

Chain Reaction

A Novel About Power in the Age of Climate Change

By Shawn Connors

Atomic Garage Movement, LLC

This book is a work of fiction. Names, characters, places, and incidents are the product of the author's imagination or are used fictitiously. Any resemblance to actual events, locales, or persons, living or dead, is coincidental.

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Author's Note

This story is fictional. Two literary genres were used; historical fiction and near future technology thriller. Historical figures, past technology, and past events are often actual. Current nuclear technology is actual, but fictionalized to be advanced about 30 years ahead of today (2023). The alloy, *Sartorium*, is currently fictional. It allows the nuclear reactors to have the disruptive characteristics necessary to create dramatic tension in this story. Historical figures are actual but put into fictional situations, as in the prelude. The declassified report in the front of the book is fictional. Government organizations (foreign and domestic) are real but their representatives, if they play a role in the story, are fictional. Some protagonist organizations are real and have been included in the story with their permission. But their representatives are fictional, and this story may not accurately reflect their opinions or missions (see acknowledgements in the back of the book). The antagonist characters and organizations are all imaginary and do not represent a corresponding organization or person in real life. The author, Shawn Connors, has never served in the military or for any intelligence service. The factual information is available in the public domain (see Resources at AtomicGarageMovement.com). What is real is the promise of nuclear energy, and the human potential it can unleash.

If you'd like to know if part of a passage in this story is real or fictional, ask us at info@AtomicGarageMovement.com We may post those Q & As on our website.

AtomicGarageMovement.com.

In Memory of Anthony J. Sartor, PhD

Go Blue!

DRAFT

*Never doubt that a small group of thoughtful, committed citizens can change the world.
Indeed it is the only thing that ever has.*

Margaret Mead

BRIEF TO THE PRESIDENT OF THE UNITED STATES OF AMERICA

CLASSIFIED BY NSA / CSSM 148-6

SEPTEMBER 10, 2001

DECLASSIFIED AND APPROVED FOR RELEASE BY NSA, CIA, DIA, THE JOINT STAFF,
NSC, AND OSD ON MARCH 10, 2011

MOST PROBABLE FUTURE SCENARIO OF TRANSITIONING TO DISPERSED FUEL
SOURCES UTILIZING TARGETED SUBSIDIES

NOTICE FROM UNITED STATES CONGRESSIONAL INVESTIGATOR (120th US Congress, May 19, 2027): This report about near-future circumstances was produced by a group of 27 non-partisan United States citizen-scientists selected by a bipartisan study group of the 106th US Congress in July 2000 by request of President William J. Clinton. It was delivered to President George W. Bush in 2001, one day before 9/11, the day of a large-scale terrorist attack on US soil. It remained highly classified for nine years and five months. It was released by President Barack O'Bama's administration to the public domain, one day before the Fukushima Daiichi nuclear accident in Japan. The remarkable timing of the delivery and public release dates of this report have contributed to it being a largely unrecognized footnote in recent climate change history.

THE GREEN WALL - A PLAIN LANGUAGE EXECUTIVE BRIEF

The year is 2030. Western democracies are energy starved after decades of self-inflicted constraints on using fossil fuels. Fossil fuels emit CO₂ and methane causing more heat to be trapped within the Earth's atmosphere. Climate computer models predict various levels of catastrophe over a variety of time frames, thus western democracies' climate policies have been prioritized. Many countries have also shut down their working nuclear power plants because they fear accidents that may expose the public to dangerous radiation levels. Nuclear regulatory methodology in the United States and Western Europe favors near-zero risk over CO₂-free power production benefits. The physics of weather-dependent wind and solar power have resulted in immense amounts of rural land and coastal offshore areas to be populated with wind turbines and solar panels. Rural communities and some high-profile environmentalists around the world are taking a page from previous antinuclear activists and stalling these massive projects via kitchen-table advocacy and aggressive not-in-my-backyard activism. Meanwhile, the renewable power system wreaks havoc on electrical grids while the politically well connected make billions of dollars off renewable subsidies. There remains no technological solutions for storing baseline energy. Baseline back-up power availability via battery technology is measured in minutes, not hours and days. As always, all energy produced and energy consumed must be perfectly balanced in real time. As a result, a small cohort of the wind and solar community are starting to deploy small nuclear reactors to fill in the intermittent dips from weather-based power systems. A split of pronuclear versus antinuclear advocates within the progressive environmentalist community is a contentious issue over solutions to combat global warming.

Rolling blackouts are the norm as people plan their days around energy availability. Electricity and gas prices have quintupled over the last five years and show no sign of slowing

down. Mandated smart metering leaves millions of Americans and Europeans involuntarily without the use of their washing machines, dryers, dishwashers, garage freezers, pool equipment, EV chargers, and air conditioners throughout the day. Most people have accepted the reality that having electricity is not guaranteed for more than short periods between late afternoon and midnight.

Airports routinely run out of jet fuel, stranding thousands and making travel expensive, inconvenient and unpredictable. Even though combustion engine fuel is heavily taxed, making those vehicles expensive to operate, people will still drive gas-powered vehicles for as long as 15 hours rather than fly to a destination. Electric vehicles are mostly used for local transportation for fear of being stranded afar during a black out. The US Federal Government, like many European governments, is considering making short-hop domestic flights illegal and incentivizing travel by train. Mass transportation is highly subsidized but often dangerous and unreliable.

In 2026, Western European countries and the United States also outlawed the manufacturing and use of gas-powered marine propulsion for recreational boats, gas stoves, gas-powered lawn maintenance equipment, outdoor fire pits, and outdoor propane heaters. Residential garage doors have handles for manual operation for when electrical power is not available. A resilient US citizen is defined as a person or family who can survive on their own for a period of 31 days or longer without any inputs. Due to energy shortages, this population is now estimated to be 15 percent of the US population, representing a diversity of people with slightly above average incomes, and women representing 40 percent of this community. Resilient citizens are now a powerful voting bloc.

Rare earth minerals for batteries, solar panel components, wind turbines, and mobile devices are drying up, causing massive layoffs and plant closures. Eighty-five percent of those

rare earths are mined in China or in African mines controlled by China, Russia, or India. Import taxes and tariffs have tripled around the world over the last five years. International treaties and trade agreements mandate that the more CO₂ emitted during the production of goods, the higher the import tariffs into countries that consider global warming an existential threat. Crippling trade wars are common among previous allies, clogging supply lines in every industry. The public suffers the anxiety of facing a dystopian future or the prospect of drastically lowering the quality of their lives. They can't avoid both they're told.

Revolution is in the wind. Twentieth-century wars over access to and control over fossil fuels are becoming a reality again based on growing regional conflicts escalating over those once-again scarce resources. Coal, oil, and natural gas are at all time high prices as countries grudgingly fall back on these energy sources to placate their angry citizens, even as these countries limit access to the vast stores of these commodities within their own borders. Poor countries have no path to increase power production; and with a fertilizer shortage and agricultural transportation disruptions, starvation is taking millions more lives around the world than at any time since World War II.

In spite of a decades-long push to transition the world off fossil fuels, developing countries are burning more coal and natural gas than at any time in history. Millions of people perish each year due to atmospheric particulate pollution. CO₂ levels continue to rise past 420 parts per million, the point a reduction should have been occurring by this date. At the same time, developed countries cut off developing countries from fossil fuels, locking billions of people in a constant state of poverty. Simply stated, the demand for energy is vastly outstripping supply.

The technology to solve all these problems isn't a mystery. Nuclear power, if invented today, would be considered a miracle source of energy. Radioactive waste is in fact slightly used nuclear fuel and is considered by many to be a national treasure for countries where it is available. The best scientists from around the world increasingly whisper the obvious to one another and have testified to this committee that, *"We could do it now; it's plentiful, clean, mobile, and cheap. We have the experience and know how, we've done it before – nuclear energy really could be a silver bullet. What else do they want?"*

Summary

Mr. President, this panel of 27 of America's top non-partisan scientists, across a wide variety of disciplines, highly recommends the United States pursue a national policy that rapidly advances nuclear energy capacity in the United States. We also recommend that the State Department's mission be prioritized to make the United States the top exporter of nuclear energy technology to world energy markets. The result would be a technological renewal within the United States' educational and industrial systems, improved nuclear safety around the world, and checks on nuclear proliferation with our partner countries. We also recommend that federal subsidies be mitigated to the extent possible within the US energy markets, and that incentives, if required, focus on private capital formation rather than grants. Free markets are more likely to uncover a path to rapid energy production while reducing CO2 emissions that are causing global warming. Finally, this panel believes that nuclear energy could indeed be a silver bullet to avoiding the world described in this report.

Respectfully,

REDACTED

Prelude

Saturday, November 9, 1963, New York City, New York, USA

PRESIDENT JOHN F. KENNEDY WAS VISITING NEW YORK CITY. There is no official record of what his schedule was that morning. The day before, in the Oval Office, he met with Glenn T. Seaborg, serving as chairman of the U.S. Atomic Energy Commission at President Kennedy's request. With his colleagues in 1941 and 1942, Seaborg discovered how uranium decayed into plutonium-239 and then set up procedures to produce it. In 1946, he grouped and named the actinides—the 15 metallic elements on the periodic table with atomic numbers from 89-103, actinium through lawrencium. He was awarded the Nobel Prize in Chemistry in 1951. Five US national labs have institutes named after Seaborg.

Seaborg's influence touches every historical stepping stone in developing nuclear weaponry and later developing civilian nuclear energy for peaceful purposes. He was a giant in the world of physics and chemistry, arguably one of the most influential scientists of the 20th century. On March 17, 1962, President Kennedy asked Chairman Seaborg to conduct an extensive study that should "identify the objectives, scope and content of a nuclear power development program in the light of the Nation's prospective energy needs and resources and advances in alternate means for power generation."

On November 20, 1962, the President received the study report titled *Civilian Nuclear Power. A report to the President, 1962*. It was a common-sense blueprint conceived by the world's top physicists and decades ahead of its time. The plan would make the United States energy independent, and possibly an exporter of known nuclear power technologies, preliminarily tested by veterans of the Manhattan Project. The operations could be brought to

industrial scale within years instead of decades. The plan strategically used government research labs to develop the basic required technologies and the private sector's capitalization and operational capabilities to apply those technologies over the long term.

The president immediately understood the potential of the elegant technology outlined in the report—small but powerful nuclear reactors that would breed fuel as they ran without the need to refuel for 20 years. They would leave very little radioactive waste behind, be built fast and affordably in factories, not melt down (walk-away safe), and be nearly proliferation proof. From an operational standpoint, they wouldn't require water for neutron moderation or coolant. That means no risk of a hydrogen explosion. They would operate at one atmosphere of pressure (sea level). In addition to being affordable to build, they would be inexpensive to operate. And they could operate in any terrain or climate, or underwater. One design could be fueled by thorium, considered a waste product of rare earth mining and found in abundance all over the planet.

The obstacles to building these reactors in mass and putting them into production would present technological challenges. But those challenges also offered promising solutions. The political obstacles, however, were daunting. The creative destruction when the technology was rolled out would be substantial, but ultimately would position the United States as the first mover in powering the entire world with abundant, affordable, clean, and reliable thermal and electrical power. The possibilities were numerous. One of those was to prevent nation-state conflicts over fossil fuel resources, while improving the prospects for adopting western style democracies in the developing world. The promise for advancing human potential everywhere, lowering the intensity of the Cold War with the Soviet Union, and protecting the natural environment were within reach with an endless source of clean fuel available. In other words, the world would

change in ways that were unpredictable and potentially massively positive. It would be a battle to clear the way for Seaborg's plan, and Kennedy knew it. The stakes couldn't be higher.

President Kennedy walked into the Presidential Suite at one of New York City's finest, the Carlyle Hotel located on East 76th Street. A continental breakfast had been arranged for the small group. In the room were Ted Sorenson, his closest advisor on domestic issues and his speech writer; National Security Advisor McGeorge Bundy, his adviser on foreign policy; Kenneth O'Donnell, a World War II hero, adept political advisor, and close friend of the Kennedy family; and the president's brother Bobby, the attorney general.

"Thank you for coming to New York on short notice, gentlemen," the president said. "I'm headed to Wexford in a couple hours, so I appreciate all of you accommodating my schedule today. Jackie has organized a horse show for some of our neighbors in Atoka. The good voters of the Old Dominion love their horses. This is Jackie's event, so it's for my security, not national security, that I show up. Plus, I put in a fix for John Junior's pony, Leprechaun. That's highly classified by the way."

Soft laughter echoed through the room. Then the president got down to business.

"Yesterday I spent some time with Glenn on that new nuclear reactor idea his team came up with."

O'Donnell chimed in. "You may have better security with your pony fix than talking with Seaborg, Mr. President. The guy records everything he does in a diary that he religiously keeps up to date," he reminded the president.

"Just get him a couple tickets to a good football game or movie, and you'll have his loyalty for life," Bobby joked.

“Let’s hope he’s kind to me in his journal. To paraphrase Churchill, ‘history belongs to those that record it,’” the president reflected. “But I didn’t reveal the depth of our commitment to his plan; we just went over his progress. I wanted a read on his confidence one year after delivering his report. As you probably know, I visited Oak Ridge in 1959 as a senator and had the privilege of spending time with the director, Alvin Weinberg, and seeing the Homogeneous Reactor Experiment Two in operation. That place and the operating technology left an indelible impression upon me. I have no doubt Glenn’s report is well within the realm of our capabilities,” the president assured.

“I’ve also talked with Seaborg,” McGeorge Bundy said. “He really believes the technology is ready to be tested, standards developed, and put into mass production in a relatively short period of time. He said these smaller reactors are by a factor more simple than the large, light water reactors on the drawing board and will have about the same odds of becoming a reality as the propulsion challenge for *Apollo*’s proposed Saturn V rocket program,” Bobby added.

“We can’t let the Navy have all the fun,” Ted Sorenson remarked. “Admiral Rickover figured out how to power submarines. The *Nautilus* has been in operation eight years now. And our nuclear-powered *USS Enterprise* aircraft carrier was launched two years ago. I don’t see why we can’t use the same nuclear technology to produce commercial energy.”

“That’s a good point, Ted,” President Kennedy concurred. “Glenn pointed out that those reactors use highly enriched uranium and are perfect for the Navy. But the small reactors that he’s proposing for civil use will use a different technology. What many people don’t realize is we built an early prototype of Glenn’s reactor at Oak Ridge in 1954. It was the world’s first molten fluoride salt reactor and operated at 860 degrees centigrade; that’s over 1,500 degrees fahrenheit.

It ran for 100 hours. The next generation was going to be a reactor called *Fireball*. It was to be less than 5 feet in diameter. It was originally designed to power bombers before our in-flight refueling and rocketry technology had matured. That little device could have put out 200 megawatts of thermal power. Glenn told me we could power over a quarter of a million American homes or a huge steel mill from that single unit.”

Bobby said, “It’s clear now that the next iteration of this *Fireball* type reactor is going to be able to do what the smart guys have been saying it could do.” He paused as he looked out the large upper floor window of the Carlye’s Presidential Suite and then continued to pace back and forth in front of the window. “It’s going to be a leap in our ability to generate thermal and electrical power at low cost, very safely, and in almost unlimited amounts. I’ve asked a couple of folks from the big think tanks how they would predict such a technology could change things. The quick takeaway is the ramifications are significant, potentially global, and mostly good.”

“From what I hear, there may not be enough uranium to make nuclear energy the driver of a viable US energy policy,” McGeorge frowned. “But a reactor that uses an abundant fuel like thorium and can breed its own fuel, which is a different type of uranium according to Seaborg, sounds like the right technology at the right time.”

President Kennedy, fighting off a back spasm, a constant reminder of an injury he sustained while rescuing members of his PT 109 crew in the Pacific Theater during World War II, walked stiffly to the front of the room. “Last September, I challenged the nation to land a man on the moon and return him safely to Earth before the close of this decade. I think we can tie Glenn Seaborg’s plan into that overall effort if I am re-elected,” the president speculated.

“Mr. President, of course anything can happen between now and next year’s election. Right now, it looks like the Republicans might actually put up Goldwater as their candidate,” Ted Sorenson reported.

“Goldwater is an unabashed hawk,” Bundy said. “He makes our allies nervous. If he gets the Republican nomination, I think we could define him as a total nutcase, and he’d rise to the occasion.”

“Stick to the center, Mr. President,” O’Donnell recommended. “And we should be in a good position if Goldwater ends up being the Republican’s candidate. He’s too extreme to win a general election. It would be ours to lose.”

“Ah, Jack, when did you want to start talking about this effort to make nuclear power a top priority for the next term?” Bobby brought the discussion back to the agenda.

“Well, I was thinking of my upcoming trip to Texas. Maybe in Dallas,” the president suggested. “The party is fractured down there; Governor Connally and Senator Yarborough are in an epic pissing match that could escalate to the point of harming this campaign. I’ve asked Lyndon to help me down there and see if he can get Yarborough to relent a little so we can show the nation a united front in Texas.”

“I am sure Seaborg wouldn’t object if Texas joined Idaho as one of several locations for the extensive testing protocols that the nuclear reactor project will require,” O’Donnell proposed.

“Good idea, Ken. Even better if Yarborough gets the credit for landing the project in Texas,” Bobby added.

“I tend to lean more conservative with Governor Connally, but we’re going to need Yarborough to deliver Texas,” the president pointed out.

A solid rap penetrated the suite as the door came slowly ajar. Agent Cliff Hill stepped inside the room and locked the door behind himself, “Mr. President, I am sorry to interrupt, but the First Lady insisted I deliver a message. She said she didn’t care what you were doing.”

The president grinned from ear to ear, as he poured himself a fresh cup of coffee from the silver service set, “Well, Cliff it must be a national emergency of some variety; you might as well share it with my staff.”

“Of course, Mr. President. The message is from John John. He said ‘don’t forget to bring a lot of carrots for Leprechaun this afternoon.’” The room erupted with laughter.

“Thanks, Cliff. Tell the First Lady I’ll give her a call shortly.”

After the Secret Service agent exited the suite, Ted Sorenson said, “Mr. President, back to the nuclear reactor technology, this sounds exciting, and it certainly fits in with our *New Frontier* strategy. The reactor that Seaborg and his team came up with is like an alien visiting us and saying, ‘Here’s a device that will leapfrog your current technology by 50 years, have fun.’ Let me work on a draft announcement for your consideration. The hard part is that it seems too good to be true.”

“Let’s hold this announcement dear until you deliver it, Jack,” Bobby suggested.

“I agree Mr. President,” McBundy added, as he nodded his agreement with Bobby. “Ted should release your planned remarks without mentioning this project, then you can deviate from that script when it comes time to deliver your Dallas speech. It will give us a little more time to gauge the Texas political environment, hone the message on the run, afford us the option of a go or no-go decision, and not spend time defending the initiative before you introduce it. If it’s a go, it should be you who first delivers this message to our fellow Americans and the world, not the press.” Everyone in the room agreed with the strategy.

“By making Glenn Seaborg’s plan a natural extension of the *Apollo Project* and the *New Frontier*, history may look back on this decision as one of the foremost transformative moments in our nation’s history, kind of like when the world was first introduced to steam power,” Sorenson suggested.

“After Dallas, let’s move forward as if we’ll win the election and get the support behind Glenn’s team,” Bobby said. “By tying this initiative to our NASA space program, we should be able to capture the imaginations of our fellow Americans. There will be plenty of opposition. We’ll be spending a lot of time dealing with that. The Landowski Foundation, with an obvious interest in oil, has been scaring the hell out of everyone over the dangers of radiation from civil nuclear power for nearly a decade now. Their Linear No Threshold Theory that any exposure to radiation causes a cancer risk has been debunked, but it makes for good headlines. Academia and the media seem to have adopted that story.”

“I am afraid they’ve also adopted a lot of endowment money from the Landowski Foundation right along with that theory,” the president grinned.

“We’ve got to do a good job of selling this, Mr. President,” O’Donnell insisted. “People are conflating nuclear power production for energy with nuclear weapons and radiation exposure. The oil industry is fighting like hell behind the scenes against nuclear power. They’re ingraining their people in the regulatory bodies, academia, environmentalist organizations, and the press. But once the public sees these new reactors in operation, I think they’ll accept the technology, and the oil guys can adapt.”

“Gentlemen, we have a small window of opportunity to possibly move the whole world into a new, sustainable, and hopefully peaceful technological renaissance, starting with the United States,” President Kennedy proclaimed. “That is exactly what I intend to do in my next

term. These new, small, powerful, and safe nuclear reactors can drive productivity and innovation on the ground, while our first steps at manned space exploration capture the imagination of future generations.”

12:30 p.m., Central Standard Time, Friday, November 22, 1963, Dallas, Texas

While riding in a motorcade through Dealey Plaza in downtown Dallas, on the way to the Trade Mart to deliver his speech, President Kennedy was shot and killed by Lee Harvey Oswald. The topic discussed just 13 days earlier in New York City was never presented to the public. The prepared remarks, as planned, didn’t include a mention of the commitment to the new nuclear reactors.

After John F. Kennedy’s Death

Excerpt: A 2023 RBX Satellite affiliate documentary. *An American History; The Anti-Nuclear Movement*. Episode Three.

Glenn Seaborg and Alvin Weinberg were unaware of Kennedy’s deep commitment to building the advanced nuclear reactors they proposed. Even then, they did get prototypes built, tested, and in use in the years after Kennedy’s death. Prototypes were built that operated for thousands of hours. In 1965, two breakthroughs occurred at Oak Ridge National Labs. First, in January, the Molten Salt Reactor Experiment was started. It was a reactor that used liquid fuel, demonstrated thorium could be a viable fuel for future reactors, and operated for 13,000 hours at full power. Second, in August of 1965, a High Flux Isotope Reactor (HFIR) was powered up. In addition to producing heavy isotopes for research and medicine, its technology allows scientists to test faster and better, dropping the time it takes to validate a new idea to improve nuclear

reactors by a factor of 10. As of this documentary in 2023, the reactor is still operating at Oak Ridge Labs in Tennessee, is being prepared for its 502nd fuel cycle, and delivering HALEU, a much needed nuclear fuel for Small Modular Reactors being tested all over the United States and the world.

Argonne National Lab's Experimental Breeder Reactor (EBR 2) was a sodium-cooled fast reactor. It could breed its own fuel. EBR 2 was a multi-year demonstration of the concept that Seaborg had outlined to John Kennedy and his brother Bobby in 1962. EBR 2 was shut down in 1994. The used fuel pulled from EBR 2's core during decommissioning will be recycled and loaded into OKLO's first test reactor, the Aurora Powerhouse, later this year. Many in the nuclear community consider the Aurora, EBR 3.

Bobby Kennedy, the former US Attorney General, was aware of all these positive developments with new kinds of nuclear reactors taking place at the country's national labs. He had decided to run for president in the 1968 election, in part to realize his brother's goal to make the United States the leader in producing nuclear energy for peaceful purposes. He had just opened a path to the presidency by winning the Democratic Presidential Primary in California on June 5, 1968. He was assassinated during his victory speech. The potential of the new small nuclear reactors died with him. Admiral Rickover's light water reactors, still used by the Navy, were enlarged and adapted for use on land. First mover status of light water reactors, military necessity, nasty politics, and limited budgets eventually killed the promising nuclear technology that President Kennedy and Bobby had planned to support.

America's antinuclear community learned how to influence and infiltrate the Nuclear Regulatory Commission (NRC), which was established in 1974. The NRC adopted two primary theories supported by the antinuclear community regarding risk evaluation concerning

radioactivity. They are the “Linear No Threshold Theory of Radiation (LNT).” That theory states any exposure to radiation is dangerous and cumulative. The theory is incorrect, but is largely responsible for the public’s unjustified fear of radiation. The second is “As Low As Reasonably Achievable (ALARA),” a reference to the time, distance, and shielding used to protect a person exposed to a radiation source. But the word *low* and the word *reasonably* are not definitive. As a result, nuclear plants often have to reduce radioactive emissions to levels far below what exist at coal plants, in nature, or come off kitchen and building stone. Or they have to prove they can respond to a series of imagined catastrophes that have never occurred before and pose such little risk of occurring that every activity in an average person’s typical day, like driving a car, are by magnitudes more risky. These two theories are largely responsible for over engineering of nuclear plants, with as many as four redundancies required for each key piece of equipment.

There is still a highly organized and well financed antinuclear community in the United States, many of which are funded by billionaires with a Malthusian view of the world. For the most part, the world shunned the full promise of nuclear energy and continued to depend on the density and reliability of fossil fuels at the expense of increasing the level of atmospheric CO₂.

From 1982 until 2012, a 30-year time frame, the NRC limited itself to allow some reactors in the early stages of construction just before 1974 to be finished and extended the licenses of some existing reactors. During that time, it didn’t approve a single new license for a nuclear reactor. When the NRC finally approved new reactors, it was for four new AP-1000 Westinghouse reactors. Unit one and unit two to be built at the Virgil C. Summer nuclear project near Jenkinsville, South Carolina. Unit three and unit four to be built at Southern Company’s Vogtle nuclear plant in Waynesboro, Georgia, with two reactors already in operation. The V.C. Summer build of unit one and unit two were canceled in July 2017 over disputes with regulators,

which caused the project to go over budget and miss critical deadlines. Nine billion dollars was lost on that project. Vogtle's units three and four came online in 2023 after 11 years of construction and nearly 100 percent over budget with a \$30 billion price tag. Vogtle is now the nation's largest nuclear plant with four operating reactors. China built a nearly identical plant, using two of the same AP-1000 Westinghouse PWR reactors. They completed it on time at a cost of \$6.12 billion in US dollars. The NRC has approved closing down 22 US reactors in 19 states, and the United States is on the way to producing less total nuclear energy in 2050 than it did in 2020. It is unlikely another pressurized water reactor like unit three and unit four at Vogtle will ever be built again in the United States. But large plants are continuing to be built in China, Great Britain, Canada, France, South Korea, and other countries.

Glenn Seaborg would work the rest of his life to ban nuclear weapons testing and advocate for the peaceful use of nuclear energy. He died in 1999. Alvin Weinberg, who died in 2006, was the founder and longtime director at Oak Ridge National Labs. In June 1967, he wrote a cover letter introducing the report *Summary of the Objectives, the Design, and a Program of Development of Molten-Salt Breeder Reactors*. It's numbered ORNL-TM-1851. His cover letter and the report are a testament to the fact that small modular reactors were working decades ago. Before Dr. Weinberg passed away, he famously prophesied: "I believe a rebirth of nuclear energy, a second nuclear era in which the full potential of the technology will be realized, is very much within our human prospect."

June 2023, Indianapolis, Indiana

The American Nuclear Society (ANS) met for its annual meeting. With COVID-19 still causing social turbulence . . . economies straining from self-inflicted energy scarcity . . . a hot

war in Ukraine . . . China pushing for world hegemony . . . China and India adding hundreds of new coal plants each year to meet their insatiable appetite for energy . . . Germany shutting down its last nuclear plant . . . African countries making commitments to use Russian and Chinese nuclear reactors to meet their energy needs . . . a dangerous shortage of HALEU, the nuclear fuel used in advanced nuclear reactors now in testing . . . mountains of regulatory red tape stifling American innovation . . . and apocalyptic panic setting in over climate change—a window of opportunity does exist. Many people motivated to decarbonize the atmosphere and end energy poverty are now saying they’re in favor of nuclear energy . . . but that window is closing. The path forward is not clear. There is no plan. Time is precious. The theme of the ANS conference was *Failure is not an Option*.

PART I

Never does nature say one thing and wisdom another.

— Juvenal, The Sixteen Satires

DRAFT

One

Friday, June 4, 2027, Algonquin, Michigan, The Atomic Garage

AMY AUSTIN WATCHED HER FATHER'S BEST FRIEND, WHO SHE CALLED UNCLE STEW, check the gauges on the molten salt loop equipment from Copenhagen Atomics. It was a refrigerator-size laboratory instrument that acted like a burner to test chemical compositions, pumps, gaskets, flanges, filters, valves, pressure sensors, flow meters, and heat exchangers. The loop was also well suited for a wide variety of material and chemical experiments. It was like having a small nuclear reactor to experiment with, minus the nuclear fuel.

Stew glanced behind and saw Amy looking on. He stood aside so she could see better.

"We've melted the fluoride salts, and we're at 700-degrees centigrade. The magic number," Stew emphasized.

"That's 1,292 degrees fahrenheit; you'll have a clear liquid at that temperature. Are you looking at reactivity at this temperature range?" Amy asked. Stew knew Amy, although just 19 years old, was much more than a gifted student. He had never known of anyone who could match her grasp of almost any science. She was doing graduate-level work at the University of Michigan's Nuclear Engineering and Radiological Sciences Program, with an emphasis in chemistry.

"Well, yes. And we're testing a new pump we printed, made of your father's new alloy," Stew explained. "Did you know he named it Sartorium?"

"Sartorium," Amy laughed. "He named it after his old U of M roommate, best man, and legendary engineer, Tony Sartor. Perfect name. Tony would have loved it. God rest his soul."

“You know Amy, your dad told me Sartorium would not have been discovered without the contribution from Harshil and you,” Stew said.

“But it’s you, Uncle Stew, who got us thinking about this,” Amy clarified. “Remember when you told me nuclear reactors needed something like the high-strength superalloy, intermetallic titanium aluminide, TiAl, which is used in extreme applications like aerospace engines?”

“Always a conversation starter,” Stew laughed. “But yes, I remember driving around town with you when you were still using your driver’s training permit. All you wanted to talk about was rocket engines and SpaceX.”

“I did pass my driver’s test, thanks to you, Uncle Stew,” Amy said. “And I haven’t forgotten the lessons you shared. Don’t die protecting your right-of-way; don’t react in any way to a person in the throes of road rage. For sure, don’t flip them off; let your intentions be known; always use your blinker; keep a comfortable distance behind the car in front of you; practice parallel parking; accelerate past a semi-truck on the highway; don’t dally alongside; and don’t slow down once you get in front of it. Except, I think my car does all that by itself now.”

“Trust your instrumentation. You were an excellent student,” Stew said. “The nachos at The Arrow, after our drives, were fun too. Still, your observations about how to tweak your dad’s formula to produce Sartorium was incredible.”

“I just capitalized on the work out of Idaho National Labs,” Amy said, trying to downplay her observations. “They’ve been working on a nickel-based super alloy. They’ve been adding trace amounts of cobalt, ruthenium, and rhenium to the mix, which causes a repeating pattern like interlocking matrix of boxes. A hierarchical microstructure, it’s like a super stainless steel, really. Harshil and I read their paper, *The origin and stability of nanostructural hierarchy*

in crystalline solids. Although Sartorium is a different alloy than a nickel-based one, the principles of producing it are very similar. So, we thought we'd help dad with his testing. Harshil used AI to test different combinations of heating and cooling during fabrication, similar to Idaho National Labs protocols. Not only did we come up with similar results as INL but found we can adjust Sartorium's makeup for its specific application within the reactor. For example, on the one hand, it can transfer heat highly efficiently. And we've eliminated the need for pumps for the reactor assembly. We can use thermodynamics to keep that flow going by using hotter to cooler temperatures within the flow."

"Ahh," Stew acknowledged, "The second law of thermodynamics."

"Yep, and also with a slightly different combination of cooling and heating during fabrication, Sartorium can reflect heat as well as those re-entry thermal protection tiles on a space vehicle," Amy smiled. "Harshil say's Sartorium is like flour, useful in a wide variety of tasty cake recipes."

"Hey, I'm just in the physics farm league, kiddo. I can turn this thing on and off. But you're going to be one of the greatest scientists of our time. Someday I'll be telling people that I knew her when. It's nice having you around here for the summer. Damn, we're all so proud of you, girl," Stew gushed.

"Ahh, thank you Uncle Stew." Amy smiled as she gave him a hug.

"It's a good thing you inherited your mother's genetic profile instead of your dad's," Stew laughed.

"Hey, I heard that," Frank, Amy's father, chimed in.

“I don’t know, Uncle Stew, I’ve just heard a rumor that dad has a patent application on his newly named alloy, Sartorium. He just might make these Generation VI Reactors a reality and become a billionaire. Maybe we should be nice to him, just saying.”

“Why?” Stew asked. “Just because Sartorium can fully shield radiation, will not stress or melt like zirconium fuel rods, is light as a feather, has amazing thermodynamic properties, is inexpensive, can revolutionize power production on Earth and in space, and replace at least 10 other elements that are expensive and ecologically damaging to mine is no reason to get cocky.”

Amy laughed at her uncle’s rant as she walked over to the molten salt loop’s monitor, checking the temperature, flow, pressure, and chemical composition.

“This is really a simple device. It’s a data-gathering machine for Copenhagen Atomics,” Amy said as she made an adjustment on the control panel. “They’re building an impressive database on various chemistry combinations, thermodynamics, potential alloys, and proliferation-proof fuel concepts by hundreds of labs around the world sending in their test data. I’ll bet they have 100 years of test data from this. We’ve got one of these in the lab at U of M. It’s like when the Wright Brothers adapted the early wind tunnel instrument to meet their needs. You can learn very quickly what won’t work and thus save a ton of time. One of my professors said the Wright Brothers accomplished building a powered, heavier than air, flying machine two decades before it would have been possible because of the data they produced in the wind tunnel. So we may have had airplanes flying around in 1903 instead of 1923 thanks to their wind tunnel. I’d like to be part of jumping fission nuclear power ahead by decades.”

Amy smiled at her father who had his head down listening. He absorbed and noticed everything. He caught her eye and touched his nose with his finger, their secret sign of solidarity. Once again he had read her mind. *How does he know me so well?* Amy thought. He was standing

to the side scratching Proton behind one of his ears. Proton was one of two greyhounds that Uncle Stew always had with him. He was white with butterscotch patches. The other greyhound was Neutron, a brindle who was asleep on his big bed in the Atomic Garage's small kitchen area. The Atomic Garage was the name the crew gave to the luxury pole barn next to the Austins' house, which was in synergy with the Atomic Garage Movement, known as AGM, the nonprofit organization Frank and Stew had started three years ago when Amy was 16. The Atomic Garage was more of a super high-tech geek den than a man cave. It was a modern-day engineering and chemistry lab. The goal of the movement started as a way to counter the antinuclear crowd who was always filing complaints against the local North Rocky Point Nuclear Power Station, which everyone called, The Rock. AGM wanted The Rock's license renewed with a MOX reactor for 20 more years. Recently, AGM had expanded its mission to follow in the steps of Oklo, a small nuclear energy company, and push for reasonable regulations for the next generation of nuclear reactors, which were currently generation IV.

Frank Austin and Stew Grassley were both retired. Frank, an Algonquin native and a University of Michigan alum, was a metallurgist and had been part owner in a successful small business called, PHTA, LLC, which once stood for Precision High Tolerance Alloys. Many of his clients were nuclear power plants, and he had spent a considerable amount of time working inside of The Rock over the years.

Stew was a former nuclear naval officer and engineer serving on submarines. After 22 years in the nuclear navy, he spent a few years working at The Rock and then, after a brief retirement, consulted NASA on using nuclear power for space missions and for establishing colonies on the Earth's moon and Mars. That work took Stew all over the world to the various space agencies and contractors' space production facilities. But a long, thin friendship with

Algonquin local Joline Burkhart, which started when she was in Seattle at a trade show, turned into a romantic relationship. Joline, now the mayor of Algonquin and long-time friend of Frank and Becky Austin, accepted Stew's marriage proposal, provided they could make Algonquin their home. Stew loved his visits to Algonquin, enjoyed Joline's family and friends, and had no requirements for where his home base was. Over time, the Grassleys' friendship with the Austins grew into a bond that can only be defined as family.

Frank had purchased an early molten salt loop from Copenhagen Atomics back in 2021 during the COVID-19 epidemic to better understand how the chemistry of generation IV nuclear reactors would work. Last year, AGM purchased the 2024 model of the molten salt loop to see what role Sartorium might play in the manufacturing process and to see if the AGM crew could add new information for nuclear reactor developers to consider. As the team worked, the group kept their findings transparent and even set up open-source software to tap the contributions of other scientists from around the world who were testing nuclear fuels and alloys. Frank had repurposed the 2021 model molten salt loop into a refrigerator to keep Oberon cold in the Atomic Garage kitchen. The AGM team's hope for the next round of testing was to hone and finalize Amy's theories for building a Micro Liquid Fluoride Thorium Reactor, Sixth Generation. They referred to the conceptual reactor as M-Lifter Six, M-LFTR-VI for short.

Harshil Varm, an Indian working at the Atomic Garage on a Green Card, was the other young scientist in the Atomic Garage. Amy and Harshil had dug into the ancient Oak Ridge Labs' historical documents that were discovered, preserved, and recorded by Kirk Sorensen back in the 1990s. Amy and Harshil totally immersed themselves into the extensive formulas, problems, and engineering challenges of that day. They had studied the Molten Salt Reactor Experiment documentation, which took place in the 1960s. The 7.4-megawatt test reactor

operated from 1964 to 1969 for 14,000 hours at full power. The invaluable information from this work was in the public domain and used by China, Russia, Canada, France, India, and a host of other countries in developing their Generation IV LFTR nuclear test reactors that were now up and running, with more coming online everyday. The US was still without an operating LFTR in 2027 due to decades of bureaucratic red tape and endless environmentalists' lawsuits filed at every regulatory step. Amy's reactor concept being worked on in the Atomic Garage was unique because it would be smaller, lighter, and pound for pound more powerful than any other human-made source of energy on Earth. It was not an incremental improvement in nuclear energy; it was a device equal to the impact of the Wright Brothers' Flyer. That's why they used generation VI instead of generation V, in recognition of the 30-year leap in fission technology it seemed to be.

