their opinions, values, and arguments are based on supporting the common good and are equally accepted by others within the group. Input from each person in the group is equally received and equally considered (Habermas, 1984).

Reciprocity is the drive and motivation established through acceptable reasoning involving each person in the group. Agreements reached through a mutual dialogue on ideas generated from the whole group, called *social solidarity*, are a sign of positive collaboration through self-preservation and reasoning (Habermas, 1984). Therefore, deliberation about reasoning can result in decisions regarding a new safety policy that supports the health and safety of the community. There needed to be an exploration of the perceptions of community members' rationalization of living within a 10-mile radius of a nuclear power plant. The study required a conceptual framework and research method that could explore the essence of these perceptions.

Conceptual Framework

A transcendental, phenomenological, research method was the conceptual framework for my study because it grounded the theory and allowed me to explore the essence of lived experience. Husserl (1931) stated, "Natural knowledge begins with experience and remains within experience" (p. 9). The interviews I conducted brought about a rich description of the participants' experience of the phenomenon of living in the evacuation zone of a nuclear power plant. The starting point of an investigation entails exploring a phenomenon. Habermas (1994) claimed, "What appears in the conscious is the phenomenon" (p. 26). The objective of the study was to explore the essence of a lived experience by interviewing participants. Moustakas (1994) asserted that the challenge is to explicate the meaning of the experience, recognize the aspects of consciousness, and understand the essence of the experience. This entailed a scientific study of the phenomenon, as it appeared to me in the consciousness.

Transcendental phenomenology was the best approach to obtain the data sought in this study. Unlike hermeneutical phenomenology, where the researcher focuses on interpretation, transcendental phenomenology focuses on the description of the participant's experience. It is a strategy of inquiry in which the researcher identifies the descriptive meaning of the essence of human experience, as described by research participants. In the case of citizens living in an evacuation zone, their decisions to evacuate, and associated behaviors, are determined by their perceived situational risk (Malesic, Prezelj, Juvan, Polic, & Uhan, 2015). The risk perceptions of participants, their

experiences of living in the evacuation zone, and their interpretations of what they saw as their priorities were all explored. Perception is a key factor that influences research participants' attitudes about potential dangers in their environment (Malesic et al., 2015). In the analysis of the collected data, I explored the role that deliberative democracy's rationalization and reasoning could play in changing public safety policies regarding nuclear power plants.

Nature of Study

The participants in this study were residents in the evacuation zone located near Diablo Canyon Power Plant in California. Participants had lived within the 10-mile-radius evacuation zone of the plant for at least 10 years between 1986 and 2017. The research questions were used to explore whether democratic deliberation via critical thinking skills has played a role in policy changes. Participants contributed data via interviews that explored individual, subjective experiences of living close to a nuclear power plant. The research design paradigm of phenomenology employed a top-down, exploratory, deductive approach.

Assumptions

One of the assumptions of this study was that deliberation on ideas exchanged after reasoning and rationalization among community members can reach and influence policymakers or public officials, possibly inspiring change in safety policies. I also assumed that the subjective experiences shared by the participants mirrored public debates on the pros and cons of nuclear power plants. The understanding of which

policies were relevant will benefit decision making in the future. The objective was to explore the essence of consciousness during interviews with the participants so as to obtain the subjective descriptions of their lived experiences.

The study's research problem included the assumption that individuals had subjective views and interpretations about living close to nuclear power plants. Another assumption was that participants answered interview questions honestly and openly and that the interview data were adequate to address the research questions. My hypothesis was that community members' reasoning about how they percieve their risk of living in the evacuation zone is linked to their influences by other means. Through the perceptions expressed by research participants about their lived experiences, I attempted to prove or disprove the hypothesis.

Scope and Delimitations

I focused on why an individual chooses to live in the evacuation zone of a nuclear power plant. The experiences of participants and how they perceived the phenomenon were explored through the process of derivatives that facilitate the knowledge of epoche, phenomenological reduction, and imaginative variation. I chose this specification to eliminate intentional and unintentional supposition of objectives derived from myself. I used the methodology of transcendental phenomenology to explore the essence of the perceived experiences. I applied the theory of deliberative democracy to the data to analyze the essence of participants' experience.

The delimitations of this study included that only participants who had lived in Diablo Canyon, California were included. Research participants were chosen only if they lived within the plume EPZ (a 10-mile radius) of the nuclear power plant. The results will be useful for future studies on nuclear-power-plant evacuation.

Limitations

The media has influenced the population's perceptions of nuclear power. The limitations of this study included my own biased views about nuclear power plants, which stemmed from media accounts and other sources, that could create bias during the interviews. Specific biases included my belief that nuclear power plants are dangerous because of a high risk of radioactive contamination and destruction of the environment.

Epoche is a Greek word that means to refrain from, stay away from, or abstain from (Moustakas, 1994). The process of epoche sets aside a researcher's judgment and eliminates the bias of everyday knowledge. Transcendental–phenomenological reduction and imaginative variation are methods that can help a researcher to refrain from bias thoughts (Moustakas, 1994). In addition, bracketing is a method used in qualitative research to eliminate the effect of biased thoughts (Tufford & Newman, 2012). One technique I choose to use was *memoing*, the recording of all ordinary thoughts in a journal alongside each interview (Creswell, 2013).

Due to my time frame and budget, I chose Diablo Canyon Power Plant as the location for this study. There was a need to study the experiences of members of communities in areas of higher risk. Participants were excluded based only on time and

accessibility. However, the above limitations did not interfere with the validity of the study. The journal recorded any possible bias limitations, as part of the results, to ensure credibility.

Significance

Nuclear reactors have been built all over the world. As of 2012, the United States had the largest number of reactors, approximately 104 (Pearce, 2012). One burden facing the nuclear power industry has been storing the byproducts, called used reactors, which encases the nuclear waste (spent fuel). These reactors' half-life is around 25,000 years of active fission or radioactivity (Pearce, 2012). Each power plant generates 20 metric tons of high-level radioactive waste a year. As of writing, the nuclear power industry, in its 40 years of existence, has produced 74,258 metric tons of high-level radioactive waste (Nuclear Energy Institute, n.d). The storage space to secure the accumulation of this high-level radioactive waste is the size of a football field stacked 8 yards deep (Nuclear Energy Institute, n.d.). Addressing the importance of safety risks that exist in the communities near nuclear power plants will promote positive social change by leading to better safety policies.

Definition of Terms

Epoche: Clearing all thoughts, suppositions, prejudgments, biases, and preconceived ideas to purify the conscious mind while witnessing a new phenomenon (Moustakas, 1994).

Imaginative variation: A method of arriving at the best possible structural description of the experience given by a participant among the multitude of possible cognitions (Moustakas, 1994).

Risk perception: The subjective attitude of the community, the self-assessed knowledge of the population's awareness of facts, and the level of preparedness to evacuate in case of radiation or an emergency spill or accident (Kopytko, 2011).

Transcendental–phenomenological reduction: A method of suspending judgment toward all thoughts to avoid the ordinary method of self-perception; a textural descriptive meaning that allows the essence of the phenomenon to be perceived (Moustakas, 1994).

Summary

The purpose of this qualitative study was to gain a better understanding of how individuals living in the evacuation zones of nuclear power plants perceive their safety risk. Deliberative democracy, defined by Habermas and Rawls, was one of the main theories guiding the research questions explored. I explored individuals' involvement with risk factors and their rationalization, communication, and justification efforts in relation to the phenomenon. In the theoretical framework, I emphasized communication, reasoning, and rationalization within local communities by using deliberative democracy. I used a transcendental phenomenology approach, which allowed for the exploration of participants' experiences and perceptions. The assumption underlying this study was that deliberative democracy plays a role in how safety risk is perceived. The research took

place within the community of Diablo Canyon, and data were collected through interviews with selected participants.

In the literature review in Chapter 2, I will detail sources that served as background for my study.

Chapter 2: Literature Review

Introduction

Radiation is a hazard to human health, and nuclear power plants have a 10-mile evacuation plan in the case of a radiation spill emergency. The purpose of this study was to explore the lived experiences of individuals living in the 10-mile evacuation zone of a nuclear power plant. In this chapter, I detail the strategy used in reviewing existing literature and present the literature review, which covers four major areas: (a) theoretical foundations, (b) the relationship between risk perceptions and the chosen theory and methodology, (c) published literature about risk perceptions of individuals living in evacuation zones, and (d) comparative studies of nuclear power plants.

Literature Search Strategy

Databases referenced to compile the literature review included Google Scholar and Walden University Library's databases, including Public Policy Administration, Sage Journals, Political Science Complete, JSTOR, and Thoreau. Information relating to the latest developments in nuclear power was retrieved from the websites of the Nuclear Energy Institute and the World Nuclear Association. The key words I used to search were *nuclear power plants*, *deliberative democracy*, *Aristotle*, *Kant*, *Habermas*, *Rawls*, and *risk perceptions*.

Theoretical Foundations

This study's theoretical foundation drew on the notion of deliberative democracy. The theory of deliberative democracy was developed from Habermas's (1984) theory of

communicative actions and Rawls's (1997) theory of justice. The notion is rooted in Aristotle's theories of ethics and justice (Davia, 2016; Greenberg & Cohen, 2014; Perrin, 1885) and Kant's theory of morals through rationalization and the critique of reason. Hume, in turn, had an impact on Kant. The influence of Aristotle, Kant, and Hume was reflected in the works of Habermas and Rawls that led up to deliberative democracy. The perceptions of individuals were the focus of my study, which included the assumption that individuals use rationalization, reasoning, and communication.

Aristotle

Aristotle sought knowledge, arguing that individuals' perceptions are influenced by past events that have occurred in their lives. Aristotle's theory begins with the belief that all knowledge is attained by individuals' experiences (Perrin, 1885) and that the experiences of human beings result from their attempt to achieve happiness. Aristotle defined ethics as the aim of achieving happiness and dictating how a person should act. Aristotle believed that happiness is an activity of living well and that a human being's function is to use rationality to achieve this goal (Perrin, 1885).

Aristotle identified justice as complete virtue toward others and for the good of others and asserted that the distribution of justice depends on the merits of the victims in a society. Rectificatory justice depends on the authorities assessing the value of someone's wrongful loss or gain and correcting it. Aristotle's notion of justice is based on the criteria of the merit innately possessed by birth, status, or family (Greenberg, 2014). The difference between virtue and justice is that virtue relates to a person's moral

state, and justice relates to a person's relationship with others. Aristotle associated happiness with virtuous activity. However, Aristotle identified two virtuous actions of excusing conditions: ignorance and force. The ethics of virtue are influenced by either ignorance or force (Crisp, 2014). My assumption was that the ethics of virtue is the phenomenon's final character and is an ethical conclusion agreed upon "for the most part." However, Aristotle's definition of for the most part is recognized, because things by nature are things that happen always or for the most part. Things that happen for the most part are things that exist in nature. However, these things that happen may not happen or may happen in a different manner (Simpson, 2014).

Aristotle further stated that to practice virtuous acts an individual must have interactions and relationships with other people. Aristotle explained that to achieve this successfully there needs to be a pursuit of contemplation of philosophical wisdom and philosophical reasoning (Crisp, 2014). In the case of communicating with others, rationalization and reasoning are key to gaining wisdom. Davia stated that Aristotle's notion of ethics included judgments and arguments made about the phenomenon and how it is perceived in an ethical manner. Aristotle identified the theoretical definition of ethics as a derivative of actions and not knowledge. Seeking human good and happiness is part of a "deliberative desire" (Davia, 2016, p. XX).

Kant and Hume

Kant believed in transcendental freedom. Kant explained morality as a motive that has either a duty or an inclination. Kant asserted that a duty is the part of morality that

gives an individual the freedom not to succumb to the temptations of his or her human desires. Inclination, on the other hand, is the state of being influenced by those human desires. Kant also claimed that freedom entails a person's determination to be either autonomous or heteronomous. Autonomous determination is when a person controls his or her own will, rather than his or her human desires. Heteronomous determination is allowing a person's human desires to control his or her will. Kant identified reason as imperative and imperative as either categorical or hypothetical: Categorical is the universal law that makes human beings rational, while hypothetical entails actions based on human desires. After writing this critique, Kant considered this to be a final accomplishment. However, Kant described awakening from a "dogmatic slumber" in the following fashion: "I freely admit that it was the remembrance of David Hume which, many years ago, first interrupted my dogmatic slumber and gave my investigations in the field of speculative philosophy a completely different direction" (as cited in Hanna, Louden, & Jimenez, 2016, p. 55). Kant was referring to Hume's *Problem of Induction*.

In *Problem of Induction*, Hume identified two propositions. The first, synthetic truth (matter of fact), is a posteriori (dependent on experience), meaningful, rich with information, and true by observation. The second, analytical truth (relationships of ideas), is a priori (independent of experience), meaningless, and true. An example of synthetic truth is observing a ball on the floor. An example of analytical truth is the statement, "all bachelors are single men." Hume argued that human beings are nonrational, incapable of using reason, and no more than animals (Hanna, 2016).

Kant amended Hume's propositions. In this new work, Kant asserted that Hume's synthetic truth is also a priori, that the role that humans play is one of dignity, and that the definition of categorical imperative stands true. Kant agreed with Hume's proposition that analytical truth is a priori, but disagreed with Hume's proposition that synthetic truth is not a priori (Hanna, 2016). Kant identified two kinds of knowledge and two kinds of judgement. The two kinds of knowledge are

1. A priori knowledge, which is (a) true by definition and (b) mathematical. It has two characteristics: (a) it is essential and (b) it is universal.
2. Empirical knowledge, which (a) depends on the senses and (b) is scientific. It also has two characteristics: (a) it is not essential and (b) it is not universal.

The two judgements were

1. Analytical judgment, with the characteristics that (a) it is true by definition and (b) the concept about the judgment's predicate is also in the concept about the judgement's subject.
2. Synthetic judgment, with the characteristics that (a) the concept about the subject adds a new concept, (b) it is not true by definition, and (c) it is ampliative.

An example of a priori knowledge is, "all rocks are rocks" or "two plus two equals four." An example of empirical knowledge is the law of gravity. An example of analytical judgment is "a female sibling is a sister." An example of synthetic judgment is "a sister wears a dress." Kant agreed with Hume that all analytical judgments are a priori,

and all empirical knowledge is synthetic, but Kant also believed that synthetic judgment is a priori knowledge.

Kant viewed clarified human beings' role in causality and induction. Hume saw subjective knowledge, within the relationship of cause and effect, as invalid. Kant countered Hume by first using the definition of metaphysics. Kant argued that the definition agreed upon by theorists of metaphysics is meant to find truths necessary and universal as a priori, and humans are to extend their knowledge via ampliative synthetic judgment.

Habermas and Rawls

Habermas and Rawls were relevant for my study of deliberative democracy because of their emphasis on communicative actions, rationality, and reasoning. Habermas emphasized how reason and rationality through communicative actions can bring about deliberative democracy. Rawls's theory of justice, where reasoning derives from a public perspective and the question of how the citizenry becomes reasonable, was also critical. Both philosophers derived the theory of deliberative democracy, and both saw their theories as being related to beneficial relationships among and between citizens (Barker, 2015). One of my assumptions for this study was that by using rationalization and reasoning and sharing different views through communication within communities, there may be a way to bring better safety regulations to people who live in nuclear-power-plant evacuation zones.

Rawls was a critic of utilitarianism. According to Rawls's theory of justice, each person is entitled to equal rights, and those rights should not be abused or sacrificed by those in power. Rawls presented a theory that could resolve conflicts among citizens by using reasoned responses to questions. Rawls believed in understanding and interpreting the thoughts of others and asserted that wrong interpretations lead to misunderstandings when they are expressed by individuals who are naive thinkers (Follesdale, 2014).

Rawls saw using reasoning as important, but not to the extent that it could make a major change in society. Rawls stated that, in their reasoning, citizens are seeking justice with the most reasonable expression of value with a family of political concepts, not just one. The fairness of their merit collapses into only one concept. The reasoning and criteria of that one concept are then up against interpretations from whomever receives and reviews the concept. Each reason must have principles and guidelines. Therefore, Rawls leaned toward deliberative democracy. Deliberative democracy, as a school of thought in political theory, asserts that the result of a political decision should be a fair and agreed-upon collaboration, with debates among citizens (Rawls, 1997).

Rawls believed that all humans have a sense of justice and have the capability to understand and apply this principle. Rawls saw people as rational beings with the ability to achieve mutual understanding by collaborating with each other. Rawls noted that by using the "veil of ignorance" (p. X) individuals can determine the morality and the principle of justice. Rawls explained that there are two principles of distributive justice:

1. The principle of liberty: Everyone has equal basic rights (civil, political, voting, freedom of speech, freedom of religion, and equal protection under the law).
2. The principle of social inequalities and economic inequalities: This principle has two conditions: (a) the principle of equal opportunity, or having equal access to jobs and careers if abilities are equal, and (b) the difference principle, which is that social and economic inequalities can be justified among disadvantaged groups in society (Follesdale, 2014).

Rawls's concept of justification in deliberative democracy can be seen in a situation recognizing the fairness of a political process where the decisions of a majority versus a minority may or may not show favoritism. During the conflicts of the 1960s, with struggles over the Vietnam War, women's rights, and the rights of African Americans, the public's focus was on the legitimacy of the government. This was when Rawls' theory of justice came into play. Racial and gender discrimination were factors in terms of equal rights, limited job opportunities, inadequate legal protections, and political opportunities (Follesdale, 2014). There is always more than one side to every argument, and everyone's perceptions can only be attained through their own epistemological limits of perception and reasoning. However, clear communication among citizens can logically lead to consensual decisions for the common good of the community (Barker, 2015).

Habermas's philosophical efforts were, from the beginning, aimed at creating a bridge between diverse thinkers. Habermas had an interest in the *public sphere* as a place

to reason, and it was through this notion that Haberman began to develop the theory of communicative action. The public sphere is where individuals come together as a public (Haneef, Zulfiquar, Alvi, & Faisal, 2014). This was the beginning of what has come to be called deliberative democracy. Habermas (1984) stated, "There are internal relations between the capacity for decentered perception, manipulation of things and events on the one hand, and the capacity for reaching intersubjective understanding about things and events on the other" (p. 14). Social media, television, news, and the Internet have created ethical life-worlds, which have become more generalized values about money and power. The media's influence has restructured conscious communal social actions, like deliberative democracy, with noncommunal purposive rational actions (Habermas, 1984).

Reason and rationalization, along with system and life-world, are a part of Habermas's theory of communicative action (Habermas, 1984). Habermas's theories of morality, politics, and law eventually developed into a more intense focus on political theory and rationality, which became the theory of deliberative democracy. Habermas saw the importance of civic engagement through public debate and viewed it as a constructive way to bring about moral and practical solutions to problems confronting political entities. Habermas believed that using the tools of everyday moral practice, ethical dialogue, and rationalization would result in justice prevailing (Haneef et al., 2014).

Relationship of Theory to Current Study

The developments made by Rawls and Habermas opened the door for participatory roles of civic engagement and for citizens to use deliberative democracy to defend their individual rights. The 1960s were characterized by a diminution of the democratic process, which began to become more obvious during the era of Rawls and Habermas with signs of anomie, disintegration, alienation, demoralization, and destabilization of western society (Ferrell, 2016). As a result of innovations in science and more transparency from the media, citizen involvement became more prevalent. Public perception about, and discussion of, radiation began to emerge with advances in technological development and the ability to understand the issue (Candela & Mariotto, 2014). With the development of television, computers, and social media, information has been traveling faster, has been more readily available, and has facilitated a high degree of communication in a short time span (Weart, 2012). This has created a new form of power among citizens of the world. This improvement in communications has outpaced the government's ability to stay updated. The problem with this type of exposure is the phenomenon of selection bias, or that the availability of so many avenues of information results in views becoming narrower and existing opinions being reinforced (Balla, Lodge, & Page, 2015, p. 129).

The challenge of addressing climate change has led to an increase in debate. One of the most popular debates has referred to the pros and cons of nuclear power plants and alternative energy resources. In addition, government officials have been finding it harder

to avoid disclosure of nuclear-energy accidents to the public (Pearce, 2012). I analyzed the concept of sharing thoughts without the goal of personal gain or using a deliberative democratic approach to address potential problems that nuclear power plants create. I stopped reviewing here due to time constraints. Please go through the rest of your chapter and look for the patterns I pointed out to you. I will now look at Chapter 3,

Literature Review Related to Key Concepts

Risk Perception

An individual's comprehension of a phenomenological risk through communication and debate is more than just a necessity for understanding the risk. The risk that a person communicates about could be a life-or-death situation. Doll and Hill conducted a study in the United Kingdom in 1954 credited with establishing smoking as a cause of cancer. Their target group consisted of male physicians over the age of 35 in the United Kingdom. The results of their study showed that only 12.7% of the 24,389 deaths from participants with cancer were nonsmokers (Krakow, Heard, & Newell, 2015). Prior to this study, there had been many assumptions and debates about the risk of smoking. In the beginning, risk perception about smoking showed ignorance among smokers. Communication and debate were the tools used to rationalize the risk of smoking. The concerns about smoking and the ignorance regarding the risks associated with it resulted in a need for a risk analysis and a quantitative study. The results of the quantitative study were initiated from the beginning using rationalization, reasoning, and thorough

discussions. The lack of knowledge or understanding of a risk requires rationalization and reasoning and sharing those thoughts (Krakow, Heard, & Newell, 2015).

What role do citizens play in understanding which risk measures are the most accurate? This is very important for citizens who are directly in harm's way or live close to potentially dangerous hazards. Conscious thought contributes greatly to how people reason about how they perceive a risk, and the decision sciences will attempt to eliminate this as part of their risk analysis (MacGillivray & Pidgeon, 2016). The task of estimation and choice has weighed heavily on the political arena, in terms of what risks are most relevant. In most cases, people who have protested loudly have tended to get the attention of politicians. This has usually happened after communities have deliberated and made their voice heard in the public arena. Citizen reactions toward the decision sciences have become more obvious when the results of the risks and benefits have not been clear. The public's deliberation has always been valued, and truth has been driven for the welfare of the community (MacGillivray & Pidgeon, 2016).

There should be deliberation on ethical values by ordinary citizens, and discussions in the public sphere on what will make a sustainable future society. Technological research studies should be conducted in a variety of disciplines, and their risk perspectives conducted at the macrosocial level. However, the fragmented literature and theoretical debates on how to prioritize risks by importance have needed improvement (MacGillivray & Pidgeon, 2016). The anti-nuclear-power-plant movement in the 1960s led to the environmental justice movement in the 1980s. However, there

were anti-nuclear-weapons protesters as far back as the 1950s (Kyne, 2015). Research regarding how people use reason to analyze risk is necessary and should be conducted more often.

Comparative Studies of Disaster Potential Evacuation Zones

Risk perception has not been the same across different groups and societies. In 1979, after the Three Mile Island nuclear accident, Slovic et al. conducted a major technological-risk-perception-model study relating to the risk of nuclear power plants. The risk was ranked highest by college students and women. The reasons for this high ranking were accidents from nuclear reactors, radioactive waste, and fear of fatalities and an inability to control the situation. However, businessmen and professionals ranked the risk of using nuclear power at 8. Among the hypotheses were social control, trust, and power relationships (Leong et al., 2014).

There have been significant differences in the way society accepts and understands the risk of nuclear power plants. The International Nuclear and Radiological Event Scale (INES) is an international tool for communicating how significant an ionization of radiation incident is to the public. The highest rating is 7 and the lowest is 1. The scale reads as follows: anomaly (1), incident (2), serious incident (3), accident with local consequences (4), accident with wider consequences (5), serious accident (6), and major accident (7). In March 2011, an earthquake struck Fukushima, Japan. Two hundred thousand people located 20 km from the nuclear power plant had to evacuate. This incident was rated 7 on the INES scale. Chernobyl is the only other incident that has rated

7 on the scale (Hasegawa et al., 2015). A study in China showed that people residing near the Jiangsu Province nuclear power plant had less acceptance of its presence because of their proximity to the nuclear power plant compared to Korea. A Korean study showed a socioeconomic stigma associated with the damage done by Fukushima. This was all evidence of misunderstandings of the risk perception of nuclear power plants' potential damage to communities (Leong et al., 2014).

There are many reasons for the risks having been perceived differently. The risks to those living close to a nuclear power plant, when plants should be shut down or phased out, and what constitutes a safe distance for residents, have still been broad concerns. Leong et al. (2014) studied the Fukushima incident's effect on the risk perceptions of people living close to the site of the incident. In the quantitative study, conducted at 18 universities in Japan, Korea, Taiwan, and China, a total of 1,814 students completed a survey on the effects of nuclear power plants (Leong et al., 2014). The survey was taken around July 2011, right after the Fukushima incident. Of the many categories surveyed, the one of interest was the perceived safe distance from a nuclear power plant. The average perceived safe distance was 273 km, and the averages for students from the different countries were 500 km for Taiwan, 11 km for Korea, 75 km for Japan, and 43 km for China. Most of the participants from Taiwan lived near the Kuosheng nuclear power plant (Leong et al., 2014).

A nuclear power plant has an added societal impact on the environment and the people who live inside the 10-mile evacuation zone around the plant. It is important to

study the risk perceptions of those people. Only surveys had been conducted of their risk perceptions (Leong et al., 2014). A qualitative phenomenological study allowed the exploration of subconscious thoughts and understanding of individuals' experiences because expressions of experience bring out the invariant essence of a phenomenon (Moustakas, 1994). It is important to understand the reasoning behind the different risk perceptions of individuals who live close to nuclear power plants.