"So dad and Uncle Stew, when we get our design to the point of building a reactor and testing it, what comes next?" Amy asked.

"What did the Wright Brothers do once they felt they had the aerodynamics figured out?" Frank asked.

"They built the prototype and tested it at Kitty Hawk, North Carolina. But those guys didn't require nuclear fuel to test their assumptions. And they didn't have an FAA as a backseat driver back then. I know U of M's *Fastest Path to Zero* is supporting us in getting a lab to test our future LFTR design with real fuel, but it just seems like we're pounding our heads against the bureaucratic wall," Amy pointed out as her dad and uncle remained silent.

"Seriously, you guys. I feel we can build the full M-LFTR-VI now, taking advantage of our new alloy, Sartorium. We've pretty much built it piece by piece in our testing protocols. I'll

be an old lady before the chicken littles of the world let us go from this garage to a national lab to test with live fuel.”

“One step at a time, sweetheart,” Frank said. “Once we have a prototype built, we can work with partners to weave our way through the regulatory gambit. There are groups who will want to use your reactor design, Amy, people who have long-time working relationships with the NRC and have been talking to them about new nuclear power for years now. I know Oak Ridge National Labs is itching to help you. We’ll piggyback onto that legacy. That should speed things up considerably.”

“That sounds like a prayer, dad. Hope is not a strategy,” Amy countered.

“Luck is not a factor,” Uncle Stew added with a chuckle.

“And as James Cameron would finish this quotation,” Frank jumped back in, “Fear is not an option.”

“Well let us not forget that last part because I don’t trust anyone else to get this job done,” Amy huffed. “I know you two pretty well. You don’t just swing once and hope for the best. What’s plan B? What happens when we almost assuredly get stonewalled from doing anything innovative or different. It’s time to clue me in on that plan B.”

Neutron jumped up from his nap and joined Proton in heading to the window to look out at the parking lot. Both their tails were wagging with delight.

Stew looked over at Frank. “Saved by the bell. But she’s right. Her design is going to work, Frank. And I don’t see a path to getting it commercialized fast enough. Maybe someone else in the world is picking up our data and building one of these, but there is really no way to know. Plan B has a chance of working. And we’re fast approaching our predetermined go versus no-go red line.”

“Yea, I know. I know,” Frank sighed. “Including her on plan B is a red line too. And I need Becky’s full blessing. Once Amy knows plan B, she’s going to be all in, and then, Katy bar the door.”

DRAFT

Two

A HORN BEEPED OUTSIDE. Amy headed out to the Atomic Garage's parking lot. Her mom, Becky, and Aunt Joline, Stew's wife and the mayor of Algonquin, pulled up. They had on their hiking shoes and backpacks with their water bottles and binoculars in tow for spotting birds and other wildlife.

"Aunt Joline, are those new binoculars?" Amy asked.

"Yep, I figured it would give us a better chance to spot your elusive Kirtland's Warbler," Joline announced.

"We'll be able to hear him before we see him though," Amy remarked. "They're usually a little farther north. I just love their markings. Blue-gray streaks and yellow breast. I'd love to get a picture of him."

Amy looked through the binoculars into the distance, toward the Odina State Park, set in a valley and bordered the north boundary of the Austins' property.

"Wow, Aunt Joline, look at that—10 by 42 millimeter, high-definition, high-class glass. I like them," Amy exclaimed.

Amy walked to the north side of the Atomic Garage and gazed into the distance. The lush green leaves absorbed the late-morning, June sunlight and cast a shadow on the cool forest floor. Amy loved summers. The steam coming off The Rock five miles away was easily spotted. She picked up the binoculars and looked closer. That's about 550 days in a row at full power. She thought the refueling should be coming up soon for the old pressurized water reactor.

Amy turned and walked back to join the hiking party as Harshil, her Atomic Garage lab partner, math savant, computer genius, and the closest thing she had to a soul mate, came up the

driveway in his white 2014 Honda Odyssey van, now 13 years old with 250,000 miles. He loved that stupid van. But it was great for toting equipment around or transporting Proton and Neutron when dog sitting. Amy had grown close to Harshil over months of working together when she was at home in Algonquin. He had a great sense of humor, was bright, kind, worked hard, and had a natural curiosity about everything. He was self-taught because he thought institutions of higher learning were inefficient and stifled innovation. Amy thought he had a point. College wasn't for everyone. Harshil was in some good non-college attendance company: Michael Faraday, Thomas Edison, Nikola Tesla, the Wright Brothers, Bill Gates, Steve Jobs, and Elon Musk to name just a few. But Harshil's role model, who was also self-taught, was Srinivasa Ramanujan, a young Indian who died at age 32 in 1920. Ramanujan's math skills were so advanced that his formulas were often written off by math scholars at the time as rubbish. Over the decades, his contribution to mathematics became appreciated. It turned out he was solving problems thought to be unsolvable. He made substantial contributions to mathematical analysis, number theory, infinite series, and continued fractions, which Harshil loved to pore over. Had Ramanujan lived to average life expectancy, his name would have been as familiar as Einstein.

Harshil had never asked Amy on an official date despite the flirting, messaging, and hints. It seemed that the one-hour distance from Ann Arbor to Algonquin had resulted in them growing closer instead of drifting apart. But apparently men don't get hints. Maybe a two-by-four upside the head would do the trick, Amy thought. She ran up to Harshil before she lost her nerve, hugged him, and whispered, "I am taking you out on a date while I am home."

Harshil laughed and said, "I'd thought you'd never ask."

"I needed to review your rap sheet first," Amy bantered back.

“When did you ever find the time? Don’t forget I am an old man,” Harshil said with a wink.

“Uh huh, three years older than me. Well, more like two-and-a-half years, I’ll be 20 in October,” Amy pointed out. After a pause she said, “But who’s counting?”

“Close enough for me if it is for you,” Harshil laughed.

“I missed you so much, Harshil,” Amy admitted. Harshil touched his heart and indicated the same. She hugged him tight. Amy had worked hundreds of hours with Harshil in the Atomic Garage and loved hearing his many stories about India where much of his family still lived. His aunt, an accomplished physicist in India, funded some of Harshil’s equipment purchases, sent him books, and talked regularly with him via a new encrypted app they worked on together using blockchain technology. He called her Aunt Kasvi. She was also involved in the Sulabh International Social Services Organisation, India’s largest nonprofit organization dedicated to improving the country’s water sanitation. Millions of Indian homes were built with two-pit toilets called Sulabh Shauchalayas at the encouragement and direction of the organization. The Sulabh Complexes are large bath houses that offer clean water for bathing and consumption. The concept was inspired by Mahatma Gandhi and founded by Dr. Bindeshwar Pathak. Nearly 11 million people use Sulabh Shauchalayas or Complexes each day.

When Amy was away at U of M this last semester, Stew had accompanied Harshil to India for a three-week trip to help build a new complex, in addition to visiting with old friends from Stew’s days working with the Indian Space Research Organisation, India’s national space agency. Stew had worked with Harshil and his friend Sam Benetiz and arranged to have half a dozen small water tank towers produced by the Groundwater Consortium out of Baltimore, Maryland, shipped to Chennai, India.

Back in 2022, Sam Benetiz, a burley, former college wrestler, and entrepreneur, was installing water tanks in India as part of a program between the Baltimore consortium and Sulabh International. Harshil helped Sam get a couple of those tanks installed, and a friendship was forged. They were using the tanks atop the complexes to store treated rain water or water obtained from other sources. The power for the complexes throughout India were provided partly by solar energy but primarily by onsite diesel-fueled generators. Those specialized generators were also able to burn the biogas from the digesters located under each complex, turning some human waste into electrical energy. The generators were provided by an anonymous donor, Sajan Ganguly, whom Kasvi had recruited. He was now an American citizen and founder of a fast-growing high-tech company based in the US.

Sam Benetiz and Sulabh International plumbers had come up with an ingeniously simple way to treat and pump thousands of gallons of wastewater each day through a purification system using small pumps and gravity. As a result, Sam had inadvertently established the image of the small water towers, loaded with fresh, clean water, and located above every Sulabh Complex in India as an iconic symbol of sanitation. They were ubiquitous.

Somewhat frustrating to Sulabh International, however, the World Bank was putting considerable pressure on Indian politicians to replace current and planned use of diesel-fueled generators in the rest of the country with solar power and battery backup via grants worth hundreds of millions of dollars. That ask would result in Sulabh Complexes not having adequate power to keep pumping and sanitizing wastewater. The bank was politically powerful. It provided more than 100 programs in India with nearly \$30 billion per year in funding. Enormous political pressure was applied to Sulabh International to make solar energy their primary power source as part of India's contribution to reducing global CO2 emissions. The Indian pols knew

that the visual presence of big solar panels mounted all over Sulabh Complexes would be a fantastic optic. Politicians in line for kickbacks on the potential massive solar subsidies—and desiring a power position within Sulabh International—lobbied relentlessly for India to go green and join the world of renewable energy, which in India was code for “just use solar panels and batteries.”

The powerful board of Sulabh International, which consisted of some well-respected Indian scientists, including Harshil’s aunt, wanted to reject that idea on its merits. But a suggestion whispered by Stew Grassley to Sam Benetiz and Harshil, then to Kasvi Aakanksha, Harshil’s aunt, resulted in an agreement with the bank to add the solar panels to 10 test sites. The understanding was there would be continued use of mixed-use generators as backup, and any solar program extension beyond the 10 test sites would be at the Sulabh International board’s sole discretion. It was a good-enough, short-term fix. It kept the possibility of making solar a high-profile technology with the millions of Indians who used the complexes. The politicians took the win with the belief that the first step to securing a piece of the incoming solar subsidies had been achieved. But Kasvi, Harshil, Sam, and Stew took the compromise as successfully limiting the number of facilities dependent upon solar power, without irking the environmental activists who controlled where the World Bank invested.

Harshil explained to Amy, “The only path from being poor and needy to having a good life is to provide people with enough energy that the day-to-day tasks could be done by technology, like washing machines, refrigerators and freezers, stoves and ovens, water pumps, adequate lighting, and some basic air conditioning. Those devices free up girls’ and mothers’ time from attending to endless daily chores. With that liberated time, the mothers can then make sure the daughters get an education.”

Harshil was frustrated that such a basic thing like lack of freshwater killed more than 200,000 poor Indians a year in the 21st century. Or that nearly half of Indians, about 1.3 billion people, did not have a toilet where they lived. He often thought about how much time most people had to spend getting freshwater, washing clothes, and preparing food on straw and dung fires, which was like having 400 cigarettes burning inside the living area. There was no time left for people living in those conditions to learn, think, or explore anything. No down time, no vacations, no new ideas, no concept of solutions, no way to break the iron circle of poverty. It was a three-foot world with a three-hour time horizon, forever. The concept of a future simply did not exist.

Amy responded, “Those problems won’t be solved with solar power. They’ll end up with no power and more contaminated groundwater. Solar panels are on track to produce 50 times more waste and cost four times more than predicted just a decade ago. Nobody is around when it’s time to throw away the used-up solar panels; they can’t be recycled. In fact, some developed countries send their used solar panels to poor Third World villages to use up the rest of the panels’ power. If you ask me, it’s just a form of dumping a rich country’s waste into the developing world. Those things produce 300 times more waste per megawatt than a nuclear reactor does.”

Amy never forgot Hashil saying, “It is mothers, Amy, who are always changing the world for the better. Inform them. Help organize them. Free up their time. Unshackle all of them around the world. If you could do that, I think humanity could live in peace and prosperity in balance with the big Mother, mother nature.”

May 2026, One Year Earlier

Amy could focus her vision for the future with practical applications of technology to overcome obstacles that she and Harshil identified. During one marathon session in the Atomic Garage, working on a particularly knotty chemistry problem involving the rate of decay for various radiated elements, Amy vocalized what she knew was on both their minds.

“Harshil, you and I know that power generation for most of the world will have to come from fission. You know there is no viable energy storage technology in sight. Those facts are presenting themselves throughout the nations of the world now.”

“I think I know where you’re going with this,” Harshil said. “It’s the transmission. The obstacles to affordable energy around the world are the required infrastructure and the electrical grid upgrades.”

Amy, at 5-foot-10, easily reached up to grab a beaker from the cabinet above the chemistry counter. She set the beaker down and redid her ponytail. Harshil loved listening to Amy as she performed these simple rituals.

“Someday may be too late.” Amy added, “The importance of the grid will be obvious to a lot of smart people who should have known better.”

“Oh, they know,” Harshil interrupted. “Look at any military force on Earth. Their number one target once hostilities start are the electrical infrastructures of the invaded country. The reason countries don’t improve those infrastructures during peace time is because they’re basically invisible to the public. Because of the foresight of previous generations, everyone, until just the last few years, has taken inexpensive, reliable power for granted. But now a politician wants to cut a ribbon on a bridge or a big building or at a huge new airport, or bless a sprawling

new solar farm or wind turbine farm with their presence. Electrical infrastructures are ubiquitous, unappreciated, massively complex, fraught with right-of-way street fighting legal issues, and prohibitively expensive.”

“Expensive in comparison to blackouts, sky-high cost for electricity, and collapsing supply chains?” Amy huffed.

“Exactly, proposing an investment in infrastructure over beefing up or adding another entitlement, or cutting back on pork-barreled spending is political suicide,” Harshil ranted. “So they kick the can down the road. Somehow the lights will stay on, politicians think. The lights have always stayed on. They can’t imagine them going off. But they will most assuredly go off and have started doing so at an increasing pace.”

“You know, Harshil, maybe there’s another way, a cheaper way to transmit electrical energy. And we may be able to miniaturize the technology. Did you ever see that video of the 1975 NASA JPL, Goldstone wireless power demonstration. They transmitted 34 kilowatts of electrical power about a mile at an 82 percent efficiency.”

“Huh, it reminds me of the wireless technology that was inspired by Nikola Tesla’s long-range wireless experiments conducted in 1901,” Harshil noted. “But his knowledge of how electricity was transmitted was based on 19th century theory, which proved incorrect.”

“You know, I recall an article I read a few years ago. Somebody is working on this,” Amy said as she excitedly asked her mobile device a series of questions. “Here it is. They’re in New Zealand. They’re called Emrod. They use a collimated beam that allows airplanes, birds, or any other physical structure to pass through it unharmed as the energy is transmitted through the atmosphere point to point. Emrod did a small test with the European Space Agency in 2022 to

demonstrate its feasibility for use in space. Since then, they have been increasing their power and distance. Harshil, this would be like having a virtual high voltage powerline in the sky.”

Harshil added, “And since we’ve been talking about bringing power generation closer to end users, the distance we have to transmit should not be a problem.”

After contacting Emrod, and a year of discussions back and forth, involving Frank Austin, Stew Grassley, Bob James, and other AGM members, Emrod had agreed to set up a test with AGM in Michigan provided AGM covered the testing expense. The purpose would be to demonstrate the feasibility of using atmospheric transmission of power in areas recovering from disasters. It was reassuring to have contact with Emrod, but the project kept getting delayed, back burnered, and adapted as AGM’s board attempted to find the money to pay for it all. As interesting as the people at Emrod found the concept and liked Amy and Harshil, the truth was they would lose a lot of money conducting the demonstration. Just getting the equipment and team to Michigan from New Zealand would cost \$2 million. Emrod would need a significant public relations win to accommodate AGM. Or a clear path through US red tape to test atmospheric power transmission on US soil with various other power producers. But the promise of a solution to the obstacles of power transmission were now on the table.

Harshil couldn’t believe it had already been a year since AGM contacted Emrod. He was at the Atomic Garage today to relieve Frank and Stew, who planned to hike with Becky, Joline, and Amy. Harshil volunteered to monitor the fuel circuit tester as it went through the day’s test sequence and sent data to Copenhagen Atomics. He didn’t mind hanging back with Proton and Neutron. Harshil, an animal lover, also served as the dogs’ sitter. Both dogs could run fast for

short distances but would have found today's five-mile hike through Odina State park in the June humidity grueling.

Frank and Stew gave the gauges one last check to make sure the temperature was holding at 700 degrees C and the data was going to the Copenhagen Atomic's website. Hundreds of these test devices were working around the clock and around the world, constantly feeding performance data to the Denmark lab for evaluation and analysis.

"Amy and Harshil give me hope for the future," Stew said, clapping Frank on the back as they walked outside to greet Harshil and joined Becky, Joline, and Amy for their regular weekly summer walk through Odina State Park.

Frank sighed, "I just hope once we get a prototype built, a national lab or a member of our international consortium will get the fuel and run it through the testing and regulatory process."

"One step at a time, buddy," Stew advised. "Let's get a solid data set together, and we'll probably have people tripping over red tape to try to build and fuel it first."

Three

THE PARTY OF FIVE DESCENDED INTO THE ODINA VALLEY on the wide hard-packed path and crossed from the Austins' north property line into the state park. Joline, who also served as the primary contact person and public relations director for the Atomic Garage Movement, thought it would be a good time to share some news.

"We received a reply from TES yesterday afternoon via overnight delivery. It was, of course, addressed to Amy and Harshil. Amy had given me permission to open any response coming in from TES" Joline announced. Joline had become the reluctant mayor of Algonquin after so many of The Rock staff encouraged her to run. She won in a landslide and was now in her second term. There was no Algonquin, Michigan, economy without the nuclear plant. And she had become passionate about the subject the more she learned about it. She could do more to save The Rock as mayor than anything else, and she didn't trust anyone else to make it a top priority. What she didn't count on was her little, honorary niece, Amy Austin, growing up and challenging the world's top antinuclear environmental group to take another look at nuclear.

Everyone knew TES was short for the Terrestrial Ecology Society. Amy and Harshil, with help from AGM's Advisory Board, had sent an open letter one month ago to the powerful environmental group, petitioning it to stop being antinuclear energy and go back to being pronuclear energy like the organization was until the mid 1960s.

"Harshil and you did such a great job on that letter, sweetie," Joline said. "It was accurate, compelling, balanced, and conciliatory."

"We looked into TES's recent history," Amy added. "Back in 2004, one of their most influential directors Hanah Rule-McBride made a speech basically saying that climate change,

which they called global warming at the time, was an existential threat, and TES should revisit their early history and once again support nuclear energy. She saw nuclear energy as the only realistic path to provide the world with CO2 free, dependable, and affordable energy.”

“What happened?” Joline prompted.

“She was immediately forced to resign,” Amy shared. “But it was an informative event. It has been a long time since 2004. Climate change is an even more front-of-mind issue than it was then. She can’t be the only one within TES who felt that way, or may feel that way now. Being antinuclear is a weakness of theirs, not a strength. Their board is aging. I wonder what some of their younger members think?”

“I loved the part of your letter about AGM and TES working together to advocate for safe, clean, new nuclear reactors that could make energy available to the poor all over the world, and reduce energy poverty and carbon emissions at the same time,” Becky boasted like the proud mom she was. “That message should ring true with a lot of TES’s members, I would think.”

“I wholeheartedly agree with your mom, Amy,” Joline added. “You have a way of making a strong case for anything you believe in.”

“Thank you, Aunt Joline, and today I’d like to make a case that we should go to the ArrowHead Cafe & Grill for nachos like Uncle Stew and I used to do after we went on a drive while I was using my driving permit when I was 15,” Amy suggested.

“Wow, what persuasion, I am in,” Stew laughed.

“Well, what did TES say, Joline? I am on pins and needles,” Becky blurted out.

“They said, not surprisingly but unfortunately, that they remain unequivocally opposed to nuclear weapons and nuclear power. I quote from memory, ‘On behalf of our Board of Directors, and our 1.5 million dues-paying members in 130 countries, our policy shall remain to utilize

renewable energy to replace fossil fuels, and advocate against the use of nuclear energy.’ They also said that nuclear fuel is not renewable, nuclear plants are too expensive to build, waste is still a problem, and new reactors are mostly theoretical. Here’s another quote, ‘nuclear energy has too much catastrophic potential to accept any level of risk of using it for any reason. Let us instead work together to rid the world of nuclear weapons.’

They said the total focus should be on renewables like wind and solar. You can read the whole letter over nachos at The Arrow.”

“As if nuclear war and nuclear energy are the same topic,” Frank vented. “And somebody forgot to tell China that nuclear energy is bad. They’re building 150 new reactors at a cost of \$440 billion. Hell, France is probably going to be the first nation on Earth to be fully powered by nuclear energy; they’re at 75 percent and climbing right now. And most of the French don’t even like nuclear energy. Meanwhile, the United States, the greatest country on Earth, sits on its hands in comparison to France, South Korea, Russia, India, and China. It’s so frustrating.”

“Wait, there’s more,” Joline added, while doing her best imitation of an old infomercial. “They want to send their big, iconic movie star, Josh Manning, to Algonquin and debate with any representative of AGM over the fate of The Rock.”

“Wow, Josh Manning, how cool is that? When?” Amy mischievously smiled.

“They proposed in July at The Rock’s parking lot or an Algonquin location of our choosing,” Joline reported. “They included some debate rules in a letter of engagement, but they looked like they were garden variety.”

“You’re kidding, right? Their iconic pitchman would come here to try to get The Rock closed down? Boy did that guy ever deserve the Best Actor Oscar last year for his role in that

Civil War movie *Brady* where he played the famous wartime photographer, Matthew Brady. What a great movie,” Stew gushed.

“It sounds like you have a crush on him, dear. Have you seen his documentaries on climate change? The guy is a freaked-out climate apocalypse nutcase. With his help, TES has been effective in getting nuclear reactors shut down all over the world and new ones from even being built,” Joline fumed.

“They must be worried that if we can keep The Rock open by using some of the \$6 billion of the civil nuclear credit dollars allocated in the last infrastructure budget, other older nuclear plants will also qualify,” Becky said. “They know we’d switch them to MOX fuel and start burning up all that so-called nuclear waste sitting outside the plants in dry casks like France does now. Better to stop that money from ever being used by any nuclear plant. I bet they’ll try to get The Rock shut down for some nonexistent safety issues.”

“Yea, they think every federal dollar going into nuclear energy is a dollar taken away from wind and solar. They might be right about that,” Frank revealed.

Everyone walked along in silence. The gentle wind and bird songs filled the sky as the pine scented the forest in a refreshing aroma. A doe tentatively crossed the path about 50 yards ahead. A few seconds later, her fawn stumbled across and followed her into the woods. The brook running by the shaded path was soothing. The small group took in the moment.

Ten minutes later and a little farther down the hiking trail, Becky proclaimed, “Well, I’ll tell you what I think, gang. Don’t touch that debate challenge with a 10-foot pole. It would get lots of publicity, and Josh Manning would go viral by traveling to our small town and confronting the evil plant and the country rubes who support it. The press will have a field day,

like he's off slaying a dragon or exposing the imbecility of Homer Simpson in The Rock's control room."

"Really, mom? No way. He's wrong. TES is so wrong," Amy blurted out. "The nuclear energy industry has a lot of smart people in it, but they never stand up for themselves, correct these untrue statements about nuclear energy, or sue anyone for defamation. TES and others like that are all over US college campuses spreading lies about how bad nuclear energy is and how wonderful wind and solar are. All the English, political science, business, and law students believe that nonsense."

"Hey, that pretty much sums up everyone serving in the US Congress," Frank laughed.

"It's like most scientists think just being correct wins an argument," Amy said as she turned to the group and walked backward on the trail. "That's not enough. We owe it to the laws of physics and humanity to win this debate once and for all. We can't let them keep telling everybody all these things about nuclear power that aren't true. And the new reactors are simple and safer than a car. You should hear these college professors in my non-science classes. They are apocalyptic climate-change priests. They're so negative and crabby about everything except wind and solar power. And some of those classes are just a short walk to where some of the world's best professors on nuclear physics are lecturing. It's a complete disconnect within the same institution."

Frank shared his thoughts, "There's a lot that could go wrong for The Rock and AGM if we take them up on this. The only upside is Manning would provide us with a national stage, maybe an international stage. The media will lean into him more than us because his climate apocalyptic message gets clicks. But if we could hold our own, it's a high-level way to get out our message and finally put The Rock and its employees in the good light they deserve."

Becky elaborated, “It’s a risk. That’s for sure. It might not help keep the plant open, but it could doom it on the spot if this guy gets us on defense with all the typical lies about nuclear power and we can’t pivot.”

The group walked in silence for a while longer as Amy searched for her Kirtland’s Warbler without success. The search was the fun part anyway. She did see a few robins and a bright red cardinal.

As they approached the end of their walk, Frank asked, “So what do you guys think? Go or no go on the debate? We shouldn’t sit on it long either way? If it’s a go, we should hit them with that answer today to show our confidence to the media.”

Joline glanced at the group. “Well, if we do debate TES, our representative should be Amy.”

“Wait, are you sure? Either Uncle Stew or dad would do a better job. They’ve got a lot more public appearances under their belt and know the subject cold,” Amy pointed out.

“Nope, Aunt Joline is right, sweetie,” Becky said. “You’re ready. It’s your generation’s future at stake. Just pretend you’re talking to Harshil or a group of your friends. Manning won’t know what hit him.”

The unique, high-pitched chirp of a Kirtland’s Warbler shot through the forest. It took Amy about 30 seconds to spot it with Aunt Joline’s new binoculars. She snapped a digital picture with the attached mobile device.

“A good omen,” Amy announced. “Now help me get ready to kick Josh Manning’s cute butt back to the Stone Age, the place he apparently wants the rest of us to live.”

Becky whispered to Frank, “Well, nobody will ever accuse us of raising our kid to be a wallflower.”

Four

Thursday, June 10, 2027, Jackson Hole, Wyoming, Big Bear Ranch

RHONDA MATTINGLY, President and majority stockholder of Chelsea Resources, read the room from the command of the large leather chair making direct eye contact with each of the six men and three women leaning against the giant gas log fireplace and sitting and standing around the oversized black slate stone cocktail table. She took a sip of her Blantons bourbon as she thought about what she was about to say. The 2,000-square-foot library was Rhonda's favorite room. She glanced out through the 30-foot wall of glass at the star-filled night. On the western horizon rested the ever-present profile of the jagged Teton mountain range. As a child, she imagined them as ancient dinosaurs with saw-shaped backs. The Jackson Hole lodge was called Big Bear, named in honor of her grandfather's favorite game animal. Oil rig roughnecks of the past also called a 50-day hitch in the field, the Big Bear. Her grandfather pulled way too many of those long sessions away from home according to what her grandmother had told her. Rhonda was the third-generation owner of the Big Bear Ranch, inheriting it from her father. She had spent many summers there while growing up. Her guests tonight were immensely wealthy and some of the most well-connected people in the world energy market. The nine people in front of her represented oil and gas companies, commodity traders, a hedge fund owner, an investment banker, and of course, Hank. They were the innovation behind the US natural gas market and the most resourceful people she had ever known. Their knowledge of the subject was deep. She called the group, the Strange Bedfellow Club, SBC for short. It was not a legal entity, more of an informal study group and brain trust. There was no information about SBC floating around. No documentation of any kind. Outside of this room, the group simply did not exist.

“Well, Rhonda, if you’re just going to sit on that pretty ass of yours sipping this overpriced bourbon, I’ve got better places to be,” Hank Boudreaux announced. He was from the old school. A native of Pointe à la Hache, Louisiana, in Plaquemines Parish, located near the Mississippi River Delta, surrounded by oil refineries, shipping lanes, and active transportation terminals for land and sea. He had the Gulf of Mexico and oil running through his veins. Hank grew up roughnecking on the offshore oil rigs. He started his own company, Boudreaux Energy X, which at first transported emergency replacement parts to those rigs by boat out on the big salt. As the rigs got bigger and more complex, the demand for just-in-time parts skyrocketed. Without those parts, the rigs could lose millions of dollars an hour. His street smarts drove him to fill that void in the market before someone else did. The company’s slogan was, “We’re on the way!” Today his business was like a small freight air force that shipped mining and fracking equipment around the world on a moment’s notice. He was a lifelong but younger friend of Rhonda’s father, Rex. When Rex passed away unexpectedly at age 61 in 2012 Rhonda was 31 years old. Hank honored a secret promise he had made to his friend should something unexpected happen. So it was that Hank stepped up as Rhonda’s mentor and guardian angel. Rex left the successful but troubled oil enterprise to his only and relatively unknown daughter. At the time Chelsea Oil, now called Chelsea Resources, was embroiled in an alleged controversial scheme of funding an environmental non-governmental organization (NGO) that opposed nuclear power. The oil fraternity of good ol boys that fished and hunted with Rex were shocked he had left his empire to his daughter instead of planning to sell it to one of them.

But Hank knew what Rex knew. Rhonda was smart and tough enough for the job. And nobody cared more about Chelsea Oil than Rhonda. Hank had helped Rhonda navigate her way out of the NGO controversy and improve the business in her early years at the helm. Today,

Chelsea Resources was a major natural gas company with a market capitalization of \$15 billion. Rhonda controlled 53 percent of the shares, making her the majority stockholder and one of the wealthiest people in the United States. Chelsea's resources included 500,000 acres in the Permian Basin and the Anadarko Basin in the southwest, and 175,000 more acres in the Marcellus Shale in the northeast part of the country. She sat on five fossil-fuel company boards. She always reconstituted those boards with her people. She loved Hank Boudreaux like a second father.

"Oh, Hank, you're always such a charmer. No wonder you have three exes," Rhonda laughed.

"Damn she's a mean bitch, ain't she?" Hank smiled, as he toasted her. A relief of laughter filled the room. "Thanks for the invitation, honey; let's tell them what we've been talking about. I am sure your guests are curious?"

"First, thank you all for coming," Rhonda said as she put her drink down and started walking around the room. She was 46 years old but could be mistaken for late 30s, average height, with thick shoulder length auburn hair, and stylish clothing. She stayed fit and strong with a solid build that leaned trim. She loved riding her horses and working outside at the Big Bear Ranch when she was there or hiking mountain trails all over the Earth. She hated gyms. Her workouts were functional just like her street-smart business moves. She never married and if she had a lover it was probably an unknown rancher or a self-made person like her dad or Hank. She cherished her anonymity and worked to keep it.

After a brief pause, she got to the point. "I am not pulling any punches tonight my friends. We need to be straight forward. For a short time, in this room, among ourselves, let's set

aside all the nonsense we hear about climate change. I think you understand when I say that the subject is always the elephant in the room that nobody dares to scrutinize or question in public.”

Maria Sanchez, the group’s go-to technical expert on all things energy, smiled and nodded at Rhonda, giving her assurance and the confidence to say what needed to be said.

Rhonda continued, “In fact, we have nearly the lowest CO₂ levels in the atmosphere now than any time over the last 150 million years. Back then, according to deep ice samples, CO₂ was 2,500 parts per million, ppm. Life thrived. Of course, the sun was different, Earth’s orbit has changed, and active volcanoes weighed in as well. Atmospheric CO₂ is a complex thing to study. Then CO₂ declined steadily for millions of years as plants used it as food, then compressed it into the Earth upon their death, and crustaceans in the oceans turned it into protective shells. And those shells held that CO₂. CO₂ levels started bouncing up and down recently. Recently being the last few thousand years.”

One of the guys raised his voice, “Hank was around then; he could tell us what it was like.” Soft laughter filled the library.

Rhonda smiled and continued, “Then CO₂ hit 280 ppm in 1750. The Industrial Revolution kicked in about then and we’re at about 420 ppm now. I’ll concede that the increase could be due to human activity. But most people don’t realize surface vegetation and trees die at 140 ppm because they’re not getting enough CO₂ to survive. We’ll die too at those levels because we depend on plant life for oxygen and food. CO₂ isn’t really just carbon, just like H₂O, water isn’t just hydrogen. CO₂ is an organic, noncarcinogenic gas with no toxic effects on people unless it gets to 10 times the current amount in the atmosphere. We need CO₂ for life to exist. We’re just 270 ppm above that 140 ppm mark now. Is it possible the CO₂ emissions of the Industrial Age postponed our demise by about 50,000 years from the lack of CO₂?” Rhonda

speculated. “Honestly, I don’t know. My point is that the increase from 280 ppm to 420 ppm became the basis for much of the developed world trying to get off fossil-fuel dependence. I don’t think most people know that fossil fuels make modern civilization possible and will for at least another couple hundred years. Regardless of good or bad intentions, those climate change policies have created a massive problem for the world and for our businesses. But also, possibly an historic opportunity.” Rhonda nodded to Hank as he took over the presentation.

“Here’s what I think,” Hank offered as he stood and folded his arms in front of his stocky frame. “Climate change will be studied in the future as a mysterious cultural mania that became dogma around the world in the first three decades of the 21st century. I know you don’t all agree with that, but hear me out. The physics of wind and solar and the fantasy of baseline energy storage in the form of a battery at this time in history will be a head scratcher to future technical historians. I am sure they’ll be wondering, ‘What were they thinking?’ As we meet here tonight, governments and businesses are still trying to muscle the world into using wind and solar energy instead of coal, oil, and natural gas. They call it a transition. It’s costing a lot of time and money. And I mean decades and trillions of dollars and euros wasted. Whether those decisions are because of mistaken scientific conviction in the alleged harm of CO₂ or just a political ploy to gain more control over populations, the fact is the Western World hasn’t been tapping new oil and gas reserves at home or exporting that technology to South America or Africa. The Gross Domestic Product (GDP) of nations follows energy production. When the production of energy increases, GDP increases, and the opposite is also true.

“Right now, people all over the world need more energy than is being produced. Demand for energy is vastly outstripping supply everywhere on Earth,” Hank said as he made a wide gesture off to the horizon. “About a billion and a half people get by on the amount of energy just

your modern refrigerator uses. Five billion people are walking around today in clothes washed by hand. Billions more burn dung or wood to stay warm or cook. Sanitation and clean water for them are non-existent. What about those people? But the political idiots don't know a kilowatt from a terawatt. We've tried to talk to our representatives about physics, the science of energy, the weaknesses in some of the arguments related to climate change and the financial realities of energy exploration, production, and transportation. But they don't listen. They never listen. The first job of a politician is to get re-elected. So, they pander to ignorance, false hopes, and sloth. They're not interested in defining problems and coming up with realistic solutions," Hank growled. He flashed back to many of those meetings where he could tell the young staffer or Congressional Representative wasn't buying the story that the country had to produce more oil and gas, not less. He took a couple breaths and calmed himself.

After composing himself, he continued, "An old guy I knew, a World War II veteran who worked out on the big salt as a roughneck most of his life then ended up owning that rig, gave me a piece of advice I've never forgotten. He said, 'Be a patriot first. If that doesn't work, screw em then, be an opportunist.' Lord knows, we've gone the patriot route as hard as we could. Now we're all opportunists. And we're in good shape because we didn't get on the renewable bandwagon. We wisely refused wind and solar subsidies, which would have put us on the take. Like joining a cartel or a gang, there's no going back. Turning down those subsidies was the right thing for us to do from both a business and moral standpoint. And yet, we found a way to make money off wind and solar, the same technologies we advised our government not to subsidize. We kept finding ways of making our oil and gas assets more productive as well. Even as the politicians made those commodities rarer and more valuable by not allowing us to tap our country's immense reserves of natural gas. Our lives are stuffed full of red tape, aren't they?"

Everyone looked up sharing an understanding of that statement; it was something that had to be experienced to be believed.

Hank smiled as he made his last point, “Now that our oil and gas wells’ productivity are starting to decline, how are we going to continue to feed our generators? What about tomorrow? How will our fellow citizens accept higher energy prices and more and longer rolling blackouts?” Hank gestured toward Rhonda.

Rhonda nodded toward her friend, “It was Maria who had uncovered a formally classified report commissioned by President Bill Clinton and delivered to President George W. Bush making a prediction that 30 to 40 years of high-level subsidies would be spent before physics caused the wind and solar scheme to collapse. Or hit the green wall as some have come to explain it. Our strategy of building and purchasing peaker natural gas plants to back up those weather-dependent systems turned out to be a good move. And they’re something to see at work, aren’t they? They go from idle to full blast in seconds. Most of the public does not realize we have to keep them running as back up to wind and solar 24/7. There’s 2,000 of them in our country right now. They put off more methane than we used to think and half the CO₂ of a coal plant, but there is no modern life without them now. The irony is our country would be emitting far less methane and CO₂ had we just built bigger natural gas plants and not subsidized wind and solar at all. And we would have had abundant, reliable, and cheap power every hour of the day.”

“Ignorance is bliss,” someone added.

“Boy, isn’t that the truth,” Hank cut in. “Ignorance is what’s at the core of our current energy crisis. I don’t think wind turbines and solar farms would have existed if free markets dictated energy policy. When the wind doesn’t blow, the sun doesn’t shine, at nighttime, or at high energy demand times, like when people get home from work, our peakers have to kick in.

At 50 to 150 megawatts, those plants will power 50,000 to 150,000 homes. As you all know, the government would like to shut them down now too. But they know they can't. And when we're not making electricity with our peakers, a few years back we started making hydrogen and ammonia for fertilizer, both of which require significant process heat. So, we're all making a good honest buck. It's the American way. Hell, it's everybody's way. We have great partners here; we're well capitalized, minimizing market risks, generating great cash flow, and making the world a hospitable place at the same time."

"So, what's the problem, Hank? Why are we here when the bass are running?" another guest asked.