At the time of writing, one in three Americans lived within a nuclear power plant evacuation zone, prompting an examination of why individuals would assume this risk and why the USNRC has limited the evacuation zones to only 10 miles rather than the 50 miles prescribed in other countries (Physicians for Social Responsibility, n.d.). U.S. citizens have tended to view their sense of reality through the interference of other interpretations within the political, social, and community arenas. This social construction that Americans deal with, inspect their views of realistic disjuncture on, and which forms the single reality that they trust in, is then tested by different understandings and interpretations outside of them. This counterverifiable rendition permits the disjuncture to be viewed as an idiosyncrasy, which can then be rationally clarified (Eyles, Fried, & Eyles, 2014).

An exploratory research project by Francioli (2015) in Cape Town, South Africa, involved a quantitative study of the evacuation of a hospital ward 16 km from the Koeberg Nuclear Power Station. The researchers distributed 33 semistructured questions to each of 230 individuals residing in the evacuation zone; 203 individuals answered. The

researchers' objective was to determine if the information provided on evacuation preparedness to the patients of this ward would be utilized. The results revealed poor knowledge and little concern by the participants concerning their preparedness (Francioli, 2015). The weakness of this study, inherent with this type of quantitative approach, was that it did not allow an understanding of the specific concern's participants displayed about residing in the evacuation zone of a nuclear power plant.

Malesic et al. (2015) conducted mixed-methods research at the Krsco nuclear power plant in Slovenia. Their research design included both an opinion survey and semistructured interviews on the experience of individuals' evacuation preparedness. Malesic et al. (2015) explored the theoretical conceptualization of their study and the past evacuations of Three Mile Island, Chernobyl, and Fukushima. The Fukushima incident forced the evacuation of 200,000 evacuees in a 10-km radius of the damaged reactor and 180,000 evacuees in a 20-km radius of the reactor. In comparison, if an evacuation should occur at the Krsco nuclear power plant in Slovenia, the entire country and most of southern and central eastern Europe would be in danger (Malesic et al., 2015). Evacuation preparedness included not just nuclear-power-plant accidents, but floods, volcanic eruptions, and hurricanes.

The objective of the study in Slovenia was to determine the evacuation preparedness of communities and companies near the Krsco nuclear power plant. One of the researchers' theoretical assumptions was that sociopsychological theories of the community should be part of the evacuation plan, because risk perception through

communication and education of the public should play into how the community would accept the plan to evacuate (Malesic et al., 2015). For this reason, they argued that communities should be part of the evacuation planning. The researchers conducted semistructured interviews with officials of schools, hospitals, nursing homes, companies, pharmacies, and hotels, among others. It was the responsibility of the officials of an organization to provide specific information about the risk perception for each disaster that might occur (Malesic et al., 2015). The results showed how members of the community perceived their risk in the case of flood, storm, nuclear-power-plant disaster, drought, or earthquake. On a scale where 5 is a high threat and 0 is no threat at all, a storm with hail and strong winds received a 2.96 rating and a nuclear disaster at the Krsco nuclear power plant received a 2.56 rating. The probability of a nuclear disaster was estimated at 25%, and the probability of a disaster not occurring was estimated at 53% (Malesic et al., 2015).

Synthesis of the Study

There has been a need for a qualitative study on the experiences and perceptions of citizens who live close to nuclear power plants. This study's objective was to understand the lived experiences of this phenomenon and, through those understandings, to explore the role of deliberation in improving the risk perceptions of citizens. Aristotle, Kant, Habermas, and Rawls were all foundational to the concept of deliberative democracy. As history has unfolded, different groups have emerged to demand an expansion of rights and argue for justice. Justice includes individuals being safe in their

communities. I studied the effects of citizens' use of reasoning, rationalization, and communication to understand the risks they were taking by living in the evacuation zone of a nuclear power plant. There were possibilities of a high perception of risk, variable perceptions of risk, or no perception of risk at all among community members.

Habermas agreed with Kant on the moral obligations that humans ought to possess and on the notion that individuals are capable of being rational enough to distinguish right from wrong. Havermas also agreed with Kant and Rawls that humans should not be unjust, immoral, or unethical toward others. However, Habermas did question the possibility of a dispute between two groups with different views of what is unjust, immoral, or unethical (McCarthy, 1994). Therefore, obtaining rich descriptive experiences from individuals in the evacuation zone of a nuclear power plant was important.

During deliberative democracy, there can be discourse on an ethical decision or disagreements on an issue and how something should be done within a community. Habermas argued that to have a successful resolution, with the final objective being subjective mutuality with social benefits, there must be universal pragmatism within communication. If debates, discussions, and reasoning were used to overcome disagreements, the answer to the research questions regarding perceptions of safety risks and future advantages for the evacuation-zone community (Ferrell, 2016).

Perceptions are interpretations developed by the conscious mind. Throughout history, philosophers have debated how and why rational human thought is possible.

Understanding the roles that morality, ethics, virtue, human desires, and politics play in influencing the conscious mind was the purpose of this study. The approach selected was meaningful because Moustakas's (1994) empirical phenomenological research methods help with understanding the perceiving mind.

One social justice group was born during the Vietnam War when its members began protesting and advocating for the rights of their enlisted children. The group continued to function after the war ended, and its members eventually began a new battle fighting for the environmental safety of their communities. The group kept its original name, Mothers for Peace, with the new objective of fighting for safety rights from a mother's perspective. The members saw the need for better safety precautions at the nuclear power plants in their neighborhoods to protect their children and future generations. Their participatory role as citizens has been a model for other communities where nuclear-power-plant safety regulations have been outdated or insufficient (Delaure, 2011). The risk perspective of the Mothers for Peace stemmed from the group's desire to protect society's most vulnerable citizens and their futures in the United States.

Summary and Conclusions

The evolution of deliberative democracy began with philosophers like Aristotle, Hume, and Kant, and continued with the work of Habermas and Rawls. The theoretical foundation of my study was to use the concepts of rationalization, reasoning, and communication as a framework to examine the risk perceptions of those living near nuclear power plants. The assumption of this study was that communities use a form of

deliberative democracy, where rationalization, reasoning, and communication of ideas generate shared views. Based on this assumption, perceptions of the risks that are apparent to those in these communities may be unknown to people outside the communities.

I examined existing literature on deliberative democracy in this chapter. The literature explained how the theory of deliberative democracy can play a role within these communities, and how validation of the facts and judgments of an issue can become sound through using rationalization. My conceptual framework was built on the assumption that this theory may play a role in the outcome of resolving community issues and in understanding why people live in evacuation zones. If enough individuals understood the risks to their health, homes, families, and environment, the study could result in a better understanding of how risks are perceived. My objective was to answer the research questions and fill the gap in the literature regarding what individuals experience when living in the evacuation zone of a nuclear power plant.

By interviewing participants who had lived within 10 miles of a nuclear power plant for at least 10 years between 1986 and 2017, I developed and analyzed themes. In Chapter 3, I will discuss the procedures of how the data were collected and analyzed, along with the research design, the role of the researcher, the methodology, details of the sample, and ethical procedures.

Chapter 3: Research Method

Introduction

The purpose of this qualitative study was to gain a better understanding of how individuals living inside the 10-mile evacuation zone of a nuclear power plant experience this phenomenon. I used interviews with participants to explore their individual, subjective experiences and social perceptions of this phenomenon. The focus of this chapter is on the research design and its rationale, the research tradition employed, the strategy for collection of data, and my role as the researcher in my interactions with the participants. This study was an example of phenomenological research, an exploratory technique that brings out the essence of human experiences from participants (Moustakas, 1994).

Past nuclear accidents, such as Three Mile Island, Chernobyl, and Fukushima, have raised suspicions about the hazards of nuclear reactors and their potential danger to surrounding communities. These events have had effects on U.S. citizens living near nuclear power plants (Hammond, 2015). By following the phenomenological research tradition, I explored and focused on understanding the central, underlying meaning of participants' experiences.

Research Design and Rationale

I used a transcendental phenomenology approach to set aside previously formed judgments regarding the phenomenon and understand how it was perceived by the participants. I also explored the role of the conscious mind by having the participants

interpret what they perceived. The role of consciousness plays a part in how something is perceived and interpreted (Moustakas, 1994).

I used a bottom-up, exploratory, inductive approach—meaning that although the research was guided by certain theories, there were no guarantees that they were able to explain the phenomenon. The theory from the conceptual framework enhanced the findings of the study. My conceptual framework became apparent after the data collection and analysis. It emerged because there was a gap in the literature regarding the perceptions of individuals who live within the 10-miles evacuation zones of nuclear power plants.

Central Concepts

The central concepts of the study related to transcendental phenomenology and are mentioned throughout this chapter. These concepts are defined as follows.

Intentionality: the relationship between the object and the way the object appears in the conscious.

Lived experience: a participant's experience of the phenomenon.

Epoche: researchers' abstention from their own perceptions, thoughts, feelings or presuppositions about a phenomenon when collecting data.

Phenomenological reduction: describing an individual's experience through textural language.

Imaginative reduction: relying purely on participants' imagination rather than empirical data.

A priori: independent of experience or observation.

A posteriori: dependent on experience or observation.

Research Questions

RQ 1: What concerns do community members express about living in the evacuation zone of a nuclear power plant?

RQ 2: How do rationalization and reasoning play a part in individuals' perceptions about their safety risk?

RQ 3: What do the community members perceive as the present and future advantages and disadvantages of existing nuclear power plants?

Research Tradition

The phenomenological tradition has been described as knowledge as it refers to the conscious mind (Husserl, 1931). Husserl (1931) highlighted Aristotle's notion of intention and how it orients an object to the mind. I interpreted intentional acts by perceiving something in a judgmental manner of value. Husserl (1931) broadened the concept that the object may just be imaginary and not exist on a physical plane. However, using communalization where people are living with and interacting with, one another, I had an opportunity to explore how citizens could use phenomenological reduction as one of the community's natural, intuitive ways of perceiving a phenomenon (see Moustakas, 1994). I used phenomenology as a method of scientifically analyzing the experiences of the conscious mind. To be successful, I allowed my mind to be free of any biased thoughts, and I made an attempt to eliminate my own subjective interpretation. My

thoughts were in a transcendental structural condition, so as to reveal the objective information. This made interpretation of the experience possible. This is the method of bracketing (Husserl, 1931).

I employed phenomenology to examine the phenomenon from many views, perspectives, angles, and sides until I reached the essence of the experience of the phenomenon (see Moustakas, 1994). I had to concentrate on the conscious mind's perceptions of the experiences; this approach allowed me to delve into the lived experiences of the participants. I allowed the participants to give a rich description of the experience. I also allowed the participants to express what they understood about the information that was circulating about nuclear power plants. My intent was to explore their safety risk perceptions.

Rationale for the Chosen Tradition

There is more than one type of phenomenological study. The two most familiar approaches are hermeneutic phenomenology and transcendental phenomenology. The term transcendental has also been used synonymously with psychological or traditional when referring to phenomenological approaches. I chose to use a transcendental approach because it focuses on the description of a participant's experience. The hermeneutic approach focuses on the interpretation of the researcher and less on the participants' lived experience of the phenomenon.

I chose the phenomenological tradition to attain clarity and understanding of the common meanings generated from the essence of participants' experiences. Because they

expressed their thoughts and experiences regarding living close to a nuclear power plant, I was able to develop clarity while exploring their conscious mind. This allowed me to broaden the scope and essence of each participant's conscious mind regarding nuclear-power-plant hazards. I was then able to develop a foundation on which to base my theories about nuclear power plants' potential hazards or benefits, as perceived by citizens living near them.

Research Design Rationale

The rationale behind my research design was to understand what motivational stimuli and characteristic behaviors were being developed within a community by using a phenomenological research approach (Moustakas, 1994). Exploring the reasoning and rationalization among citizens and how they perceived their situation near a nuclear power plant allowed me to collect rich descriptions of the phenomenon. Deliberative democracy has been a longstanding method of civic engagement among the citizens within studied community (Delaure, 2011). However, exploring the risk perceptions of the individuals who resided in the evacuation zone of the nuclear power plant had never been attempted.

Individuals living close to a nuclear power plant may show the influences of civic engagement based on democratic deliberation. This research design allowed me to explore this theory of deliberative democracy and to contextualize the results. Policy makers could make changes if the target population perceived the phenomenon to be a safety threat. As a result, initiating campaigns and mobilizing others to support the cause

through deliberative democracy could transition into influencing the thoughts of the citizens (Candela & Mariotto, 2014). I did not use a quantitative method in this study, because the study required an exploratory, subjective perspective based on participants' lived experiences of the phenomenon (see Balla et al., 2015).

Role of the Researcher

My role was to be an observer, interviewer, and protector of the research participants (Sieber, 2013). I had no professional affiliation with the nuclear power plant or participants involvement in the research. I did have a brief dialogue with an advocate who appeared to be well-versed on the inner workings of the San Onofre nuclear power plant. However, the results of any exchange that generated bias were bracketed throughout this study. I used the bracketing process (epoche) to make sure that my subjective views were transparent to the reader. I used phenomenological reduction to listen to the participants with the conscious and deliberate intent of understanding their perspective. I used imaginative variation by approaching the phenomenon from different perspectives. I allowed my imagination to be free of any roles and positions.

Methodology

Participant Selection

In 1985, Diablo Canyon Power Plant opened 80 km west of the San Andreas fault. At the time of writing, it was owned by Pacific Gas and Electric (PG&E). The target population lived within the 10-mile EPZ of the power plant, in Baywood–Los Osos, located halfway between Los Angeles and San Francisco. The city was in San Luis

Obispo County, a popular tourist destination known for its low crime rate, beautiful wineries, fishing, boating, fairgrounds, highly sought universities, and good weather. The single greatest category of employment in the county was administration, in which 15% of the population (approximately 750 people) were employed with a median annual salary of $46,000. The next greatest category of employment was health and social services, with 12% of the population (approximately 600 people) employed with a median annual salary of $90,000. The third greatest category of employment was management, in which 11.7% of the population (approximately 583 people) were employed with a median annual salary of $63,000.

Nationally, home ownership was 63.9%. In Baywood–Los Osos home ownership was 47.1%. The largest property share value of owner-dwelling housing in Baywood–Los Osos was between $500,000 and $750,000. This was above the national average. Racial demographics were as follows: 77.8% White, 16.6% Hispanic, 1.9% Asian, and 16% Black. The median age of native-born citizens of Baywood–Los Osos was 49.2 years, generally older than the foreign-born population. Of those aged 18 to 54 years, 803 were foreign born and 3722 were native born. Of those aged 55 to 75 years, 425 were foreign born, and 3663 were native born.

The target population pool was part of the sampling strategy plan that I used. Sampling was purposeful, and recruited participants had to meet all listed criteria (see Palinkas et al., 2015). My first criterion was that each participant had to show proof of being a consenting adult with photographic identification. All participants had to have

experienced living close to Diablo Canyon Power Plant. Participants had to be willing to share their experiences and undertake somewhat lengthy interviews with me. They also had to be willing to allow their interviews to be recorded. The selection of participants was not based on opposition or support for the nuclear power plant. Community members who had neutral feelings or no concerns or information regarding the nuclear power plant were also interviewed.

During the preinterview screening of the potential participants, I confirmed their criteria qualifications by having the participant ssign the consent form and by making sure that they had firsthand experience with the phenomenon. The consent form also screened out all vulnerable participants. Each participant again had to prove his or her identity by showing a legal form of identification with a photograph. The three requirements for my purposeful sampling approach were (a) participants signed the consent form, (b) participants showed understanding of what the consent form was expecting by reporting back to me their understanding, and (c) participants understood their rights as participants, again by reporting back to me their rights (see Moustakas, 1994). My sample consisted of 15 participants. My justification for this sample size stemmed from my budget and that I had acquired enough participants to reach saturation (see Moustakas, 1994). I reached saturation once illumination of the research questions was reached.

Data Collection

My primary method of data collection was in-depth interviews. The interviews were semistructured and consisted of open-ended questions that encouraged a rich description of participants' experiences (Appendix B). The questions I asked were consistent with all participants, and I asked them in a way to encourage free conversation from the interviewees. I did this by encouraging the participant to provide thick descriptions of the experience. The interviews were stimulated by opening the interviews up with casual dialogue so that I could gain an easy and comfortable rapport with each participant. I exchanged general information about myself. My strategy was to build a rapport with the interviewee to achieve an open and honest connection that would result in comprehensive responses to more detailed questions later. I obtained thick descriptions from my semistructured interviews by using different types of follow-up and probe questions. This type of insight, coming from the interviewees, helps to promote the credibility of the study (Shenton, 2003).

I had participants describe the phenomenon in sufficient detail to allow me to appraise the extent to which the conclusions drawn could transfer to other times, settings, situations, and subjects. I wanted the participant to evoke an open self (see Moustakas, 1994). I encouraged each participant to express him or herself, and I allowed myself to be in a learning and empathetic mindset toward my participants (see Lin, 2013).

The interviews took place in an environment that guaranteed confidentiality for the participant. I carried out the interviews by both taking notes and recording them with

a digital recorder. If the recorder had stopped working, I had a backup recorder ready for use. However, this never occurred. Note-taking included my journal for memoing and bracketing possible biased thoughts (see Moustakas, 1994). To the extent that time and budget allowed, interviews were face-to-face. Each interview was conducted in the city where the participant resided; however, when a face-to-face interview was not possible, the interview was conducted by telephone or teleconference. I scheduled each interview at the convenience of the participant.

The execution phase for interviews was approximately 2 weeks long. I set up a place at the community center in Morro Bay, where prior arrangement was made for private interviews. I limited the number of interviews to only two per day. Each interview lasted roughly 30–60 minutes, but I left enough time for the participants' issues to be accounted for, even if they were not a part of my interview questions. When there was time left over, I followed up on my notes, journals, and preparation for the next week or interview. The exit phase of each interview included a reassurance to the participant that his or her feedback would be confidential and that it was intended to contribute to a positive change in his or her community.

Procedures for Recruitment, Participation, and Data Collection

I initiated the recruitment of participants by placing flyers in local grocery markets, on church bulletin boards, and in other public places. The criteria for the participants I was seeking were explained in the flyers, so potential participants understood their role and the study expectations. E-mails and phone calls were used for

any follow-up questions I had after interviews were conducted. Recruitment was slow to begin with.

Data Analysis Plan

After the interviews, I organized the data by using Microsoft Excel and NVivo to create themes, codes, keywords, and phrases. The combination of the different keywords and phrases identified patterns and themes collected from the interviews. Some of the coding was based on identification of the time frame of an incident, called a date reference of the experience. The flexibility and legitimacy of the results were also assisted by using NVivo coding for data analysis to find patterns of themes and generalizations. All collected data will be stored for 5 years after publication and then destroyed.

Issues of Trustworthiness

Credibility

The main goal of my collection of data was to promote rich descriptions of the phenomenon by participants. The primary tactic I used to ensure trustworthiness was to engage in member checks. I accomplished this by making sure that statements made by the participants were given an opportunity to be reiterated, verified, and explained in more detail. Date references (i.e., Fukushima, Japan tsunami) comprised one of the ways I could identify and compare each participant's state of mind during the phenomenon experienced (Kornbluh, 2015). I employed triangulation to attain rich, thick data descriptions from participants' interviews to the point where saturation was achieved.

Saturation was accomplished after the answers to the interview questions began to repeat and no evidence of new themes appeared. This allowed me to contextualize the results (Kornbluh, 2015).

I established early in the relationship with each participant that the interviewer and the participant were equal partners in the study. I did this by diminishing any possible fear of judgment on the part of the participant. One way of achieving this was to convey a sense of trust and to assure the participant that my intentions were to accurately convey their perspectives and were free from any political motives. I welcomed scrutiny from peers and colleagues to get fresh perspectives regarding my assumptions.

Transferability

The chosen participants in my research were able to provide rich, thick descriptions of the phenomenon. This information—the life experiences of individuals living in the evacuation zone of a nuclear power plant—has never been explored before. The benefit of giving a thick, rich description of the phenomenon was that conclusions could be drawn that might be transferable to other times, settings, situations, and subjects. The reliability of recording and managing data contexts resulted in more authentic and reliable sociologies. The rationale was that the narrations presented in the subjects' words were from the bottom of the heart (Lin, 2013, p. 1).

Dependability

I achieved dependability by creating an audit trail to record the origin of information. I used my journal to record dates and times of events as markers during

objective thoughts from the interviewee. I allowed the observer to be able to trace the path of the research step-by-step as decisions were being made by using the audit trail.

Confirmability

My interviewing was reflexive and illustrative during the data collection. I recorded my preconceived thoughts and biases in a journal and annotated my reflective commentary. I adhered to a very distinct and reflective audit trail throughout the collection of data by using a reflexive journal for memoing during each interview. This allowed the reader to follow and trace all reflective thoughts from the researcher. My personal history on the topic was part of the final interpretation.

Ethical Considerations

The most important ethical consideration was to protect my participants (Sieber, 2013). I protected the confidentiality of participants by using codes to identify them. I identified each participant without using a name or referring to roles or incidents related to the project (Saldana, 2014).

During the initial processing of a potential participant, I had the participants sign an informed consent form. This consent form detailed the purpose of the research and listed any potential risks or benefits from participation in the study. The form was dated and signed by both the potential participant and me. During each preinterview, I clearly identified myself and the sponsoring institution and clearly stated how the participant was selected. Participants were guaranteed confidentiality, assured that they could withdraw at any time, and given names of contacts to consult in case any questions arose.

The following measures were taken to ensure confidentiality: no names were used, all identifying characteristics in any description of responses (e.g., occupation, city, or ethnic background) were changed, audio tapes were only listened to in my home by me and will be destroyed after publication, and all discussions were confidential unless I had a suspicion of illegal activity by the participant. The data were kept in encrypted form and were available only to me during collection. Once the results have been published, the data will be destroyed.

Summary

The approach for this study was characterized as transcendental phenomenological. The rationale behind this approach was the opportunity it afforded to explore the experiences expressed by the participants. The three components of this research design included (a) the philosophical worldviews of the participants, (b) thorough interpretations, and (c) analysis. The focus was exploration of what participants had in common through a qualitative phenomenological approach. My assumption was that each participant would have different perceptions regarding the experience of living close to a nuclear power plant. I used a variety of procedures to investigate the varying degrees of conscious experience of the phenomenon of living close to a nuclear power plant. The result of the interviews I carried out was a composite of the participants' descriptive essences of their experiences.

Chapter 4: Results

Introduction

The purpose of the research was to gain a better understanding of why individuals continued to live inside a 10-mile radius of a nuclear power plant. Past nuclear disasters, such as Three Mile Island, Chernobyl, and Fukushima, have raised concerns about the safety hazards of nuclear reactors and the potential danger for neighboring communities living in the 10-mile-radius evacuation zone. During all three incidents, communication and strategies of evacuation for the communities were problems (Hammond & Bier, 2014). The public reasoning and communicative role of deliberative democracy formed my theoretical framework, and I designed the research questions to explore this. The research questions allowed for a better understanding of how well the reasoning of community members agreed with their perceptions of their safety risk. The significance of the study lay in its elucidation of whether deliberative democracy can be a social safety tool for a community in this context.

This portion of the chapter first covers the demographics of the participants and recruitment and interview procedures. Data collection code definitions and themes are then explained in detail. The trustworthiness is then covered before presentation of the results, relating to the three research questions.

During my visit to Baywood–Los Osos, California, I discovered that Diablo Canyon Power Plant has been scheduled for decommissioning in the year 2025. This

created an awareness of concern from the participants that may or may not weigh on my findings. To keep all findings accurate, I included it in the results.

A second observation worth mentioning, which had to wait until my visit, concerns the exits out of Baywood-Los Osos. There were two exits out of the community of Baywood-Los Osos. One exit was along the coast from Baywood Park to Morro Bay (6 miles away) and San Luis Obispo (13 miles away). The other exit was inland, from Los Osos, with a distance of approximately 10 miles. Both exits from Baywood-Los Osos to adjacent towns were, for the most part, a single lane wide.

Demographics

The racial demographics of Baywood-Los Osos were as follows: 77.8% White, 16.6% Hispanic, 1.9% Asian, and 16% Black. The median age of native-born citizens of Baywood–Los Osos was 49.2 years, which was higher than that of foreign-born citizens. Of those aged 18 to 54 years, 803 were foreign born, and 3,722 were native born. Of those aged 55 to 75 years, 425 were foreign born, and 3,663 were native born.

There were 15 participants in the sample. All 15 participants were White, and none were native born. I interviewed three men and 12 women. Two of the men and two of the women were under the age of 30 years. The others were between 40 and 65 years of age.

Recruitment

Participants were willing to share their experiences and were willing and able to take part in hour-long interviews with me. However, the interviews actually lasted 20

minutes on average. They were also willing for their interviews to be recorded. Selection of participants was not based on opposition or support for the nuclear power plant. Three of the recruited participants volunteered in advance that they were members of Mothers for Peace. Except for the knowledge of these three participants, I had no knowledge of the stance of potential participants regarding Diablo Canyon Power Plant. During the interviews, the Mothers for Peace members promoted their beliefs against the Diablo Canyon Power Plant and demonstrated knowledge about the plant. I asked no personal information of the participants after they showed proof of being a consenting adult; this allowed each to speak more freely during the interviews.

Interview

The recruitment and interviews were conducted back to back in May 2018. Due to time constraints and convenience of the participants, I conducted three interviews each day. The data collected were the transcripts of the digital recordings and each participant's age range. I conducted three interviews at the Morro Bay Community Center and 12 interviews at the Baywood–Los Osos Community Center

The goal was to allow participants to give a rich description of their experiences of what they perceived through their own expressions and interpretations regarding the safety risk of Diablo Canyon Power Plant. The questions asked were consistent from participant to participant, followed the same order for each participant, and were asked in a way to encourage free conversation from the interviewee. The interviews began with

casual introductory dialogue to build rapport with each participant. The main objective was to explore the three research questions.