"Because it's time once again to focus on the future. Our future," Rhonda retorted as she swept the room with her hand. "With our wells just starting the process of diminishing, it also turns out there's a clear and present danger to our business model on the horizon. Maria discovered it about a year ago. At my request, she did a deep dive into the situation. And now she's ready to define the problem and offer a plan to get us past it. I am not easily surprised at this stage of my life, but I've got to be honest. I usually don't question Maria when it comes to anything technical in the energy business, but when she laid out what lies ahead, and what we should do about it, I think it's the first time I asked her, 'Are you sure about this?'"

Five

“I AM SURE. Bob Dylan would tell us, ‘Times, They Are A-Changing.’ Our present dilemma all comes down to a set of ideas worthy of a Nobel Prize. Not my ideas, unfortunately,” Maria explained as she lowered a screen over the massive fireplace. A picture of a tall young woman came up on the screen. “Ladies and gentlemen, meet Amy Austin. She’s 19 years old. Lives in a rural town in Central Michigan called Algonquin. She’s a cross-country runner, animal lover, and, believe it or not, can’t be located anywhere on social media.”

An image of an old-style stainless-steel roadside café came up. It had a rusty neon lit, arrow-shaped sign pointing down toward the restaurant from a pole out at the road. “Amy likes nachos and pizza and can often be found with her friends and family at the Arrowhead Café and Grill, the Arrow for short.”

Then an image of Amy working in a University of Michigan lab faded in. “She’s taking graduate-level physics and chemistry courses at University of Michigan, as she did when she was still in high school.”

Another image of a guy in a hard hat at a metal fabrication factory was the next image. “Her dad, Frank Austin, is a rich, early retired materials guy and just filed a patent for a new alloy he calls Sartorium.”

The Algonquin Credit Union building faded in that included an inset image of a pleasant looking woman in designer wire eyeglasses. “Amy’s mom, Becky, is pretty much a modest financial genius. She sits on the board of the local credit union and works there a few days each week volunteering as a financial advisor to some of its members. She’s got a Certified Financial Planner, CFP designation.”

A happy, middle-aged couple smiling at a camera in a bowling alley came up next. “Frank and Becky’s best friends are Stew and Joline Grassley. Stew served in the US Nuclear Navy. He has been advising NASA and other space agencies around the world on nuclear propulsion for space vehicles after leaving the service. Joline is the mayor of Algonquin. She’s a heavyweight political street fighter but settled into small town politics to save the North Rocky Point Nuclear Power Station, The Rock as the locals call it. She also stayed local to support and mentor Amy. They’re extended family now, Uncle Stew and Aunt Joline,” Maria explained.

“Another of Amy’s mentors is Bob James, a retired nuclear reactor driver and a thorn in the side of the antinuclear Terrestrial Ecology Society, you know them as TES.” There was a picture of Bob working in what was clearly a nuclear plant control room.

“And there’s a young man from India, Harshil Varm.” A photo of Harshil’s India passport appeared. “Harshil is a math savant, computer whiz kid, and we’ve recently learned to be highly adept at blockchain technology. He’s working for Frank Austin on a green card.”

Then a picture of all of them together. “Here’s a rare shot of this little group from a story run by Channel Seven Action News of Lansing, Michigan, an affiliate of the RBX Satellite network. They’re posing in front of the Atomic Garage, the cute name they gave to a pole barn on the Austins’ property. Ladies and gentlemen, these people are about to rock your world.”

“How are they going to do that, Maria?” asked a woman sitting by the cocktail table.

“Here’s the quick answer: Amy has come up with a micro reactor concept that we believe will be commercially scalable within a couple years, tops,” Maria explained.

“How do you know that?” one of the guys posed.

“She’s been working on it for years,” Maria started to answer.

“What the hell, Maria, did she start when she was 12? She was a child. She’s just a teenage kid now,” one of the guys pointed out.

“I understand that reaction, but we’re going to have to set her age aside,” Maria insisted. “The way I discovered Amy is when my most talented college intern was tasked with looking at nuclear energy as a potential replacement for fossil fuels. His focus was to be real science, high probability stuff, not just happy talk. He was to scan the literature, news, and social media to see if there was any possibility of such an occurrence that might be off the radar. Once he turned in his brief, I didn’t get a chance to review it for about a week. When I started reading excerpts from Amy’s posts, I had a ‘WHOA! Holy shit!’ moment. I did a deep dive into her posts. She had opened-sourced everything that she’d been working on. Everything seemed not only plausible but possible. The chemistry of the reactor she proposed seemed correct to me. So, I had a few top physicists and chemists in the international physics community’s look at Amy’s work. Even though she’s just 19 now, she’s already as far along as a few seasoned top innovators in the micro reactor space. My advisors were highly impressed with her work. They told me they thought her physics and chemistry work were top notch but the micro nuclear reactor she envisioned was decades away from being commercially viable.”

Maria paused for effect. She noted everybody was listening intently. “Then a couple months after that her father came up with a new alloy he calls Sartorium. One of those highly talented and top paid physicists continued to work for us by keeping current with Amy’s work. He called me a while back. I remember because it was 2:37 a.m. He couldn’t contain himself. He forgot what time it was. He told me his initial thoughts were that Amy was gifted and would be a great future scientist. He’s now disabused himself of that thought. He had taken a closer look at Frank’s patent application for Sartorium. He said he would not have made the connection

between Amy's reactor design and the obscure new alloy her father came up with if it was not for this assignment. He now thinks Amy had been working for over five years as if she knew that alloy would be available to her in the future. She was innovating in anticipation of it. Kind of like running a pass pattern in football. She knew she was going to catch the ball downfield. He explained that our current crop of nuclear reactor developers doesn't think like that. They design, even subconsciously, with all the antiquated regulatory hurdles in mind. Their mandates, experiences, and training keep their work incremental. But a magnificently gifted 12-year-old, with nurturing and supportive adults around her, would have no such limitations. Think of those young piano or violin savant kids performing and you've got that and then some in the physics and chemistry world with Amy."

"I imagine you secured a second opinion on that diagnosis from our consultant?" one of the guys inquired as he set his drink on the massive fireplace mantle.

"I did indeed," Maria answered. "Here's the bottom line: Amy's micro reactor means there's a new fission machine and fuel system that will soon exist and checks all the boxes for massive commercialization. Think of building airplanes now instead of airports and you get the idea. And she's showing the whole world how to do it right now, including the recipe for Sartorium. Our best scientific advisors believe that if Sartorium has the thermodynamic properties and is as light as claimed, it's not technology that will slow this little team down; it's regulations. Amy and her team will still need nuclear fuel to test with."

"Please elaborate," one of the women encouraged.

Maria winked at Rhonda as a signal to take over. "Okay, I'll try to keep it brief," Rhonda explained. "Amy's reactor is a Micro Liquid Fluoride Thorium Reactor. They call it the M-LFTR-VI for short. That VI means what generation it is. Today's nuclear reactor developers

are working on generation IV. So, Amy is cocky. She's basically claiming her technology is 30 years ahead of where we are today. To be fair, it can be argued that Edison with electrical distribution, the Wright Brothers with flight, and Elon Musk with SpaceX reusable rockets made decadal leaps in technology. That means it's possible. Amy's design and chemistry make the M-LFTR-VI small, reliable, and powerful. Frank's alloy Sartorium makes it inexpensive and lightweight. And Sartorium will eliminate the supply-chain problems other micro reactor innovators are running into as they try to get their first factory-made products out the door. We're not sure how powerful and how light M-LFTR-VI will be just yet. Even if those metrics are ideal, they still need fuel to test it."

"Why is it time for us to make a move now?" the investment banker asked.

"I'll take the question," Hank volunteered. "Two reasons. First, Amy's open-source posts of her work and some of the other stuff going on in that pole barn present like a popular online video for kids, but the content is the real deal. We think scientists and governments around the world will soon have these sessions on their radar if they don't already. And their brainiacs are going to tell them the same thing our brainiacs tell us: The M-LFTR-VI is a game changer. Second, you might have heard that TES is sending their spokesperson, Josh Manning, to Michigan next month to try to get the single reactor nuclear plant in Algonquin closed. The same one Joline Grassley, mayor of Algonquin, has dedicated her career to protecting. The plant wants to extend its operating license and modify the reactor so it can burn recycled nuclear waste called MOX. TES doesn't want to see that happen because all the nuclear plant owners may want to do the same thing with the other 90 nuclear reactors in service. If The Rock gets the green light on modifying the reactor to burn MOX, it will set a precedent. So, TES had its spokesperson, Josh

Manning, challenge the locals to a public debate on the issue. Guess who accepted that challenge?”

The whole room of people answered together, “Amy Austin.”

“Very good class,” Hank laughed. “My friends, the train is about to leave the station.”

Maria walked to the center of the room with her arms folded in front of her. “At first, even with the revelation of Amy and the work her little team has accomplished, I’ve tried not to overreact. I just didn’t see a path for them, or anyone else, to get this device into testing, work through the regulatory process, set up manufacturing facilities, and get them delivered, hooked up, and in operation within the next 10 years. Even 10 years to do all that would be considered insanely fast in this environment. I actually did come close to advising that we just go fishing and not worry about some new, exotic fission technology disrupting our business model. But then I thought about Amy Austin, who at around 12 years old, starts building a nuclear reactor based on an alloy she knew her father could come up with for her. These people are going to get past the non-technical issues too; I am sure of that now. I just don’t know how they’re going to do it.”

“Well, if they do somehow pull that off, Maria, what’s our risk?” a guest asked.

“One of the very first applications of Amy’s reactor could well be to replace all our peakers. The environmentalists hate them. The pronuclear progressives will target them. The media will scream for that transition to happen. The politicians will oblige those demands.”

Someone by the wall of windows blurted out, “Why am I feeling like we’re totally screwed here? What’s the plan, Hank? What would that old World War II guy advise in this situation?” The room full of guests all nodded having the same questions in mind.

“He might say, if you can’t beat em, join em,” Hank retorted. “Look, the world will need natural gas, gasoline, diesel fuel, and the many byproducts of oil for decades to come, even though it’s a tough slog for producers right now. It will be profitable, just less and less so because the government will end up being our business partner to an even greater extent than they already are.”

“We have to think differently than everyone else,” Rhonda interjected.

“That’s right,” Hank segued. “If we continue to see ourselves as in the natural gas business, we’re going to die the death of the Kodak Company, which didn’t embrace digital photography fast enough. Or the early train companies that didn’t know they were in the transportation business and didn’t look at airplanes as a natural evolution of what they were doing. But if we’re in the energy transmission and application business, to coin a phrase, ‘the world is our oyster.’ For starters, why wouldn’t we want to move our peakers to a denser, less expensive fuel now that technology has a way for us to do that? If we think that way, we could tell all our current adversaries that we’re trying to get our peakers off natural gas and use emission-free fuel. Hell, they’ll probably applaud us. Then we could keep going with the idea. Think how much we could expand our hydrogen and fertilizer production, move into desalination of seawater, heat buildings, put these reactors in container ships, power airports, use the reactors to power oil rigs, and processes that make oil-based products, like everything found in a hospital. Our infrastructures are almost custom made for that kind of repurposing. We could standardize all those applications. We could buy up our competitors with the infrastructures we’re looking for before they realized what was going on. If a million of these new reactors go into service, we don’t compete with those producers, we offer to franchise them and wrap them

in the infrastructure and systems that allow them to be highly efficient and profitable. Not so different than making pizzas or sandwiches.”

“But how do we get our flag on that hill first? The Chinese, Russians, and a host of other countries could build these reactors without the regulatory obstacles our country self-imposes on its own citizens,” asked the gentlemen standing by the fireplace mantle.

“We have a head start. We may be early in discovering what’s going on. I think we need to team up with these good people in Michigan. And I mean real soon,” Hank proposed.

“At first, I thought what they could use most is a customer, that could be us,” Rhonda shared. “But then it became apparent what may be more valuable to them is to bring a solution to the table. Help them with a piece that they’re missing. What big obstacle is between them and making their technology so attractive that the regulatory system will get off its ass and put all these small nuclear reactors on a fast track? If we’re right, regulation will follow good design in a competitive world market. The public will demand it, and the politicians will appease them. We need to get on Amy’s team. But we need to bring something to the table. Something big. A calling card.”

“I may have an idea. Hank, may we borrow one of your big-ass airplanes?” Maria asked.

After dinner the guests headed to their own small houses across from the big house. Hank and Rhonda sat by the fire pit on the library patio deck, under a brisk and clear starry night sky. “TES came up tonight. Looks like our paths are going to cross with them again. How do you feel about that?” Hank asked.

Just that acronym TES makes me sad. I wish we could tell the world what we know. My poor dad took so much crap from so many people who hadn't a clue what was actually going on. Hank, tell me again how all of that came about," Rhonda pleaded.

"Well, back in the 1950s, we had big oil companies. Landowski Oil was the mammoth. Anton Landowski was the robber-baron who founded it in the later part of the 19th century. It was the Victorian Golden Age; the Industrial Revolution was in full swing going into the 20th century. The future was bright, and coal and oil were driving levels of prosperity that had never even been imagined. Years later, the US came out of World War II with a booming economy and a determination to put fission to work to produce power for peaceful purposes. Eisenhower started that journey with his "Atoms for Peace" Speech at the United Nations near the end of 1953. The heirs of Anton didn't like that idea so much. The Landowski Foundation pushed the dangers of radiation, financed studies, offered endowments, engaged in public relations, and got their people on college boards, foundations, and inside government agencies to kill nuclear energy. It's the reason people today are scared of any amount of radiation. The Cold War with the Soviet Union, the ongoing Vietnam War, and the fear of a nuclear war were entwined with the production of nuclear energy. Your dad took over Chelsea Oil from your grandpa in 1963. Right in the middle of that shit storm."

"He was so ruggedly handsome. I miss him so much, Hank. I just wish he were here so we could talk. I always ask, 'What would daddy do?' I'll never stop asking that question?" Rhonda admitted with tears welling up.

"I know exactly what he'd do, honey. He'd do what you're doing. He's part of you. He believed in you. He just beamed with pride when he talked about you. You were his whole world. He knew you would be able to handle whatever life was going to throw at you. He didn't

protect you from the hard knocks in life. It tore him apart to watch you get knocked down. But he knew that in this life, in this business, you're either the predator or the prey. He prepared you to face down adversity. Brush yourself off. Get back up. Get in the fight. You're tough. Just follow your heart. Your daddy is right here with us," Hank said as he grabbed Rhonda's hand.

"Well, he got screwed," Rhonda said, as she composed herself and patted Hank's hand. "People think he was sneaking millions of dollars to TES to get them to be antinuclear to protect Chelsea Oil. What a total crock. And I have to stay silent and let the world think that's what went down. Those TES assholes pulled about \$150 million out of natural gas companies over a about a 12-year period, and we were about \$15 million of that total at a time we couldn't afford it. I know you told me once but explain to me what happened again just one last time."

"Okay, but it's the last we shall talk of it. Agreed" Hank asked.

"Agreed."

"Okay then," Hank sighed. "TES also wanted your dad to invest in wind and solar, collect the substantial subsidies from the government, and skim some of that to TES as well. Your dad drew the line there. He hated those damn contraptions. When it comes to the label environmentalist, your dad was the real deal. TES doesn't give a rat's ass about nature. Your dad didn't want anything to do with wind and solar. But a few others in the natural gas business did do that. One of those guys told me the tax credits are the only reason to build those things."

"Tell me about the blackmail?" Rhonda prodded.

"It's a short story," Hank explained. "TES pulled their blackmailing scheme on the most innovative small oil companies that had moved into fracking. They threatened to say that fracking was contaminating groundwater, could cause massive earthquakes, leaked massive amounts of methane and CO2, and other nefarious things. There were bits of truth in some of

those claims that would make them stick. From around 2005 to the time we lost Rex in 2012, you'll recall global warming was all the rage. That's what they used to call climate change. The media was all in. And had TES engaged in a frontal attack on Chelsea Oil with those claims, your company would have gone bankrupt. Your dad was ramping up to get into fracking. The company was overextended in debt. I told your dad he had to pay TES. And he hated it."

"But he did stop making those payments just before he died," Rhonda recalled.

"Yep," Hank nodded. "That's because a faction of TES's Board wanted to go pronuclear because they were concerned about global warming. They had a huge falling out, and another progressive environmental group was formed that was pronuclear. The new group saw nuclear as a solution to climate change and a way to get off oil fossil fuels."

"So, my dad went to the newly formed pronuclear environmental group that spun off from TES and exposed the extent of the corruption going on inside TES," Rhonda recalled.

"That's right. And that got a lot of media exposure. Your father just shut down the maze of shell companies used to hide the transactions. And he stopped paying TES after that. Nothing about that was technically illegal about donations going to TES. It was just a terrible story of power and greed," Hank sighed as he shook his head recalling those days. "But the part you want to tell the world is it was your dad who caused that split on the TES Board and exposed the whole scheme."

"Yep."

"But that's something you can't tell anyone darling. Not ever," Hank emphasized. "Even though your dad's moves were righteous, ironically they would also have gotten him prosecuted by the FBI. Today if that came out, you'd bring a lot of heat down on Chelsea Resources that you

don't need. Besides, we have to see what TES is up to with this nuclear business in Algonquin, Michigan. That debate is going to be something to see."

"How do you think that will shake out?" Rhonda asked.

"I have an ominous feeling. Like a long difficult journey is about to be engaged."

"Me too, Hank. I feel the same way," Rhonda revealed.

"There's one more thing I need to tell you about this TES business that you don't know. It may come out in the coming months." Hank was trying to think about how to say it.

"What is it, Hank? Just tell me."

"The goon TES hired to blackmail your dad and start that whole ugly chapter years ago was a young Carson McMullen. He's TES's current executive director."

Friday, June 25, 2027, Tel Aviv, Israel

ARIEL RAQUEL WALKED ALONG THE LAKE IN MENACHEM BEGIN PARK, south of Tel Aviv. Families were setting up picnics while their kids were running off to the playground, and joggers crisscrossed the park. It was a picture-perfect day. Ariel noticed the joggers and thought his 35 years of deep cover work for Mossad, Hebrew for the Central Institute for Intelligence and Special Operations, had turned him into a partial cyborg with an artificial left knee, a partial left hip, and a new right shoulder. At 77, he was amazed that he lived in a time when surgeons could repair the human body with devices and in such ways that he could still stay physically active. He ate mostly a vegetarian diet, slept well, and his social life was good. He liked what his doctor said about compressing morbidity until the very end. That was the inside joke when Ariel's friends would say, "May you live long and die quickly."

Ariel had entered the park from Moshe Dayan Street, named in honor of one of Israel's most charismatic and controversial personalities of the past. Ariel often thought of the iconic figure with his eyepatch and powerful bearing. Ariel's own mentor, Meir Dagan, a legend in Mossad, became its Ramsad, the director, in 2002. It was Meir who had noticed 22-year-old Ariel's fearlessness and intelligence as a soldier. Meir recruited Ariel, tutored, mentored, supported, and ultimately befriended the younger man. Over several decades, Meir, with Ariel's help, had infiltrated enemy countries at high levels. It was widely acknowledged, even by Israel's enemies, that Meir Dagan had prevented rogue countries from obtaining nuclear weapons under his watch, not the least of which was Iran. Within the intelligence community, Meir was known as the "King of Shadows." Ariel had participated as a field operative in many of those missions

and was now considered a treasure of experience, advice, institutional history, and common sense. Ariel preferred to stay out of the limelight and behind the scenes, where he was immensely more effective and able to move around with much more independence and less oversight.

Mier and Ariel had a father-and-son relationship until Mier's death in 2016. Moshe taught Meir, Meir taught Ariel, and Ariel taught his protege, Levi Katz, a man he loved as a son. It was a lineage formed of necessity to defend their beloved Israel. Israel is located in the Middle East, at the crossroads of Asia and Europe, surrounded by enemies, with 54 countries in Africa to the south, and becoming increasingly dependent on totalitarian regimes for energy and infrastructure while the world's democracies sleepwalked. Mossad was busy as always. Each generation of Mossad passed a baton of responsibility onto the next generation with the singular goal to ensure Israel's future. Never forget.

Ariel saw his tall, lean friend, Professor Levi Katz approaching. They smiled, shook hands, and half hugged. At 6 foot 2 inches, Levi towered over Ariel's 5-foot 6-inch still powerful frame. Ariel had recruited Levi when he was 24 years old. Levi then rose quickly within Mossad's ranks. Ariel saw a rare calm and brilliance in the younger man that ended up serving Israel well over the years. Levi, now 52 years old, was a scientist, philosopher, historian, and one of the greatest intelligence strategists in Israel's history. He was beloved and respected by all his colleagues within the Mossad and at Tel Aviv University. And he was at the top of his game.

"Levi, my friend, you look good. How is the family?"

"Demanding, but well, thank you for asking. And thank you for meeting me here today, Ariel." Levi didn't ask about Ariel's family because he knew he was estranged from his son and

daughter. His wife had died seven years ago during a terrorist assassination attempt on Ariel, which was related to the estrangement from his children.

“I always have time for the smartest man on the planet,” Ariel said with all honesty.

“If that were true, I would not need to talk with you today, my friend.”

“The world is a dangerous place. You can’t save it all by yourself. Unburden yourself,” Ariel said.

“Wise advice, as always.” Levi got to the point, “One of our Katsa’s operators embedded in the Indian Army hierarchy reported that one of India’s physicists named Dr. Kasvi Aakanksha has a contract on her head. She’s at the Madras Atomic Power Station in Kalpakkam. She works on the team that keeps the 500-megawatt LFTR, called Kamini, going. It’s part of India’s fast breeder reactor program and their longer range plan to power their nation on a nuclear fuel they have in abundance called thorium. In fact, LFTR stands for Liquid Fluoride Thorium Reactor.”

“Any idea on why someone in their military would want to eliminate her?” Ariel asked.

“As you well know, Ariel, India is Russia’s biggest customer for uranium export. India purchases over 100 tons of it per year from Russia. The uranium is used mostly in their civilian Boiling Water Reactors, BWRs. There are basically three types of uranium in use in the world. First, LEU, low-enriched uranium, enrichment of LEU is about 4 percent. Second, HEU, high-enriched uranium, at 95 percent enrichment, And third, HALEU, pronounced like ‘Hey Lew,’ and means high assay, low-enriched uranium; most of the time, it’s enriched to 20 percent. Enrichment is the concentration of the fuel that is fissionable. Fission is the nuclear reaction when the uranium atom splits.”

“Ah, it’s been awhile, but I recall this information. Remind me how those nuclear fuels are used,” Ariel requested.

“Sure. LEU is used in most of the world’s current operating civilian reactors. For the most part, Pressurized Water Reactors and Boiling Water Reactors. LEU is proliferation proof. Then HEU is what you can use to make atomic weapons. HEU is also the fuel of choice for powering nuclear naval submarines and aircraft carriers. On a side note, France and China are using LEU instead of HEU to power their naval vessels because it’s much cheaper and faster to build a navy with. And HALEU is used in the new advanced Generation IV reactors. Just think of those new reactors as turbo-charged machines. They need high-grade premium fuel but not rich enough to be a proliferation risk; 20 percent is that cut off,” Levi explained.

“Okay, professor. Thank you for the refresher,” Ariel chuckled, thinking Levi was a teacher at heart. “I assume we can now move to the motive for the alleged contract on Dr. Aakanksha’s head.”

“We can,” Levi confirmed. “About 80 years ago, India set down a three-part, 50-year plan to use their abundant reserves of thorium as nuclear fuel. Thorium is found all over the world. It’s plentiful, and India has over a quarter of the world’s reserves of it. If my memory serves me correctly, there are about 500,000 tonnes of it in India. It’s plentiful in the monazite sands found mostly on the country’s southeast coast.”

“I trust your memory, my friend. So India is swimming in thorium,” Ariel tried to shortcut the information he wanted.

Levi smiled and proceeded, “Thorium is also a byproduct of rare earth minerals mining. Most of the developed world has ready access to vast thorium stores. How they use thorium to produce nuclear energy is a lesson for another day. Several thorium test reactors are running now in India, China, Russia, South Korea, Japan, and Israel. Most of these have come online over the last two years. Unbelievably, the US is still mired in regulations trying to get their LFTRs out of

testing at their national labs and into commercial production. Just know that the first LFTR operated in the 1960s at Oak Ridge Labs in the state of Tennessee in the US. These LFTRs as they're called, Ariel, are by a magnitude more simple than the 440 big water reactors used around the world today. And India and China are racing to put them into factory production."

Ariel glanced around the park as Levi tutored him on nuclear energy. As Ariel watched people enjoying the outdoors, he thought of that old saying, "Ignorance is bliss." The world was such a dangerous place. Evil was everywhere. But yet, most people were good. They made the world better. Maybe it was just that most of them didn't realize the veneer between a life of abundance and misery was paper thin.

"Ah yes, thorium instead of uranium," Ariel said as he refocused. "They've been talking about that a long time now. I recall the time about 2005 or 2006 when Indian physicists working on advanced nuclear reactor technology were dying in car accidents, being poisoned, and suddenly becoming the victims of random violent crimes."

"Yes, I pulled the file," Levi said. "All of them were working on test reactors designed to burn thorium as fuel. We believe a few top Indian Army Generals, working in concert with a corrupt powerful politician, were responsible for those murders. It was a payola scheme. A Russian general and energy oligarch were also getting kickbacks from all those billions of Rupees, Euros, and dollars floating around inside the Indian bureaucracy. It was India's responsibility to look into those murders. Although tragic, we determined the events posed no immediate threat to Israel. The killings stopped for about five or six years, then there were a few more in 2012. Maybe it's the same people and situation playing out again?"

"That would be one's first reaction, yes," Ariel concurred.

“India lost some of their top nuclear scientists via these killings, and it set their 50-year plan to burn thorium instead of uranium back about 20 years,” Levi revealed.

“So someone still does not want to see a switch from uranium to thorium to power future reactors,” Ariel guessed.

“In general, that is the story,” Levi agreed. “The new thorium reactors, LFTRs, still need to use a lot of HALEU as a starter fuel to get the thorium burning. India just started producing their own HALEU under Dr. Aakanksha’s leadership but still depend on Russia for most of it.

To use a metaphor, think of HALEU as kindling and thorium as the log. Once thorium is burning, it can run that reactor for 20 to 25 years, or it can produce uranium-233, which operators can extract to start future LFTRs. So once operators have a critical mass of LFTRs running, they close the entire nuclear fuel loop within their country. In theory, they could be totally energy independent much faster than anyone thinks,” Levi explained.

Four F-35 Israeli fighter jets flew over the park. Both men looked up then looked at each other with a silent acknowledgement. The jets had been enhanced back in 2024 to hit Iran’s three nuclear weapons sites, Bafq, Ardakan, and Bandar Abbas. They also hit the undisclosed and safe quarters of the Iranian President, Ashraf Hadi, with an unarmed bomb. The attacks on the nuclear facilities were not totally unexpected. But dropping an unarmed bomb on the president’s location was a clear shot across the bow of Iran. It shook up Iran’s president. And it was Ariel and Levi who had been able to track the elusive leader inside his own country. The attacks were never confirmed by Iran, and the story died while the frustrated Iranians’ watched their uranium-enrichment processes get set back another two to three years.

Ariel patted Levi on the knee as he organized his thoughts, “So if one could derail India’s progress on building LFTRs in factories, it would delay advanced reactor deployment, keep the

old reactors operating longer, and put millions more dollars in the bad guys' pockets. A good rear-guard action strategy if you have no morals or conscience. Does that sum up a possible motive, Levi?"

"That's our thinking," Levi summarized. "I am concerned about the Indian generals and the Russian oligarchy starting to look to Iran, their other proxies, and bad actors as a new short-term uranium market to replace the shortfall that India will create in Russia's uranium exports. We're on full alert looking at any questionable shipments of radioactive materials out of India and working with the Americans to track unusual or undocumented uranium shipments out of Russia and her allies. Because Israel developed our nuclear weapons capability without transparency to the United Nations and did not disclose our nuclear-arms capabilities, the International Atomic Energy Agency, IAEA, will not cooperate with us in any nuclear fuel related investigation. They see us as nuclear renegades. Not that I'd trust their intelligence in these matters anyway."

"Excellent precautions, Levi. But please, tell me more about Dr. Aakanksha," Ariel instructed as they both took a seat on a nearby park bench.

Levi shook his head, "There's something going on here. Lots of dots to connect."

He pulled up a close-up picture of the Indian physicist on his mobile device and showed it to Ariel. Dr. Aakanksha appeared to be in her mid 30s. Her dark eyes, framed by stylish glasses, were penetrating, and her expression beamed of confidence, life, and mischief. She had a presence. "Ahh, she's beautiful as well as intelligent," Ariel responded.

"She was born in 1989. Her birth name was Dhvani Neerja. She's 39 years old now, never married, and we don't think she's ever had children," Levi revealed.

"A reminder that all lives are complex, Levi," Ariel reflected.

“You mentioned the murders of Indian physicists. Back in 2006, as it turns out, one of those people was her father, Dr. Tej Neeraj,” Levi explained. “We have reason to believe that this man, General Yuri Mikhail of the Indian Army, ordered that assassination. The general died in 2021 at age 74.” An image of the Russian came up on Levi’s screen. Ariel silently nodded his understanding.

Levi continued, “When Dhvani’s father was killed, that left her and her older sister Mishti as orphans. Their mother, Shahana, was an accomplished chemist in her own right and had suspiciously and sadly disappeared in 2005. Foul play was suspected but there were no leads. Shahana was working on India’s advanced nuclear reactor program as well. She helped develop the chemistry for the core of these reactors to efficiently transmute thorium into uranium-233. She was a crucial person to the program, Ariel.”

“That indeed sounds like some heavy intellectual lifting, my friend,” Ariel replied.

“Tej and Shahana were intellectuals, scientists to the core. I am sure their daughters are genetically favored with a high level of competence in the sciences,” Levi added.

He continued, “Well, Dhvani and Mishti moved from their home in Delhi, we think to live with a distant relative in Chennai. For over a decade, they disappeared. No official documents, passports, dog licenses, credit cards, social media, school enrollments, nothing. The sisters’ names were gone, probably to protect them from the same fate of their parents. Then 11 years later, in 2017, a single affidavit, filed by 28-year-old women, for a name change, ironically from one alias to a new alias, showed up. What red flagged it for us was the document included two witness signatures, one of them unknown, the other was signed by Mishti Neerja, Dhvani’s sister. It seemed she had mistakenly signed her real name to that document.”

“Ah yes, she may have suffered from depression by the loss of her parents, and living a covert life,” Ariel guessed. “The loss of identity can be very traumatic. It’s not unusual that she may have signed her real name by mistake on a routine document.”

“Agreed,” Levi said. “So it appears Dhvani had changed her childhood alias to an adult alias name, Kasvi Aakanksha. She must have been trying to distance herself from her parent’s past.”

“Yes, one wonders if revenge in some form isn’t in the making?” Ariel mused.

“Just one little mistake like that honest witness signature, and the brand new person Kasvi Aakanksha shows up on our radar. Today, she is a nuclear physicist working at the Madras Atomic Power Station,” Levi informed.

“That’s incredible,” Ariel sighed.

“From what we can tell, her educational credentials are false,” Levi continued. “There is no official record of her attending university. She took a low-level lab assistant job at Madras and seemingly worked her way up. Apparently, her knowledge of physics and chemistry were advanced enough to not raise any suspicions about the resume she used to get her toe in the door.”

“I guess seeing is believing,” Ariel said.

Levi looked at his notes, “Three years after Dhvani changed her name her older sister, Mishti Neerja, who kept her given name by the way, married a man 12 years her senior, Shivaay Varm. She then took his surname. He was a widow with one 15-year-old boy. The son’s name was Harshil, born in Chennai in 2005. Harshil is a math prodigy, who quickly found a connection with his new aunt, Kasvi Aakanksha.”

“Where is this young man now?” Ariel asked.

“With his aunt’s help, he applied and was accepted at the University of Michigan’s Summer Institute for Gifted Children,” Levi reported. “While attending that program, he stayed with a distant relative in Algonquin, Michigan, and heard a talk by Dr. Frank Austin on the history of nuclear energy in the United States. They became friends. Harshil decided to extend his stay in the US. He isn’t a fan of formal education because he apparently learns faster on his own; he signed up for a STEM OPT (Optional Practical Training) extension of his F-1 Visa and had applied for a green card. He’s employed at Frank Austin’s organization, a small business called the Atomic Garage Movement. Frank founded that business with his friend Stew Grassley, who brings an interesting twist to the story too. They’re working on a small, new advanced nuclear reactor. More on that in a moment. The Atomic Garage Movement also advocates for nuclear energy and regularly confronts the antinuclear organization called, Terrestrial Ecology Society, or TES.”

“We know TES. They’re all over Europe too,” Ariel recalled.

“That’s right,” Levi said as he showed his mobile device screen to Ariel. “Frank Austin is father to one, Amy Austin. She’s 19 years old now. Next month, she’s going to debate the Academy Award winning actor Josh Manning. Manning’s grandmother was cofounder of TES. The debate will be over whether to close or update and extend the operating license on a nuclear plant in the Austins’ home town of Algonquin, Michigan. It’s the North Rocky Point Nuclear Power Station, which the locals call The Rock.”

“Really, just 19 years old, and getting up there with an international bigwig, quick-thinking environmental activist and professional actor? Many accomplished public figures wouldn’t take those odds,” Ariel whistled.

“We think the young lady is a ringer. TES is underestimating her, and Manning is walking into an ambush,” Levi stated.

“What makes you think so?” Ariel inquired.

“She is extremely gifted in physics, material sciences, chemistry, and math,” Levi revealed. “We believe she is the one who conceived of the micro nuclear reactor they’re working on.”

“Why does the name Stew Grassley sound familiar?” Ariel wondered.

“He’s a retired naval officer. Like a lot of the nuclear community in the states, once he retired from the US nuclear navy, he went to work in the commercial sector of nuclear energy. He met Joline Burkharut from Algonquin, Michigan, at a conference in Seattle where Stew was living at the time. They hit it off. Got married. Then they made Algonquin their home. Stew worked at the nuclear plant, The Rock, for a few years after moving to Algonquin, Michigan. Joline Burkharut is lifelong friends with Frank’s wife, Becky. That’s how the connection was made. Maybe the connection that will change the course of history.”

“Still, that name?” Ariel clicked his fingers. “It’s right there. Why can’t I think of it? Ahh, wait, ISRO. What is it?”

“Ariel, you haven’t lost your amazing memory, it’s still keen as ever. ISRO, the Indian Space Research Organization. Guess what Stew Grassley did after he retired from The Rock?” Levi baited.

“Unretired,” Ariel answered.

“Correct,” Levi confirmed. Stew went to work for NASA, the National Aeronautics and Space Administration. And NASA collaborated with ISRO on how to best power future spacecraft, land vehicles, and provide electricity with nuclear energy to surface colonies on the

moon and Mars. Thorium is found in abundance all over the moon's near side. Thorium reactors would be ideal for moon or Mars-based nuclear reactors. By the way, this concept lit a fire under the international nuclear community. You might have seen Stew Grassley in a TED Talk or being interviewed as an expert on the subject, or as the guest in any of several documentaries."

"So, you think the first contact between these Americans and Indians now working on advanced reactors started with that NASA and ISRO contact?" Ariel looked for confirmation.

"It's a developing narrative. But here's new information, Ariel," Levi said. "Amy Austin, even at the young age of 19, seems to be the driving force behind developing a highly advanced nuclear reactor. And she's posting everything about their research, specs, progress, and problems online. Everything is totally open source. I could be part of their team online tomorrow."

"Why would they do that?" Ariel rubbed his chin.

"For a couple reasons," Levi responded. "Our brilliant friend, Adele, arguably one of the top physicists in the world, took a look at that source documentation for us. She told me the reactor is a game changer, a leap forward for the technology. Further, we believe Amy Austin is in contact with Kasvi and possibly an underground group of physicists from around the world may be contributing to Amy's design. But she is the inspiration. She and her father, a materials science guy, developed a new alloy called Sartorium, which will revolutionize nuclear energy, construction, and space exploration by itself, according to Adele. And I concur. They opened sourced how to make Sartorium as well. By being open sourced, they avoid a mountain of international nuclear laws on building or sharing nuclear technology. They present the whole concept like it's just a fun science project."

"And by now, probably every developed and developing country on Earth has a team following along and building their own copy of it," Ariel guessed out loud.

“That’s probably true,” Levi confirmed. “They call it the M-LFTR-VI. And it will burn thorium.”

“Is Israel working on one?” Ariel wanted to know.

“Of course, yes,” Levi flatly stated.

“What’s the end game here? What is it these Americans and Indians want to happen?” Ariel asked.

“I’ve given this a lot of thought,” Levi said. “We think Amy’s technology will be a paradigm shift in lowering the upfront capital cost of building a new nuclear reactor. Maybe to cause a nuclear-energy race instead of a nuclear-arms race. Adele said the technology is advanced, but simple, safe, and elegant. It’s going to be really easy and cheap to build or buy one of these things. Possibly the most disruptive technological advance in a millenia.”

“The stakes are higher than ever right now. The world order is experiencing more change than at any time in history,” Ariel sighed. “Russia and China are using nuclear-power technology to build long-term relationships in Africa.”

Levi added, “And China is just starting to use their new small modular reactors to strengthen their choke hold on Africa’s rare earth resources. Almost everyone is vastly underestimating China’s commitment to these reactors. I could see them building thousands of the M-LFTR-VIs to get their nuclear energy flag planted on the hill first.”