Interview Questions

The 15 participants each answered seven interview questions. During the interview, I asked the questions in an order such that there was no room for suggestive thought and the participant was encouraged to self-reflect. In that way, I was not introducing subconscious suggestions to the participants to talk about nuclear power plants prematurely. I preferred the participant to bring up what they thought their environmental concerns were, because it may not have been the nuclear power plant. Another strategy I used in the questioning order was to ask questions to create trust and rapport. The first question was, what do you like about your community? This procedure encouraged rapport with the participants that encouraged sharing of feelings about their community (see Moustakas, 1994). The sequence in which I asked the interview questions also reflected the numbering of the themes that developed later from the interview questions and responses.

Data Collection Definition and Codes

The objective of this research was to answer the three research questions. A theme was established from each interview question, and the themes were numbered the same as the questions (Saldana, 2014). I coded the answers to the questions and used these to analyze and interpret the data. A given answer to a question was counted only once per participant, no matter how many times they used it in their response to the question.

Participants could give more than one answer to an interview question, and each answer was counted for the corresponding theme. The sections that follow detail, for each theme, the corresponding question, the definition of the participant interprets the interviewer's meaning of the question, and the collection of codes discovered during analysis of responses to the question.

Theme 1

Question. What are the benefits of living in your community?

Definition. Participants' understanding of what they see as benefits, to them, of living in their community near a nuclear power plant.

Codes. Good people neighbors, small community, beauty, nature, safe, clean air, good weather, good environment to grow up, raise, lower cost of living, slower pace life, less traffic, have own water, grow own vegetables, larger living space, less children, easier to find work, walkable community, community involvement.

Theme 2

Question. What environmental safety concerns do you have in your community?

Definition. Participants' perceptions as to what they see in their environment that is not nuclear related.

Codes. Water sewer, living close to nuclear power plant, evacuation, earthquakes, tsunami flooding, radiological release, living near forest, fires, no clear response plan, safety of endangered species, off limit areas, recycling, pollution, drought, overdevelopment.

Theme 3

Question. What degree of trust do you have in your elected official concerning the safety of Diablo Canyon Nuclear Power Plant?

Definition. Participants' degree of trust in elected officials.

Codes. *High trust*: accountability, concern of nuclear-power-plant age, officials understanding of nuclear-power-plant issues, take job seriously safety concerns. *Low trust*: lack of transparency, lack of knowledge about nuclear power, pro-nuclear, NRC focused on keeping plant open. *Moderate trust*: some officials working for the people, some concern to protect community, increased trust, mayor is activist. *Neutral Trust.*

Theme 4

Question. What are your main sources of gaining information about your community?

Definition. The different sources of information that participants use to learn about what is happening in their community.

Codes. Newspaper newsletter, people, internet, community group, local government meetings, radio, local TV news channel, reports, library.

Theme 5

Question. What do you know about nuclear power reactors?

Definition. Participants' knowledge conveyed about nuclear-power-plant reactors— devices that store radiation and create power.

Codes. Not very much, how nuclear power plant operates, deadly hazardous materials, nuclear-power-plant quality design utility, increased after Fukushima accident, putting off learning more, nuclear-power-plant facility issues, creates green renewable energy.

Theme 6

Question. What concerns do you have about nuclear power plants, if any? If you don't have any concerns, why not?

Definition. Participants' concerns expressed about the nuclear power plant.

Codes. Potential accidents, toxic nuclear waste, evacuation emergency plan, spent fuel terrorist attacks disaster, proper safe storage, devastation to area, loss of family death, operating nuclear power plant, radiological releases, health risks, none, proper operation of nuclear power plant, high operational cost, nuclear-power-plant closing impacts, little time spent thinking about nuclear-power-plant danger.

Theme 7

Question. What community discussions do you have about the nuclear power plant, and if you don't, would you like to in the future?

Definition. Participants' involvement in, or knowledge about, community discussions concerning the nuclear power plant.

Codes. Shutting down nuclear power plant, little to none, discussions with friend's kid safety, economic impact, safety, environmental issues, not enough

community discussions, educational series on nuclear-power-plant issues, people reject information, building de-sal plant, nuclear toxic waste, renewals.

Trustworthiness

Credibility

I used triangulation to attain rich, thick data descriptions from participants' interviews to the point where saturation was reached. Saturation was reached once the answers to the interview questions began to repeat and no evidence of new themes appeared. This allowed me to contextualize the results (see Kornbluh, 2015).

Transferability

The reliability of recording and managing data contexts resulted in more authentic and reliable sociologies. The rationale was that the narrations presented in the subjects' words were from the bottom of the heart (Lin, 2013, p. 1).

Dependability

I achieved dependability by creating an audit trail to record the origin of information. I used my journal to record dates and times of events as markers during objective thoughts from the interviewee. I allowed observers to use the audit trail to trace the path of the research step-by-step as decisions were being made.

Confirmability

My interviewing was reflexive and illustrative throughout the data collection. I recorded my preconceived thoughts and biases by using a journal and annotating my reflective commentary. I adhered to a distinct and reflective audit trail throughout the

collection of data. I accomplished this by using a reflexive journal for memoing during the interviews. This allowed the reader to follow and trace all reflective thoughts coming from the researcher. My personal history on the topic was part of the final interpretation.

Results for Research Question 1

RQ 1 was: What concerns do community members express about living in the evacuation zone of existing nuclear power plants?

Theme 2 and Theme 6 answered RQ 1. The participants' phenomenal distinction that they perceived and interpreted as they explained their environmental and nuclear-power-plant concerns were expressed during their interview answers. The research question asked what the concerns of the participants are.

Theme 2

The question associated with Theme 2 was: What environmental safety concerns do you have in your community? Apart from evacuation, radiation, and earthquakes, many participants stated that their concerns were nonnuclear in nature and related to the area close to where they resided. Participants' risk perceptions of these nonnuclear environmental concerns outweighed those of a nuclear-power-plant accident.

Participant 1 stated:

> So, when talking about the nuclear power plant, I am concerned that there might not be a clear vision for the people here of what we would have to do if something happened. And how likely it is that something may happen. No one's ever told me that. (Participant 1)

Participant 2 stated:

> We had some sewage issues, which we've just corrected with a new sewer. Now, we have water issues, which we're going to have to address with wells. Aside from that, those local problems we have always . . . We're within the three-minute or five-minute warning of Diablo Canyon, so that has always been sort of a concern in the back of your head and what would happen if you really did hear those sirens go off and you had to evacuate. There's only two ways in and out of our . . . two roads in and out of our community. If those are blocked, then there's no way to get out. (Participant 2)

Participant 10 stated, "Well, I think, of course, the drought is certainly a concern, and sometimes smoke from fires, and the fires themselves. Earthquakes." Participant 4 stated:

> I think about earthquakes more than I think about just about anything else. They're prevalent here, as in all of California and a fault line which I believe is called the Foothill Fault Line, I can look that up, but I believe it's called the Foothill Fault Line stretches from here all the way out two miles into the ocean. And it was discovered well after Diablo was built. That's the main one. Probably tsunami would be also a concern, they say we're all in the tsunami belt, whatever that means. Okay, maybe it's a small community on the tip of a little peninsula, and there's probably only two real ways to leave the area, to go East, inland. I

would think if there was a dangerous situation, leaving could be hard. (Participant 4)

Participant 5 stated:

I think the only one I have felt any concern about is . . . Where my located home is located is near . . . Oh, I can't think of the name of the . . . It's a forested area. I can't think of the name of it. It's right off Los Osos Valley Road. So, I've wondered if there was a fire. I'm very close to that, like four houses down. Would that impact me? When the rains come, would there be wash out there? This year we didn't have much rain but last year, I believe, was a lot of rain. It seems to make any difference at all. I try to keep the area around my home . . . you know, pull the weeds and take care of it. So, there hasn't been any problems. That was the only thing that really bothered me. (Participant 5)

Table 1 and Figure 1 indicate the distribution of codes for Theme 2.

Table 1

Codes for Interview Question 2: What Environmental Safety Concerns Do You Have About Living in Your Community?

Code	*n*	%
Evacuate	9	27
Radiation	3	9
Earthquake	7	21
Environmental	12	36
Fires	2	6
Total	33	100

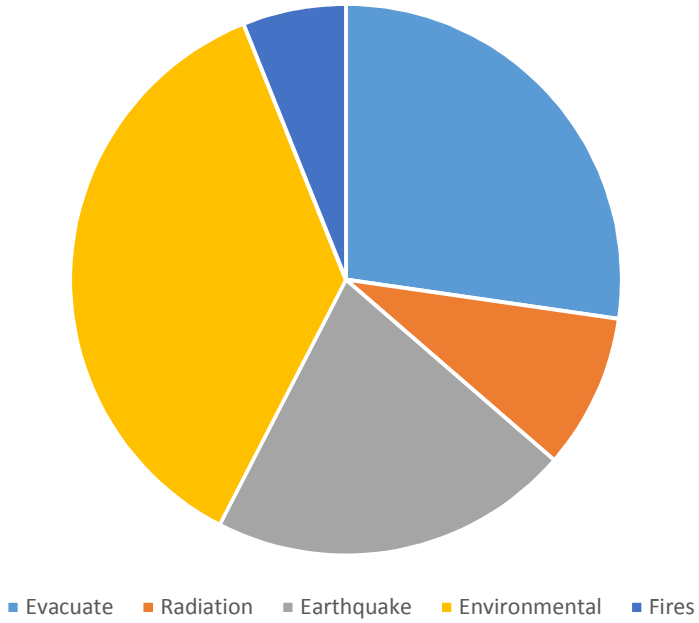

Figure 1. Codes for Interview Question 2: What environmental safety concerns do you have about living in your community?

Theme 2 Structural Description

The environmental concerns of the participants appeared to be mainly nonnuclear in nature. When I asked the question about the environmental concerns, I assumed that the participant's answers would concern the nuclear power plant. However, the results contradicted my biased assumption. Many participants perceived the nuclear power plant as not a high risk compared to other environmental factors. For instance, an evacuation could be a way to avoid the dangers of a possible fire, earthquake, or tsunami. An evacuation is a way to escape many kinds of danger. Earthquakes have always been a major concern in California.

Wildfires in the rural areas of Camp San Luis Obispo were very prominent in 2017 right after my interviews. The areas most vulnerable to wildfires are those with high vegetation. Many areas in Baywood-Los Osos had high vegetation.

Theme 6

The question associated with Theme 6 was: What concerns do you have about nuclear power plants? There was an important difference between the answers of participants with knowledge about the nuclear power plant and those of participants without such knowledge. Participants who knew very little about nuclear power perceived less of a risk from the nuclear power plant. On the other hand, it really depended on which knowledge was correct in both situations.

Participant 10 stated:

> I don't really have concerns. I think that they're built in such a way that it would protect the people in the community if there was something that went wrong with the materials. (Participant 10)

Participant 13 stated:

> Well, my concern also is about the decommissioning of the plant because it employs a lot of people. I think there's enough time between now and 2024 and '25 to try to help the people who depend on it for a livelihood to retrain. I think it is incumbent upon the county, and the state of California to try to help this county find a . . . give incentives so that we can develop other centers of commerce. Try to attract more high-tech companies here, build more low-income housing, so that

it's not just a hulking haunted shell of nothing when it's decommissioned. We must replace it with something positive. That's my concern. (Participant 13)

Participant 14 stated:

We're in earthquake area, so my concern would be safety during an earthquake and, I guess, a possible tsunami since they are right on the ocean, and how safely everything is stored and what the last effects . . . My kind of understanding is that it's kind of . . . The waste that they produce lasts forever or so long, and what is the implications of that for the environment and for future generations? (Participant 14)

Participant 11 stated:

I'd say I do. The primary concern I have again, is about the safety of the nuclear material including the spent nuclear material that's stored on site. And knowing that there are faults nearby that weren't mapped when the project was constructed. And we're learning more about them and learning that they're more a threat to the nuclear power point and to the storage holds than was realized at the time. I'd like to think that they over-designed everything so that it won't be as big an issue as it could potentially be, because otherwise I might be living in fear constantly. And that's not how I want to live. (Participant 11)

Table *2* and Figure 2 indicate the distribution of codes for Theme 6. Evacuation, radiation, and terrorists were all less of a concern than accidents at the nuclear power plant.

Table 2

Codes for Interview Question 6: What Concerns Do You Have About Nuclear Power Plants, If Any? If You Don't Have Any Concerns, Why Not?

Code	*n*	%
Accidents	15	35
Evacuation	4	9
Radiation release	4	9
Terrorist	4	9
Death	2	5
Spent fuel	9	21
None	3	7
Cost	2	5
Total	43	100

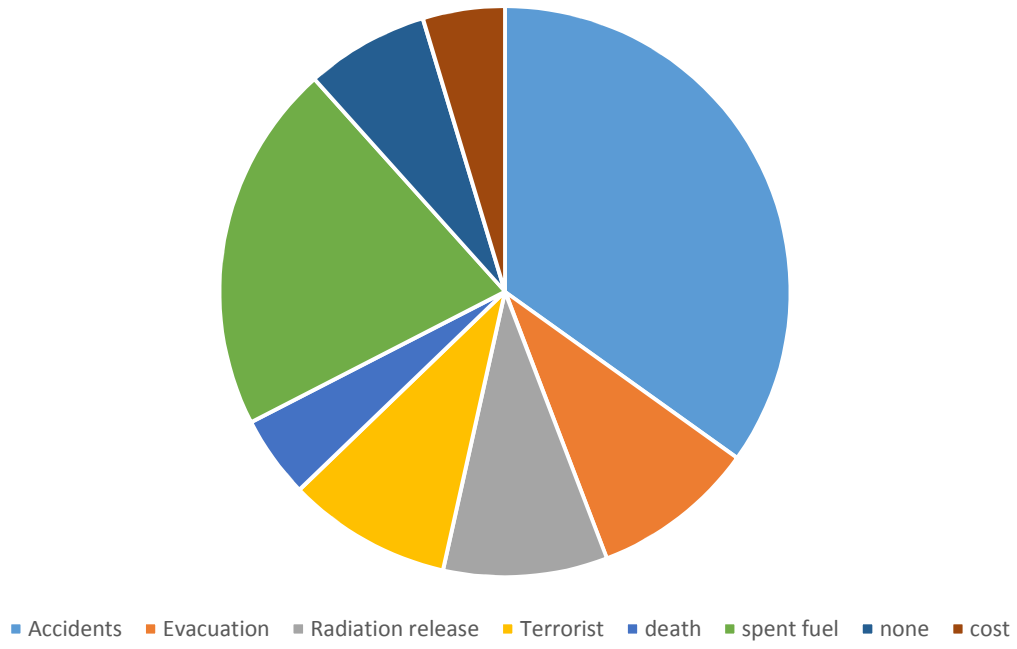

Figure 2. Codes for Interview Question 6: What concerns do you have about nuclear power plants, if any? If you don't have any concerns, why not?

Theme 6 Structural Description

The main objective was to explore the concerns of all participants regarding what they perceived to be the highest risk factor of living near a nuclear power plant, taking into consideration that they may not have perceived any risk at all. When asked about only environmental concerns, evacuation was rated a higher risk (5% higher than the nuclear power plant). Accidents and spent fuel were among the highest concerns. However, concern for terrorism was equal to that for radiation and evacuation. In particular, one participant felt reassured and hopeful knowing that reactors were constructed safely to diminish fear.

Results for Research Question 2

RQ 2 was: How do rationalization and reasoning play a part in individuals' perceptions about their safety risk?

Themes 4, 5 and 7 were best suited to answer RQ 2. In order for individuals to rationalize and reason about what their risk factors are, when living in an evacuation zone of any kind, they need to be informed in some way.

Theme 4

The question associated with Theme 4 was: What is your main source of gaining information about your community? I was impressed with how participants from the community of Baywood-Los Osos avoided relying on only one source of information about their community. This showed that they were drawing on more than one source when rationalizing their opinions about their community and the nuclear power plant.

Participant 4 stated:

I guess all the usual suspects. The San *Luis Obispo Tribune*, the *New Times Weekly*, the local Sierra Club also puts out a monthly newsletter that has a lot of information. Not every time but a lot. And, just neighbors, people talk. You heard of the online site called "Next-door?" (Participant 4)

Participant 6 stated:

Mostly online. If you find a news article about something on Diablo, I usually kind of more information about it. I kind of figure out what's going on with it, not just be in the dark and be like . . . Oh, I also have friends that have worked out there, too. My stepdad worked out there a long time ago. They've always provided me with information or anything like that. They keep up-to-date on it all the time because it's one of their jobs that he retired from. So, he keeps up with people, I'll pay attention to that kind of stuff. He'll tell me some certain things like that as well. (Participant 6)

Participant 12 stated:

I am very involved in local politics. I attend County Board of Supervisors meetings every two weeks when we have them. I go to local advisory council meetings and our community services district meetings. I've been on several of the advisory councils. And I try to attend as many meetings about the nuclear plant as possible, though I don't get to that many. I occasionally . . . I get emails. I

> listen to local programs on our radio network. I consider myself well informed. (Participant 12)

Participant 8 stated:

> The CSD meetings. "What are the main sources of gaining information about your community?" Yeah, I would say the newspaper, and then just hearing about the meetings that go on. The CSD is our local community services district, and they deal with the water and they oversaw the sewer, but then that got turned over to the county to implement that and get all the pipes in and build the plant. (Participant 8)

Table 3 and Figure 3 indicate the distribution of codes for Theme 4. The sources of information in the community were close to being distributed evenly.

Theme 4 Structural Description

The participants all showed a need to seek what is happening locally in the Baywood-Los Osos community. However, their interest also extended into the county beyond their community, as shown by references to seeking answers from the *San Luis Obispo Tribune*. News about Diablo Canyon Nuclear Power Plant appeared to always be of interest to participants. The need or spirit of participants to want to reach out within the community was an important finding.

Many participants used the "next door" Internet app that allowed community members to connect with their neighbors. One participant stated that they went to county

board supervisor meetings and community services district meetings for information about the nuclear power plant.

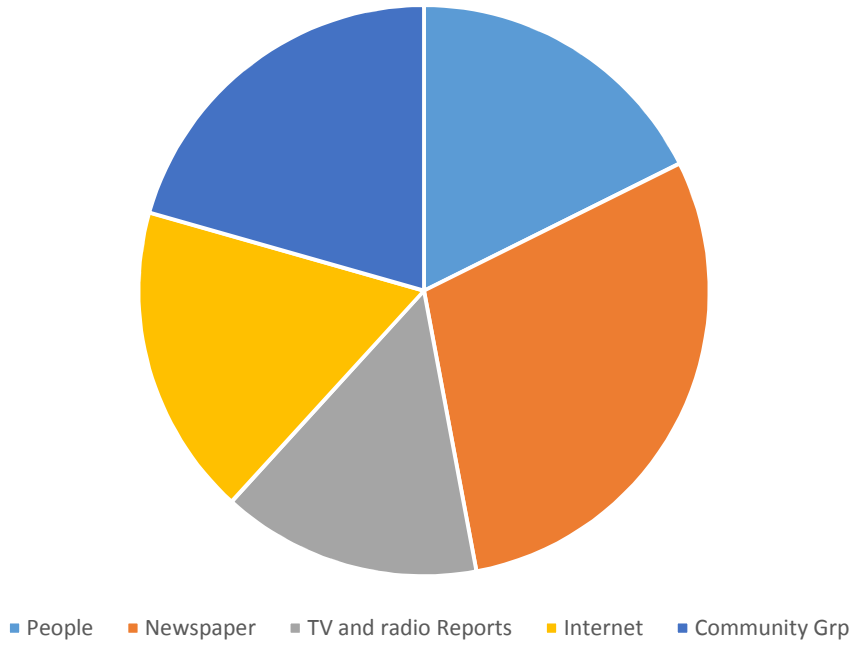

Figure 3. Codes for Interview Question 4: What are your main sources of gaining information about your community?

Table 3

Codes for Interview Question 4: What Are Your Main Sources of Gaining Information About Your Community?

Code	*n*	%
People	6	18
Newspaper	10	29
TV and radio reports	5	15
Internet	6	18
Community group	7	21
Total	34	100

Theme 5

The question associated with Theme 5 was: What do you know about nuclear power plant reactors? I asked this question because it separated participants more clearly regarding their knowledge and awareness of the nuclear power plant's reactor. It made it easier for me to see how participants from the community were informed on the subject of nuclear power plants in general. The comments were very explorative.

Participant 3 stated:

> Well, now I know a whole lot more than I did when I moved here. Just because I'm involved in an anti-nuclear group, and I've been traveling between here and Japan and working with people in Japan, as well, on this matter. . . . I don't know very much about them. I mean, I've heard things on television, and I guess some of those suspense movies. What's that one . . . China Syndrome, was that the movie with Jane Fonda? I don't know a lot about the reactors. It wasn't my expertise at school at all. I taught elementary school, that was not my thing. (Participant 3)

Participant 13 stated:

> Well, I know that they need to be constantly cooled. This is done at Diablo using ocean water, and the results of that mean . . . The discharge of the water that was used to cool the plant is then heated to about 20 degrees higher than the surrounding ocean water, so it changes the ecology of the marine life around the plant. I know that if there's a problem in the cooling system, that that can create a

meltdown and certain radioactive gasses can be released. The extent of that damage would depend on weather conditions at the time, which way the wind is blowing and how fast. That would be a mechanical problem.

If there were a tsunami, a storm event, that would create a different kind of damage, and it's hard to anticipate that kind of thing. The Fukushima problem, that resulted in Japan, after the tidal wave was devastating. From my understanding, the Nuclear Commission told American expatriates living in Japan, that if they were 50 miles within Fukushima, they should execute. The Diablo Canyon evacuation zone is much smaller, so I question that discrepancy Why would the commission make that suggestion or that guideline for those near Fukushima, and not have a 50-mile radius here?

However, I choose to live here. I did not even consider Diablo Canyon in my decision to come here. It wasn't even a factor. I might just say, I was thinking about this on the way over there, it would be a terrible thing, but I don't live my life thinking about it. Same thing as rape, it is a terrible thing. There are men everywhere, but I don't think they are going to do that to me. It's not going to happen to me, and if I did, I would fight. (Participant 13)

Table 4 and Figure 4 indicate the distribution of codes for Theme 5. Knowing how the reactors operate and not knowing very much about how they operate were closely matched.

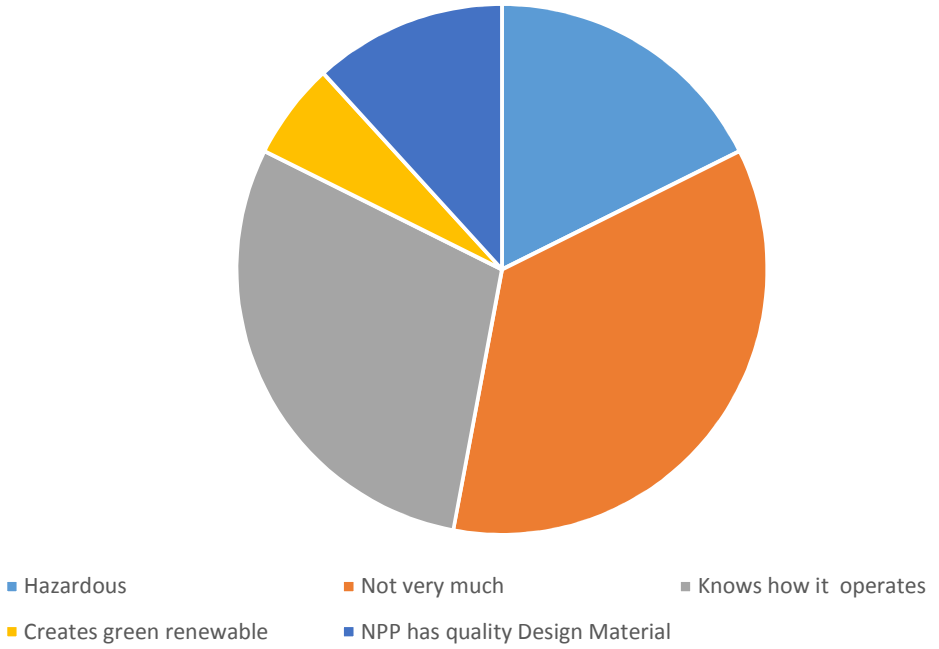

Figure 4. Codes for Interview Question 5: What do you know about nuclear power plant reactors?

Table 4

Codes for Interview Question 5: What Do You Know About Nuclear Power Plant Reactors?

Code	*n*	%
Hazardous	3	18
Not very much	6	35
Knows how it operates	5	29
Creates green renewable	1	6
Nuclear power plant has quality design material	2	12
Total	17	100

Theme 5 Structural Description

I noticed many types of knowledge that among the participants regarding nuclear reactors. One participant received most information from an antinuclear group. This may have provided a one-sided view and so not delivered a fair assessment of the facts.

Another participant received information about the reactors from Japan. However, any type of accurate information is better than none at all.

Another participant was not aware of Diablo Canyon Power Plant until they moved to the community. This participant had no knowledge of the plant's existence and, consequently, no risk factor concerns. The participant explained that they would be concerned when something happened and not before.

Theme 7

The question associated with Theme 7 was: What community discussions do you have about nuclear power plants? This was the final question that I purposefully asked during the interview. The answers given to this question allowed me to see how important participants thought it was to have discussions about the nuclear power plant.