“China is filling a void left by the United States, which should be more involved in Africa now and touting their great safety record and propensity to taking nuclear proliferation off the table,” Ariel explained. “And what do you think will happen when these unstable African regimes experience anarchy?”

“Of course, when chaos occurs in any African country where Russia or China have nuclear assets, they will use that chaos as an excuse to occupy and stabilize the country,” Levi quickly responded.

“This is the next chapter of the ongoing geopolitical chess game between India and China,” Ariel added. “One thing I am absolutely sure of is that nobody knows how all this shakes out.”

Both men sat silently for a few minutes. Ariel then patted Levi on the back.

“For now, let’s help keep the Indian physicist alive. I’ll talk to our friends in India whom we can trust,” Ariel revealed. “I am sure they want an energy-independent India as much as Kasvi does. Get on this job full time, Levi. I’ll clear your schedule from above. Keep connecting dots. I wish you much success, my friend.”

“And I wish you success too, Ariel.” They hugged and parted. The concept of wishing each other luck had never occurred to either of them their entire lives.

As he started the walk home, Ariel kicked a soccer ball back to two young women who were practicing their passing skills as one got by. “Wow, nice kick for an old guy,” one of the girls yelled. Ariel smiled.

Seven

11 a.m., Wednesday, July 14, 2027, Algonquin, Michigan, Courthouse Steps

JOSH MANNING CLIMBED THE ALGONQUIN COURTHOUSE STEPS AND HEADED TO THE MICROPHONES. There were about 150 people in the crowd, along with some local, state, and national media. It was a last-minute affair organized by the PR folks back at TES's home office in Berkeley. The debate was scheduled for the following day, Thursday, July 15th, but Manning agreed with the TES Board to make an early statement about why he was in Algonquin to debate the Atomic Garage Movement about the future of the North Rocky Point Nuclear Power Station.

The courthouse he was standing in front of also served as the Odina County seat. It sat proudly in the center of the town square and was still in use. The welcoming, large park across the street from the courthouse had existed since the village was incorporated in 1855. It was finally named Hookstraw Park in 1872 in honor of a Civil War first lieutenant and Algonquin resident Eugene Hookstraw who served with distinction for the Union's Michigan Wolverine Brigade. The popular Hookstraw ACE Hardware, just two blocks away, had been founded in 1964 by his great grandchildren. By 1893, Algonquin Village had become a city with a population of 300 people. Today, 8,500 people called Algonquin home.

If the weather held, the debate would be in the park across the street at 11 a.m. Eastern Daylight Saving Time tomorrow; it would be breakfast time on the west coast. The weather forecast looked perfect. So did TES's strategy, Manning thought as he smiled at the small crowd.

"Thank you everyone for coming today on such short notice. This is just a brief statement. First, thank you to the City of Algonquin, Michigan, and the Atomic Garage

Movement for agreeing to put on this debate. The debate between the Terrestrial Ecological Society, TES for short, and the Atomic Garage Movement, AGM for short, is really a reflection of where the world is on the nuclear energy issue. I, Josh Manning, will represent TES, and Amy Austin will represent AGM. I am looking forward to meeting Amy; I understand she is a promising young scientist.”

There was small laughter from the crowd who knew Amy Austin better and could see her coming up behind Manning and quietly taking a place behind him on the courthouse steps. She was a fierce competitor, outspoken, with a cutting wit, and lightning-fast mastery of any subject matter. The locals never really thought of her as a “promising young scientist.” She had a presence more similar to a clap of thunder. You wouldn’t know it from that pleasant smile of hers.

“The key question,” Manning said, and then paused, as he gave the number one sign. “Is nuclear power really a viable option for powering the world in the future? Or are there safer, less expensive ways? I think the solutions are in place by continuing to build out wind and solar infrastructures as fast as we can, while closing down fossil-fuel sources. Amy, representing the AGM, will make a case that nuclear power is the better answer.

“The reason we asked for this debate was that a few weeks ago, AGM wrote TES an open letter and asked us to consider becoming pronuclear again as we were in the early 1960s, nearly 70 years ago. That was before we knew about the dangers of nuclear power as we do now. AGM requested we work with them on getting the local nuclear plant’s license extended for another 20 years with the Nuclear Regulatory Commission. AGM and the plant owners are proposing to use mixed oxide fuel called MOX fuel, which is being produced in Tennessee using a dangerous process with lethal, radioactive elements that come from the waste of these nuclear plants.

“We told AGM, what I will tell you now, I personally, and TES as an organization, remain unequivocally opposed to nuclear power. We remain proud of being a big part of closing down 13 active and dangerous nuclear plants here in the United States and preventing the construction of 15 more while they were in planning starting way back in 1967. I personally played a key role in closing the San Onofre nuclear plant located in San Clemente in 1992 while I was a college student. In addition to being too close to a major earthquake fault line, it had a lot of the same problems as the plant near here, not the least of which is the buildup of highly radioactive waste and debris around the facility, stored in temporary, time-dated casks.”

“Mr. Manning, Mr. Manning,” a reporter yelled. “But what makes this nuclear plant so important that TES felt they had to ask for a public debate and fly their superstar out here over its proposed operating license extension instead of retiring it? It’s just a single reactor, small-town plant. What’s the big deal?”

“Because this one is different,” Manning immediately shot back. “This time they want to upgrade the reactor, ship those nuclear waste casks to Tennessee for processing, break them open, process that radioactive debris, which means they have to increase the risk of exposing the public to radioactivity. Then they want to ship that stuff back here and use it in a new untested reactor. They call it recycling the fuel, or closing the fuel cycle. We call it insane. If that is allowed, these old pressurized water reactors built anywhere from 30 to 50 years ago will be pushed into service way past their expiration dates. You’re putting a good section of the upper midwest at high risk of being contaminated with radioactivity for a thousand years or more. Just one mistake is all you get.

“Some of these pronuclear nuts brag they could get operating licenses out to 100 years of age on these neutron brittled, rusting, and leaking plants. That nonsense is now being seriously

considered. Too many people are losing touch with the dangers of this technology. It's been a few years since our last big nuclear accident. I am worried the next one is due. We have to draw the line on this nuclear insanity right now. Right here in Algonquin. Let's shut down these old, dangerous nuclear plants. Let's also stop working on highly radioactive new small reactors and use what is working, renewable energy. I am here, my friends, because we at TES believe keeping this nuclear plant operating, at this time, will be an environmental injustice with far-ranging implications. We're here to Block the Rock. Thank you."

Amy walked by a surprised Josh Manning and right up to the microphone. "Welcome to Algonquin, Mr. Manning, I hear you're a talented, aging actor. How was your flight in? You know, you put about nine tons of carbon into the atmosphere on that one-way trip from California today. And you fly around enough in one year to equal the CO2 footprint of 1,000 families here in Algonquin. Not to worry, while you're here you'll be living on carbon-free nuclear energy compliments of The Rock. That's what we locals affectionately call the North Rocky Point Nuclear Power Station, the place you want to brag about closing down."

Amy was feeling more confident, "It appears my email and phone must not be working so well; someone forgot to send me an invitation to meet you here for this little circus, preceding tomorrow's debate. Nonetheless, I'd just like to say that for 80 years, the scientists and skilled laborers within the nuclear energy industry have been relentlessly vilified, while movie stars, politicians, and musicians were lionized for demonizing nuclear energy without challenge. Those days are over, my friends. Because of the Atomic Garage Movement, millions of others from my generation and other pronuclear organizations will now speak for them.

"The only true statement Mr. Manning made in this appearance is the number of nuclear plants TES has had a hand in shutting down or cutting off over the years. That makes TES the

number one CO2 polluter in the world. You say you're trying to prevent apocalyptic events because of climate change. But you're responsible for the scary future you've been prophesying about. Tomorrow we'll debate. For now, I'd just like to tell the media that everything you said about nuclear power in this rigged and fake PR stunt is false or so highly exaggerated to have absolutely no basis in physics. And since 1967, never has. Get a good night's sleep, movie star, you're up against a scientist with an attitude tomorrow."

Frank and Becky Austin, Stew and Joline Grassley, Harshil, and Bob James, a family friend and an advisor to AGM, were standing to the side of the crowd at the bottom of the courthouse steps. They had rushed to get Amy to the event once they realized what TES was doing. Stew let out a small whistle as he shook his head. He looked down at the pad of paper and pen he was holding, "I guess a Josh Manning autograph is probably out of the question now."

"Bob, I asked you to coach her a little, give her some confidence, keep her from getting too intimidated," Frank laughed.

"Don't look at me. Becky and you raised her," Bob laughed as he raised his hands in surrender. "She showed up with Von Clausewitz's book *Principles of Warfare*, and suggested we tap into his expertise," Bob explained. "She's already got inside Manning's head and set up tomorrow to go viral. The media is going to have a field day with this the rest of the day. She told me she wanted to debate him on the terrain of her choosing in place, subject material, and terms. Who the hell was I to argue?"

Amy smiled and blew the small group a kiss from the podium.

Becky smiled, waved back, and said, "I told your father this was a bad idea."

Stew laughed, "Hell Becky, this will be the nuclear industry's finest hour in 70 years. That little girl of yours is a dynamo."

“She’s going to clean his clock tomorrow, and he knows it,” Frank said, “Let’s get a crowd here to support her. We know TES is working the phones right now. She’s on her home turf, and we need to hold that advantage. Game time folks.”

Frank pulled out his cell phone and got to work.

Joline grabbed Becky’s hand, “Let’s get to work, girlfriend. Frank is right.”

Josh Manning was on a fast pace walk out of the park and immediately on his cell phone to TES Executive Director Carson McMullen. “Hey, what the hell have you gotten me into here? Easy peasy my ass, this kid is for real.”

Eight

3 p.m., Wednesday, July 14, 2027, NRC Public Comment Zoom Call

CARSON MCMULLEN JUMPED ON THE ONLINE NUCLEAR REGULATORY COMMITTEE'S PUBLIC MEETING about the North Rocky Point Nuclear Power Station's application for renewal just in the nick of time. He had only been on the ground in Michigan for 20 minutes and was using the wi-fi connection at the Capital Region International Airport's private terminal in Lansing. The flight was provided by the Michigan Chapter of TES and funded by a renewable energy nonprofit organization, NPO, which received \$5 million in funding from another green NPO. That NPO was funded by a blind trust. It would take a team of financial forensic specialists to follow the money back to Midstate Gas and Power, which was moving out of running natural gas plants and moving into wind and solar. Carson didn't care who paid for the flight. He let TES's top antinuclear activist Bonnie Fogart handle those details. As he often told people who didn't get to the point quickly, "Speed this up, I've got a planet to save." TES was in an environmental war, and he was the five-star general. The tactics were whatever the tactics had to be.

The NRC committee chairperson holding the public meeting, with an online audience of 623 people, called on Carson. "I see Dr. McMullen has just joined us. Ladies and gentlemen, next on the agenda is the application to extend the operating license another 20 years for the North Rocky Point Nuclear Power Station, located in Algonquin, Michigan. It would run from 2029 when the current license expires to 2049. We will be hearing from two expert witnesses arguing for non-renewal and renewal respectively. Our first expert is Dr. Carson McMullen of the Terrestrial Ecology Society, which is also known as TES. Dr. McMullen's bio is available

online, but we'll ask both our experts to make a brief introduction. Welcome and thank you for your input today, Dr. McMullen. Please give a brief explanation about TES and your role with that organization. Then you may proceed to make your comment."

"Thank you, Mr. Chairperson and members of the Advisory Committee on Reactor Safeguards. TES is an environmental nonprofit organization established in 1958, with about 1.5 million members with chapters in 130 countries. We advocate for sustainable environmental practices. We are not antinuclear. We're agnostic about nuclear energy. But currently our position is that the technology remains too dangerous for commercial expansion, and older reactors need to be retired because they are increasingly dangerous. If nuclear power were safe, we would support it because of its non-carbon emitting capability. But it is far from safe, which is why I am making a statement today. I am the executive director and senior science officer for TES with a speciality in physics and chemistry."

Bob James, a longtime advocate for nuclear power and a former reactor driver, was also online monitoring the proceedings. He was in a hotel room in Algonquin, Michigan. He had been coaching Amy Austin for tomorrow's debate against Josh Manning, TES's spokesperson. Bob had been away from his Cleveland, Ohio, home for a week. His wife was making the four-hour drive to join him. He was up next.

"What a crock of shit," he blurted into his muted speaker.

Carson McMullen had a Ph.D after his name, but the only PhD he had a record of being awarded was for environmental science, not physics or chemistry. And the chairperson of this NRC safety committee had been publicly speaking out about the risks of nuclear energy for 20 years. TES pushed the guy on the NRC; and like a weed, he grew himself into several key committees and got a few more of his TES cronies in high-level administrative positions at the

NRC. The nuclear-energy community kowtowed to the NRC and said nice things about them in public, but the NRC in Bob James' opinion was treasonist and was no more than a slow-motion terrorist organization. They were single-handedly destroying the United States' dominance in nuclear energy and together with that, throwing the country's future into the toilet.

McMullen segued fast, "The Michigan nuclear plant in question, referred to as The Rock, is a plant with a long history of safety issues, and specifically its inability to find a permanent fix for the control rod seal failures. The control rods are a part of the reactor that must be fail safe because as the control rod is moving up or down, the rod needs to move through its full range of motion, and the coolant from the reactor needs to be contained. Yet, The Rock was shut down in 2008 because the reactor coolant, which is highly radioactive, leaked from the J-Groove weld in the control rod drive mechanism. Similar leaks occurred in 2012 and 2013, and then 2019, on different control rods, and then once again in 2022. The owners, Midwest Electric Power Distributors, MEPD, say the issue has been resolved, and they'll continue to monitor the performance of the leaky fuel rods. I am not reassured. The NRC operating license runs until 2029, just two years from now. MEPD hopes to have its application extended to 2049, and instead of refueling as scheduled for next year, they'd like to use an extended down time to make several upgrades including adapting the plant's single reactor to burn MOX fuel. For those listening in, that stands for mixed oxide fuel. MOX is a fuel that comes from reprocessing nuclear waste and burning it a second time in a reactor. TES's position is that this recurring leak around the control rods is a chronic problem; it can't be fixed because of the amount of aging, brittleness, and corroded metals that have been exposed for 25 years to the reactor core. And remember, more than one control rod is having this problem. In TES's opinion, renewing this application for a 20-year extension would be a grievous mistake. We will still be confronting

these same control rod seal problems that have plagued this plant in the past again, for the next 20 years, or God forbid, until the control rods cause an accident and expose the public to harmful levels of radiation. Not only should the NRC deny this license extension, the plant should be shut down now and decommissioned, not two years from now. The NRC should then overlook the safe decommissioning of this dangerous nuclear plant with a company like DeTech, which specializes in that process.

“I also warn the NRC to be vigilant in protecting the public as some ambitious politicians and naive non-governmental organizations try to save this plant in the name of climate change. Remember, you are an independent body, and the public’s safety is your single mission. Renewable energy is the safest path to mitigating climate change, and TES supports those technologies. If you approve the application to keep this plant running on MOX fuel, you’ll be creating two areas of high-level risk. First, you’ll be keeping an aging plant with a long history of radiation leaks in operation. Second, you’ll have created a situation where highly radioactive nuclear debris from all over the United States will be shipped on trains and trucks to Oak Ridge, Tennessee, for reprocessing, exposed at the reprocessing plant, and then the MOX fuel shipped back here. Then eventually other nuclear plants will also want to transition their old reactors to using MOX fuel. In TES’s opinion, you may find yourself needing to explain why the NRC approved an extension of an old, problematic nuclear plant that resulted in a melt down or a radioactive transportation accident in an unsuspecting town or city. Deny the application to extend this plant’s operating life, and do not approve the upgrade to MOX reactors anywhere, including with this application. Thank you for your consideration,” McMullen concluded.

The chairperson came back on, “Thank you, Dr. McMullen. We now have Robert James, representing the Atomic Garage Movement to offer a statement. Good afternoon, Bob, you know the drill.”

“Good afternoon, and thank you for your service at the NRC, ladies and gentlemen. And we appreciate the excellent testimony the NRC continues to receive from our national labs, especially the Idaho National Labs. As always, we’re grateful for the skill level and expertise of much of your field staff but disappointed in the basis in which the NRC evaluates risks. I have an undergraduate and graduate degree in Nuclear Science and Engineering from the Colorado School of Mines. I’ve spent nearly 40 years working at three different nuclear plants as a control-room operator and then supervisor. We’re known as reactor drivers within the profession. Ironically, all three of those plants were shut down while I was employed at them, and TES played the lead role in those debacles. The Zimmer Plant in Ohio never even got open. It was 97 percent complete. TES effectively got a brand new nuclear plant shut down. Then it was converted to coal in 1983. So at the tender age of 24 years old, I transferred to Shoreham on Long Island Sound. It was closed in 1985 over some bogus lack of an evacuation route. Finally I ended up at Indian Point, in Buchanan, New York, along the Hudson River, and that plant was closed in 2021. It was a perfectly operating technological marvel. By then I’d had enough; I retired at 63 to spend all my time advocating for nuclear power. That was six years ago.

“And what an interesting coincidence that this hearing was called just three weeks ago, and scheduled for the afternoon before the high-profile public debate over The Rock. It was pretty clear that the NRC was going to renew this license. But just last month, this committee recommended a re-evaluation of that decision based on five-year-old data that is misrepresented by TES and is irrelevant to the license extension. Just a point of observation.

“The interesting thing about listening to Mr. McMullen is that if you applied his standards for nuclear power safety to any other form of power generation, including wind turbines and solar panels, we’d all be shoveling tons of horseshit again. Not that we aren’t doing that figuratively right now. That’s because we’d have to shut down any power generation device that presented any level of risk.

“Just 200 years ago, about the time I was born, the world was mostly powered by human and animal calorie expenditure. From an energy standpoint, we weren’t all that different from people who lived during the reign of the Egyptian pharaohs. Steam engines, which improved the work of a single man by 500 times, were powered by coal and shipped over here from London, which started our country’s love affair with fossil fuels. Fossil fuels have been a miracle economic engine to this country and the world. I mention this because the so-called radiation leak McMullen is getting his panties in a wad over has to be detected by computerized sensors and electron microscopes, emitting just 3/100ths of what is considered a risk to human health. It’s a hydrogen gas called tritium. When it comes into contact with oxygen, it turns into tritiated water, HTO. It also exists naturally in our upper atmosphere and is emitted in such minute amounts from a nuclear reactor that it simply is no risk to human health. But the uranium fuel inside that reactor provides three million times more power than fossil fuels. That means if you’re serious about climate change, you have a clean fuel source available that is three-one-millionths the size of fossil fuels. Get your head around that statement if you can. That sounds pretty green to me.

“Let’s just say we’re getting a little too close to the trees here, folks. The Rock, which sits on just 450 acres of land, has provided clean, reliable power to about 800,000 homes in Michigan and northern Indiana for 25 years without any incident that put the public at risk. In

nearly 80 years of operation in this country, not one person has died or been injured from a radiation leak from any of our 90-plus commercial reactors. Not one. Anywhere! That's one hell of a record, people. With upgrades, this plant could operate another 75 years, easily. The relicensing process that mandatorily occurs when a nuclear plant hits 40 years is totally arbitrary. Every engineer, if you ask, will tell you there is no reason a nuclear plant should not operate 100 years. And we can run it on MOX fuel, a process invented in the United States, then outlawed by the Carter Administration in 1977 because of proliferation risks. The MOX fuel idea was picked up by France, which has now been recycling their nuclear waste like this for decades without incident. We have enough slightly used fuel stored in onsite casks that we could repurpose it for our current and next generation reactors to last us about 400 more years. And remember: The Rock's reactor upgrade means the plutonium and uranium will not be separated from the used fuel during reprocessing. That makes handling the returning MOX easier and offers better mileage on its second pass through. And although isotopes only represent about six percent of that used fuel, we'll be able to pull that valuable stuff out and use it in research and medicine.

“Also, there is wear and tear on any mechanism that operates nearly 95 percent of its existence like a nuclear plant does. Remember the life of a wind turbine or solar panel is about 20 years max, 15 years would be more accurate; and they operate, give or take, about 20 to 30 percent of the time. Those devices have material supply problems on the front end. Uyghur slave labor in Xinjiang China to build most of the worlds' solar panels comes to mind. Using thousands of Balsa trees in the Ecuadorian Amazon Forest as part of the makeup of non-recyclable wind turbine blades is another hush-hush secret of renewables. Talk about inconvenient truths. Then we have the intermittent performance problems during their operational lifetimes, which wreak havoc with our electrical grid, and toxic waste problems on

the back end. Only Carson McMullen whose PhD is not in physics or chemistry could love those specs. Mr. McMullen, I'd love to read your doctoral dissertation if one really exists.

“The point is with any machine, in any discipline, we monitor and schedule for wear and tear, and then fix stuff. That’s how it’s done. Then we turn the thing back on. And we always do so in a culture of safety. Carson McMullen, representing TES, an organization that never built anything, just went on record to inform you that American physicists, engineers, and highly skilled union members in the trades can’t replace welds, pipes, or pumps. Not true. What I implore all of you to do is weigh the risks, which are so low as to be almost unmeasurable, with the benefits this type of power offers humanity.

“Over the last several years, Americans have grown extremely frustrated paying five times more for their electricity than they paid just five years ago. They now schedule their days around rolling blackouts. Millions of people, via smart metering, get their high-energy appliances cut off from electricity at peak usage times. That’s because so much of our power is now intermittent, and our grid is falling apart. It’s unacceptable to find ourselves in this position in the 21st century.

“And for Pete’s sake, let’s get on with building a set of regulations to accommodate the technologies of advanced nuclear reactors. As far back as 2019, the US Congress passed the *Nuclear Energy Innovation and Modernization Act*, and since then, other legislation has passed to accommodate the innovation and support of new, advanced reactors. But the NRC, in my opinion, is in violation of a Congressional mandate, because y’all have just been cutting and pasting the same regs you use for regulating our huge Pressurized Water Reactors and applying those old regs to new applications coming in for Generation IV reactors. Oklo, bless their A-framed hearts, have developed the 1.5-megawatt Aurora microreactor, which will save one

million tons of CO₂ emissions from being emitted over the fossil-fuel alternative during the life of that reactor. When they first submitted their combined license application to the NRC, it was 12,000 pages long. It was the first application submitted to the NRC for a new reactor in 10 years. And the NRC's first action for a proposed new reactor was to reject the application over bogus concerns brought up by TES."

The NRC committee chairperson interrupted, "Mr. James, this hearing is specifically about the extension of the operating license for the North Rocky Point Nuclear Power Station to be extended from 2029 to 2049, with its reactor adapted to burn MOX fuel. Your input on advanced reactor licensing will be welcome in forums regarding the licensing of Generation IV reactors. Please wrap up your comments."

"Okay, understood. Sorry about that," Bob apologized. "Let me just end by reminding this committee, TES, and the people listening today, if the United States doesn't lead in nuclear energy, many of our allies, and China, and Russia will fill that role. They've already started. China is about to exceed the number of operating nuclear reactors in the United States. We hear they're planning to build 40 new nuclear reactors but are purchasing enough materials to build 400 of them. Personally, I think they're gearing up factories to manufacture SMRs. You need to renew The Rock's license for another 20 years and allow the reactor to be upgraded to burn MOX fuel. Thank you for hearing me out."

The committee chairperson adjusted his mic and reviewed his notes. "Mr. McMullen, since you went first, you have the last word. You have two minutes."

"Thank you. It's important to make note of what Mr. James didn't say. First, he didn't tell us the owners of this plant, Midwest Electric Power Distributors, would fix the chronic radioactive leaking fuel rods once and for all. That's because they can't or they would have done

so already. Second, he didn't talk about the 1,200-mile, two-way trip by train or truck of the white hot, highly radioactive debris that will need to go back and forth between Algonquin, Michigan and Oak Ridge Labs in Tennessee to keep the reactor going with MOX fuel. Next time you see a highway or train accident, think about that. And third, TES has full faith in American innovation, skill, and productivity. We support and appreciate union workers across all the trades. But our nation's limited resources should be prioritized. Because of climate change, time is of the essence. Spending it on expensive nuclear reactors that take decades to build and remain one accident from catastrophe misallocates our national treasure. Wind and solar energy, granted, have challenges, but not of the magnitude that Mr. James would have you believe. In fact, in 2015, the US produced 230 terawatt hours of electricity from those sources. By 2022 that doubled to 543 terawatt hours of electricity. That's just under 10 percent of all the US electrical production. By 2030, just three years out, 40 percent of our electricity will be coming from these sources. Ladies and gentlemen, we have the technology to produce all the energy we need without the need to create mountains of radioactive debris in the process. Prioritize. Let's develop wind and solar power, and wait on radioactive-free fusion technology instead of fission, which comes with unacceptable radioactive risk. Deny the license extension for the North Rocky Point Nuclear Power Station and close it down now, not in two years. Thank you," McMullen ended.

After the NRC call, Bob sat silently in his hotel room. Getting the NRC to weigh risk versus benefits, think of radiation levels from a nuclear plant compared to safe background levels that exist in nature, and consider the ways new nuclear reactors operate in developing updated safety standards seemed impossible. Fusion was going to be the fuel of the future, but it could

easily be 50 years or more away. Radioactivity had never been a technological problem of fission. In many ways, it was just as good as having fusion technology now. The pronuclear community couldn't even get the politicians to use an almost completed below ground nuclear waste storage facility at highly stable Yucca Mountain in Nevada, even with people living close to the mountain wanting the disposal site. That was \$15 billion down the drain. If groups like TES screamed, the politicians folded. Bob couldn't see a path to a reasonable regulatory environment. It took 10 minutes of napkin math to prove that the supply of power generation in the US and the world was falling way behind demand.

Bob knew it was normal for McMullen to outright lie about electrical production of wind and solar. Much of that electrical production goes to waste because it's all produced at the same time and the grid can't absorb it. Also, the world still uses thermal power in industrial processes and fossil fuels in transportation. He knew that people didn't have the slightest idea that 78 percent of the world's power is produced by fossil fuels, and that percentage has only dropped a couple percent in the last 40 years. What the hell was going on? Was the group Environmental Progress correct? That using ever-more efficient fuels was not inevitable. Would groups like TES, a bureaucratic and politically based NRC, and a risk-averse public frightened by a biased media, actually leave the greatest country and the longest lasting democracy in history dependent on the will of foreign dictators? Could we actually reverse course and experience the unimaginable, diminishing lifestyles, the loss of innovation and pride in our technological prowess, and quietly go into the night? Would prehistoric nuclear plants sit across what once was the United States landscape, like the monolithic human figures at Easter Island, or the prehistoric monuments at Stonehenge, or the ancient city of Catalhöyük, Turkey, a city that existed 7100 to

5700 BC, long before humans invented farming, writing, wheels, or metals? All advanced civilizations that stopped advancing for some reason. Why? “Damn,” Bob said out loud.

DRAFT

Nine

September 1997, Spooner's Cove, San Luis Obispo, California

“The sea, sky, Earth, and you my little man, are all made of stardust. Josh, when you go outside and swim at the beach, or walk through a trail in the woods, or lay on your back looking at the clouds or the stars, or when you just silently watch the animals and the birds, or when you ride your bike outside, you’re at peace. You’re connected to it all. Promise me you’ll never be so busy or so distracted you lose that connection. Make time to wonder at it all. Listen to the leaves rustle in the fall, the surf on the rocks and sand, and make animals out of cloud formations. See how fast the buds blossom in the spring. Smell it, the pine of the trees, the salt of the ocean, the musty rot of an old piece of bark. Feel the breezes and the winds, warm and cold and sometimes stinging. Sometimes gentle and soothing. Hear the songs of the birds and the insects. See how many stars and planets you can count. Think about how soft and beautiful a new blanket of snow is. Watch the bees work, the caterpillars evolve into butterflies. Identify the fauna. Look in tide pools and notice all the life. Be aware of the awe inspiring migrations of wildlife. Love all animals great and small. You live on the Earth, Josh. It is a paradise, an oasis in the universe. We are so blessed. I am going to protect it now, I have to go. . . Oh, look Josh, the Walking Leaf.”

The dream seemed so real. Josh was a boy, just nine years old when his grandmother shared her feelings about the natural world with him as they sat on the shore of Spooner’s Cove with a view of the vast Pacific Ocean, located in Montana de Oro State Park near their shared home in San Luis Obispo, California. The moment was frozen in time, including the colors, scents, and warm breeze of that day. An ageless, treasured memory. He had written her talk down

from memory that very night. He re-read it thousands of times over the years. The moment had turned into a reoccurring, pleasant dream. In many ways, it was his prayer. When he awoke he could almost pick up the scent of flowers that was Nana. But she always left before he could talk to her. It was her way. He knew she was there with him. His grandfather had been killed in the Vietnam War years before Josh was born. Josh's mother barely remembered her father. Josh's father had died in an industrial accident at work. His father's family lived on the other coast. Over time, they had simply lost touch with Josh and his mother. She had not remarried but was so busy making a living he was mostly reared by his grandmother. Nana had prepared him well for the jagged realities of life.

Now gone, Josh's grandmother's lasting gift to him was a deep love and appreciation of the natural world. She was an internationally known conservationist and author. Josh, unaware of her fame at the time, had just loved her as his Nana. Her adult friends referred to her as Lizzy. It was not until his late teenage years that he read all her books and decided to protect the Earth. He would never forget the passage of how radioactive waste was discharged into rivers and streams as big labs dedicated to enriching uranium or producing plutonium to make nuclear weapons were destroying those ecosystems. And how native Americans were poisoned by radiation emitted from part of the 250 million tons of toxic tailings left over from Cold War uranium mining. Radioactivity ran through the land and then emptied into the sea in what was a criminal violation of nature's balance. And the evil of unseen poisons and toxins emitted by big corporations in the form of pesticides, weed killers, fertilizers, and oil drilling had motivated him to become an environmental activist. He would make a stand. Do something about it. Fight back. That mission came from someplace deep inside. It could never be diluted or compromised. It was a spiritual awakening. The Earth needed a voice, and being that voice had become his purpose in

life. His acting career would provide him the platform and the resources to pursue his mission. As an adult, he became more aware about how increasing CO2 levels in the atmosphere from burning fossil fuels were causing global warming. Deniers of this phenomenon always pointed out cold weather events to refute the claim, so the term had evolved to the more accurate description, climate change.

It seemed the dream of his grandmother talking to him occurred before a big event, something that challenged him, called on deep resources, determination, and survival. She was preparing him for something. A change was coming. He would make her proud.

His phone chimed. The moment had passed. He looked at the caller ID.

“Hey Carson, what’s up?” Carson McMullen, TES’s Executive Director was okay, but Josh always thought there was something off about the guy.

“Good morning. Just checking in. Anything I can get you? Food, information, a pillow, coffee, narcotics, bowl of cereal, you good?” Carson had flown into Algonquin, Michigan, yesterday afternoon to attend today’s debate.

“Nah, I am fine,” Josh reported as he looked out the window of his hotel suite toward Hookstraw Park. “Looks like a crowd is developing. We’re going to have a good showing.”

“Both sides have been ramping it up,” Carson reported. “Yesterday’s press conference got everyone’s attention. That young lady may regret that she caused the event to go viral. Most of the big media outlets are here or sending their affiliates.”

“Okay, I’ll be ready.” Josh clicked off. From his window, he watched the crowd increase in size. It looked like a beautiful day. He bowed his head, “Nana, help me today.”

10: 35 a.m., Thursday, July 15, 2027, Algonquin, Michigan, Hookstraw Park Band Stand

MAX STEVENS, THE ODINA COUNTY SHERIFF, HAD BEEN WISHING FOR THUNDERSTORMS AND HEAVY RAINS FOR THIS MORNING. No such luck. The weather was perfect in Algonquin, Michigan. The thermometer just passed 76 degrees, the humidity was low, a slight breeze out of the southwest, and just enough cloud cover and mature trees to keep the crowd out of the direct sunlight. People had been claiming their spot in Hookstraw Park to see the famous movie star debate the local, gifted young woman Amy Austin who had crashed his spurt-of- the-moment press event a day earlier and caused the video of it to go viral with 18 million views over the last 23 hours. The deputies estimated a crowd of 8,500 people. Port-o-Johns, water stations, and a refreshment tent were set up on short notice as it became apparent Algonquin had a big event on its hands.

Regional TV celebrity Kathy DeSable of Lansing's Channel Seven Action News was facing a camera with her back to the crowd and preparing to interview Bob James, the well known and outspoken critic of renewable energy and advocate for nuclear power. He had retired and dedicated himself to educate the public about the benefits of nuclear power and confront TES wherever they attempted to close down a nuclear plant. The camera's lights came on. People behind DeSable started yelling and waving.

"We're here at the much anticipated debate about to begin over whether the North Rocky Point Nuclear Power Station, better known locally as The Rock, should be shut down or have its operating license extended another 20 years. That approval is subject to upgrading The Rock's

reactor to burn recycled nuclear waste, called MOX, which stands for mixed oxide, as France does. Does that sound right, Mr. James?”

“Call me, Bob. Yes, that’s correct.”

“So, what do you make of this crowd?” the TV reporter followed up. “It appears the majority seem to be for shutting down The Rock.”

“They’re like wind turbines, all over the place but not really doing anything.” Bob shot back.

“According to your booklet, *The Quick Read Nuclear Energy Guide*, 21 *Easy-to-Understand Q & As*, that’s part of the problem, right? The antinuclear forces have been effective because they’ve been loud and controlled the narrative about nuclear power for years, while the nuclear industry didn’t push back?” Kathy asked.

“Unfortunately, yes,” Bob replied. “Amy Austin has more backbone than anybody in the nuclear industry has exhibited over the last seven decades. Most peoples’ knowledge of nuclear energy, and this includes the US Congress, corporate boardroom dwellers, nonprofit organizations, and many college professors, comes from Homer Simpson. It’s a tragedy that all this nonsense was not debunked 50 years ago.”

“Give me a sound bite then,” Kathy requested. “Very briefly tell us why nuclear power is a good way to go.”

“Well, Amy may touch on this question in the debate. But the bottom line is that nuclear fuel is very dense. This means a little fuel provides immense power 24 hours every day. Uranium, a nuclear fuel, is three million times more powerful than fossil fuels. And because it’s dense, it produces dense waste, thus it’s easy to reuse or safely store. Heavy, of course, but very compact. If you’re serious about going green, you have to go with dense fuels.”

“But why not just use wind and solar? Then we don’t have the radiation problem to deal with,” Kathy posed.

“First, there is no radiation problem. Second, the physics behind wind and solar technologies are terrible. We have to use thousands of devices spread over millions of miles of the Earth’s surface area to capture very dispersed energy offered in wind and sunlight. Then we have to condense that dispersed energy and transmit it. Nature has already condensed energy in fossil fuels, and nuclear fuels for us. Any engineer could show you, on the back of an envelope, why wind and solar will never work to replace fossil fuels. It’s just incredible to me this gibberish passes as something real.”

“But with renewable energy dropping in price and so inexpensive compared to fossil fuels and nuclear power, aren’t we finally at the tipping point of having those sources be our primary source of energy for the foreseeable future?” Kathy asked.

“That’s what the rent-seeking wind and solar people will tell you,” Bob snarked back. “Okay, let’s say I have a new electric car for you. It’s a beauty. Fast, cool looking, and popular. It’s also a tenth of the cost of a similar car with a combustion engine. You’d want that over the combustion engine, wouldn’t you?”

“Sure, why wouldn’t I?” Kathy replied.

“Because they don’t tell you the rest of the story,” Bob said. “Now imagine that once you bought that car, you discover it can’t make it to the top of a hill, the air conditioning causes it to run out of energy twice as fast as expected, and it stops working everyday about 4 p.m. until the next morning? And when you do drive it any significant distance you need a friend behind you in a combustion engine car to pick you up because there’s no telling when it will just stop working?”

“I wouldn’t like it, what’s the solution?” Kathy went along.

“A solution indicates there is a problem,” Bob answered. “And that’s the point, there is no problem. Just drive the combustion engine car, maybe over time we switch to hydrogen fuels because we should soon be able to make that non-CO2 emitting fuel a safe alternative to gasoline. Maybe we also switch from natural gas to uranium or thorium for electrical and heat energy because those would be denser fuels. But nothing is wrong with fossil fuels for now. In fact, all these damn windmills and solar panels take so much fossil fuel to make, they’ll never end up making up for the CO2 they emit during their short unproductive life of about 15 years, while operating at very low production levels. This renewable stuff is a religion, it’s not science.”

“But what about climate change and all the problems that excessive CO2 can bring?” Kathy asked.

“I do agree the Earth is getting warmer because of human activity,” Bob said. “But we’ve got plenty of time to adapt. CO2 is now at 420 parts per million, PPM, in the atmosphere, that’s up from 300 PPM around 1850 when the industrial age kicked in. TES talks about getting to net zero CO2 but doesn’t tell the public what sacrifices that will entail. Scaring people about CO2 is a very one-sided and dishonest discourse. There are a lot of more important things that we should prioritize. Besides, without India, China, and eventually Africa not agreeing to cut back on fossil fuels, it doesn’t matter what the United States or Europe does regarding trying to reduce CO2 emissions. It’s like trying to have a no peeing section in a swimming pool.”

“Why did you say radiation is not a problem with nuclear energy?” Kathy followed up.