Participant 11 stated:

> Yeah. I don't have any in-depth discussion. Now and then it comes up, often with my parents who live outside of the area who worry about me living so close to a nuclear power plant. Since the power plant is going to be closing, there's been more local discussion about it. That's been good. That's a good thing. There are a lot of issues that come along with it closing, economic and environmental issues

that need to be vetted. Hopefully we can find some resolution to those concerns. But I haven't personally been involved in the public discussion side of that. I would be interested in talking more about it, learning more about it. (Participant 11)

Participant 4 stated:

You know I think to live here you must have a mix of denial and fatalism, and somewhere in between that lies hope. Denial gets you through every day, fatalism makes you understand that everybody's gonna die anyway eventually, it's just a matter of how and when and where, I guess? (Participant 4)

Participant 13 stated:

I haven't had no community discussions, and there are too many other issues that I'm concerned about that seem to me to be more pressing right now. I am trusting that the operators of the plant are keeping it well maintained, and are progressing toward the decommissioning, and from what I read, that seems to be the case. I think my issues are more on a national basis, concerned with racism and other things and not this plant. I have successfully been able to put it on the back burner in my mind. (Participant 13)

Participant 9 stated:

This community has had a lot of discussion about the nuclear power plant and the Nuclear Regulatory Commission. They regularly send [inaudible] to have [inaudible] and the nuclear power plant [inaudible]. So, I can get quite a few of

those. And, I've been to the Nuclear Free California meetings that were held here a couple of years ago. And that's a group of activists and other people that want to see other nuclears shut down in California.

I think in general, the community share a different . . . Like I said before, they don't really want to think about the problems that are just over the hills [inaudible] and the waste that's building up there. So, I think only the activists type people, the environmental activists are really involved and concerned with it. And I think the general community at large, their concern that I hear from people and I've been to school district meetings on [inaudible] and when their revenues are peaking, it goes away. And most people are concerned about the economic impact it's going to have on the community. But personally, I'm more concerned about the waste that's going to be left and who's going to manage that waste and how good of a job is the company going to do managing the waste. Because once they shut it down, it's not over. It doesn't just disappear, that waste and that toxic problem out there [inaudible] on top of the earthquakes [inaudible]. It's going to be there for a long time. (Participant 9)

Participant 4 stated:

I've never been involved in any community discussions. I can say I've talked briefly with friends about it, especially now that we have kids. It wasn't a concern before, but now that we have kids curious . . . . They're just entering school, so curious about drills. We used to do drills when we were in school. If something

> happened, we'd all go into the auditorium, or something, and that just seems weird now to put all the people in the same spot. I guess, just mainly talking to friends about curiosities and what that means . . . and how it will affect the kids and if they'll notice or if they still do that. More personal conversations, but not often. (Participant 4)

Participant 5 stated:

> I haven't talked to anybody about it. I don't know if it's on anyone's mind. Like I said, I haven't heard anything or read anything, in discussions, either small group or the civic meetings that I've heard about, the meetings that I've gone to for People Helping People. I haven't heard anybody discuss it so I don't think it's utmost in anyone's mind right now, which doesn't mean it shouldn't be, but it isn't. (Participant 5)

Table 5 and Figure 5 indicate the distribution of codes for Theme 7. Over half of the participants stated that they had not had enough discussions about the nuclear power plant.

Theme 7 Structural Description

This question was very important for exploring the importance to participants of discussing the opinions of others in their community. Many participants wanted to have discussions about the nuclear power plant. This desire to want more community discussions could have stemmed from the Fukushima incident or other events like

wildfires that had happened in the area. The number of participants showing a need for discussion was very significant.

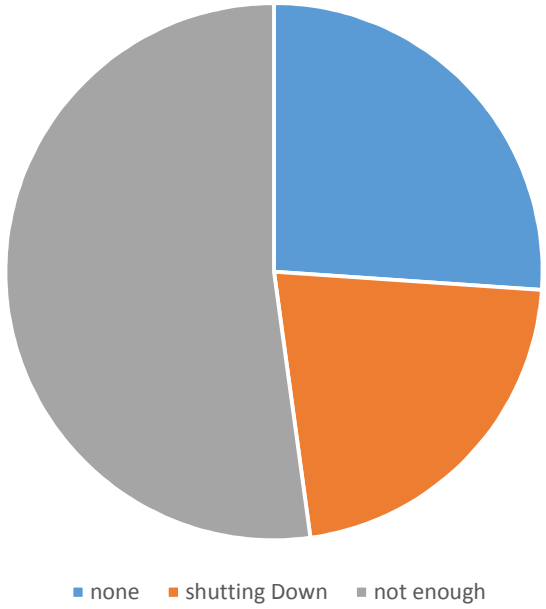

Figure 5. Codes for Interview Question 7: What community discussions do you have about the nuclear power plant, and if you don't, would you like to in the future? Why?

Table 5

Codes for Interview Question 7: What Community Discussions Do You Have About the Nuclear Power Plant, and If You Don't, Would You Like to in the Future? Why?

Code	*n*	%
None	6	26
Shutting down	5	22
Not enough	12	52
Total	23	100

Results for Research Question 3

RQ 3 was: What do the Community members perceive as the present and Future benefits and disadvantages of existing nuclear power plants?

Theme 1 and Theme 3 were used to answer RQ 3. The participants were given the opportunity to express their reasons for living in their community. Policy makers were identified by some and not by others.

Theme 1

The question associated with Theme 1 was: What are the benefits of living in your community? Participants perceived Baywood-Los Osos as being friendly, safe, and small. These traits reflected what the participants strived for and wanted to maintain. None of the participants mentioned any disadvantages of the community in any of their answers.

Participant 2 stated: "Our community is very small and we're not very much of a tourist community. So, it's very quiet here, safe for the children, and beautiful. That's why we like living here." Participant 3 stated:

> Living in this community, well, I grew up between Los Angeles and Tokyo. I can tell you that here, clean air . . . you know, I live on a ranch, so we have our own water, which is good. The ability to grow our own vegetables. Most of all, for me, just the space, having lived in two big cities. The people are wonderful. (Participant 3)

Participant 5 stated:

Previously, I came from Los Angeles, which is a community with a lot of people, a big community population-wise, traffic-wise. There are a lot more things to do there than there are here . . . more activities, but as I'm 64 now, I don't need as many activities. Up here, it's nice, people are very friendly, less traffic, easier for me to get around. The weather up here is lovely, it's cooler. I live in a manufactured mobile home park community, which is very quiet. It's a 55+ community, so there's no children. I kind of like that. Being a retired school teacher, I've had enough children for 35 years. I think that's probably the most . . . [crosstalk] the 405 freeway. (Participant 5)

Participant 14 stated:

It's a small community, so being able to know a lot of your neighbors. I have a son who's six so there's a feeling of safety because we know quite a bit of people. There's a lot of great activities for kids that are free most of the time. We've got great parks and libraries, and our community is so nature-oriented. We're so lucky to have . . . the state park is here, you can go to the beach. (Participant 14)

Participant 7 stated:

Well, there's many benefits in our community. Probably the environment ranks number one for me. We're nature lovers and love the ocean. I grew up in southern California near the coast and always had a love for the ocean and the open spaces. Our area down there in Orange County became so expensive that I couldn't afford to live there or raise my family.

> We came up the coast looking for a place that was a little more moderately priced, which in the early '90s when I got here it was . . . It's never been cheap, but it was better. We could afford to rent a house here.
>
> I like the smaller communities. The big cities don't offer a lot for me. I work as a carpenter so I can find work anywhere. Generally. Sometimes it takes a while but . . . I've found work in the nice smaller communities that I just felt more livable, more healthy living and so on. (Participant 7)

Table 6 and Figure 6 indicate the distribution of codes for Theme 1. Safety and beauty were not rated as highly as friendliness.

Table 6

Codes for Interview Question 1: What Are the Benefits of Living in Your Community?

Code	*n*	%
Small	12	23
Safety	7	13
Friendly community	15	28
Healthy resources	13	25
Beauty, nature	6	11
Total	53	100

Theme 1 Structural Description

The main purpose of this question was to see what participants were truly seeking in their community for the future. An individual's choice to live in any community is based on what that individual wants to maintain. Individuals have their own perspectives of risks, but every individual hopes that danger will not come his or her way in the future.

The future wants and needs of the participants appeared to be consistent with living in a community like Baywood-Los Osos. Most of the participants perceived the community to be safe, friendly, affordable, and healthy.

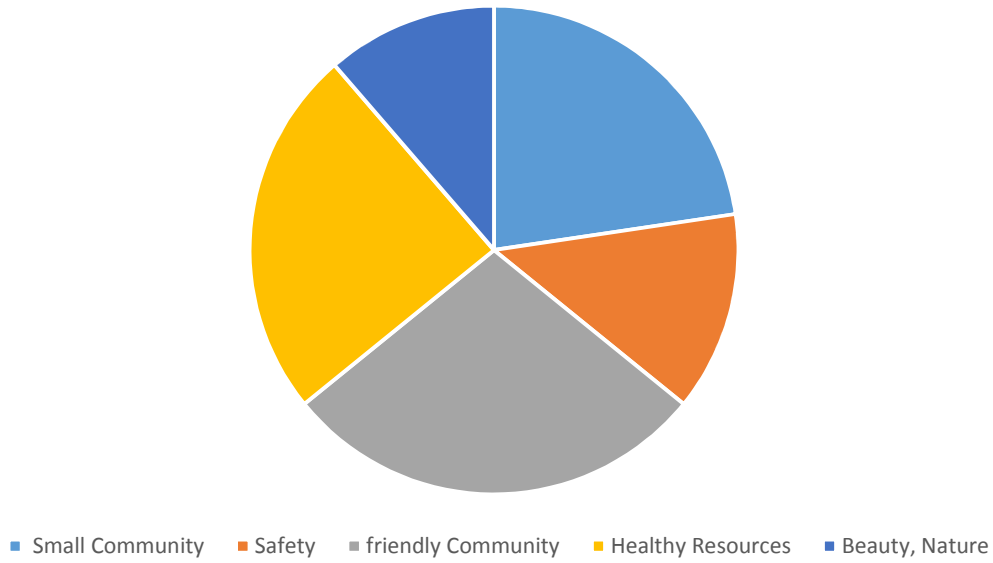

Figure 6. Codes for Interview Question 1: What are the benefits of living in your community?

Theme 3

The question associated with Theme 3 was: What degree of trust do you have in your elected officials? Few participants offered any negative comments about their elected officials. The most important information obtained from these answers was that the elected officials were the community's main source of money and jobs.

Participant 1 stated:

I'm reluctant to trust them because I feel like there's not transparency with what's going on there. I don't know what's happening over there. I remember hearing about some of

the tests that they were doing that were killing whales and for them to make sure that it could withstand a certain earthquake. And when I do read things like that, it scares me. And I wonder what else I don't know. (Participant 1)

Participant 6 stated:

> I know that Diablo Power Plant, obviously, provided a lot of jobs for people in this area. It kept a lot of people in this area, but with the closure, we've seen a decline in people buying houses around here or a lot of the people that were living here have left and found jobs elsewhere. It is also bringing in new people for still security jobs in case the power plant closed, but they still need people there to make sure it's not being ridden in or taken control of by anybody else.
>
> I do think our elected officials have helped us out a little bit in at least the closure of it. I can't remember who it was, but we had a big meeting here one day where they were on the brink of firing this guy because he wanted to close it. Everybody else on the electoral board was like, "No, no. We don't want to close. It benefits this . . ." and then he was fired because of that. We had a meeting here and there were so many people rallied for him. I do see that there are electoral officials that are trying to make the works for the people, but there's probably are some that are . . . I'm not going to say in the pocket of other people, but might have hand, or some relationship with some other people. (Participant 6)

Participant 9 stated:

> I would say that as far as the county supervisors that are here in the area, I trust them maybe about halfway to protect the community. Because I think they're pretty concerned about getting the revenue from the power plant that that brings to our area and it has for a long time. And now with it going to be shut down at the end of its license period, I think they're more on the side of protecting the corporation [inaudible] needs than protecting the community so much. I don't trust them to fully protect us from the dangers of the power plant. (Participant 9)

Participant 14 stated, "I'm not too familiar with our elected officials and their views on the power plant. I would say kind of neutral." Participant 8 stated, "I trust them. I've known people who have worked there, and they seem like they take their job very seriously in terms of safety." Table 7 and Figure 7 indicate the distribution of codes for Theme 3. Elected officials were rated by how they were trusted regarding their efforts for ensuring safety of the nuclear power plant. High and low trust were relatively evenly matched.

Table 7

Codes for Interview Question 3: What Degree of Trust Do You Have in Your Elected Official Concerning the Safety of Diablo Canyon Nuclear Power Plant?

Code	*n*	%
High	5	33
Low	4	27
Increased	3	7
Moderate	1	20
Neutral	2	14
Total	15	100

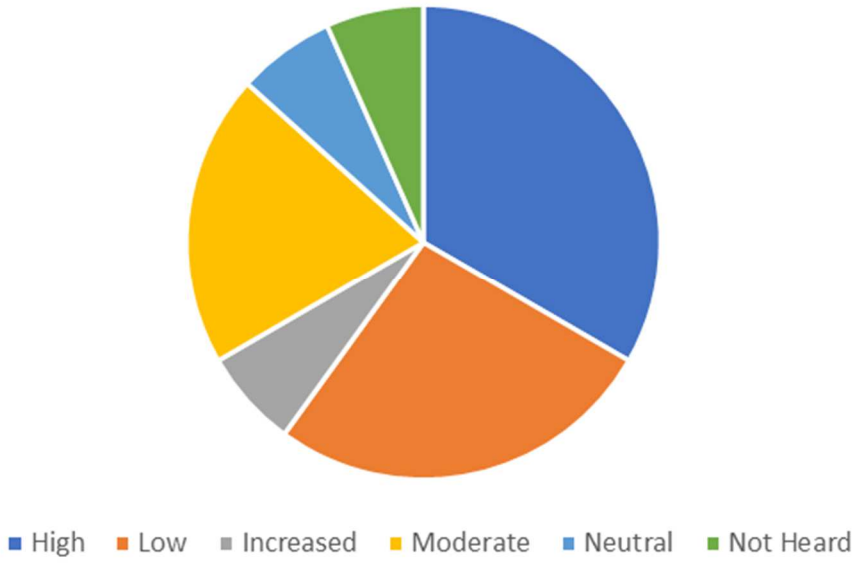

Figure 7. Codes for Interview Question 3: What degree of trust do you have in your elected official concerning the safety of Diablo Canyon Nuclear Power Plant?