“Radiation is part of life. We are awash in it. It’s called background radiation,” Bob explained. “It’s responsible for the ability of our cellular DNA to adapt and evolve. There is no life without radiation. There is less radiation inside a nuclear plant than what comes off the walls

of the Capitol Building in Washington, DC, home to a bunch of crackpot fear mongers who have shut down nuclear plants, while the building they're sitting in is powered by a coal plant down the street. Colorado, due to its rocky make up emits a lot of radiation. If Colorado had to follow the same radiation emission laws as nuclear plants do, they'd have to evacuate the state. And yet it's very safe to live there. The natural background radiation is fine."

"But what about the nuclear meltdowns at Three Mile Island here in the US, Chernobyl, located in the Ukraine, and Fukushima Daiichi in Japan?" Kathy asked.

"Those accidents damaged the reactors but stayed contained to those locations," Bob reassured. "Nobody in the US has ever died from radiation coming from a nuclear plant. Besides, think about it like this: Nuclear is the only source of energy production required to capture and store its own emissions rather than sending them into the atmosphere. And they're safely stored in 125-ton stainless steel, cement casks with an inert gas, until we burn it again in our new reactors. That's what this debate is about. We want to recycle the slightly used fuel sitting outside The Rock, treat it, and then use it up in the upgraded reactor. Nuclear waste is simply not a technical problem. It's a political problem. If we can get past that, we'll look at all this so-called waste as a national treasure because there's enough of it to power our country for 400 years."

"That is interesting. I know you sit on the Board of the Atomic Garage Movement, and it's been reported you've been preparing Amy Austin for this debate by role playing as Josh Manning. Is that true?" Kathy probed.

Bob laughed, "Amy Austin is like nuclear fuel, she is a force of nature. If there is any doubt who learned the most after a week of working with her, I can assure you that I was the student. I understand what nuclear technology can do. Amy understands that too, but she also has

a natural sense of empathy for people. Unlike me, she still has full faith in most peoples' ability to reason, realize their potential, and do the right things in life. I hope she proves me wrong."

"So nuclear energy is powerful and safe. It's time for the nuclear industry to defend it like Amy is doing. And wind and solar are not up to the job of providing enough power to be a viable alternative to fossil fuels because they're just not powerful enough. Does that sum it up?" Kathy looked for confirmation.

"That does sum it up," Bob nodded.

Kathy then stepped aside to give the camera a better shot of all the people in Hookstraw Park. She narrated as the camera spanned the crowd.

"From the looks of the crowd, about three-quarters of people are carrying banners and signs for closure, but about a quarter of the crowd appears to be pronuclear," Kathy estimated. "There's a poster that reads, 'Mothers for Nuclear. Another poster reads, 'I work at The Rock.' Three hundred people came in from Michigan's chapter of Generation Atomic; there are a few of them waving at us from a booth they set up. There's a poster over there of a Coca-Cola can. It reads, 'One Person's Lifetime of Waste from Nuclear Energy Fits in This Can.' There's also a poster of Diablo Canyon Nuclear Plant, located in Southern California and had its license extended back in 2022. There's a whale breaching the sea in front of it. I didn't know whales were pronuclear."

Kathy continued her voice-over, "The antinuclear group has images of the famous nuclear station accidents, radiation warning emblems, pictures of skulls and rusty leaky barrels of green ooze. Posters of Homer Simpson, possibly the poster child for the antinuclear community. There are even some pictures of Josh Manning with words that read, 'No Nukes.' A

lot of the signs read, 'Block the Rock,' a slogan he introduced yesterday at the press conference preceding this debate.

"There you have it," Kathy said as she turned and faced the camera. "It's going to be the Hollywood star versus the favorite daughter of a small midwest town where a nuclear plant's fate, and by extension maybe our own, are on the line. It promises to be a clash of atomic proportions. We'll be back for the reaction. This is Kathy DeSable reporting live from Algonquin, Michigan's Hookstraw Park for Channel Seven Action News."

11 a.m., Thursday, July 15, 2027, Hookstraw Park Band Stand, Algonquin, Michigan

AMY HEADED UP THE STEP TO THE STAGE SETUP AT THE EAST SIDE OF THE PARK. Josh Manning jogged up behind her and extended his hand, which she shook. “Amy, it’s nice to meet you. I wanted to ask you how you ended up in this debate instead of the owners of The Rock?”

As they got to the top of the stage, they stood aside to let people behind them go by. “I’m representing their customers instead,” Amy responded.

“Good answer, I can tell you’re going to be a formidable opponent today.”

“I wanted to ask you a question too,” Amy shot back.

“Sure, what is it?” Josh offered.

“Is it true that my favorite songwriter, probably the best ever, Shanta and you are a thing?”

“Ahh, you read the tabloids,” Josh joked.

“They stare at me while I checkout at the grocery store.”

“It’s true,” Josh confessed. “In fact, she called me last night. She had just watched a video of you pinning my ears back at yesterday’s press conference, and she couldn’t stop laughing. She loves you. I think you two may have a common enemy.”

“Ha, the enemy of my enemy is my friend,” Amy retorted.

“You’ve got me out gunned today.”

“Oh, I think you’ll hold your own. It’s nice to meet you, Mr. Manning.”

“Josh, call me Josh. It’s my honor to meet you, Amy.”

As Amy headed to her podium, she modified her debate plan based on the brief encounter and her research on Josh Manning. Time to take off the gloves.

The din of the crowd drowned out City Council Member Abe Peterson as he called the assembly to order. After he calmed down the crowd, he went over housekeeping details, the circumstances that led to the debate, and the rules that would guide it. In the middle of the crowd, 30 feet back from the stage, stood Harshil Varm, Becky and Frank Austin, Joline and Stew Grassley, and Bob James. Other Atomic Garage Movement members were also there to cheer on Amy. Stew leaned into Frank and whispered, “Buckle your seatbelt, buddy. The world is about to meet your daughter.”

Frank grabbed Becky around her shoulders and made eye contact with Amy as Abe was going through the housekeeping details. Frank winked and rubbed the side of his nose with his finger. When he saw her beautiful smile beam back at them as she scratched her nose, he knew she had found her calling.

Five minutes later Abe said, “Now let’s get right to it, shall we? Hopefully, you were able to read the full bios of our two speakers. But just in case you didn’t, here’s the brief version.”

Abe continued as he read from his notes, “Josh Manning is an American actor, documentary producer, and environmentalist. He’s been an environmentalist since childhood, more on that in a minute. He attended San Luis Obispo High School in his hometown of San Luis Obispo, California, where he was an All-State basketball player. What position?”

“Guard, but without a three-point game,” Josh answered.

“You must have had a good game to be All State in California,” Abe complimented. “Getting back to the bio, he later graduated from the UCLA School of Theater, Film, and Television. Then just two years after college graduation, his first of four Emmy Awards about the

environment came at age 24 for his documentary *What's Wrong With SONGS*, an acronym for the San Onofre Nuclear Generating Station. That plant closed in 2012, an event largely credited to the documentary. Mr. Manning is also an Academy Award winner for his leading role in the 2025 movie *Brady* about the Civil War photographer. That was a great movie by the way. Folks, if you haven't seen it, it's well worth the time. No charge for that plug, Mr. Manning." Laughter and clapping echoed through the crowd.

"Mr. Manning is a lifetime member and sits on the board of directors of the Terrestrial Ecology Society, known as TES, a grassroots environmental organization with 1.7 million members located in 132 countries around the world. He represents TES here today. Mr. Manning's grandmother, Elizabeth O'Brian, known to friends as Lizzy, was one of TES's co-founders in 1958. The Lizzy Foundation is an adjunct of TES, which presents the prestigious annual award, called *The Lizzy*. Some recipients of *The Lizzy* include two past US presidents, Nobel Prize winners, European leaders, and grassroot renewable energy activists doing field work in Africa, South America, India, Indonesia, and other developing nations. Mr. Manning spent much of his early childhood with his grandmother learning about the natural world, taking samples of water, soil, and fauna for pesticide analysis. And like his character in the movie *Brady*, he's an accomplished photographer, but of nature not war. We're very pleased to have Josh Manning here to engage in the favorite American pastime of spirited civil debate. Let's give him a big hand."

A cheer went up from most of the crowd followed by a respectful standing ovation by all.

Abe glanced over at Amy and winked. "Amy Austin is the science officer and board member of the Atomic Garage Movement, AGM for short. AGM advocates for keeping existing nuclear plants operating and establishing common-sense regulations for new nuclear reactors and

plants. Amy is preparing for a career in nuclear energy. She attended Algonquin Central High School where she graduated as the valedictorian, in three years, at the top of her class. She is a top 10 winner of the prestigious Regeneron Science Talent Search, a national program for high school students in STEM programs, which stands for science, technology, engineering, and math. Her category was in the discipline of Earth and Planetary Science. At age 16, Amy was awarded a second place prize in the amount of \$175,000 for her research project. It was a new method for shrink fitting or brazed joint the ceramic turbine and a metal shaft as might be used in advanced nuclear reactors. She told me it was just a fancy way of soldering.

“She is also a great athlete. In her junior year, she placed 10th; and senior year, she placed second in the Division Three Michigan High School Cross-Country State Championship. She is effectively a junior at University of Michigan’s College of Engineering, Nuclear Engineering and Radiological Sciences. And she is enrolled in two post graduate courses. Amy is an avid bird watcher, loves nature hikes, and considers her aunt and uncle’s rescued greyhound dogs, Proton and Neutron, among her best friends.

“Her idol is Marie Curie who lived from 1867 to 1934. Curie was a two-time Nobel Prize Winner, the first woman to win this award. She discovered the existence of radiation, spoke five languages, loved math problems, and has inspired generations of scientists, including Amy. Amy said she is here today as she believed Marie Curie would be as well, to take a stand against fear with the power of knowledge. Let’s give Amy a big hand,” Abe said as he clapped.

The crowd stood with the type of polite applause and encouragement often reserved for a volunteer about to be subject to a magic trick or a hypnotism. Then a booming chant went up, “Block The Rock, Block The Rock, Block The Rock.”

“Mr. Manning, I am afraid you’re the only one who can get the ball rolling on this thing. The rules say you make an opening statement first. Then we’ll hear Amy’s opening statement. After that, we can get more into points and counterpoints. The stage is yours,” Abe Peterson explained as he stepped back to applause.

Josh stepped up to the south podium. Amy to the north podium. The park went silent. Josh cleared his throat and dove into his introduction, “Thank you all for coming to this important debate today. My grandmother, Lizzy, was one of America’s iconic environmentalists. And like Amy, my grandmother also admired the accomplishments and passion of Marie Curie. But what a lot of people may not realize is that Marie Curie eventually died of radiation poisoning. Her clothes and her personal belongings were so radioactive they had to be classified as toxic waste. As magnificent as Curie’s discovery of radiation was, the lesson Lizzy took from her was that radiation is powerful but also extremely dangerous. Too dangerous certainly when used as an atomic bomb. But in many ways equally as dangerous when that radiation production comes from a nuclear power plant.

“It’s nice to see so many people who want to heal the Earth, help it cleanse itself, and work to bring it back to its natural state. I know people have been fighting to get this nuclear plant and all the other dangerous old nuclear plants shut down for years. They average about 45 years old in the United States. Antiques really. I have four major points to make in my opening statement.

“First, five nuclear reactors at three plants around the world have blown up or melted down over the last 60 years. It will happen again. It’s just a matter of time. Our luck can’t hold out forever. The fourth big nuclear accident may be the one we can’t control or contain. We came very close to catastrophe with the huge Zaporizhzhia nuclear plant in the Ukraine in 2022 when

all that stood between the world and nuclear disaster were Ukrainian scientists working at gunpoint under Russian military field commanders, people who knew nothing about running a nuclear plant—all of this while explosions from incoming ordnance rained around it. We were lucky then as well. How many more years must we count on luck as the foundation of nuclear energy safety. We all know that luck eventually runs out.

“If this old, brittle, leaky Rocky Point nuclear plant, here in the middle of the United States has a reactor meltdown, everything from here to Detroit and beyond could be dangerously radioactive for a thousand years. Ann Arbor would look like Chernobyl, abandoned. Toronto, in Canada’s second largest province of Ontario, may have to be evacuated.

“The nuclear industry can’t be wrong one single time. Not once. Nobody is that good. I know the owners of these reactors tell us Chernobyl could not have happened here in the United States. But why should we believe that? They say that Fukushima was caused by a tsunami. But who cares, the thing blew up. It was actually three explosions. And climate change is creeping the surface of the sea closer to nuclear plants every year, all over the world. Three reactors melted down at Fukushima, along with three cooling pools. That’s actually six melt downs, but who’s counting. We watched on television as those hydrogen explosions spew radioactive debris into the sky and into the Pacific Ocean. And the only thing I’ll say about our country’s worst nuclear disaster, Three Mile Island, is that it led to the creation of *The Simpsons* as a reflection on how terribly and comically these nuclear plants are managed by for-profit corporations.

“Second, we have to worry about nuclear debris. Right now, about 140 tons of white hot nuclear waste resides inside 30 exposed and expiration-dated casks, outside this nuclear plant. There is no national repository for it. Why is that?” Josh asked rhetorically as he raised his hands. “Because nobody wants this stuff. And people don’t want it traveling around the country

on trucks and trains, which brings us to why we're here today. Let's be clear on what's going on. The owners of this old, brittle nuclear plant want to ship all its highly radioactive waste from here to Tennessee; that's more than 600 miles away. Then they want to break open these casks, expose all that highly radioactive hyper-heated waste as they reprocess it, which means they want to wash the really bad stuff off it to get the plutonium out of it. Plutonium is an element that forms after uranium has been fissioned. The stuff makes for one hell of a bomb if you haven't noticed. And we still have a storage problem with that leftover radioactive debris in Tennessee. Then, after their patch-and-paint job is done on this plant, they want to reship that reprocessed fuel back here and burn that traveling mountain of nuclear crap for another 20 years.

Josh felt he was hitting his groove now, "Right now those 30 casks, with more than 350 tons of radioactive material inside, are just 150 yards from your beautiful Odina River and across from the Odina State Park. That's just five miles from your grade school and eight miles from Amy's high school. Counting the reactor, that makes 31 potential spots for a melt down right here in Algonquin. And you're adding to that stacked-up radioactive debris every day that plant operates. The answer isn't to ship that stuff around the United States like some Amazon order or furniture van. The answer is to shut this place down. Stop making radioactive waste, and then let's get this stuff buried somewhere forever while we follow a more sane and non-dangerous path to energy independence.

"Third, this nuclear plant is so old and leaky it will just be too expensive to fix. The other option is to build a new one for \$30 billion like they did at the Plant Vogtle nuclear plant in Georgia. That's about twice as much money as they originally budgeted. It took 10 years to get those two new reactors approved, then 10 years to build them. Does that sound like a solution to climate change? Does building more of these really make any sense?"

A large portion of the crowd yelled back, “No.” Then the chant started again, “Block The Rock, Block The Rock.”

Josh raised his hands to calm the crowd. “The bottom line is nuclear power can’t compete with much less expensive power coming from wind and solar, which Michigan has done a great job of building out. Why take a risk with something so expensive and radioactive when wind and sunshine harmlessly present themselves to us everyday?”

Josh paused to take a sip of water, “Fourth, and my last point, if the wrong group gets hold of the plutonium pulled out of the used nuclear fuel at the reprocessing stage, they’d be one step away from having an atomic bomb. That’s how India got the bomb. They pulled plutonium out of radiated uranium even though they promised the United States and Canada they wouldn’t do that. A creative and resourceful terrorist group could raid the transport or damage the reprocessing plant, putting the surrounding area at risk of radioactive contamination. I know the odds of this are low. But once the high value target clearly exists, a terrorist only needs to be successful once. Somebody is going to win the lotto this week. Eventually that one time will happen. That’s why we need to get out of this business completely and quickly. Block The Rock. Thank you.” Josh sat down. The crowd nervously applauded with many chanting, “Block The Rock.”

Amy adjusted the mic. “Thank you for coming today everyone. It’s time for a little common sense. By the way, Marie Curie lived to the average life expectancy of her day. I do think her exposure to radiation shortened her life. Like test pilots and astronauts, pushing the envelope of what we are capable of is often a risky proposition. They risked their lives; it’s true. But now millions of people fly around in big aircraft every day, and we watch repeated rocket launches as we build our settlement on the moon and prepare to go to Mars. And who in this

audience would deny a loved one the benefit of medical radiology for early detection and treatments of various diseases? I see a couple hands. You can bet those two haven't been asked to serve as anyone's Medical Power of Attorney."

Becky advised in a low voice, "Watch it, dear. The crowd is your friend."

"I noticed that Josh, you can see we're on a first-name basis, was a little shy in talking about CO2 emissions today, even though that subject is all over TES's website. In the four years of 2012 to 2016 after the San Onofre nuclear plant closed down, thank you for that by the way, California emitted an additional and unnecessary 37 million metric tons of CO2 that would have not been emitted with the plant in operation. In fact, ladies and gentlemen, according to the Breakthrough Institute, since 2012 the carbon costs of nuclear phaseout policies in developed countries add up to almost a million metric tons of CO2 being emitted that would not have been. That's about the same amount of CO2 a country like the United Kingdom or Turkey put into the atmosphere over more than a two-year period. Let's just say antinuclear hypocrisy is much thicker than 420 parts per million, the current level of CO2 in the earth's atmosphere." There were boos and scattered cheers from parts of the crowd.

"Notice how Mr. Manning never quantifies anything. Lots of adjectives. Plenty of speculation and hand wringing over things that may happen, but have not in the last 80 years. He's fear mongering and making untrue statements. For example, the risk of a nuclear accident or a terrorist attack on a hard target like a nuclear plant isn't the same as the certainty that someone, somewhere will win a lotto game this week. The risk of a nuclear accident or terrorist attack at The Rock is more like saying Mr. Manning will be the one to win the lotto this week. Don't bet on it.

“Just being alive is a risk. Each of you is exposed to the risks of accidents, disease, and natural events every day of your life. All of them are infinitely more likely to occur than being injured or dying from a nuclear plant accident. Life is a process of gauging risk, comparing the benefits of an action to the risk that action introduces. Those of you who drove to this debate today exposed yourselves to one of the highest health risks in our society, automobile accidents. And ironically, some of you drove here to shut down something that is arguably the lowest risk you are exposed to in your entire life, nuclear energy.

“The US gets about 15 percent of all its energy and 60 percent of all its carbon-free energy from nuclear plants. That’s going down thanks to organizations like TES. In fact, by 2050 if we stay on the present course, we will be producing less nuclear energy in 2050 than we did in 2020. Wind and solar will not fill that gap. It takes about 400 times more surface area of the Earth to build the equivalent in wind turbines or solar panels to compete with the same power coming from a nuclear plant. We would require 6,400 acres of solar panels, or 85,000 acres of wind turbines to replace the power generated by The Rock’s single reactor. That would be enough wind turbines that if placed in Lake Michigan, would go from its southern shore all the way to the Mackinac Bridge. That would require a lot of materials and construction of new electrical grids to reach those devices. All of that stuff is made with heat generated with fossil fuels, meaning those devices create more CO₂ in the atmosphere than they prevent. And they need natural gas backup idling on stand-by 24 hours per day for when the wind doesn’t blow and the sun doesn’t shine enough, which is about 70 percent of the time.”

“She’s on a roll,” Frank said to Becky. She nodded as she watched and listened to her daughter with pride in her heart and the determination to support her girl no matter the costs.

Amy went on, “Have you ever wondered why we don’t launch rockets using wind turbines and solar panels? Or why US aircraft carriers are not powered using big sails to catch the wind?” Light laughter lifted from the crowd. “See, you do understand physics. Wind and solar can’t power an entire civilization for the same reasons. They’re not small enough or powerful enough to do the job.

“TES says to shut down nuclear energy and fossil fuels. Instead we’ll just need to turn stuff off, stop having kids, stop eating meat, restrict our travels, stop driving fossil-fueled cars and SUVs, slow down, turn down, and hit pause. That pause button is on your life by the way. That’s not progressive energy policy; it’s regressive. We’re going backward. For the first time in the history of our country, we’re living the reality that our childrens’ lives will not be as prosperous and modern as ours. A nation’s wealth and opportunity are tied directly to the energy it’s able to produce. Right now, we can’t produce enough energy to meet the demand of our economy and American families. It’s a situation that is self-inflicted, unnecessary, and unforgivable.

“Here are a few more facts. The slightly used nuclear fuel sitting outside of The Rock is a national treasure. The only reason it’s called waste is because TES and other organizations named it that. First, you can take all the nuclear waste in the United States over the last 80 years, and it would fit on a football field less than 15 yards high. Be aware that so-called nuclear wastes are emissions that have been captured and stored instead of emitted into the air like fossil fuel emissions. That stuff does weigh a lot, which is why the antinuclear crowd likes to correlate nuclear waste to how much it weighs rather than how much volume it takes up. That’s because nuclear fuel is dense. Density means powerful but small. And that material is only four percent used up. That’s why we’re here today; we want to recycle that slightly used fuel and burn the rest

of it to make thermal and electrical energy. The few percent of radioactivity left after that can be used in medicine for early detection and treatment of cancer. Then the last of it can be stored safely away where it will cool and become safe in a few hundred years.

“The casks where we store our used nuclear fuel weigh about 125 tons each. And each of them holds 12 to 15 tons of used uranium. They’re lined with stainless steel and cement, and filled with inert gas. They are not fissioning; the material is decaying and cooling using ambient air via a protected vent. They can’t melt down. You can crash a jumbo jet into them, and they’ll stay fully intact. Those casks are fine where they are.

“For nearly six decades, more than 2,500 cask shipments consisting of military spent fuel have been transported across the United States without any radiological releases to the environment or harm to the public. The used fuel is a solid not a liquid so will not leak like a glowing goo. And the odds of any radioactivity escaping during a transportation accident are one in one billion. Probably the same odds as Josh hitting a three pointer in high school basketball.” The crowd laughed.

“Recycling nuclear fuel was a concept conceived in the United States, then disallowed under the Carter administration in 1977 because of proliferation risk. That risk is so low you would need a bunch of zeros to the right of the decimal to calculate it. Essentially it’s as close to zero as you can get. But for the last 35 years, France took the concept to heart. France has processed nearly 30,000 tons of used nuclear fuel for reuse in MOX Reactors for its own country. They have done so without accident or incident. And now 10 percent of all their energy comes from burning MOX fuel. If we did the same thing, we could power all our nuclear power plants with MOX fuel for at least the next 400 years.”

Amy paused to judge the crowd's interest, "I have used up my time here. But I could go on. The facts support the statement that nuclear power, including old nuclear plants, which can run for 100 years with routine maintenance and upgrades, and next generation nuclear plants are the safest, cleanest, most dependable, and will ultimately be the least expensive way to generate both thermal and electrical power for society. And do it CO2 emission free. Don't block The Rock, ladies and gentlemen; let it rock for another 20 years."

ABE PETERSON WALKED UP TO THE MIDDLE MIC. “As your host today, I am happy to announce that we have just received the news that this event has gone viral on the internet. We have 8.3 million live views going on right now from around the world. And I am told that number is growing fast. Of course 3.5 billion watch the finals of the World Cup soccer tournament. But for a debate on nuclear energy taking place in a small midwestern US state, 8.3 million live views ain’t bad. Let’s give our millions of online attendees a big cheer.” And so a cheer went up from Algonquin’s Hookstraw Park, as people looked at one another in astonishment.

“We’ve got a lot of questions here from the audience and coming in from our online viewers,” Abe reported. “The debaters will be responding to many of these on social media online. But here’s one that seems to summarize what’s on many peoples’ minds. And the question is for Josh. May I paraphrase?”

Josh nodded his head as he waited for the question.

“What do you hope to accomplish as an environmentalist if you could be 100-percent successful? What does that world look like? What is your ideal vision of it?” Abe asked.

The crowd was quiet. Josh didn’t answer immediately; he could feel tears welling up. He didn’t look over at Carson for any signal. The summer breeze blowing through the old sycamore and silver maple trees in the park were the only sound. He looked up in the sky, then across the stage.

“Okay, I’ll bite. The Earth I want to leave behind is a better place than we have now. In my ideal vision, the Earth is abundant, full of animals and birds, clean water, colorful ocean

reefs, clear skies, and respectful people. We'll be in tune with nature and treat her with tenderness and respect. That means we'll see the panoramic colors the skies, mountains, and seas paint for us every day. We'll marvel at the aroma of plants and trees. We'll observe wild creatures and their unique forms of intelligence as they teach us about their perspective on life. And there will just be love in the world with hate being a dark part of our evolutionary history. Our days will be full of wonder and awe for everything that lives around us. And we'll sleep when darkness comes, and arise refreshed, with the promise of a new day at sunrise.

“There are three general things we need to think about to get to that point. First, at birth. How many kids should we have, if any? Does the Earth really need more mouths to feed, cloth, and consume? Second, while we're going through our life journey, can we consume less, produce and emit less waste, and move through our lives with a lighter environmental footprint? As a society, we're disconnected from nature. We don't listen to her; we don't celebrate or respect her natural wonders as many native peoples of the Earth do. We just consume its resources like locusts. There is a better, kinder way to live. And third, what is our legacy and how do we plan to leave things? It's ironic, but we can actually improve the prospects for the future more after our life than during it through the gifts we leave at our death. Can we donate our assets to nonprofit organizations working for environmental and social justice, energy equity, and sustainable practices? Near the end of my life, I'd like to look up into Earth's night sky, free of light pollution, wonder at the stars and the universe, and feel blessed for possibly saving this tiny little planet from being destroyed by humanity. That's my vision.” The crowd gave Josh a standing ovation.

Abe looked over to Amy, “You want to respond to this?”

“Yes, I do. I think Josh and I share that vision but offer different prescriptions for getting there. When I see a star in the night sky, I know God took parts of one of those massive heavenly bodies, and blended it into our Earth. Brilliant men and women have built elegant machines that can use that star stuff to provide all humanity with an unlimited supply of clean, inexpensive energy. The Earth is magnificent. But it has always been very hostile to human life. As pretty as nature is, she does a good job of trying to kill us. Without tools that build things to protect us from the elements, produce enough food, cloth us, make clean water, and provide sanitation, life would be a daily struggle for survival, as it was for people before the Industrial Age. Where abundant, affordable energy is available people and nature thrive. Josh’s vision doesn’t exist without plentiful energy; we need lots more of it, not less.”

Josh interrupted Amy, breaking his rule of not trying to convince his opponent of his arguments, “But we don’t need more people, Amy. We’re eating up the Earth’s resources.”

“Not true,” Amy took back control. “Where energy is inexpensive and abundant, population growth slows or goes down, the environment gradually gets cleaner, forestation expands, our footprint for producing energy shrinks, waste is minimized, conflicts over energy sources are reduced, and innovation flourishes because people are freed to pursue interest beyond just surviving day to day, especially women.

“The more dense the fuel, the more these things are true,” Amy continued as she shifted from facing Josh to facing the large crowd spread out in Hookstraw Park. “When Josh says we should use less energy or less dense fuels like wind and solar, it means you are either unaware or don’t care that physics works against that argument. Half the world does not have as much energy available to them as your refrigerator, and about two billion people have no access to electrical energy at all. And organizations like TES intervene to keep those poor people from

using diesel-fueled generation, which is always the first step to a fuel source more dense than wood or dung.

“That’s why we say Americans use too much energy; we’re using up the world’s resources and creating climate change that will make all the Earth inhabitable in the near future,” Josh interjected.

“The solution to the lack-of-energy problem in the world isn’t for Americans or the citizens of any advanced society to feel guilty, cut back on their way of living, and go without,” Amy insisted. “Even if that were possible, it would accomplish nothing because billions of people need to consume more energy, not less. The solution is for us to make sure all humanity has access to the same sources of power that we do. And the cleanest, most powerful of those sources is fission. People are beautiful too. We’re part of life and nature, not its parasites or locusts. We can live in harmony with everything else in existence and serve humanity at the same time. That is why I advocate for nuclear energy.”

“Well, my friend,” Josh cut in. “We have different worldviews and different ideas about how to make the world better. But nuclear power with all its potential for destruction and radiation exposure eliminates it as a future source of energy.”

“Amy, any last word?” Abe asked.

“A world powered by nuclear energy will be cleaner, more prosperous, and more peaceful. And the laws of physics and a lot of our greatest scientists, with your support, can make sure of it,” Amy promised.

Questions and answers went on for another 20 minutes. The debate concluded with a standing ovation.

Immediately after the debate, reporter Kathy DeSable was in the middle of the park conducting person-on-the-street interviews. A young lady was removing an ear bud and pausing her mobile device. “Hello, I am Kathy DeSable with Action Seven News. Do you have a moment?”

“Sure.”

“What is your name and where are you from?” Kathy asked.

“Oh, I know you. Hi, wow. My name is Olivia. I’m from Dearborn. I just wanted to see Josh Manning in person.”

“And what did you think of the debate?” Kathy asked.

“It was cool. I mean, really, more people are driving electric cars now. Josh was doing that a long time ago. He makes sense to me, but I really don’t know anything about nuclear stuff. It is radioactive and all that, so like, really, do we need to go down that path?” Then she looked at the camera and mouthed, “Josh, call me,” as she made the related universal gesture with the same meaning. Two of her girl friends broke into laughter.

Kathy moved onto a couple in their mid 30s from Saginaw. “What did you two think of today’s debate?”

“We really liked it. For one, it was civil and both speakers did a great job of putting their views forward,” the man said.

The woman looked at her husband and decided there was a nonverbal mutual agreement to voice their opinion on TV. Kathy moved the microphone to her, “We liked Amy a lot but have to agree with Josh Manning. Nuclear really is just too dangerous. I mean if you lived in a flood zone for 50 years you might not get flooded out for 49 years. But if in the 50th year you get

flooded, who cares that it doesn't happen much. A nuclear accident can't happen at all or we shouldn't use that kind of energy." The crowd around the reporter clapped.

Kathy asked, "Is there anybody who was more convinced nuclear is safer as a result of being here today?"

A hand went up from a man who appeared to be in his late 60s.

"Hello sir, what's your name and how did the debate sway you to be more in favor of nuclear power?" Kathy asked.

"My name is Troy, I am from Fort Wayne, Indiana. I was once adamantly against nuclear energy. Guess I've mellowed some. The nuclear accidents didn't seem to be the end of the world. And they don't happen much. I came to this debate not really giving a rat's ass about nuclear power. My wife and I are staying nearby with my sister-in-law, so it gave me something to do. The debate sounded interesting, and I am glad I came today. I think we need to listen to this young lady, Amy Austin; she's smart, and she represents the future. These antinuclear, professional protestors just need to smoke some weed, chill, and enjoy life a little bit. What a bunch of miserable crabby people, geeze! The most important thing Amy said is that 'people are important too.' She knows this debate wasn't really about a nuclear plant."

"Briefly, what was the debate about if not saving a nuclear plant from shutting down?" Kathy prompted.

"It was about your right to achieve your full potential versus some busybody telling you how to live a life of scarcity and regret. Screw that. That's why Amy swayed me. She doesn't take any. . .[beeped out] from anybody. Good for her."

"Well that was a unique perspective, thank you," Kathy ended the interview. "I'll be back right after this commercial break. Stay tuned for the debate highlights and some final words."

Kathy DeSable spent nearly the whole night after the debate working on a special report to summarize it. Kathy knew she was under the gun. The report would be aired after the evening news on the RBX Satellite network to all the affiliates around the world and played on various social media platforms.

The Special Report opened with b-roll highlights of scenes from the debate for the opening 90 seconds, then Kathy came on camera. She paused as if searching for the right words, then held the microphone up for the wrap, “The actor Josh Manning has been the media’s darling environmentalist for the last 10 years. He was in Algonquin, Michigan, yesterday representing the powerful environmental group, the Terrestrial Ecology Society, known as TES. It was TES that requested the debate as a counter to being asked to reconsider their antinuclear stance by the Atomic Garage Movement, AGM. TES not only did not consider the proposal, they doubled down with their antinuclear creds. TES was cofounded in 1958 by Josh Manning’s grandmother, Elizabeth O’Brian, who went by the nickname Lizzy. The Lizzy Environmentalist of The Year Award, hosted by TES, is named after her. Add to that history, Josh Manning’s good looks, quick wit, command of the facts, and acting skills make him a must-have at some of the world’s most iconic environmental events. A recent Best Actor Academy Award for a movie called *Brady*, about the US Civil War, has introduced him to millions of new admirers,” Kathy explained, as the screen showed Manning participating in a wide variety of venues and then a clip from the movie *Brady*.

“The story of him growing up with his grandmother, Lizzy, and how he carries her work on in his life is as heart warming as it is inspirational.” Images of a young child with his grandmother up to their knees in a stream came into focus. Kathy continued her voice-over. “His

five Emmy Awards for wrenching documentaries on climate change have won him worldwide acclaim. He has been making annual treks to the COP, Conference of the Parties, the United Nations' annual world forum for all things climate change for the last 14 years. His first was at COP 19, in Warsaw, Poland, in 2013 after winning his first Emmy, for the documentary *What's Wrong With SONGS* about the San Onofre Nuclear Plant, now closed, which is what that documentary was about."

A short clip from the documentary ran for 20 seconds.

Kathy picked up the narrative again. "He's now preparing to make a keynote at the upcoming COP 32 in Sydney, Australia, this November. And as a regular, high-profile attendee at the World Economic Forum in Davos, Switzerland, Josh Manning counts investment bankers, CEOs, and world leaders as personal friends. He's a regular guest testifying and advising US Congressional Committees on climate change and other environmental-related legislation. He's also appeared on various popular talk shows and podcasts. He's dating Shanta, the song writer behind many of the music industry's greatest hits these last 10 years. And he's working on a book about his famous grandmother, with the working title *Earth's Ambassador, the Life and Times of Lizzy, America's First Climate Change Warrior*, due out next year.

Kathy transitioned as Amy Austin's image came on screen, "So it came as a surprise to this reporter that an unknown 19-year-old woman, an Algonquin, Michigan native, would challenge the iconic environmentalist on the world stage. She more than held her own."

The images from the debate were fading in and out of the visuals. A 15-second clip of the debate rolled as Kathy paused. The camera came back to her as she walked in front of a background screen with visuals of the North Rocky Point Nuclear Power Station.

“At first, the debate wasn’t really that big of a deal. Interesting, but not a national lead story. Then the real story broke the day before the debate. TES called an impromptu press conference featuring Josh Manning, in Algonquin, Michigan. But Amy Austin crashed that party and boldly refuted the famous actor, in an act that some called disrespectful as others said it was about time Mannings’ lies about nuclear energy were called out. From that point on, it was a David versus Goliath story. It’s not surprising then that the debate went viral. Our media experts predict that in the month to come it will be viewed 40 million times, with four million people commenting on it. I’m told it’s now being picked up by all the major networks. It’s the topic of conversation in newsrooms, think tanks, board rooms, the halls of Congress, government offices, and faculty lounges all over the world today. Clearly, Amy Austin was the underdog going into the debate in favor of the North Rocky Point Nuclear Power Station getting its license extended. Not anymore. Amy Austin is on the way to becoming a household name, and her message about nuclear power is getting an audience. Stay tuned to see if the Nuclear Regulatory Commission renews the license of The Rock another 20 years along with the request to use MOX fuel in the upgraded reactor. I almost forgot that was the original focus of the debate. This is Kathy DeSable signing off from beautiful Hookstraw Park, in Algonquin, Michigan, for Channel Seven Action News.”

Harshil loved this spot just outside Odina State Park—a little known overlook of the Odina Valley. He had discovered it on a lunch break while working in the Atomic Garage. The spot was just a short walk from there. Miles from any artificial lighting, the stars were bright and easy to identify in the clear sky. Amy and Harshil, after a long hike through the state park, laid on the soft grass looking up at the universe around them. They hadn’t talked once about the

debate earlier in the day. Back in civilization, TES and AGM were burning the midnight oil trying to capitalize on what was quickly becoming a transformative moment, possibly a high-water mark, where nuclear energy may have won over the forces of fear. Media outlets and independent reporters around the world were all weighing in on the debate.

The last few minutes had been silent. Just the sound of a slight breeze, crickets, and a far off howl of a coyote.

“Okay, Harshil, this is the date I promised you,” Amy broke the silence.

“Boy, I didn’t realize I was going to be on such a cheap date. Amy, I’m not great at these types of things. Do you think it would be okay to kiss the girl now?”

“I certainly do.”

Three days later, Rhonda Mattingly finally was ready. She picked up her mobile device and hit the speed dial.

“Hello, darlin’, so what do you make of Amy Austin?” Hank Bordeaux asked as his caller ID placed Rhonda’s image on his mobile device screen.

“Maria Sanchez just called. She’s been all over AGM’s website since our meeting,” Rhonda briefed Hank. “She says they are basically open sourcing their nuclear research. Their site is loaded with docs, references, experimental results, and formulas. They’ve just applied for a patent on a new alloy called Sartorium. Bottom line, Amy Austin is a genius, maybe the next Einstein. Her formulas check out. They’re very advanced. So I hired a top physicist we can trust to do a quick thumbnail evaluation of the posted docs on AGM’s website. A second opinion.”

“Let me guess, he verified Maria’s opinion?” Hank speculated.

“In spades, my friend. The guy said, ‘Imagine what happens to our world when a very powerful, extremely light, almost totally safe small nuclear reactor that can work anywhere comes into existence because that’s what is coming out of AGM, and it’s years ahead of anything else I’ve ever heard of. This thing is going to work,’” Rhonda summarized.