Theme 3 Structural Description

It was very important to find out what the participants expected from their leaders and whom they saw as their leaders or elected officials. It was important to observe the influence that leaders may have had on citizens' decision-making abilities. The influence of how jobs and money came into the community needed to be explored.

Summary

The recruitment procedure gathered a total of 15 participants from Baywood–Los Osos, California. After making sure that all participants were able to take part, I collected data from face-to-face interviews. I explained the coding procedures using the interview questions, which I also used as the themes. The data in this chapter revealed seven themes from the seven interview questions. The answers to these questions were coded. I

calculated the percentages of how often different codes came up relative to all codes for each theme. The findings will be presented in Chapter 5

Chapter 5: Discussion, Conclusions, and Recommendations

In this study, I explored the risk perceptions of individuals who lived within the 10-mile-radius evacuation zone of a nuclear power plant. The time needed to evacuate in the event of a nuclear-power-plant accident would cause mass chaos as well as a substantial loss of life (Hammond & Bier, 2014). An individual's decision to live within one of these evacuation zones was of interest, because it could indicate an overextension of trust in outdated government safety policies and a false sense of security. Increase in population may be a reason to change the policy from a 10-mile evacuation zone to a 50-mile evacuation zone. I studied citizens of Baywood–Los Osos, California, exploring their risk perceptions and the reasoning behind their choices to live inside the evacuation zone of the Diablo Canyon Power Plant. I also examined whether deliberative democracy may have played a role in community members' reasoning, rationalization, and communication among themselves regarding safety policies.

The data reported in Chapter 4, collected from the interview questions, reflected the perceptions of the participants. The answers from the interview questions give a better understanding of how the conscious mind and perceptions of the participants rationalized the risk factors in their community. I derived a theme from each of the seven interview questions and coded the responses from the interviews for each theme. These codes are part of the interpretations used to answer the research questions. The interview questions and themes were numbered in the same way, and the seven themes were as follows.

1. What are the benefits of living in your community?
2. What are your environmental safety concerns?
3. What degree of trust do you have in your elected officials?
4. What is your main source of gaining information about your community?
5. What do you know about nuclear power plant reactors?
6. What concerns do you have about nuclear power plants?
7. What community discussions do you have about nuclear power plants?

Interpretation of the Findings

The interpretation of the results of the results are organized by the research question that they help answer. I started out with the three research questions.

RQ 1 was: What concerns do community members express about living in the evacuation zone of existing nuclear power plants? Theme 2 and Theme 6 were used to answer RQ 1.

RQ 2 was: How do rationalization and reasoning play a part in individuals' perceptions about their safety risk? Themes 4, 5, and 6 were used to answer RQ 2

RQ 3 was: What do the community members perceive as the present and future benefits and disadvantages of existing nuclear power plants? Themes 1 and 3 were used to answer RQ 3.

Research Question 1

Theme 2 responses showed that the different environmental safety concerns expressed by the participants were not all directed toward nuclear power plants. Many of

the concerns expressed were about other environmental risks. The personal and local situations of individuals within the community determined what they perceived to be the greatest concerns. Compare this to the findings discussed in Chapter 2 from Slovenia reported by Malesic et al. (2015), who found that a storm with hail and strong winds and a nuclear disaster were rated 2.96 and 2.56 out of 5, respectively, as threats.

The question tied to Theme 6 was purposefully asked close to the end of the interview. It asked directly about concerns relating to nuclear power plants. Accidents were the leading concern, followed by spent fuel. Surprisingly, evacuation made up only 9% of concern, the same as radiation release and terrorist attack. Baywood–Los Osos had only two single-lane roads for evacuation in the case of a nuclear-power-plant accident. The location, timing of similar incidents, and impact on individuals determined their response to questions regarding the relative weight of concerns.

In Chapter 2, I discussed the results of Leong et al. (2014), who found that in the wake of the Fukushima incident, students living near the Kuosheng nuclear power plant in Taiwan preferred a wider safety zone compared to students in three other countries in the region. However, this is not an option for the citizens of Baywood–Los Osos, California. Most of the residents would have to move to another city to have a safe distance from Diablo Canyon Power Plant. Thirty-five percent of the concern about environmental risks expressed by the participants from Baywood–Los Osos was about the chance of Diablo Canyon having an accident. More concern was expressed about

earthquakes and tsunamis, and there was no mention of increasing the radius of the evacuation zone.

Research Question 2

Theme 4 explored where and how information was obtained in the community. It appears that the participants were not influenced by any one source of information and gathered information from multiple sources. The community was at a stage where its members could exchange ideas with each other and deliberate without a polarized effect or view.

Theme 5, regarding knowledge about the operations of the nuclear power plant, gave me little to work with. The code not very much made up 35% of the responses. A few of the participants involved with environmentalist groups knew quite a bit. One-third of the participants knew how reactors operated, but only one-fifth of participants saw them as hazardous. Not much more can be evaluated from this information except that the participants were more aware than I had assumed before I began the study. Members of the community had the ability to share their knowledge and gaining more through future decommissioning meetings in San Luis Obispo.

The interview question associated with Theme 7 was the one that I had purposefully planned to ask as the last interview question. I wanted to see how important community discussions were in the community and whether there had been enough of them. During the early stages of my participant recruitment, I went to a decommissioning meeting that was sponsored by PG&E. The meeting did not have a great turnout of

citizens from Baywood–Los Osos, far fewer than I had anticipated would attend. I was not aware of any other meeting scheduled for the community of Baywood–Los Osos that pertained to Diablo Canyon Power Plant. The decommissioning meeting was conducted in San Luis Obispo, a different city.

For the question about how many community discussions the community has, none made up 29% of responses, and not enough made up 52% of responses. One participant mentioned that there was a denial to the reality of what would really happen if community members had to evacuate due to a nuclear-power-plant accident. Another participant mentioned that there were too many other things to worry about, so community members must pick their wars. The results suggest a need for more discussions among the citizens. The desire for community discussions was a positive sign: There is potential for members of this community to gain necessary support from each other.

Research Question 3

The question associated with Theme 1 was the first interview question I asked the participants. I had to explore the reasoning behind why participants chose to live in Baywood–Los Osos, California, so close to Diablo Canyon Power Plant. The first acknowledgements that participants expressed with this question were their descriptions of the people in Baywood–Los Osos as friendly. They said that the community was a small, healthy environment and a safe place to live. Exploring why the benefits of living in Baywood–Los Osos could override the risk of living inside the evacuation zone of a

nuclear power plant played a role in this study. There was very deliberative democracy in this community. However, the environment's friendliness, beauty, and fresh air were daily reinforcements to live their everyday lives (While staying there for a week, I did notice the warm welcomes that the people living there gave to others, including myself. It is a very beautiful place. Morro Bay is a tourist attraction that is less than 10 miles from Baywood–Los Osos. Inhabitants of both Morro Bay and Baywood–Los Osos live off the beach. It is a nice, affordable place to live. However, these are only biases that are not part of the interpretation of my findings).

Theme 3 investigated trust of community members toward their elected officials. Thirty-three percent of responses expressed high trust in elected officials, and 20% of responses expressed moderate trust. Participants also expressed that they depended on the revenue from the nuclear power plant for funds to run their schools and for employment. The participants identified the elected officials as being an influence throughout the community. They also expressed that the PG&E officials were part of their elected group of officials who played a role in the decisions regarding where the community's revenue went. The input from the community appears to have allowed the elected officials to make most of the decisions instead of the citizen being part of the decision making. There were not enough community deliberations happening. Over half of the participants expressed that they would like to have more community discussions about the nuclear power plant.

Limitations

A limitation of this study was conveyed during my interviews of known members of Mothers for Peace. My intent was to keep my own biased views away from theirs. As I allowed them to portray their negative opinions about the nuclear power plant, I had to make sure that my impressions stayed neutral. During these interviews, my assumptions were in a transcendental state. I tried to use transcendental phenomenology throughout. However, there were times when I had to pull their opinions and topic back to the research question. This limitation was my greatest challenge throughout the interviews, and I found it a constant effort during the interviews to refrain from bias.

Recommendations

There are many reasons why it is important for citizens to communicate with each other in their community settings. The lived experience and the essence expressed from the participants in this study left me with the following recommendations.

During the interviews, the participants portrayed a sense of helplessness, fear, and lack of information about their community. There should be more community deliberations about the nuclear power plant.

San Luis Obispo County should have more programs in place to promote the awareness of Diablo Canyon Power Plant's decommissioning in 2025. There should also be stronger county-driven incentives to encourage the citizens of the community to get more involved with the decommissioning. In addition, the county should improve

awareness of evacuation preparedness for the communities and schools within its boundaries.

Implications

This study is not only of local concern to Baywood–Los Osos. This is only one of many communities with nuclear power plants globally that are facing the same issues of decommissioning, spent fuel, radiation poisoning, accidents, the need for extending the evacuation zone distances, and more. Global transparency could be the ideal solution to for many issues associated with nuclear power plants. Positive social change now could result in a more promising outlook for the future.

In a world with computers and the social media, deliberative democracy is possible on a global level. On the East Coast of the United States, nuclear power plants are in close to one another. The terrorist attacks of 9/11 hit the World Trade Center and the Pentagon, but next attack could be a nuclear power plant. This burden should not be placed on the shoulders of future generations. The longer the problem is ignored, the worse off the environment will be.

The use of nuclear power plants is not the problem, but research is needed to resolve the issues created by their existence. There are as many people for keeping nuclear power plants as there are opposed to them. Both sides working together can be the solution. Regardless of what side an individual is on, nuclear power plants have been part of the world for over 60 years. Global transparency and deliberative democracy using the social media is the only solution.

Conclusion

The purpose of this phenomenological study was to gain a better understanding of why individuals continue to live within a 10-mile radius of a nuclear power plant. I explored concerns about the safety hazards of nuclear reactors and their potential danger for those living inside the 10-mile-radius evacuation zone. The theoretical foundation of my study drew on the work of Habermas and Rawls and their theory of deliberative democracy. I investigated how the theoretical framework of deliberative democracy could resolve problems related to nuclear power plants for the studied community and globally.

I recruited and interviewed 15 participants in Baywood–Los Osos, California. This location was inside the 10-mile evacuation zone of the Diablo Canyon Power Plant. My findings were based on the participants' answers to seven interview questions, which also formed the seven themes of the study. I used responses to the themes to answer the three research questions.

For RQ1, participants expressed more than one view. The conscious minds of the participants measured their reasoning as being an inaccurate judgment, in many cases, while being in harm's way. Perception is the interpretation of the subconscious mind and is only the thought of one person. After deliberation with other community members, community decisions can become more defined.

For RQ 2, Rationalization and reasoning can only be accomplished through deliberations and debates within the community. However, this can and will happen if the

community has the desire to participate in community discussions. Over half of the participants in the study showed that desire.

For RQ 3, the most important need that was mentioned was future revenue after the decommissioning of the Diablo Canyon Power Plant. Jobs were something most of the young people were hoping will develop; otherwise, they will be leaving to find them elsewhere. The community has been growing older and younger generation saw no future in Baywood–Los Osos. However, there were many younger people living in Baywood–Los Osos who were depending on the elected officials to keep them and their families safe.

There are 104 nuclear power plants throughout the United States and since their construction the population across the country has increased considerably. The risk perceptions of those who live in the evacuation zones of nuclear power plants need to be more realistic, and these individuals need to face the issues. The citizens living in Baywood–Los Osos take pride in their city and love their community. This is not about people leaving the place they love and care about: It is about being aware, realistic, and taking action. Those who live in the evacuation zones of nuclear power plants need to prevent the owners of those plants making the decisions for their community.

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Appendix A: Interview Questions

1. What are the benefits of living in your community?
2. What environmental safety concerns do you have about living in your community?
3. What degree of trust do you have in your elected official concerning the safety of Diablo Canyon Nuclear Power Plant?
4. What are your main sources of gaining information about your community?
5. What do you know about nuclear power plant reactors device?
6. What concerns do you have about nuclear power plants, if any? If you don't have any concerns, why not?
7. What community discussions do you have about the nuclear power plant, and if you don't, would you like to in the future? Why?