“Understood, sweetheart,” Hank said. “That doesn’t surprise me. Let me think about how we can help the Austins put a finger on their side of the scale and get in their good graces. Everything may be open source on their website, including Sartorium, but not everybody out there is Amy Austin, and not everybody has the infrastructure to transport hydrogen or transmit electricity. Get some rest now. I love ya, kid.”

“Love you too, Hank. Good luck.”

PART II

You don't know what bad times are until you don't have enough energy to run the machinery of civilization.

— Unknown

Thirteen

Tuesday, December 14, 2027, The Atomic Garage, Algonquin, Michigan

THE BENEFIT OF FAME IS INFLUENCE BUT ITS PRICE IS THE LOSS OF ANONYMITY.

The two people most aware of this reality were Frank and Becky Austin. Within hours after the infamous debate with Josh Manning, back in July, while Amy had snuck away with Harshil, the Atomic Garage's phones started to ring off the hook, and the website's contact inbox filled up with more than 10,000 new emails within the next three days. Because of the global nature of the publicity, it was a 24/7 phenomenon and had only recently let up. Major media news networks, streaming channels, substack reporters, podcast pundits, foreign ambassadors, YouTube stars, academia, board room denizens, book publishers, and popular culture talk show hosts all wanted a piece of Amy's time. Reporters and well wishers were often camped outside the security gate at the end of the Austins' property, trying to get an eye or a camera lens on Amy. When unauthorized drones started flying overhead, and the paparazzi started showing up at the front doors of their house and the Atomic Garage with bouquets of flowers as their cover, enough was enough.

Amy was only partially aware that she had become a household name around the world. She limited her internet use to scientific research, which often took up about three hours of her typical day. And like the other students at U of M, she used the online systems for submitting papers and going about the work of higher learning. But she had never participated in social media communities and didn't have a presence on any platform. She liked to read printed books and sent people handmade cards with her own drawings and small paintings, complete with

heartfelt notes carefully crafted inside with her beautiful penmanship. Those cards became lifetime keepsakes to her close friends and family.

Amy was a social anomaly. This tactile approach to experiencing life made her almost invisible to the casually curious and muckrakers alike. Although she appreciated all the advantages of living at a time when anyone could get access to almost any information, she looked at most electronic social media as an addictive distraction that wasted time. And her time was not negotiable. Frank and Becky, who were well aware their daughter had a gift of understanding math and science, had taught her time was one thing in life she must treasure. It was sacrosanct, her most valuable commodity. And that didn't mean all work and study. It also meant making sure down time was scheduled in, time for exercise, and outdoor activities. Balance was the mantra at the Austin household. That way of living not only made it difficult to locate her, it was hard for a stranger to get in her head, understand what made her tick, see the world from her eyes, gain her wisdom, and feel like there was some common ground, a connection with this special young woman.

But that restraint from becoming controlled by the mediums of the day did not dampen her enthusiasm for engagement, opinion, debate, or action. In fact, once engaged, it was obvious her knowledge of issues she cared about was deep, reflective, and logical. That odd combination of dynamism and lack of access made her more of a mystery and fueled a frenzy to be the first to introduce her to the world, to become her distant friend and sort of a soulmate. To want to be close to Amy Austin was instinctive. She had star power.

Stew and Joline, Harshil, and Frank and Becky, developed a plan to protect Amy from predators and shield her from legitimate inquiries so she could enjoy her life and stay focused on the day-to-day science she immersed herself in. She could more than take care of herself under

ordinary circumstances, but overnight fame came with advantages and disadvantages that required some experience to survive.

Stew and Joline tapped Derek Gifford, a friend who was a highly decorated Army Ranger and now ran his own successful business called Michigan Wolverine VIP Security (MWVS). Its focus was protecting VIPs residing in or visiting Michigan. With Michigan geography as a unique selling proposition, Derek forged tight-working relationships with the Michigan State Police, county sheriffs, FBI agents, and other state-based law enforcement groups. He became a regular at several city council meetings around the state, and at US and State Congressional Representatives' offices in Lansing, which was near his home in Okemos. He offered all these organizations free training in firearms use and safety, hand-to-hand combat, transportation security, facility security, secure communications, crowd control, and hostage rescue. Law enforcement officers, government officials, and high-level executives around Michigan had grown to respect and like Derek. He had 215 employees but still more referral business than he could accept.

His daughter, a high school senior, was bent on saving the world from climate change, with a special love of protecting the habitat of wild animals. She had viewed a recording of the debate Amy had with Josh Manning and couldn't stop talking about it. She was opposed to nuclear power but realized she didn't know the things Amy said about it. So she did her own research, using some of the resources offered by the Atomic Garage Movement and TES, and was coming around to agreeing with Amy. Witnessing their daughter's transformation in thinking, Derek and his wife watched the debate with great interest. Derek, who had done regular training and review with The Rock's security staff, made it a point to understand the issues regarding the extension of The Rock's operating license. When Joline Grassley, the mayor of

Algonquin and a lifelong friend, called him for help in getting some professional security for Amy, he was all in. No charge. Whatever it took, he wanted MWVS to be Amy's protector. Nobody, anywhere was going to do it better.

He immediately had the Austins' property secured within three concentric circles, personnel and electronics were deployed accordingly. All Atomic Garage's connections with the internet and their internal devices became hard targets for the most sophisticated hackers. Harshil ended up being an immense help. Derek even hired him as a contractor to enhance some technology being employed as part of MWVS services. The automobiles that Amy rode in were protected from viruses and tracking technologies. All Atomic Garage phones and mobile devices were switched out for hack-proof technologies. Killer drones were ready to intercept any incoming drones. Long-range, heat-sensitive cameras scanned the horizon for anyone observing from a distance. And drone and ground personnel looked for and located remote cameras aimed at the trails that Amy and her family often hiked in Odina State Park. Twenty-three remote cameras were located and disabled. Their last image in service being that of a bird of a different sort.

Derek coordinated the surveillance plan of the Austin property with the state police, county sheriff, and the Algonquin city police chief. Eyes were on Amy and monitoring the environments she frequented, while at the same time staying back and letting Amy have freedom of movement. Two security personnel rode bikes, jogged, or walked with her whenever she wanted to get some exercise. After her first run, the security personnel stayed on the bikes so they could keep up better. They often suggested new and interesting routes for her. They drove to them so as not to set a pattern of running routes around her home. For now, her course of study would be conducted remotely from Algonquin, rather than on campus in Ann Arbor. Derek and

his team would tackle the logistics of covering her at U of M when the time came. If anyone were to approach her, she was instructed on how to let her security detail intervene.

MWVS's staff of men and women were all veterans, many with elite training in their areas of discipline, such as special operations, urban combat, intelligence operations, and cyber war. Some had also served a number of years in civilian law enforcement. They were all fit, armed to the teeth, smart, ready for action, and well paid. Derek, aware of the off-color humor that seemed to be part of MWVS culture, often referred to his staff as the Comedy Troupe. In addition to locating remote cameras planted by paparazzi and others, the MWVS team had already blocked three sophisticated cyber attacks on the Atomic Garage and Amy's electronics. The attacks came from the Chinese, not the Russians.

Derek assigned an armed office assistant Ann Rutledge to work with Becky. Ann had spent 15 years guarding nuclear plants and nuclear waste disposal facilities, then another seven years training recruits to do the same job. As part of that training, she had given more than 200 presentations. She also was proficient in bookkeeping and financial forensics, an area that had interested her when the FBI recruited her out of graduate school, where she had earned a MBA. But she signed up for four years with the US Army instead and went down a different path.

In 2021, during the height of the COVID pandemic, about 50 idiots from TES, as a public demonstration of how unsafe nuclear plants were, decided to "engage in war games," and staged a mock, surprise, terrorist attack on The Rock when it was under Ann's watch. They mounted four drones with paintball guns loaded with red paint, flew toward the four-foot thick containment dome and were immediately disabled with ground-to-drone lasers by the plant's security force. Big slingshots were also used to lob paint-filled balloons over the exterior security fence from Red Arrow Highway that ran past the plant, five football fields from the containment

building. Ann thought she'd seen everything. Never think you've seen everything, she reminded herself. Recognizing the demonstration for what it was, she had night sniper scopes on the people closest to the next security perimeter, and the two drone operators. Local law enforcement came up Red Arrow Highway to assist the nuclear plant's fence line security detail and removed the misguided people from the area.

Later the next day, TES announced it had flown four drones within the air space of the nuclear plant, yards from the containment dome. They had also sent faux bombs over the fence that would, in a real-life situation, open the exterior fence to a larger force. They explained it could have easily been a terrorist attack, and that the Rock's security was nearly non-existent or unable to defend the plant.

Growing frustrated, Ann explained to her HR Vice President, the Rock's corporate attorney, and the resident NRC safety inspector that to prove TES wrong she would have had to have all of them shot. She said the challenge was making sure a real terrorist had not infiltrated TES as one of the activists. She explained that none of those nitwits knew they were all in the line of our fire, they'd picked a choke point to attack from, and positioned their main force of 30 individuals enfilade to our security gate, which meant Ann's team could have mowed them all down in two seconds. The other 20 were sitting on a small hill on the other side of the highway, a few of them smoking, making their heads attractive targets. Besides, their ammo, water balloons with red dye, were obviously too heavy to carry in mass from their cars, so they each brought two balloons and left the rest of them, unused in their trunks and the back of the three pick-up trucks they came in. Ann explained, "They didn't appear to be a threat because they were not a threat. They were the Marx Brothers on steroids."

Then Ann said something two days later in a post-event preliminary hearing that again sent her down a different path in life, “Shit, maybe I should have just had those assholes shot.”

The National Nuclear Security Administration went ballistic and put her through the ringer of an investigation. When President Arthur Krants watched TES’s video of the raid the day after the preliminary hearing he knew he needed to weigh in. The next day the President of the United States, in a regularly scheduled press conference, took the opportunity to castigate Ann’s poor attitude and non-performance.

“First, that unprofessional, and quite frankly, dangerous comment by the head of security at this nuclear plant is unacceptable, grossly irresponsible, and appalling,” the president said. “We will look into this person’s state of mind and take appropriate action. Apparently, she needs professional mental health care. Second, anyone could plainly see that the demonstrators were not prevented from the mock attack. For 12 minutes, personnel at the guard gate just observed the demonstrators in the road without doing anything until local law enforcement could get there to support the inadequate plant security.”

Ann was placed on unpaid probation, until eight months later when her actions were quietly judged to be appropriate and within protocol and her back pay for the eight months was reinstated. TES didn’t post that determination on their social media. The media didn’t cover the verdict. And the president’s press secretary briefly referred to it as old business when one conservative reporter asked about it. Upon being cleared, Ann nodded and handed the panel her resignation without comment.

Derek called her before she got to her car. “You want a job?”

“As long as I don’t have to protect a damn politician,” Ann replied. “I’d also like credit for 22 years of security experience. I’ll need more than one week off a year. I want enough time

to hone my jiu jitsu skills, spend time with my dog, nieces and nephews, and restore my dad's 1957 four-door Chevy Bel Air. And, just wondering, is a big-ass bonus a possibility? I'm broke. Even with the reinstatement, I had to spend a lot on competent legal counsel."

"It's a deal," Derek proclaimed.

"Really? I was asking for twice as much as I expected to get as an opener," Ann confessed.

"And I got you at half price," Derek replied. "I'll have HR contact you with the details and have them deposit 150 grand in your account before the end of business today. You've been on vacation for eight months, are you ready to start tomorrow?"

"Some vacation. But for you, yes, I'd like to start tomorrow. Thank you for the job. I really appreciate it, Derek, I'll kick ass for you," Ann promised.

"See you tomorrow, Ann. Oh, and by the way, I would have had those assholes shot," Derek admitted.

"Armchair quarterback," she ended the call. As she got in her car, she flipped a bird up at the federal building that she just exited.

Seven years later, Ann walked into the Atomic Garage to meet the Austins. Her life then went down another path.

Monday, January 10, 2028, Auckland, New Zealand, Corporate Headquarters, Emrod

HANK BOUDREAUX WALKED INTO THE EMROD RECEPTION LOBBY. He went over to the counter and politely waited for the security guard with the name tag Brent to finish entering some data. Hank looked around the airy, clean, spartan lobby as Brent finished up. Comfortable. Efficient.

“Good morning, sir. How may I help you this fine morning?” Brent asked.

“I am here to see Issac Asimov,” Hank deadpanned.

Brent laughed out loud. “I thought that too when I first walked into this place. Total science fiction. Don’t tell anyone I said that; they take their science seriously here.”

“Your secret is safe with me. Vonnegut fans are a dying breed, you know?” Hank asked.

“Oh, I don’t know, I think he’s been rediscovered lately?” Brad replied. “His three rules for robots resonate today. Is there a living person you’d like to see while you’re at Emrod?”

“The head guy, your CEO, Russ Hackett.”

“Boy, you don’t mess around,” Brad answered. “Please fill out our guest book, name and who you represent?”

Hank filled out the line in the form and turned it around so Brent could read it. Hank also handed over his card. “Hank Boudreaux, President, Boudreaux Energy X,” Brent recited as he picked up the phone. “What does the X stand for?”

“Now it means ten levels of quality. But when I started the company years ago that’s how I signed my name. A nod to the power of literacy I suppose.”

“That sounds like a great story,” Brent held his finger up as he got a connection. “Hey, Roger, there is a guy here to see Mr. Hackett, his name is Hank Boudreaux, President of Boudreaux Energy X.”

“Mr. Boudreaux, do you have an appointment? I don’t see you on the schedule,” Brent asked.

“No, I just walked in. Eighty percent of success in life is showing up,” Hank remarked.

“No, he said he just walked in,” Brent explained.

“Okay,” Brent said, looking up. “It will be a couple minutes.”

Hank walked around the lobby looking at all the photographs and reading about the various atmospheric electric transmission tests Emrod had conducted in its young and productive 20-year life.

A few minutes later Brent reported, “Mr. Boudreaux, Mr. Hackett will see you now. Somebody will be here in a minute to escort you to the lab where Mr. Hackett is located. I’ll get you through the security check while we wait.”

Hank went through the security screening area and then left the lobby area with his escort. After they left, Brent googled, Boudreaux - Energy - X - New Orleans - USA.

“Whoa, I’d see the guy too if he just showed up,” he said to himself.

The Emrod founder and CEO was a serial tech entrepreneur with a proficiency in disrupting industries. He had a hands-on, no bullshit, no small-talk leadership style, which his employees and partners appreciated. He’d conceived of Emrod more than 20 years ago while observing the need for electricity on the island of Tonga in the South Pacific. Twenty percent of Tonga’s GDP was consumed in importing diesel fuel. That’s when he had a blinding flash of the

obvious. The lack of electricity wasn't so much a question of producing energy but transporting or transmitting it that was creating a cost barrier.

Hank noted that he was entering something more like an airplane hangar than a science lab, which made him feel at home. Technicians were working on a device that looked like a climbing wall.

"Hello, Mr. Boudreaux, I'm Russ Hackett. This is our new transmitter," he said while encouraging a closer look. "We've come a long way since our 2022 demonstration in Munich for the Space Energy for Europe Demonstration. We're getting ready for our fifth demonstration to that august body of space pioneers. By the way, I just did three whole minutes of background research on you. To what may I credit the privilege of having one of the United States' foremost entrepreneurs and self-made men visit us today?"

"In five minutes, you'll realize it's me who is on the privileged side of that equation, sir," Hank said. "Thank you for seeing me unannounced. I'll get right to the point. I'd like to use Emrod technology to transmit electricity for distances up to 10K, with the source of power being a new micro nuclear reactor. Generation VI is a good description of the reactor. The electricity will be generated by a new Rankine turbine, the size of a picnic table. We're talking about a total assembly small enough to fit in a three-car garage and light enough to move on small truck lifts. And it will produce about 10 thermo megawatts of power. My partners and I want to put those things all over the Earth, in places where no electrical grid exists, or where we just want to give our electrons a different ride."

"You're correct, I've not heard about that technology, but you've come to the right place to shoot electricity through the air," Russ smiled as he looked at his visitor with a higher level of curiosity.

“Mr. Hackett, entertain me if you will for a moment, that what I explained does exist,” Hank said.

“I wouldn’t bet against the existence of that type of new nuclear reactor, if you want to know the truth,” Russ replied.

“Good, with that in mind, can you meet that 10 clicks spec right now?”

“I was raised to never use the word, ‘impossible,’ Mr. Boudreaux,” Russ said as he leaned against a large panel of gauges. “It would depend on how many receivers and other variables that we’re talking about. But I have to be honest, we’d find meeting those specifications extremely difficult. From a technological standpoint, accelerating this process faster than what we’re currently doing would barely be within the realm of possibility. Getting all the environmental impact, safety, and regulatory hurdles cleared is the real elephant in the room.”

“Call me, Hank. In a perfect world, one where you and I were in full control, could you pull this off?”

“Yes, with some difficulty, but with a reasonable level of confidence,” Russ responded. “It was already accomplished in your country decades ago. At least at a distance of 1.6 clicks anyway. The distance isn’t the big obstacle. We also have to make sure we don’t accidentally take down an airliner, shoot the blades off a distant wind turbine, cut a cell tower in half, or fry the top floor of a skyscraper somewhere. Stuff like that. We use laser sensors mixed in with our collimated energy beams so planes and birds can fly through it unaffected,” Russ explained.

“How’s that working out for you?” Hank asked.

“In all honesty, I was thinking of supplying our local deli with all the roasted chicken they want,” Russ laughed. “It’s easier in some ways to shoot an energy beam from space on a

clear line of sight to a receiver than across the crowded surface of Earth. But over the last few months we haven't cooked a bird flying through the beam. So we're going to send more things through it, but I really think we've figured out what wasn't working."

"Have you ever heard of the test pilot, Tex Johnson?" Hank wondered.

"Nope, how is he relevant to what we're talking about?" Russ prodded.

"In August 1955, Tex took off in a test flight of Boeing's new 707 jet aircraft. Remember, this is at a time when airlines were still buying piston-driven prop planes. At the time, the company bet its very existence on that new jet, much like you're doing at Emrod. Boeing had sunk \$144 million into 707, and a lot of people didn't think it would fly. Airline executives from around the world were at Boeing's airfield that day in 1955 for the test flight of that plane. And 250,000 people were also packed around Lake Washington, just 15 miles away to watch the annual Gold Cup hydro-boat races. Tex came in over that crowd at 490 miles an hour and rolled that 125-ton 707 so it was upside down as it went over Lake Washington. Then he did a second barrel roll. The people at the boat race hardly noticed. But the guys at Boeing's airfield, who were watching the second barrel roll, almost had a group heart attack. When called on the carpet by Boeing executives the next day, they asked Tex, 'What do you think you were doing yesterday?' And Tex replied, 'Selling airplanes.'"

"You think I need to make a dramatic demonstration to sell this technology?" Russ asked.

"It wouldn't hurt," Hank said. "More importantly, and respectfully, you need to stop thinking about asking for permission and get your technology in use."

"Seeing is believing, huh?" Russ inquired.

"That's right, partner," Hank confirmed. "You're doing something here people wouldn't believe, or have even heard of as a possibility. The people who invented silicon chips didn't go to

the government first and ask for permission to invent. They knew that would be the kiss of death. They just got so many people hooked on fast processors there was no going back.”

“I guess Napster with music streaming and Uber with car rides fall into the same category. I’ll take that observation under advisement. So where can I learn more about this new reactor?” Russ changed the subject.

“We think it’s actually being developed by a very gifted young woman Amy Austin with some competent help at a place called the Atomic Garage in the state of Michigan,” Hank reported.

“Wasn’t she the young woman who debated that movie star awhile back? That was great entertainment. If my memory serves me, we have a project being scheduled with them,” Russ recalled.

“Yes, I’ve heard. Emrod is talking about doing a test with the Atomic Garage, but it’s still unscheduled,” Hank said.

“Okay, sorry it’s not top of mind. I’ll get a full brief on it today and review the specs required for their testing,” Russ said.

“Good. I am surprised it’s not a higher priority for you,” Hank chided.

“Well, you just made it so. Tell me more about this reactor,” Russ said.

“Apparently, Amy Austin is getting ready to build this thing. They don’t have nuclear fuel to test with, nor a national lab lined up to help them yet, but they can test it by producing heat and with AI assistance for a while yet. They also have a patent application for a new alloy they call Sartorium. I’ve had some top people who know what they’re talking about study that patent application and review all the related technology that the Atomic Garage Movement has cited in their papers on the development process.”

“Let me guess. It’s the real deal. And its existence will leapfrog nuclear reactor technology,” Russ speculated.

“Bingo. My experts tell me, Frank Austin, Amy’s father and founder of the Atomic Garage Movement, might have nailed down a formula with that Sartorium alloy that will revolutionize thermo dynamic industrial applications,” Hank explained. “And the stuff can be made malleable and as light as a feather. That means it might be good material for a safe hydrogen tank. That, my friend, is a game changer for transportation, nuclear energy, space exploration and among about a thousand other things. Imagine rebar reinforcement that never rusts. We’ve also been looking at some of the advanced fluoride chemistry formulas that Amy is posting on their website for their experimental LFTR they call, M-LFTR-VI, which means, Micro Liquid Fluoride Thorium Reactor - Sixth Generation. Amy says if we set aside the ridiculous regulatory process, she and her team could make that reactor right now; it would be more powerful, smaller, cleaner, and safer than any other power source in existence. I’ve got very good advisors, Russ. They took their sweet-ass time to look into this, but in the end they agreed with Amy.”

“How do you plan to utilize this technology, Hank?”

“A group of us from the fossil fuel and renewable energy fields will use the reactors to replace our older peaker natural gas plants, and then we’ll focus on making hydrogen for transportation. In fact, we’re looking at a technology now where we take CO₂ out of the atmosphere or its source using a Hybrid-Na-CO₂ System. If we use nuclear power for this system, we’ll be changing CO₂ into hydrogen in a closed, green loop. In the near future, we also want to desalinate sea water. We’ve got the infrastructure for it, and we can quickly repurpose it. Wherever we place these things, we’ll have the opportunity to produce electricity when we’re

not producing hydrogen or desalinating sea water. We'd like to send that electricity where and when it might be needed, at a profit of course," Hank explained.

"What would you like me to do, Hank?"

"I want to fly the equipment that Amy is asking you for to Michigan with a few of your best people and let her test away. For a number of reasons, we need to do this yesterday," Hank said.

"Well, we can pull it off. But I am not a billionaire, we'll need money. Everything I have is in Emrod, and we're burning cash not growing it right now," Russ stated.

"You've got the technology. We've got the money. But we're both running out of time," Hank explained. "I want to be a minority partner in Emrod, get some skin in the game with you. Help where I can. I'll email you an agreement for your attorneys to look at. We can fill in the amounts at lunch today. Then, we'll be on our way to Michigan in a couple days."

"Even if we agree to work together, that timing is going to be extremely difficult for us," Russ pushed back.

"Well, hell what isn't extremely difficult anymore. I have no doubt you can make this happen. It's called a window of opportunity. It doesn't stay open long, my friend," Hank said.

"This is highly unusual," Russ said.

"What? And sending massive amounts of electrical power through the air is normal?" Hank replied. "I'd bet most reasonable scientists think you're a crazy ass son of a bitch. Now a billionaire walks into your lobby and says I believe in you. I want to use your technology. I want to see Emrod become one of the most successful enterprises in modern history. All you have to do right now is hustle. Hubba, hubba, let's get with it."

Russ chuckled. “Okay, email the agreements, and I’ll have the lawyers take a look. Meanwhile, let’s fire this thing up for you before lunch. By the way, if we do this I imagine this development will make the Austins happy. How well do you know them?” Russ asked.

“Never met them,” Hank admitted. “This is my calling card. I always bring something to the table, Russ.”

Seventy-two hours later, Hank sat in a small office aboard one of his Boudreaux Energy X Boeing 777-300 cargo jets bound for DTW. The four Emrod engineers were belted in the small first-class cabin just behind Hank’s office. Hank leased his aircraft from AviaAM Leasing, a division of Avia Solutions Group out of Cyprus, Greece. They were converted passenger jets, reconfigured by aftermarket overhaul specialist Mammoth Freighters, established in 2021. Their main conversion facility, located at the former American Airlines maintenance hangar at Fort Worth Alliance Airport in Texas offered 840,000 square feet of space, enough for six widebody hangar bays and overhead cranes for modification and maintenance work. Hank set up his fleet of Boudreaux Energy X cargo jets right next door. He piggybacked futures contracts on jet fuel and shared maintenance services. The facility was also convenient by truck for equipment coming out of or going into the 86,000-square-mile Permian Basin in the southwest US. Hank liked to keep his options open and his cash flow healthy. He didn’t want to become a conglomerate and own everything from A-to-Z like Henry Ford had done. But having some skin in the game with suppliers and contractors seemed to align everyone’s interests in a way that hard-nosed contract enforcement could not.

Hank was a silent, minority partner in many suppliers and contractors he worked with, including Mammoth Freighters. Hank had worked hand in hand with his top engineer and personally designed the reconfiguration of the 777-300s and the 777-200s he leased to make his

operations as efficient as possible. As they took off from Auckland Airport, New Zealand, he looked down at the Tasman Sea. The act of flying in one of his own jets was just as mind boggling now as it was after he fixed up his first, old Douglas DC 3 in 1995. He had loaded that refurbished rusting, flying bucket of bolts himself with a shiny new, highly secret asymmetrical oil drill head and control package. He flew it from New Orleans to Oklahoma City. It was one of the new horizontal drills that would be credited for revolutionizing the decades-old oil drilling technique called fracking. He knew then he had hit his own geyser of money by transporting all the various equipment that would ultimately be damaged, in the wrong place at the wrong time, or just coming off an assembly line somewhere. And he understood drilling. He could speak the language of the roughnecks and miners. He never looked back. His fleet of planes and trucks were all over the globe now delivering urgently needed equipment to the energy industry.

Once they were at cruising altitude, he emailed Rhonda Mattingly. “I think we’ve got a good calling card to introduce ourselves to the Austins,” Hank typed as he sat back with a smile, reflecting on the fact that the cargo compartment of his Boeing 777-300 contained the United States’ potential future electrical grid. He’d come a long way since that new fracking drill rode as cargo in the first flight of Boudreaux Energy X that he had piloted. All that was needed now was one young lady to create the first spark in what would be the next technical revolution in human history.

HARSHIL AND AMY WERE FINALIZING THE BLUEPRINT FOR THE M-LFTR-VI PROTOTYPE AND ESTABLISHING THE SEQUENCE FOR FUELING THE REACTOR.

Generation IV nuclear reactors were being activated regularly all around the world and were going through an historic developmental arc similar to what cars did between 1910 and 1920.

The Rolls-Royce Silver Ghost, Packard Twin Six, Mercedes 37/95, Ford Model T, Austro-Daimler 27/80 Prince Henry, Hispano-Suiza Alfonso XIII, Mercer Type 35 R Raceabout, to name a few.

In 2027, a partial list of Generation IV reactors in testing or beginning production included the Xe-100 by X-energy, eVinci Microreactor by Westinghouse, the Micro Modular Reactor (MMR) by Ultra Safe Nuclear, Integral Molten Salt Reactor (IMSR) by Terrestrial Energy, the Sodium Reactor by TerraPower, Aurora Powerhouse by Oklo, the NuScale Power Module and the VOYGR SMR Power Plant by NuScale Power Corp, the Kairos Power Fluoride Salt-Cooled High-Temperature Reactor (KP-FHR) by Kairos Power, the SMR-160 by Holtec International, the Fast Modular Reactor by General Atomics, the BWRX-300 by GE-Hitachi, the BWX Advanced Nuclear Reactor (BANR) by BWX Technologies, ARC-100, the First-Of-A-Kind (FOAK) reactor by Arc Clean Energy, the Liquid Fluoride Thorium Reactor (LFTR) by Flibe Energy, the ThorCon reactor by ThorCon, the Waste Burner by Copenhagen Atomics, and the Dual Fluid Power Plant by Dual Fluid. Many more were being built and tested in China, Russia, France, Great Britain, South Korea, and Japan. And they, in turn, were teaming

up with countries in Africa, Indonesia, and South America to share their technologies in exchange for natural resources and new markets. And world dominance.

What was different from 1910 to 2027 was that none of the companies building new nuclear reactors could actually build them precisely as they wanted to like car makers did in the early part of the 20th century. The micro nuclear reactor entrepreneurs, especially those located in countries with western-style democracies, were all marginalized or inhibited by over regulation, red tape, and politics. It was a hangover from decades of worldwide antinuclear activism that had commingled the thought of nuclear war with nuclear energy. As a result, 80 percent of the world's power was still coming from fossil fuels, 50 years behind where power generation technology should be. Wind and solar were only producing two percent of the energy the world was consuming. It was the density of the available nuclear fuels, and the theory that the world could produce zero carbon emissions by 2050 that pushed the technology. Net Zero 2050 was a goal adopted by most developed countries and major corporations around the world. The vision was to produce clean, inexpensive energy, without adding more net CO₂ to the atmosphere. It was a physics and mathematical impossibility that had taken on a cult status among environmental activists and politicians. Net Zero 2050 was a global religious movement that had resulted in thermal and electrical power scarcity in countries that had adopted the goal. The result was the Green Wall, a phenomenon where demand for energy exceeds its supply. But it was behind the renewed interest in nuclear energy, the only real solution to reducing global CO₂ emissions around the world and providing emerging economies with enough energy to pull their people out of poverty.

That decades-long push for Net Zero CO₂ by 2050 was driving the motivation and providing the funds to produce safe, small, and powerful reactors without emitting CO₂.

Enthusiasm for nuclear power was better than it had been in decades in spite of the stifling regulatory burdens unique to nuclear power production. Burdens that hobbled some of the most gifted physicists, chemists, material scientists, and engineers in history.

“You know what makes your M-LFTR-VI project different, Amy?” Harshil offered as they pored over the blueprints on the big screen and the four additional screens loaded with data, charts, and graphs.

“Let me think. Because it’s just wonderful,” Amy guessed.

“Well, of course it’s that,” Harshil said with a smile. “But it’s wonderful because you never designed it with the concept of navigating a politically charged review process, fabricating its parts to specs that made no contribution to safety or function, or designing it by prescription. You always design to maximum performance. And you allow curiosity and discovery to change your thinking and the direction of development.

“You’re constantly wondering how a new technology or an application could boost outcomes. The M-LFTR-VI came from your gifted mind, and your passionate and loving heart. It’s uncompromised, extremely advanced, and elegant. I love this machine, because I love you, and I will do anything, and I mean anything, to make this reactor become a reality,” Harshil pledged, as he grasped her shoulders and looked directly at her.

“That’s sweet, Harshil,” Amy blushed. “I know you’re working on getting approval for one of our labs to test it.” She hung her arms over Harshil’s forearms. “It’s just that going through US nuclear regulatory channels looks like a high-tech kangaroo court.”

“We’ll figure something out,” Harshil promised, as he turned back to the lab table. “But you’ve already lit the imagination of the world. I’ve heard a lot of different groups around the world are working up plans to build their own M-LFTR-VI versions from our plans. We just

have to finalize a few steps on fabricating Sartorium, and we'll hear about them being built everywhere."

"The truth is my parents, and my Uncle Stew and Aunt Joline set this working environment up for us," Amy said. "My dad has often emphasized, 'It's easier to design new technology with a 10-times improvement goal than an incremental improvement.' I admit one or two incremental improvements can be game changers, but that leaves inventors immersed in the existing technology. For example, the new boiler reactors with uranium and thorium as fuel are great. They probably boost efficiency in those older reactors by 10 percent."

"Agreed, a fantastic achievement. But. . ." Harshil started to say.

"But. . .," Amy finished Harshil's thought. "We've been improving the efficiency of nuclear reactors for decades. As we went from having almost 110 reactors in the US in the 1980s to just about 90 by the early 2020s, we were producing more nuclear power with 20 less active reactors than ever before. Nobody knew that. Nobody really cared. Antinuclear activists continued to be effective through all that incremental improvement. We need to capture the public's imagination, Harshil. As we colonize the moon and head to Mars, using plutonium, by the way, our power production on Earth needs to WOW people. We need to get their attention and get them to say, 'Hey, that's great, why don't we just do that.'"

"You're modest," Harshil said. "It isn't a technology that moves people. It's vision and leadership by example. You're the right person, the change agent who will make that happen. Amy, a few years ago when I first met you and your family and became part of the Atomic Garage Movement, fresh from India, I was working on a particularly sticky math problem. I had my pencil and notepad filled with equations. I must have left them on the desk where I was

working. When I came back, there you were sitting in my seat looking at the calculations. Do you remember that?”

“Yes. I spotted your small error, Harshil. Shame on you,” Amy joked.

“You know how to tell when somebody is gifted in science and math, Amy?” Harshil teased.

“They’re just really good at it,” Amy guessed.

“True. But most people have to be taught. They have to work hard at studying those disciplines. But rare people like you and to a lesser extent me, we can look at a math problem, a chemical process, a computer code, or a long algorithm and just get it. It just all makes sense immediately, a puzzle completed instead of in a thousand odd pieces. How many times have I heard you say to yourself, ‘Oh, I see how that works now?’ Then you giggle,” Harshil smiled. Proton walked into the lab area and jammed his head against Harshil’s hip. Harshil instinctively scratched the greyhound’s ears and patted him on the side as the retired racer headed to one of the many dog beds laying around the Atomic Garage. Amy gave him a pet across the back as he walked by.

“Changing the subject, the VI is developing a personality of sorts, maybe we should name her,” Amy suggested.

“Her, like a ship. That works,” Harshil reflected.

“Or her, like a mother. Someone once told me mothers can change the world,” Amy chided Harshil.

“Indeed, they’re the only ones who can, in my opinion,” Harshil agreed.

“Okay, let’s think about a name,” Amy declared. “It will likely present itself at the appropriate time. For now, back to work, my friend. All we have at this point is a nuclear reactor on paper and inside a computer. It’s about time to start building it.”

“I requested the dimensions of the fabrication forms for making those small water tanks from the Groundwater Consortium in Baltimore,” Harshil updated Amy. “When we were in India, Stew spent a lot of time looking at those things, measuring them, and asking my friend Sam Benetiz questions about how they were made, how he shipped them, and how many of them were in India and the rest of the world?”

“Stew wants to talk about that shape for the reactor vessel,” Amy recalled. “He’s looking into programming 3-D printers to duplicate the dimensions of those molds.

“Yes, then we’ll print them using Sartorium from its powder form,” Harshil said.

“Good,” Amy concurred. “That way we can get top performance out of the fissioning and either reflect the heat back into the core or fabricate the Sartorium so it passes heat to the reactor vessel’s exterior, making it too hot to get near. We can make a choice for each unit we manufacture, or print should I say.”

“If you really wanted to, I think we could fabricate Sarotium so it would be perfectly safe to touch the outside reactor as it’s operating,” Harshil predicted.

Amy added, “Then we’ll just have the fluoride coolant move out of the reactor vessel on a short HOT leg then back in a COLD leg circuit and transfer the heat on that loop. The piping will also be made of Sartorium. The thermodynamics inside the reactor and its small size mean we won’t have to use any pumps to keep the flow inside the core going.”

“Yep, the second law of thermodynamics in play,” Harshil smiled.

“And all with no corrosion,” Amy reminded Harshil.

“With the corroding problem solved, fluorides are stable when mixed with molten nuclear fuel and also our best bet with efficient heat transfer. I do think the shape of those water tanks will work well,” Harshil reflected.

“And it will be self-regulating,” Amy pointed out. “If we’re taking a lot of heat off the circuit, that cools the fuel inside the reactor, so it speeds up. If we are not taking heat off the circuit, that molten fluoride heats up inside the reactor, thus slowing it down. It’s a virtuous feedback loop. Let’s call it our cruise control system.”

“And if anything goes wrong like an earthquake, a flood, or a fire,” Harshil ticked off. “A frozen salt plug at the tank’s bottom melts, and the fuel drains to another graphic-lined tank below it, the reaction stops on its own, and the fuel cools over a few days without any help. Walk-away safe. It’s nonsensical to think of melting down because we’re already melted down as part of function.”

“Hey, why don’t we just do that,” Amy laughed.

Just then, Ann Rutledge, on loan from Michigan Wolverine VIP Security, walked into the northeast corner of the Atomic Garage where Amy and Harshil were working.

“Hey, you guys, sorry to interrupt,” Ann said. There’s a guy on the phone named Hank Boudreaux for Amy. He says he’s the President of Boudreaux Energy X. He’s got a couple truck loads of stuff from Emrod on the way, with four technicians. He wants to know if you’re ready to shoot high-powered electricity through the sky?”

“Hell, yes,” Amy yelled. “I don’t know the guy, but we’ve been waiting months for Emrod to get things going. Hank is his name, is that what you said? I want to talk to this guy.”

“I did a quick check on him,” Ann reported. “He’s a self-made billionaire. Boudreaux Energy X hauls fracking, coal, natural gas, wind turbine parts, even stuff for nuclear plants, and mining equipment all around the world fast and delivers right where it’s needed.”

Amy glanced at Harshil, as he opened his hands and gave her a confused look. She looked at the phone. A premonition of something big about to happen flowed through Amy. Harshil smiled at her and nodded. Ann transferred the call.

“Good morning, Mr. Boudreaux, this is Amy Austin. Are you sure you don’t want to talk to Nikola Tesla?”

“What is it with dead guys lately? I just had this discussion about Issac Asimov,” Hank replied.

“Hey, any friends of Nikola and Issac are okay by me. Tell me what you’re up to with Emrod, and what it is you want of me?” Amy asked.

“Darling, girl,” Hank said like a doting father. “I want you to build that nuclear reactor you’ve been working on and replace the current electrical grid with this Emrod technology.”

“We did that last week. You’re late,” Amy replied

Hank laughed. “I already like you. Listen, may I suggest you get your full AGM team together. I am about two hours out. We need to talk. By the time y’ all hear what I have to say, you’ll wish you accomplished all of that last week.”

“Okay, Mr. Boudreaux. Two hours. I’ll put Ann on the line. She’ll tell you how you get your stuff into our fortress,” Amy said.

“The guy knew who Issac Asimov was, that’s good enough for me,” Harshil chuckled.

Wednesday, March 13, 2013, San Jose, California

THE SECRET BREAKAWAY SECT OF THE TERRESTRIAL ECOLOGY SOCIETY, known as TES, met at Calero Reservoir County Park just south of San Jose, California. Once part of the Pueblo nation, the park nestled in the foothills of the Santa Cruz Mountains. The nearly 4,500 acres are good for hiking, kayaking, and fishing, but its arid landscape and climate keep it sparsely populated. Bring plenty of water. Check.

The veteran ecoterrorist showed up after they got the coded message to gather. There were three men: Archie Ricard, Jason Crimmins, and Byron Montgomery. The two women were Maggie Hinckle and Jayla Smith-Ahmed. At one time, they were 15 strong. Five were all who were left now. The diehards. But they could trust one another. Now in their early 40s to mid 50s, each had, by all appearances, led normal productive lives, had nice families at home, and were successful and well respected within the communities where they were active. They were, by all accounts, model citizens. But they lived a double life. When alone together, they called themselves environmental warriors. Sixteen years earlier, in 1997, they swore an oath of secrecy to one another and promised to dedicate their lives to saving the Earth. Once loyal TES members, they had grown impatient and disillusioned with its leadership. TES was not aggressive enough with big oil companies and nuclear plant operators, or the big capitalist conglomerates filling the oceans with giant oil tankers and cargo ships. The big ag companies were destroying the land, eating up the Brazilian Rainforest to raise beef, and fishing species to extinction, leaving huge ghost nets in the ocean that whales and thousands of other creatures got entangled in and died. TES had gotten complacent. They were not taking the fight to the enemy.

There was no sense of urgency at the TES leadership level. The organization was adrift. It wasn't long before snide quips about certain board members became regular occurrences, off-the-record statements of frustration became more frequent, and what-if games over beers morphed into a loosely organized, highly intelligent, and violent small group of ecoterrorists.

The straw that broke the camel's back was when a co-refugee, now from a nuclear friendly environmental group that had also departed TES, discovered TES's board of directors had taken more than \$100 million in a 10-year period from natural gas companies via an elaborate scheme of trusts, offshore banks, and a chain of nonprofit organizations to hide the source of the money. It was a quid pro quo. TES would push wind and solar energy by lobbying the US Congress for incentives and subsidies, while continuing to aggressively oppose nuclear energy. In return, the natural gas donors to TES would become major investors in wind and solar, and continue to support TES under the table. The reporter even pointed out that common energy industry practices required using special natural gas fueled power plants as a backup to renewable energy, revealing the motivation behind the scheme. TES's existence was no longer to fight for the environment but to enrich and empower a pampered group of do-nothing, tough-talking, trust-fund environmental narcissists. "All hat, no cowboy," is how Byron Montgomery, from Texas, referred to TES leadership.

That left the true believers within TES infuriated and feeling betrayed. Finally, over a nine-month period, the 15 most dedicated and passionate members of TES walked away from the organization they had come to love. They put away the megaphones, poster boards, opinion pieces, and lobbying, and stopped marching and making public comments and speeches. Their primary form of warfare became sabotage. They burned down the multi-million dollar log homes of six top oil executives and two US Senators located in the mountains of Colorado, Utah,

Montana, and Wyoming. Messages and photos were sent to the victims after the attacks to let them know, “We know where all members of your family are. Don’t even think for a second we’re not serious about stopping you via any means. Stop destroying the Earth.” One senator announced he would not run for re-election, and two of the oil company executives announced their retirements shortly after those attacks. All said they wanted to spend more time with their families. The incidents were months apart, hundreds of miles from one another, and mostly of local interest. The secret group tried to get national media exposure for the attacks and included a list of their demands. Media executives just turned the information over to the FBI and considered the senders extremist nutcases.

So the group escalated its guerilla war to attacks on ski resorts, burning down public mountainside chalets, ski lifts, and winter resort parking lots full of SUVs. They spiked trees, which damaged chainsaws and chainsaw operators alike. They mixed in with peaceful antinuclear protesters and started throwing molotov cocktails at police from inside the crowds. As time went by, they became more secret and more violent. When they acquired three Russian RPG grenade launchers and six cases of grenades from a Colombian terrorist group in the Andean region of South America via Cuba, plans were in place to hit the Alaskan pipeline. But the FBI got wind of the plan. Three of their members went to prison, Jayla Smith-Ahmed, Paul Ronkowski, and Harley Beckley. They were each sentenced for seven-year hitches, which would have been more but the FBI had to initiate the arrest earlier than planned because they were about to lose track of the weapons. As a result, the defendants’ legal councils put up a robust defense based on entrapment. Those three never ratted on the other 12. The FBI didn’t have enough evidence to tie them to the previous acts of environmental terrorism and could not tie

them to additional co-conspirators. The FBI did, however, keep the Alaskan pipeline from being blown up. The rest of the group melted away, all pledging to one another to fight another day.

The group took a break from their hiking, and sat under the shade of a tree, on stadium sports seat cushions they brought along. They huddled close together. They were alone, finally. Had nine years really gone by since they last saw one another?

“So then there were five,” Maggie Hinckle pointed out.

“What was prison like, Jayla?” Jason Crimmins asked. “I read that article about you a few years back in *May I Ask?* magazine, ‘Eco-Warrior’s Mission to Save the Earth.’”

“That article is probably why they let me out a little earlier. I got sentenced to seven years; as you know, I got out at five years and six months for good behavior. Prison is not like the faculty lounge. The company wasn’t great. I worked out and read a lot. The FBI only knew about the plan to hit the Alaskan. We never got tied to the other stuff. Paul and Harley did the whole seven years. I never thought I’d see you guys again. But I am still all-in, an environmental warrior.”

“Hey, wasn’t the guy who wrote that *May I Ask?* piece on you Carson McMullen the big wig at TES now?” Jason Crimmins wondered.

“The one and only,” Jayla confirmed.

Archie Ricard, the self-appointed leader of the group spoke up, “Hey guys, time to talk business, thanks for showing up. A lot of years have gone by, but I am more committed than ever before. How do you all feel about picking things back up and causing some serious damage to the assholes who continue to put a wrecking ball to Mother Nature?”

“Hell, I’m in. Sitting in prison for five and a half years just pissed me off because it took me out of the fight. I am ready to get back at it,” Jayla Smith-Ahmed revealed.

“We talked about it a little; we all feel the same way, Archie,” Maggie spoke for the group.

“Okay, then. It’s just us. Nobody else has responded,” Archie reported.

“Are you concerned any of them will speak up about us, Archie?” Byron Montgomery asked.

“No, not at all. I consider them retired friends. They’ve served the cause well. I actually think they’ll be watching the news and rooting us on. Besides, they’ve been complicit in so many missions with us, they’d be subjecting themselves to a long prison stretch at this point if they opened their mouths about us.”

“Okay, it looks like it’s just us then,” Maggie declared.

“Have all of you been working out? Staying proficient with the firearm I told you to get familiar with, the AR-15, and have you been studying the special forces techniques of assaulting power grids?” Archie looked for confirmation. The other four nodded in the affirmative.

“Just one question before we get into this too much,” Byron requested.

“Sure, anything,” Archie offered.

“Why now?”

“The timing is that one year ago the NRC approved its first new nuclear reactors in its 38 years of existence. Four of those sons of bitches at two locations in South Carolina and Georgia. That tells me TES and the rest of the antinuclear community is not only spineless but toothless. There is no way that back in the day the NRC would have gone against TES’s wishes. TES was wrapped in enormous political power. Hell, it was TES that determined who the regulators would be to sit on the various NRC panels and Congressional environmental committees. That approval last year was just a reminder of how much our absence out there has hurt the cause.”

“So you’ve been thinking about this meeting for a year?” Jason asked.

“Yep,” Archie replied. After a pause he continued, “You know, we all have our reasons for leading the lives we do. Mine started with my father. We lived in England when my dad was working. He was a great mechanic, machinist, and welder. He worked on ships. In the mid 1970s, he was working on a trawler called *Sir Willian Hardy*. It was a sturdy vessel built in 1955 and operated by the MAFF, Ministry of Agriculture, Fisheries and Food. In 1978, MAFF sold that ship to Greenpeace. The ship was about 130 feet long. It was sea worthy but needed some upgrading and tender loving care. Greenpeace wanted to retrofit it, spruce it up, and use it in campaigns against whaling, seal hunting, nuclear testing, and nuclear waste dumping. I guess my dad got to know those guys during the ship’s handoff, and he liked the prospect of getting that old girl back in shape. So when Greenpeace purchased her and changed her name to the *Rainbow Warrior*, my dad went with the ship and became one of the crew members. He worked on it night and day for four months after Greenpeace purchased it. At the end of that time, the transformation was incredible.”

“My best friend, Adelyn, and I visited the *Calypso* in St. Petersburg, Florida, in the summer of 1975. I think Greenpeace’s *Rainbow Warrior* and the Cousteau’s *Calypso* were two iconic images that made me want to dedicate my life to protecting the Earth. Anyway, the Cousteaus were studying the red tide back then,” Maggie Hinkley revealed. “We just drove down there in our car from Tampa to see what was up. There were only two cute French crew guys on board while the *Calypso* was docked. We had a riot with those guys. Actually, my friend and I didn’t actually leave until the next morning.”

“You guys remember John Denver’s song about the *Calypso*, right? That came out a few months later. They told us John Denver was about to cut a song about the *Calypso* when we were partying with those guys,” Maggie Hinkley recalled.

“Well, *Calypso* sank in a mooring accident in Singapore Harbour in 1996. Greenpeace’s *Rainbow Warrior* was a beautiful and dependable seaworthy craft, also deserving of being sung about. It had a dove of peace painted on its prow and a rainbow with the name Greenpeace amidships, with another rainbow on the side of the bridge,” Archie described.

“My dad loved the *Rainbow Warrior*, and I think he went through a transformation with it. He became a *Rainbow Warrior* in every sense of the word. When he was home, he taught me about the environment, how greed and war were destroying the planet, but how some people were fighting back. I used to watch videos of my dad crewing in those small boats Greenpeace launched from the *Rainbow Warrior*. They would get in the path of Japanese and Russian whalers to protect those beautiful creatures from certain death. I was so proud of him it brought me to tears. Saving the Earth and all its creatures has been my life’s passion ever since,” Archie’s eyes watered up.

“That’s a wonderful story, Archie,” Jayla said.

“Hey, wasn’t that ship blown up or sunk?” Byron asked.

“It was, in 1985, in Auckland, New Zealand, by French commandos, in a stupid-ass mission called, *Opération Satanique*,” Archie confirmed. My dad told me those commandos were posing as civilian supporters of Greenpeace, being friendly and touring the ship just days before they sunk it.”

“This story has been lost in history; but at the time, the *Rainbow Warrior* was iconic for a growing surge of environmental activism,” Maggie added. “Its image could be found in the bedrooms of kids and classrooms all over the world.”

Archie confirmed, “I definitely had a poster of it in my bedroom.”

He continued with the story. “It was blown up in port, not at sea. The crew had just evacuated 300 native people on Marshall Island from Rongelap Atoll, which was radioactive from American nuclear tests fallout. They were stocking up for a trip to Mururoa Atoll in the Tuamotu Archipelago of French Polynesia. Greenpeace wanted to monitor the upcoming French Nuclear explosions. But that was not to be. On the night of July 10, 1985, those commandos operating under the French Intelligence Service attached two explosive devices to the *Rainbow Warrior’s* hull and sank her. There was a delay between the two explosions. After the first explosion, a photographer returned to the crippled ship to retrieve his equipment, and then the second larger explosion occurred and trapped him below decks. He drowned. The ship was sunk and destroyed. It was an international incident. You can look it up. The French are sorry, blah, blah, blah,” Archie growled.

“Hey, if any of you are interested, there’s a *Rainbow Warrior* Memorial on the cliffs of Matauri Bay in New Zealand that was just completed last year,” Jason Crimmins recalled.

Archy wrapped up his story, “The sinking of the *Rainbow Warrior* was a life-changing event for my family. We moved to the US after that. My dad never found as much joy and purpose in his life again. As he became more bitter about how the seas and Earth were being raped, I became more and more motivated.”

Everyone was silent as they thought about those now ancient environmental warriors confronting evil head on and in person. Not kowtowing, not playing by some arbitrary rules of civility, not backing down, but taking the fight right into the lair of those capitalist assholes.

“So much for that bullshit, stupid saying, ‘speak truth to power.’ No amount of talking is going to change anything. This is a war for the survival of everything we know,” Jayla reflected.

“What’s the plan, brother?” Maggie asked Archie.

“We’re going to hit PG&E’s Metcalf transmission power substation. I’ve already reconnoitered the site and set up four firing positions using small piles of rocks. You’ll find the AR-15 you’ve been practicing with is a close match to the AK-47s. I’ve got four of them with me and hundreds of rounds of 39 millimeter ammo. Those positions are across the road from the facility. We’ll hit it sometime after midnight, in a couple days.” Archie explained. “I assume you all practiced shooting at night and adapted for being accurate after the muzzle flashes?” They all nodded. Archie explained as he spread a map out for the team to see.

“You worked for PG&E, didn’t you?” Byron recalled.

“Yep, I’ve got inside knowledge on how these substations work,” Archie revealed.

“How well is it protected?” Jayla asked.

“No security really. It’s got a chain link fence around it,” Archie said. “There are a couple cameras aiming at the chain link fence, but none of us will be in the camera’s line of sight. We’ll wear the dark clothes I asked you to bring, but not black Ninja outfits and no masks. We just came out here because when you were at the beach earlier in the day you heard there was an after-hours party and plenty of cold beer out here. You must have been mistaken about the location or misinformed. That’s your cover story if you get detained.”

“The tricky part is we’ll have to shoot through the fence,” Jayla thought out loud. “But you guys are all good shots, right?” Everyone nodded in the affirmative. “We’ll need to take out 21 narrow cooling fans that keep the transformers from overheating. We’ll have a direct line of fire on almost all of them.”

“Archie, what about personnel on site or automatic alarms? We’d be sitting ducks for a fast response unit coming in. Those emergency response vehicles in San Jose are not too far away,” Jason asked as he put his finger near the substation on the map.

“Good question,” Archie said. “If there is anybody down there we’ll see them and come back the next night. Once we know it’s clear, I’ve identified the two underground vaults where the fiber optic communications cables go in. Maggie and Jason will work as a team and cut those. After that, Maggie will take a lookout position here, north of the facility, to see if anything is coming from San Jose, but you’ll have a good view of the whole surrounding area. Use your binoculars and look for far-off flashing lights, in the sky or on the roadway.”

“Got it. How are we going to communicate with one another?” Maggie asked.

“We’ll use flashlights, I’ve set up a grouping of very simple signals we’ll use to coordinate the attack,” Archie explained. “I hope none of you brought a cell phone with you. I am getting increasingly paranoid about those things and the ability to track everything we do.”

All confirmed they left cell phones back home. They also drove to the target rather than flying, paid cash for gas and food, and either camped or slept in their cars. They took showers at public beaches or campgrounds. Their ecoterrorism tradecraft had evolved over the years, and those instincts were coming back fast.

Archie continued the briefing, “Jason will have the fourth AK-47 and take the last position after the cables have been cut. I’ll assign the fans each of us needs to hit from each

position. We'll go over that in training. Jayla, Byron, and I will take the three other positions. We may have to stay on station for a while. It might take 10 to 20 minutes. No need to rush, we've got to make sure each fan is hit several times."

"How much damage are we talking about? This seems pretty tame compared to the old days," Maggie said.

"If I am right, we'll bring down the entire electrical power grid of Silicon Valley," Archie said. "Most of those businesses will probably auto switch to their back-up diesel generators. But about four million people will be without power in the morning if we're successful."

"Holy shit, that should move the needle all right. And the FBI will have to think about the fact AK-47s were used in the attack. One can never rule out the Russians in an event like this. It's a good plan, Archie," Jayla summarized.

"The next attack, after this one, could be the whole enchilada," Archie added. "There are three grids in the US. If we can hit just nine key substations like this one and coordinate the attack, all the other substations will fall like dominos, and we can turn out the lights on the entire country. It will take them weeks to get all the power back on."

The small group sat in stunned silence, realizing this was just a trial run. After a minute, Jayla expressed what they were all feeling, "Well, righty-tighty America, we've got to do with less. Turn off the oil spigot. Stop drilling for natural gas. Shut down the damn pipelines. Turn off the radioactive waste machines."

Maggie jumped in, "Stop making everything from disposable plastics."

"Stop killing animals in test labs for medicine to treat lifestyle diseases. Start walking and riding bikes; what is so damn hard about this?" Byron fumed.

“Stop eating animals like we’re all still living in caves. And stop destroying the rainforest to raise cattle,” Jason joined out. “We’re not entitled to suck up all the Earth’s resources in this capitalist pig sty of a country.”

“That’s our list of demands then,” Archie proclaimed. “All right guys, for the next couple days we will train intensely. Put your game faces on. I located a good place about an hour south of here for that purpose. Then we come back here and do it.”

12: 30 a.m., PDT, Saturday, March 16, 2013 (three days later)

The group came in on the Metcalf electrical substation from four different angles. Each member with their own AK-47, allotment of ammunition cartridges, flashlight, and a bag of tools they would each need. Jason carried bolt and wire cutters, long and short pry bars, and a small set of tools if getting into the fiber optic underground vault presented any surprises. Archie got to the station first, two hours earlier. After all that watching and waiting, he finally pulled out his flashlight and signaled three short on and off sequences, repeated twice—the all-clear, mission-is-on signal.

Jason and Maggie headed to the first underground vault to cut the fiber optic line. It took less than one minute. Seven minutes later, they located the second vault and cut the cables within 40 seconds of locating it. At 12:58 a.m., the communication with the Metcalf substation was cut off. Some residents in the area working on computers lost their Level 3 Communications link to the internet.

Once communications were cut, Archie used his flashlight, moving it back and forth. It was the signal to start shooting. Sparks flew off the chain link fence as bullets started to hit and

graze it. The bullets set off motion sensors built into the fence that were transmitted via a radio frequency.

Clyde Ebson, an engineer working at a nearby power plant that still had phone service, heard the gun fire and called the Santa Clara County Sheriff. “Hey, tell the sheriff it sounds like the gunfight at the O.K. Corral over at the Metcalf electrical substation. Can you get a deputy out there?”

“Thank you, I’ll get a deputy out there to check it out,” the dispatcher responded.

The first group of transformers failed and leaked more than 50,000 gallons of oil. Equipment failure alarms started going off in PG&E’s control center about 90 miles away. Archie, satisfied the target had been destroyed, used his flashlight to signal cease fire. More than 100 bullets had been expertly fired into the substation over a 20-minute period. By the time the sheriff’s deputy got there, the gates were locked and nothing looked out of the ordinary. So he left.

At 3:15 a.m., PG&E engineer Larry Snyderman did a more thorough investigation. He got on his truck radio, “Hey, you’re not going to believe the shit that went down out here. Somebody better call the FBI.”

“Are you safe, Larry?” the PG&E dispatcher asked.

“Yea, whoever it was is long gone, but this substation is shot up like swiss cheese.”

The five ecoterrorists made their escape in Archie’s 2008 nondescript, white Jeep Cherokee. Archie let them off around the corner of a Rotten Robbie’s gas station in San Jose where their cars were parked randomly around the lot. The group split up and walked into the main terminal, and then headed to their individual cars and started their non-stop return trip home. Archie had the shortest trip. He lived in Monterey, California, just an hour south of the

Metcalf substation. By 10:30 a.m., Archie had taken the duffle bag with the four AK-47s and leftover ammo used in the attack and threw it off his boat into the Pacific Ocean, 15 miles offshore in a spot where fishing and scuba diving were almost nonexistent. Maggie headed to Arkansas, Jayla to New York, Jason to South Carolina, and Byron to Texas. Once everyone was 100 miles away from Metcalf, they started throwing away clothing used during the time they were firing their weapons because of any residual gunpowder left on the clothing. Those garments ended up in 20 different rest area garbage cans in 15 states. They also washed their cars off, including an under rinse, and detailed the interiors to rid the vehicles of any soil or debris dragged into them from the environment around the Metcalf substation. They used their drive time to hone their cover stories for where they were over the last five days, and what they had done. There was no evidence left behind.

PG&E employees worked hard through the rest of the morning of March 16, 2013, rerouting power and stabilizing the grid. A few nearby neighborhoods lost power, but most people in Silicon Valley woke up Sunday morning unaware that almost four million people were on the verge of losing electrical power for days. During the next couple months, more than \$15 million of damage was repaired at the Metcalf Substation and nearby infrastructure. The next three years PG&E put \$100 million into hardening the defensive features of all their substations, including Metcalf.

Archie Ricard was getting angrier and angrier that the lights of nearby San Jose continued to illuminate the early morning sky as he headed south. The news coverage on the attack was sparse, and by noon he realized they had not achieved their objective. He knew the substations would now be hardened and made more secure. He was still convinced the country's electrical grid was its Achilles' heel. He was more disgusted than ever with the hoards of procreating,

polluting, lazy, meat-eating, mouth-breathing morons who were consuming all the Earth's resources and choking nature to death. The idiots were causing the sixth great extinction, and they were so damn stupid all they could think about was wanting more, more, more. Archie hit his steering wheel in anger and screamed inside his Jeep. The next time won't be a trial run, he thought. We should have hit multiple substations; they just re-routed around Metcalf. Shit!

DRAFT

Wednesday, January 19, 2028, Atomic Garage

THE FOUR EMROD EMPLOYEES HANK BOUDREAUX BROUGHT ALONG TURNED OUT TO BE A GOLD MINE OF INFORMATION AND ASSISTANCE. The afternoon of their arrival, they started by touring the Atomic Garage with Amy. They were impressed with the M-LFTR-VI nuclear reactor being assembled, watched one of the new Copenhagen Atomics' salt loops operating with fascination, and noted how advanced the comprehensive artificial intelligence system developed by Harshil was. It included predictive analysis, defect detection, chat bots, machine learning, deep learning, and web scraping. The four knew they were observing a modern, advanced lab based on the industrial internet of things. They would have liked to explore and experiment with the smart factory 3-D printing system if time allowed. The extensive chemistry lab was out of their areas of expertise, but they appreciated the depth of advanced work going on in that lab. If Sartorium lived up to its potential, this lab may be a museum in the future.

The Emrod group got a kick out of the Fictional Table of Elements hanging over the chemistry lab when they noticed Sartorium was taped on as the last element. They couldn't help but point at the poster of Raquel Welch from the 1967 movie *One Million Years B.C.* but with the below text, "Marie Curie, two-time Nobel Prize Winner." There was also a poster of Elon Musk with an image of Mars and some kind of settlement on the planet's surface in the background. The message below that image was, "I'd like to die on Mars, just not on impact." Amy waved it all off as "Sick Atomic Garage humor." The only women among the four from New Zealand

smiled and nodded her agreement. And of course, they gave the dogs, Proton and Neutron, plenty of attention.

But what captured the group's attention the most was Amy. She seemed to immediately grasp their accomplishments, problems, and theories related to the atmospheric transmission of energy. The group soon stopped thinking how young she looked and started thinking about how gifted and delightful she was. Her questions got right to the nub of the issues they brought up. She seemed to grasp and appreciate the solutions they had arrived at for the stubborn problems that had stumped them for months at a time over the years. And her explanations of the work going on in the Atomic Garage were fascinating and awe inspiring. They were all in.

The Emrod crew was up at sunrise, bundled up against the brisk winter morning, and setting up their equipment for the first demonstration. At least there was no snow on the ground, even if fingers were turning numb when exposed to the air to handle a tool or make an adjustment that a gloved hand could not maneuver. The transmitter was set up on the north side of the Atomic Garage's west parking lot. The transmitter would draw power from one of the big propane 150Kw Kohler generators that sat on the Atomic Garage's north wall. A relay rectenna was put in the middle of the parking lot. The receiving rectenna was set up on the south end. The distance would be about 200 feet, a little more than half a football field in length. It was a standard test that the Emrod engineers had done many times before. Amy and Harshil wanted to see it operate and establish a baseline performance data set. Harshil had written a quick program to capture the data from the Emrod diagnostic system and put that data into his own metrics. Amy had the second of two operating Copenhagen Atomic's salt loops that the Atomic Garage owned set up under the receiving rectenna. She wondered if they could pull power out of the air long enough to melt the fluorides in the loop and get through one experiment—about a

three-hour duration. She also had Harshil place two drones north and south of the midpoint relay, where the energy beams would be traveling over. Then, he programmed those two drones to elevate and descend through the beam randomly over the three-hour time frame. When one of the Emrod employees saw that addition to the protocol, he laughed and said to his colleagues, “Well, looks like the moment of truth has arrived. Have we ever run the beam this long with objects flying through it without crashing and burning?”

“Nope. Today would be a good time for the first time,” declared Laura Dankworth, the only woman on the Emrod team on this trip. “We didn’t have time to do anything but pack up everything for this sortie.”

“Or did you mean to say soiree? So far I think this has been fun,” one of the men said.

“It would have been nice to do a little more testing in our own lab before freezing our arses off in a Michigan parking lot, in the middle of winter, with an untested software safety patch, and literally our whole future in the balance,” Laura reminded everyone. “The last 48 hours have felt as if we were called up for a special forces mission. But I am very impressed with Amy and Harshil, and feel confident we solved the problem of frying objects that pass through our energy beam. We shall know soon enough.”

Hank Boudreaux looked on, standing next to Bob James and Stew Grassley on the west side of the parking lot. With the sun higher in the sky, the thermal energy was making being outside more comfortable. Stew, Harshil, and Amy were helping the Emrod crew set up. And Joline was exiting the side door of the Atomic Garage to watch the beginning of the demonstration. Hank was taking it all in. He noted that several people had addressed Joline as mayor. It occurred to him that he didn’t think of her as the town’s mayor. That was probably because she made the job seem natural.

Hank kept thinking about what he had experienced the day before. He had arrived at the Atomic Garage mid afternoon expecting to have a discussion with this little rag-tag team and lay down the rules for how they might work together. His first surprise was the amazingly in-depth security protocol they were put through. It reminded him of getting onto the property of a nuclear plant or a US Air Force Base. Finally, two of the Atomic Garage's security people drove the truck and the rental SUV past the gate and into the parking lot. Hank and the Emrod crew walked in behind them. Hank noticed the name tag of the woman in charge; it read Ann, Head of Security, Atomic Garage. Ann took the keys from the drivers after the vehicles were parked.

As Hank walked past the security gate and into the parking lot, an athletic-looking woman, lean but strong, about 5 feet, 10 inches tall, with thick, glistening, sandy-colored hair pulled back in a ponytail walked toward him. She had crystal blue eyes, and it seemed to Hank that an aura of curiosity and intelligence surrounded her. He felt more than witnessed being rapidly evaluated by her. Amy reminded Hank of a younger version of Rhonda Mattingly. Amy put her safety glasses in a hard hat, which she held at her side. She offered her hand and said, "Hello Mr. Boudreaux, my name is Amy Austin. Welcome to the Atomic Garage."

"I've heard a lot about you, Amy. It's a privilege to finally meet you and to see the famous Atomic Garage," Hank said.

"Thank you. I am not sure why you're doing this, but I want to be fully transparent and direct with you. Are you good with that?" Amy asked.

"I am good with that, ma'am."

"Good. So, you're in our garage now, which is no small accomplishment, I'm informed," Amy reported.

"I can confirm that report," Hank laughed.

“Which means, Mr. Boudreaux, we call the shots.”

“Please, call me Hank.”

“Not just yet, Boudreaux is much more fun to pronounce than Hank. First, I want to get to know the crew you brought along from Emrod a little bit. Ann is doing background research and ID verifications for each of them as we speak. We’ve already done so on you, as you have on us, I am sure. Tomorrow, we’ll do some basic testing on this stuff you flew over from New Zealand. We’ll use the rest of today and tonight to get set up for that. I need to see for myself that this technology is for real before we get into the details of what’s next. If it doesn’t work, you can pack it all right back up and leave,” Amy explained.

“I just hauled all this stuff from New Zealand, to Algonquin, Michigan, for you. Aren’t you the least bit interested in why?” Hank asked.

“I am curious,” Amy confirmed. “And all of us are very grateful, but we’re also very short on time. If this stuff doesn’t work, why talk about it?”

“Fair enough then, Amy. Let’s get this pile of science-fiction stuff unpacked and stop wasting time.”

“Okay!” Amy concurred. “And Mr. Boudreaux, either way that the testing goes, thank you for doing this. We really need long-range wireless transmission if we’re going to supply energy to emerging economies.”

“It seemed to work when I was at their facility in New Zealand,” Hank reported.

“Well if they were faking it, could you have told the difference?” Amy inquired.

“Nope.”

“We’ll be able to tell if it’s the real deal, if they’re exaggerating, or even if they’re holding back their capabilities,” Amy said. “Then we’ll need to have a talk. But not before.”

“Trust but verify, huh,” Hank reflected.

“Just the last part, Mr. Bourdreaux.”

“From the mouth of babes,” Hank replied with a smirk and head nod. “Let’s get at it, young lady.”

The first test was a simple transmission over a short distance. One of the Emrod techs explained the experiment to the small group as they stood out in the cold, breezy parking lot of the Atomic Garage.

“The transmitters, relays, and receivers are rectifying antennas called rectennas. The transmitting rectenna is drawing its power from the Kohler generator in the form of a spectrum that is like a Wi-Fi or Bluetooth frequency, and then sends microwaves of electricity in a tight-focused beam to the relay in the middle of the parking lot. The relay then sends those power beams to the receiver on the parking lot’s south side. The receiver converts the microwaves back into electrical power to operate the molten salt loop test equipment.”

Bob James asked, “How do you keep from zapping a bird or airplane that might fly through that beam?”

“That has been a challenge, but I think we’ve found solutions,” the Emrod tech replied. Tiny lasers monitor any obstructions coming between the rectennas and turn off, the beams being interrupted. It happens fast, so a bird, or a plane, or even a bullet could go through it and never even know it was there.”

“What about radiation? Is that beam radioactive?” Joline asked.

“It is, just slightly. But it leaves no residual radiation behind after it’s turned off and it doesn’t dissipate. It doesn’t spray like a cell phone tower. The transmission is tightly focused, so it sheds no radiation,” the Emrod tech explained.

The generator was started. Within a minute, the power light on the salt loop turned green, as the fluoride inside started the melting process. Very anticlimactic. A few minutes later, the drone on the north side of the relay rectenna flew through the beam. It lifted up 20 feet and set down again, and seconds later it lifted up to the approximate level of the beam and flew back and forth, north and south within it. Then the drone on the relay's other side did the same thing.

Harshil reported, "No damage to report, our onboard sensor didn't even pick up a surge of any kind. Very impressive."

With the atmospheric power transmission test underway, Amy walked up to the small group gathered on the west boundary of the cold parking lot and asked Harshil and her dad to join them. The only evidence of the test proceeding was the hum of the generator on the Atomic Garage's north side, and the drones going up and down and back and forth in the parking lot.

Amy said, "Mr. Boudreaux, this looks promising. The energy transmission is highly efficient and, at first glance, seems safer than using power lines. Extending the distance is the next step, but from a technical standpoint that should not be a big deal. On our website, we stated we were hoping for a distance of 10k surface transmission. That seems doable at the moment, considering these guys are preparing for a test with the European Space Agency on sending energy from outer space to Earth's surface. So, now tell us, why are you helping us when your history is tied to oil and natural gas, and when you've been part of a group of organizations in your industry funding TES and antinuclear groups over the years?"

"I am in the industrial transportation business," Hank explained. "A lot of my clients are in the fossil-fuel business, and I am a stockholder in some of those businesses. Most of us stopped funding environmental groups many years ago, I think around 2015 we finally stopped with that nonsense."

“Still, you were part of the effort to set nuclear energy back decades by opposing it over many years, and why? So you could make more money using fossil fuels?” Bob James challenged.

“Of course we wanted to make money,” Hank confirmed. “But it was more complex than that. You don’t need a lecture from me on this country’s history of energy. Today, we have mutual interests. The planets are aligned. We think there is a window of opportunity being presented for a paradigm shift in energy production and distribution. I am here to talk to you about that future.”

“What do you want from us?” Frank asked.

“Look, we hired a number of intelligent scientists who have been poring over your open-source materials for months. They’re telling us you guys are for real. No doubt the Chinese along with every other advanced economy country is doing the same thing. My people tell me that your little group is arguably one of the top nuclear energy innovators in the world right now. I don’t know how that happened, but there it is. Still, your concepts are mostly on paper, inside artificial intelligence silicon chips, or in this young lady’s and young man’s heads,” Hank said as he pointed at Amy and then Harshil. “If you want to make all this a reality while the opportunity presents itself, you’re going to need my team.”

“Why would we need your help? Seems you showed up once the hard technical problems have been worked out,” Joline interrupted.

“Would you be the mayor of Algonquin by any chance?” Hank inquired.

“I am in fact, and this is my husband, Stew. A retired nuke guy. Our titles at the Atomic Garage are aunt and uncle,” Joline explained.

“Ahh, I am starting to understand the dynamics of this place a little better,” Hank revealed. “I’ll get right at it then. My partners and I want to be your first customer. You’ve got some very low estimates out there for how much one of your new reactors will cost, at \$10 million each. Nobody believes that is a real number. That’s the same projected cost of Oklo’s Aurora micro-reactor, and your M-LFTR-VI will put out almost 10 times more power than the Aurora. After that, you’re saying about \$500,000 per year to maintain and operate each unit because your system requires no onsite personnel. Oklo is projecting \$3 million per year.”

Boudreaux continued, “A lot of Wall Street types looking at these financial projections don’t believe Oklo’s numbers. And they sure as hell think your project is total science fiction. But the reason they think that is they have a big stake in the status quo. And they don’t understand advanced fission chemistry, the properties of your new alloy, Sartorium, or the stuff going on in this parking lot right now.”

“But your scientists and bean counters think our financial projections for costs are realistic, don’t they, Mr. Boudreaux?” Harshil added.

“They sure do,” Hank confirmed. “Y’all are about to make nuclear energy safe and very affordable. That realization hit us like a clap of thunder. What we think is coming out of this little Atomic Garage of yours will one day be looked on as the biggest transformational advance in energy technology in 250 years. So, my partners and I would like to put in an order for 1,000 of the M-LFTR-VI at a price of \$10 million each. That’s \$10 billion. We don’t want to go over budget. We’re ready to pay \$2 billion now and work out delivery times, but we want it all done in five years. We’re not asking for an exclusive, but we also want to be a 10-percent minority partner in your business and have a seat on your board. Plus we’re going to need that

atmospheric power transmission thing-a-ma-jig to work too,” Hank said as he pointed at the relay rectenna in the parking lot.

“Mr. Boudreaux, the nuclear regulatory process doesn’t work that way,” Joline said.

“Ma’am, I’ve come to believe it doesn’t work at all. If you wait for that process, we’ll be using Chinese reactors before they approve your reactor,” Hank predicted. “You’ll most likely have to go to another country to test your reactor with nuclear fuel. I know you know that. With your data and an investment partner absorbing the financial risk, Africa, India, Indonesia, a South American country, or maybe an eastern European country will agree to be your host and likely provide you with nuclear fuel. Finland might want to put it on a ship and transmit power from a harbor, who knows?”

“Putting reactors on ships or barges and moving them wherever the need for energy is at a specific time is a common-sense way of maximizing the advantages of nuclear power,” Stew opined.

“Yep, the possibilities seem endless,” Hank went on. “Except in the United States, where the potential seems extremely limited. I never thought I’d live to see our country whimpering at taking risks. As good as our national labs are, the testing you need to do isn’t going to happen in this regulatory environment in the next 15 years. And your stuff is ready to go now, according to what I am told. Our national labs can only work with NRC-approved plans for new reactors. Think 10 years and hundreds of thousands of pages of documentation and forms, about \$1 billion for NRC-related fees.”

“And the NRC is seriously listening to that kook, McMullen from TES, who’s calling our new Sartorium alloy impossible; he calls it unobtainium,” Bob James grunted.

Frank spoke up, “Amy, based on our artificial intelligence faux nuclear fuel performance data, full temperature molten salt loop test, and thermodynamic performance, on a scale of one to 10, how confident are you that the M-LFTR-VI will work when we finally test with nuclear fuel?”

“I’d give that an eight,” Amy immediately responded to her father’s question. “We have to test the early prototypes with nuclear fuel. We’ll always learn something in actual practice that a simulation can’t predict, not only how to lower operating risk factors but to improve production.”

“Amy, let’s say there are needed fixes once we test with nuclear fuel. On a scale of one to 10, how likely are those needed fixes on the reactor’s physical structure compared to the chemical composition, timing factors, or other non-physical technical applications?” Hank posed.

“Now phrased that way, my confidence goes to almost 10,” Amy reported. “A few samples of Sartorium were saturated with neutrons at Idaho National Labs in a small test not too long ago and successfully withstood excess neutron bombardment without experiencing any degradation. Those tests matched our AI simulations. From our test here with the salt loop, we know it doesn’t corrode in fluorides and can transmit or reflect heat up to at least 900 degrees Centigrade, about 1,600 degrees fahrenheit. I think it’s even greater than that. Because we operate in just one atmosphere of pressure, and our advanced thermodynamics eliminate the need for most of the pumps and extra pipes, I would think any surprises in testing will occur with the non-physical elements of the scheme.”

“So my team poses the question, why not build the infrastructure for producing the M-LFTR-VI, before the live test?” Hank asked.

Joline voiced everyone's first reaction, "That would be a huge risk. What if we build a small factory, manufacture the reactors, and then don't get regulatory approval in a reasonable amount of time to fuel them? We'd be sitting there with no nuclear fuel to load into the cartridges."

"Build them here, fuel them there, wherever that is?" Harshil guessed.

"That's what we're thinking. Keep manufacturing in the heartland until the politicians acquire some brain cells. Without nuclear fuel onsite, the factory would be no more of interest to anyone than a place that makes office furniture," Boudreaux reasoned.

"For many reasons, I'd much prefer to test the prototypes, with live fuel, right here in the Atomic Garage," Amy said. "We can work much faster than within the confines of a quasi-government laboratory. Once we have the chemical engineering standardized and demonstrated as effective and safe, we can take that formula to a national lab with a rush order for broader testing and verification of our results."

"And there, my friends, is the gap we must find a way to span," Hank sighed. "The crux of the issue. We can't get from point A to point B with a new reactor design in less than 15 to 20 years under current regulations."

"Western economies have a serious case of energy anorexia right now," Bob James said. "War could break out in about 10 different places on the globe tomorrow over fossil-fuel access. Climate apocalypse predictions have bred more instances of destructive or violent protest against almost any energy production. And still the NRC moves like a glacier. Just last week, some eco-terrorist in Canada tried to shut down a mine there to acquire materials for wind turbines. They shot out all the tires of the heavy equipment and took the mine out of production for at least three months."

“Things are going crazy. Are we the only ones with any sense of urgency? People don’t like it when their power is turned off. We’re at that juncture now. That’s why I am here,” Hank claimed.

“I agree, no government on Earth is going to let us test this device nearly as fast as the public’s patience is running out,” Amy concurred. “Governments and their institutions are okay with incremental progress, but a technological leap in energy production will not be allowed.”

“I tend to agree as well,” Stew admitted. “Abundant kinetic energy favors freedom. The western democracies and the totalitarian regimes alike don’t really want unlimited, reliable, inexpensive, and clean energy because political power and control would quickly decentralize and then largely evaporate. Jack Kennedy’s administration thought the same thing back in the 1960s, and a number of think tanks have come to the same conclusion that only varies in degree.”

Frank spoke up, “Mr. Boudreaux, thank you for all the trouble of coming here and your offer. You’ve given us a lot to think about. When do you want an answer on our decision?”

“Ten days,” Hank exclaimed. “Right now, it takes more than \$1 billion and about 10 years to just apply to the NRC for permission to build a nuclear reactor and its facility. Everyone here knows we need to build hundreds of thousands of them starting yesterday.”

“The feeling of urgency we have is not just coming from fear of a professed climate change apocalypse,” Harshil added. “China and, to a lesser extent, Russia are exporting nuclear energy to Africa to build 100-year relationships with those countries. They’re going to control almost all of the planet’s inputs to build the world’s future energy infrastructure because they control all of the rare earth minerals needed for batteries, solar panels, and wind turbines. And in the near future they’re going to dominate nuclear energy.”

A loud snap sound came from behind the group as one of the drones hit the pavement. “Harshil, what do you think happens when the beam is encroached at exactly the same level and same time on both sides of a relay?” Amy asked.

“Apparently one of Harshil’s drones gets fried,” Harshil said with a shrug.

“Mr. Boudreaux, this is not a setback,” Amy assured. “The team from Emrod anticipated this. They’re using their older software now at Harshil’s suggestion. He wanted to see the data set the old safety system was failing under. We’ll reset and try the same thing with their new software, which I think is going to work. Then we’ll fully understand what the problem was and how they fixed it.”

As Amy and Harshil headed back to the center of the parking lot to examine the destroyed drone, Becky caught up with them as she exited the west side of the Atomic Garage. She spent a moment talking to them and shared a laugh together. Then she headed to the north side of the parking lot where the rest of the group was talking. Becky interrupted, “Mr. Boudreaux, what are your plans for this evening?”

“Please, just call me, Hank,” he said as he turned to her. “I don’t have any plans as of now. I am staying with Rhonda Mattingly of Chelsea Resources fame. Long story, but I consider her a niece; we’re family like yours here, I suppose.”

“She can’t live far from here,” Becky reasoned. “Chelsea’s corporate headquarters is about a 30-minute drive. Why don’t both of you plan on joining us for dinner this evening? Say 6 p.m.”

“Thank you, Becky, I’d like that. I am sure Rhonda will be delighted by the invitation,” Hank replied.

“And now I have a little surprise announcement for everyone,” Becket announced. “I got a call about an hour ago from Josh Manning as I was trying to head over here from the house. He and his friend, Shanta, are in Ann Arbor for a concert tomorrow. At her urging, they would like to tour the Atomic Garage with Amy this afternoon, in the spirit of understanding Amy’s perspective on nuclear energy better. I think Shanta may be a closet nuke.”

Bob James laughed, “I’ll be damned. What did Amy say to that?”

“I just told her, and she said yes, of course,” Becky replied. “She’s a Shanta groupie, who knew? They’re on the way here now. Apparently Amy and Shanta have already communicated with each other. And I made Shanta promise me that Josh and she would stay for dinner.”

“You are the queen of hospitality and diplomacy, my dear,” Frank chuckled.

“You know, I once was asked if I could go back in history for a dinner, who would I want it with?” Bob James reminisced. “I picked the 1804 dinner with Thomas Jefferson when he hosted Meriwether Lewis and William Clark just before they headed out to locate a northwest passage to the west coast. The western United States back then was still up for grabs. Jefferson had just closed the deal on the Louisiana Purchase and desperately wanted to find a northwest passage, and get our flag on the hill out there quickly. They even speculated there may still be prehistoric creatures roaming around the west. Tonight’s dinner may top that one.”

“Hey, Bob, I was at that dinner if you want to know more about it,” Hank confessed. Everyone laughed.

“Ahh, well apparently there will be a nice balance of hope and experience represented at tonight’s table,” Bob responded.

“No shop talk guys. Let’s all just get to know one another,” Becky requested. “I am looking forward to a delightful evening. And I know Amy is really excited to meet Shanta. Let’s not ruin that experience for her.”

“And there in the distant background will be the quiet cooling tower of The Rock, powering the whole region, while we share cheese and wine with TES’s spokesperson who is trying to shut it down,” Bob said.

“It will be a lovely evening. Let me head back to Rhonda’s, and we’ll be back here around 6 p.m. then. And thank you again for the invitation,” Hank said.

Josh hired a driver who showed up with a comfortable Lincoln Nautilus for the short trek to Algonquin from Ann Arbor. Shanta was wrapping up a phone conversation as the barren brown, slightly rolling fields of central Michigan’s winter countryside spread out as far as the eye could see. Josh’s phone chimed. “Hey Carson, what’s up?”

“Where are you?” Carson McMullen asked.

“I took a few days off from the shoot in New Mexico. I am with Shanta in Ann Arbor, Michigan. A few of her new songs are going to be debuted tomorrow here by Ryan Hurd and Maren Morris,” Josh explained.

“That’s cool. Those two are great performers. I am sure they’ll do Shanta’s lyrics justice. Offer her my congratulations.”

“I hear you, Carson. Thank you,” Shanta raised her voice in the background.

“Let’s stay on a roll, I’ve got more good news,” Carson announced.

“Let’s have it, the world seems to be unraveling, so we’ll take all the good news we can get,” Josh said as he raised his eyebrows at Shanta in anticipation of Carson’s news.

“I just heard that tomorrow the NRC is going to announce a decision on the application for renewal of the Rocky Point’s operating license and switching the reactor to MOX fuel. They’re going to deny it.”

“Are you sure, Carson? They were pretty much going to rubber stamp that application,” Josh reminded him.

“Got the info from a reliable source. I guess those chronic tritium leaks stuck in their craw. At any rate, it looks like another victory for the good guys, Josh. Just wanted you to be the first to know.”

“Thanks Carson, that is great news. I appreciate the heads up.” He disconnected and looked up at Shanta.

“I heard,” Shanta said. “I find it interesting you didn’t tell him we were headed to Algonquin to meet the Austins, tour the Atomic Garage, and have dinner.”

“Dinner, huh? I didn’t recall that on the schedule,” Josh said.

“I took care of everything. Just go for the ride.”

“You’re the boss. I didn’t tell Carson we were headed back to Algonquin because he would get pissed off. Why ruin his day? It’s just a bit of a cease fire that came highly recommended by someone I love and respect. Besides, it’s nice to be able to disagree with people and maintain some level of civility,” Josh reflected.

“Hmm, so you’re all in on civility in the security of victory,” Shanta philosophized. “But right now you don’t look like a shining knight who just slayed the dragon.”

“Hmm, why is that?” Josh asked. “Let’s keep this news to ourselves today. Truth be known, something just doesn’t feel right about this one.”

“Trust your gut, and follow your heart, baby. I am a big believer that things happen for a reason,” Shanta advised.

DRAFT

THE LINCOLN CHAUFFEUR PULLED UP TO THE MAIN DRIVEWAY ENTRANCE OF THE AUSTIN PROPERTY. He identified himself and held up his driver's license to the camera as instructed. The cast-iron gate with the Atomic Garage logo in the middle swung open. The Austins' inviting home looked down at the old two-lane Blue Star Highway that ran east-west across the southern boundary of their 350-acre property, about four football fields away from the entrance. The house architecture was in the genre of a small ski lodge, a substantial but tasteful presence on the hill. It complemented rather than competed with the environment around it—the result of working with one of the state's top landscape architectural firms. The spacious views over the Odina Valley to the north would have to wait until after the Atomic Garage tour, which Shanta set up with Becky Austin. Becky had texted Shanta back that Amy was thrilled she was coming and looking forward to the visit. It was decided Amy would be Shanta's and Josh's guide in showing off the Atomic Garage. The three would be left alone as an opportunity to get to know one another better. Then Amy would bring them to the house to meet the rest of the guests.

“Someday, my love, we'll laugh at how you set up a tour of a pole barn in central Michigan, during the winter, with a 19-year-old giddy, sci-fi hobbyist as a guide. Do you think the barn we're touring is heated?” Josh half kidded as he glanced out the windows of the Lincoln.

“It smells as if they have the old cast-iron wood stove all stoked up; it should be fine,” Shanta smiled.

The south-facing windows and large covered front entrance of the Austin's home glowed in the distance with soft lights as the late afternoon winter dusk encroached. It was a gloomy

symptom caused by the warmer waters of Lake Michigan to the west, producing low-lying clouds that darkened the winter skies of central and southern Michigan for days at a time. A snow storm was within the range of possibility. A slight aroma of wood burning whiffed over Josh and Shanta when the car window was rolled down at the gate, confirming Shanta's suspicion of woodsmoke in the air. The Atomic Garage was back in the trees west of the house. It was barely visible from the driveway entrance. After entering the property, about 50 yards inside the gate, a fork in the driveway presented a tastefully designed wood sign. One arrow pointed to the northeast fork and had an image of a house. Another arrow pointed to the northwest fork and had a logo of the Atomic Garage.

Josh, Shanta, and their driver were unaware they had just moved through three rings of intense security managed from a large mobile office trailer, which housed the equipment and personnel of Derek Gifford's Michigan Wolverine VIP Security. The trailer was tucked into the woods off the western egress to the property. The driver's company and his personal background were previously checked out. The Lincoln was tracked starting over a mile out by two drones looking for accomplices and additional heat signatures in the car. Thermal scans from the drones also searched the surrounding area for any humans on foot. And two canine security personnel with Belgian Malinois dogs were patrolling the perimeter of the property around the house and the Atomic Garage. The dogs were an additional level of security this evening in light of the number of expected special guests. Amy, unaware of the level of intensity of the global media coverage still focused on her, was still a clickbait story in the daily news around an energy-starved globe. And therefore, she remained a physical target for the paparazzi, opportunists, manipulators, grifters, psychopaths, and whole hosts of vainglorious politicians and

bureaucrats. But other than the security personnel, three deer, and about eight unknown small critters, there were no unaccounted warm bodies near the property line of the Austins' campus.

Once the Lincoln entered the property, the driver headed up the northwest fork as instructed and into a parking lot that could accommodate about 12 cars. The southern end of a larger parking lot was visible on the building's west side. It had its own access from Red Arrow Highway, which was a quarter of a mile west of the Atomic Garage. The Red Arrow ran from downtown Algonquin, about four miles to the south, past the Austins' long west property line running south to north, and past the front of The Arrowhead Cafe & Grill, two miles north of the Austins'. The highway then curved around The Arrow sign, which is why the locals referred to their favorite breakfast and lunch haunt, simply as, The Arrow. The road then headed north over the old steel-truss bridge that spanned the east-west running Odina River. Three miles later, it veered east again and passed the North Rocky Point Nuclear Power Station, which resided on the north bank of the Odina River. The Rock rested on a bluff 150 feet above the river looking south at the 25,000-acre Odina State Park. The Austins' front porch looked north at the same park sandwiched between them, and the far off signature of The Rock's steam-producing cooling tower.

Josh and Shanta entered a transition room at the Atomic Garage, which was its unofficial front door, even though the Austins entered it everyday from the east door, which was closest to their home. A wide asphalt sidewalk connected the garage to the house. In the summer, that 200-yard walk would teem with plants and flowers. In the winter, there were numerous pieces of metal garden sculptures left out along that route, put there by Amy and Becky over the years. Amy called them her special perennials. An EZGO, Express L6, inferno red golf cart was

available for moving guests or supplies between the house and the garage, but the Austins usually enjoyed the walk at any time of the year.

Josh and Shanta went quickly through the security screening device at the Atomic Garage's south entrance without a second thought, as their driver was checked out in the parking lot. The security detail observed the driver for any telltale signs he was carrying a weapon via how he moved, what he did with his hands, and how his clothing hung. Second nature. They then got closer and used a hand wand to check him for weapons or explosives. Once determined to be clean, he was taken to a small guard post located at the southwest corner of the small parking lot. The room was equipped with a full bathroom, an 85-inch flat screen TV, headsets, recliners, big soft blankets, stocked non-alcoholic fridge, a big basket of generous snacks and fresh fruits, and high-speed internet to enjoy the evening while he waited for his clients. In a pinch, it could be used as an extra guest house. The driver was given a cell number to text if he needed anything. If he left the room for any reason, a silent alarm would go off and he would be carefully monitored. The car was more thoroughly checked for weapons, explosives, and tracking devices after it was parked away from the Atomic Garage. Two security personnel stayed posted just outside the south and west entrance to the Atomic Garage respectively to get to Amy quickly if need be. They had come to regard her as a kind, immensely intelligent, and determined warrior for her cause. She was a national treasure in their minds, and they would protect her as such.

Josh followed Shanta into the main area of the Atomic Garage. They were in awe of what was before them. Josh was shooting a science-fiction thriller about a team on Mars, in New Mexico, but the set there had nothing over the real-life lab spread out before them.

"Holy shit, Josh, I had no idea," Shanta exclaimed.

“It seems they cleaned up the cow manure, and it’s heated as well,” Josh pointed out. Shanta laughed.

Amy walked up and immediately got a big hug from Shanta. “Amy, thank you so much for doing this. It’s so nice to finally meet you,” Shanta said, as she was struck by the realization that Amy really was a very young woman.

“I am a huge fan of yours. HUGE. It’s so cool that you came; I am just thrilled you’re here,” Amy gushed. Then she threw her arm around Shanta, turned, and walked her further into the facility leaving Josh in the background. Josh looked on in disbelief. Then both women turned and laughed hysterically.

Realizing the little gag had been pre-staged, Josh could do nothing but laugh. “I was about to say, what am I chopped liver?”

“Not at all. You’re a very welcomed guest, and I am so happy you asked Shanta to set this visit up,” Amy ribbed him. Shanta shook her head and laughed; both women knew Josh had absolutely nothing to do with today’s visit.

“Well, will we need to put on radiation-proof hazmat suits?” Josh said half jokingly.

“No. You’ll be fine. You’ll glow for a few days, but it’s nothing to be concerned about,” Amy kidded.

Enough with the radiation jokes, she could tell Josh was slightly uneasy and reminded herself that he believed nuclear energy was dangerous. He’s brave just to be here in light of the information he takes as factual about radiation, even though no radioactive materials were on site. Yet, Amy thought.

“Spread out before you is our 10,000-square-foot facility. We’re in the recreation area, which includes a full kitchen, flat screen, pool table, and beds for Proton and Neutron, our two

rescued greyhound dogs that usually nap while we work. As we enter to the right, you'll see our computer systems, which includes artificial intelligence, machine learning, algorithm sequencing, sensor controls, simulations, research archives, project notes, and reactor and plant operating software. We also control our Additive Manufacturing processes from there; that's 3-D printing. Those devices are just around the corner behind this module. Did you know that was a \$30 billion per year business now? We're making all the smaller parts and the molds we need using that equipment. We'll actually be able to manufacture some copies of our reactor right here using 3-D printing rather than just build a prototype. Our strategy is to design in a manner that will make it easier for others to simply copy us using the same tools to build their copy of our advanced reactor. That way, we can design affordably."

"Give me an example of what you mean by that, Amy," Shanta asked.

"Sounds like a pizza franchise, Amy," Josh laughed.

"That actually is a good analogy," Amy confirmed.

"It looks like a mini SpaceX Flight Control Center in here," Josh pointed out as he continued to be overwhelmed by the visual stimulus of so much high-tech equipment. "I visited the one they use at Cape Canaveral in Florida to prepare for the sci-fi film we're shooting now."

"What's the sci-fi movie about?" Amy asked.

"It's called, Origin IV, about a team of detectives on Mars checking out claims that an ancient civilization was there at about the same time the Pyramids were going up on Earth," Josh explained. "The advanced math and engineering behind those ancient Egyptian structures match ruins found on Mars. When they discovered mummies in a Martian cave they called in a special intergalactic investigative team. Of course, everything goes wrong; civilization itself is in jeopardy and the clock is ticking. It's actually a pretty good script."

“Wow, and what does the intergalactic team conclude?” Amy asked with great interest.

“You’ll have to see the movie. To be honest, they’re editing the script again, so I don’t even know the answer to that question yet,” Josh admitted. “As Kevin Costner says, ‘It’s Hollywood, we make up everything as we go.’”

Amy, Josh, and Shanta walked over to the shop’s west side.

“This is our chemistry and materials lab,” Amy said as she gestured at the area like a tour guide. “In addition to producing Sartorium here, we also mix the fluorides and other metals that will be melted in the reactor core. Sartorium is a new alloy we are using to build the reactor’s physical structure. It isn’t widely known yet, but its properties will lower the cost of nuclear energy to a point it’s cheaper than all alternatives. Basically, it allows us to take full advantage of the enormous heat our reactor creates.”

“What’s this, Amy?” Shanta asked.

“That’s one of our Copenhagen Atomic salt loop testers; it’s like a mini nuclear reactor without the fuel. The other one we own is in the west parking lot for a test we’re conducting on electronic atmospheric transmission. And we retired one, which is now an Oberon ale refrigerator back in the kitchen.”

“Now that atmospheric transmission sounds like sci-fi to me,” Shanta responded.

“You’d think so, but it’s the real deal,” Amy assured. “And it seems much farther along than the public would believe. We’re testing it successfully so far. All that computer stuff we just looked at is directing and monitoring the equipment in the chemistry lab, the salt loops, and the 3-D manufacturing equipment. Even the atmospheric test out on the west parking lot. It’s the brain center for everything you see.”

“Not that though,” Josh said as he pointed to the garage’s northwest corner where a sea-foam-colored 1957 Chevy Bel Air was in a state of repair.

“Ah yes, the exception,” Amy said. “That’s Ann’s car. She is the head of our security team. She inherited the car from her father and is fixing it up. Take a look at that and think about the fact the United States was testing small, highly advanced nuclear reactors the year that car was made.”

“You know, there are very few cars on the road from the 1960s, 70s, and 80s, but that is when most of the currently operating nuclear plants were constructed,” Josh pointed out.

“Okay, but let’s keep them running,” Amy said. “Then look to the northeast corner of the shop and see the difference between a Gen VI nuclear reactor and the 57 Chevy. When I talk about nuclear, Josh, I am talking about Gen VI. But you’re thinking 57 Chevy.”

“Amy, did you hear I am introducing three of my new songs tomorrow night in Ann Arbor?” Shanta wisely changed the subject.

“I did, that’s so exciting. Congratulations. I hear they’re going to be played by Ryan Hurd and Maren Morris. You wrote a couple of their other hits, didn’t you?”

“Yes, I collaborated on them anyway. Why don’t you come to the concert; I’ll get you some backstage tickets, and you can join us in our suite,” Shanta suggested.

“Oh, I’d love that!” Amy squealed, trying to contain her excitement. “Can I bring someone? Harshil would love to see the concert too.”

“Of course. Is Harshil your partner?” Shanta asked.

“Huh, I’ve never been asked about him like that,” Amy confessed. “You know what, he’s my boyfriend. That’s the first time I’ve said that out loud. You’ll be meeting him shortly.”

Josh smiled at Shanta; he was starting to like Amy. She was all the things you'd expect of a strong personality, someone with a superior intellect and a passion for a mission. But she was also disarming, innocent, and curious, with a touch of naivety. And at 20 years old how could that be avoided? They walked quietly over to the garage's northeast corner where the first two full scale M-LFTR-VI reactors were being assembled. A small platform about 50 feet long with four robots, two on each side, waited to be activated.

"Amy, so this is your famous reactor?" Josh asked. A full color image of what it would look like completed was posted on the wall behind the manufacturing platform.

"As simply as possible, try to tell me how it works, and why you think it's safe? If you don't mind," Josh asked.

"I'd love to. First of all it's a she, not an it," Amy clarified.

"Gotcha, my apologies. Does she have a name other than M-Lifter-Six?" Josh asked.

"Not yet, we're working on that now. But here's the basics. Nuclear fuel is dense, meaning there is almost unlimited energy available to meet the world's needs. It's three million times more powerful than fossil fuels. We just needed a machine that could tap it all. People in the nuclear industry call these reactors breeders because they say they produce more fuel as they operate."

"Is that even possible?" Shanta gasped.

"Technically speaking, they are breeding different types of uranium and plutonium and feeding those fuels back into the core. Josh, I'll bet your science fiction movie script mentions the vehicles and the planetary outpost are powered by plutonium?" Amy guessed.

"It does indeed," Josh revealed. "How did you know?"

“Because plutonium is very energy dense. When we travel to Mars, we’re going to have to haul ass to keep the exposure to radiation in space to a minimum. Nuclear power can cut that travel time in half. Then small amounts of it can power various Mars orbiters, surface stations, life support systems, and ground transportation. You could hold plutonium—the size of a cue ball—in your hand and the radiation would be stopped by your skin. And it would be enough to power your high energy life for 100 years,” Amy explained.

“Well, that information is lightly explained in the script of the movie. Very interesting,” Josh admitted.

“Back to the breeding part. How does your new reactor make more fuel?” Shanta wanted to know.

“Personally, I don’t like the breeding metaphor,” Amy revealed. “It confuses people because it sounds unbelievable. Breeding sounds negative, a breeding ground of radiation, for example; the word opens nuclear energy to unfair scrutiny. What’s really happening is a nuclear chemical process that is taking place inside the reactor core. It’s just another way of saying a tank of nuclear fuel can last 20 to 30 years. Because we burn up almost all its stored energy. The big commercial reactors operating now only burn up about four percent of it.”

“Okay, I am with you so far,” Josh said.

“We get this improved efficiency because we melt the solid fuels in fluorides or metals like lead. That way, the melted fuels also become the way we transfer heat into thermal or electrical power. And the fuel is already melted down, not in solid form as it is now, so the concept of a meltdown becomes irrelevant. We also operate at one atmosphere, which we experience at sea level everyday. That’s possible because we don’t use water as a moderator or coolant. Most big nuclear reactors operating in the United States today are called Pressurized

Water Reactors. Just like cooks once used pressure cookers to keep water hot without boiling it, we do the same inside nuclear reactors. You've got to keep water pressurized to get it very hot without boiling."

"Can you give me an example, Amy? You're losing me here," Shanta admitted.

"Sure. Just think of the current nuclear reactors as a Duesenberg Model A car. Then think of our nuclear reactor as a SpaceX reusable rocket. It's a technological leap. For one, we don't use water, which means we can operate hotter, and at one atmosphere, meaning no pressurized systems are required. Proliferation risk is almost zero. The reactor size and weight go down to something you can lift with a fork truck or even a portable hydraulic dolly. The reactors run about 25 years before needing to be refueled, leave almost no waste behind, and what is left behind can be used in medicine or stored for a few hundred years before it's harmless again.

"And they're going to be cheap to build," Amy continued. "The difference between our beloved Rock nuclear plant and the M-LFTR-VI is truly a paradigm shift."

Josh walked up to the image of the completed reactor posted on the wall. "How much will it cost and how long until one of these is up and running?" Josh asked.

"You can fit ours in a small truck instead of a 40-foot shipping container," Amy divulged. "And it will cost \$10 million, with 10 megawatts of thermo power, about enough to power 10,000 homes. Or you can desalinate sea water, make hydrogen, aluminum, or ammonia for fuel or fertilizer.

"In a perfect world where technology was the only thing considered, we could have one of these working six months from now. And be manufacturing them in factories within a year to 18 months," Amy estimated.

“I know Generation IV reactors seem to be all the rage, but how many groups are working on this kind of stuff besides you guys?” Josh asked.

“You can go to the Third Ways Advanced Nuclear Map. Nearly 250 types of advanced nuclear reactors are under development around the world now,” Amy reported. “They’ve got them organized by location, type, national lab involvement, and even list contractors and funding sources. A full-blown nuclear renaissance is going on. But we’re still not at the factory production stage yet.”

“Why don’t we just shut down the old reactors and replace them with yours and the other advanced reactors?” Shanta asked.

“Well Josh disagrees, but the old reactors still are technological marvels, extremely safe, and it’s going to take a number of years to replace their CO₂-free energy production,” Amy reflected.

“Why not put this effort into fusion technology, which doesn’t require messing with radioactive materials?” Josh asked. “That seems a much superior form of nuclear energy.”

“We know fission well. It’s ready for prime time. Fusion at a commercial level is still decades away. And I am a big believer in fusion technology as a future energy source. But there really is no nuclear waste or nuclear energy as a proliferation-risk problem with fission. Those are imaginary political constructs. The only thing that keeps the world from realizing the availability of abundant clean energy, and what I think is our mutual vision for the planet, is fear,” Amy concluded.

Josh shook his head in acknowledgement as he thought about that. He then turned and looked around the Atomic Garage. He had to admit it was all very impressive. But still if there were lots of people as smart as Amy working on wind, solar, and energy storage technology,

those were safe sources of energy that could be built and put in service right now on a massive scale all over the world. He knew TES's experts would advise against going down a nuclear bunny trail regardless of how enticing.

The east door opened, and Becky entered. She approached the trio.

"Here's my mom, Becky. I think she's going to end the tour," Amy predicted.

"Josh, welcome back to Algonquin, and Shanta, it's so nice to meet you," Becky said as she gave Shanta a hug. "Amy and I have been listening to some of the beautiful and fun songs you have written."

"Do you ever go to the movies?" Josh deadpanned.

"Well, they come to us," Becky said. "And we loved your Best Actor Oscar performance in *Brady*." Everybody laughed.

"Josh, I want you to be aware that our guest list tonight includes Rhonda Mattingly, president of Chelsea Resources; Hank Boudreaux, president of Boudreaux EnergyX; Bob James, our board member and retired nuclear engineer; and our extended family, Stew and Joline Grassley, their two greyhounds, Proton and Neutron, and Harshil," Becky warned. "Oh yes, and four delightful technicians from Emrod out of New Zealand. Unusual circumstances centered on your debate with Amy brought us all together, so we're hoping for an enjoyable evening of getting to know each other."

"Sounds like an Agatha Christie script in the works," Josh laughed.

"Amy, if Josh doesn't behave we'll just duct tape and zip tie him," Shanta suggested.

"I'll be a perfect gentleman even if I am just acting," Josh promised.

"Coming from you, Josh, that is actually reassuring," Becky admitted. "Shall we head over? It's a short walk."

Five miles away, a slightly rusting, road-salt dusted, and tired looking 2008 white Jeep Cherokee with California plates crossed over the steel truss bridge heading north on Red Arrow highway.

DRAFT

PROTON AND NEUTRON FLASHED ACROSS THE AUSTINS' SNOW-COVERED, FENCED-IN BACKYARD. Two greyhound streaks of brindle and white with butterscotch patches markings shot by the patio leaving a floating wake of snow and pieces of frozen grass. The small group of impressed guests watched from the large fieldstone patio, as they sipped wine and hot cider. An extra large, dark steel, wood-burning fire pit was at full burn, making the patio area comfortable as dusk set in over the Odina Valley, better known now as the Odina State Park. Two 44-inch Blaze grills set on the west side of the patio, whirled away as the rotisseries slowly turned and cooked the succulent prime rib and turkey main course selections, mounds of grilled vegetables, and warming baked bread. The aroma aroused appetites and anticipation of a delicious experience.

The Rock's cooling tower, with its plume of steam and blinking aviation lights were clearly visible across the five-mile span to the north. The large dining room inside the floor-to-ceiling windows facing the patio was set for 12 guests and looked like an image in an upscale home magazine. The x-racing greyhounds, now middle-aged, were ending their short show of speed and agility before mixing with their new admirers on the patio. The greyhounds were, after all, retired and just running for the fun of it. Amy, Josh, Shanta, and Becky came up the west stairs onto the patio after the short walk from the Atomic Garage. Introductions were made. The group of charismatic and interesting guests, although some adversaries in their professional lives, had good social skills with appropriate filters, and within minutes were engaged in civil conversation interrupted only by soft laughter.

Becky stood up on the three-foot wall separating the patio from the backyard and got everyone's attention, "Thank you all for coming; dinner is served."

Becky and Joline had put name tags at the table where the guest would sit. Bob James was seated to the right of Josh Manning in the hopes the two would get to know each other on a more personal level. Shanta sat to Josh's left, with Amy next to her. Harshil sat across from Amy so he could participate in any conversations she got into and still engage with Hana, an engineer from Emrod. Frank and Becky each took an end. Hank Boudreaux and Rhonda Mattingly sat next to each other with Joline and Stew directly across the table. The other three Emrod employees were placed randomly. Good enough.

Becky tinkled the side of her crystal water glass for attention, "I've asked our friend Bob James to show thanks for this dinner and the blessing of having so many talented and caring people as our guests tonight by saying grace. Bob."

"Take hands. Dear Lord, thank you for the bounty we are about to share, for the comradery being forged here tonight with old friends and new, for giving us the wisdom and patience to practice empathy, to be open to new ideas and differing opinions, and to see our fast-changing world with new and insightful perspectives. Thank you also that we live in a time and place unique in human history where prosperity and peace have been achieved at levels never known before. Please give us the strength and wisdom to work together and play our small part in continuing to build a more peaceful and bountiful world for all your children and creatures. Amen."

"Amen," everyone said in unison.

After the platters and side dishes were passed and wine and water were refreshed around the table, Bob broke the ice with Josh. “Great job in that movie *Brady*. What’s this I read that you’re working on a sci-fi movie now? Would that explain the new beard you’re wearing?”

“Indeed it does. I was telling Amy about it. It takes place on Mars. Typical sci-fi plot, but the script is very well written. I think the characters have enough depth to make it a great story,” Josh revealed.

“Bob, Josh made a rare confession to Amy about a half hour ago. Those space vehicles in the movie he is shooting are powered by plutonium,” Shanta prodded.

Bob was about to say something, then smiled and stopped himself, “You know, Shanta, that’s just too rich. I am speechless.” They all laughed.

“Emrod is working with the European Space Agency and Airbus now in beaming solar energy from space down to Earth’s surface,” Harshil said.

“It’s true,” the female engineer from Emrod, Laura Dankworth, added. “Think of when communication went from wires to wireless. Electrical energy can follow that same type of development arc. It’s happening as we speak.”

“The more you look into developing technologies the more they seem to be further ahead than even science fiction portrays them,” Stew said.

“See how wise we are. We’ve naturally found common ground in our interest in transmitting electrical energy rather than its source. And that is a critical issue. We’ve got to be able to transmit energy more efficiently or it won’t matter how we produce it,” Frank offered.

As everyone settled in and learned about one another’s kids, careers, weather, college loyalties, and favorite books and movies, Shanta whispered, “Amy, you know you’ve been a big inspiration to me. I don’t know much about nuclear energy, but you sure got my curiosity up. So

I've studied it a little more. I haven't told Josh because I wanted to learn my own way, at my own pace."

"That's great to hear, Shanta. Good for you. Investigate it and come to your own conclusions, who could ask for more?"

"Yes," Shanta looked down and smiled. "So far I know the splitting of an atom is part of it. That's about it. So you get an idea of where my level of understanding is."

"That's really the foundation," Amy confirmed. "With that understanding just ask questions. Where does that pent up energy come from? Why is it so powerful? Why does it emit so much radiation? How is it controlled? Who discovered it? What has been its role in modern life?"

"I was wondering. Oh boy, I am about to challenge that theory that there's no such thing as a stupid question," Shanta laughed.

"Not at all. Ask anything," Amy invited.

"Okay, don't laugh. If just one little atom split, would you be able to see it with your naked eye?" Shanta asked.

"Hey, that's a great question. Hmmm," Amy looked across the table at Harshil who heard the question. He smiled and nodded at her.

"Okay, say we put that small single atom under one grain of beach sand. When the atom split it would just barely but visibly move that one grain of sand. You'd have to pay close attention, but it would jump just a little bit."

"Really, Amy, that is so interesting. Thank you. Now I've got a secret for you," Shanta quietly teased Amy.

"Oh, please do tell all," Amy encouraged her.

“As kind of my own way of learning something, I wrote a fun little ditty about nuclear energy. It’s a little inane, but it makes me feel good, and leaves me wanting to learn more about it. I wanted it to be something fun rather than a ballad,” Shanta explained.

“That sounds wonderful; I’d love to hear it,” Amy gushed.

“Well, no problem there. You’re going to hear it tomorrow night in Ann Arbor. Josh has been so distracted by all his TES work and his current role in the sci-fi project that he didn’t even ask about my new songs yet. He’s going to hear it for the first time when you do.”

“O-M-G, I hope you’re bringing a change of underwear for him,” Amy laughed.

“Probably a good suggestion,” Shanta said as she touched Amy’s arm and leaned into her giggling. “But here’s the kicker, sister, Ryan and Maren came up with a fantastic fast-paced melody that’s perfect for it. I really like what they did with the arrangement. They suggested I debut it as the first song I’ve both written and sung. So I thought, what the heck, I might as well give it a try and see where things go. And I’d love for you to be out there on stage with me, if you’d like to be?”

“Oh my gosh, Shanta, not in a million years would I have ever thought I’d even get to meet you let alone be on the same stage with you for your debut as a singer. I would be so honored to do that,” Amy said, trying to contain her excitement.

“Great, then it’s a deal,” Shanta concluded. “I’ll have Ryan’s and Maren’s people text you all the details.”

“What are you two talking about? I am starting to like Bob James over here; I think I need some fresh air,” Josh joked.

“Just the concert tomorrow night, babe.”

“Did you tell Amy a couple of your new songs are going to be played?” Josh asked.

Shanta looked at Amy and whispered, “Maybe I better bring two pairs of fresh underwear.”

Amy leaned forward so Josh could hear her, “She did.”

“Amy and Harshil are going to be there. I’ve asked her to join us,” Shanta announced.

“Fantastic. Great idea,” Josh smiled.

Frank noticed the exchange between Amy and Shanta. He winked at Becky who had also observed the blossoming friendship. Just then the lights flickered, and the house went dark. Within 20 seconds, power was restored. The soft hum of the two large Kohler generators on the Atomic Garage’s north wall kicked in and powered that facility and the Austin home.

“That’s odd, we haven’t lost power in this area in years,” Joline reported.

“Could it be the nuclear plant?” Josh inquired.

Bob James answered, “Nope, even if The Rock scrambled and shut down, the power would most likely be picked up by the Algonquin Central Generation Facility.”

“A natural gas power station?” one of the Emrod engineers inquired.

“Yes, that’s what it is,” Rhonda Mattingly confirmed. “It’s across Red Arrow Highway from The Rock, less than a half mile away. You can’t see it from the road or the river because it sets back in behind a rise of trees. A lot of people, even those who have lived around here for years don’t know about it. It’s a combined-cycle natural gas plant that puts out 1,175 thermo megawatts of power.”

“The Rock produces about 800 megawatts, so that natural gas plant puts out more power than The Rock. The reason most people don’t know about it is because it employs about 45 people compared to The Rock’s 600 employees,” Bob James informed everyone.

“The Rock’s labor force requires a lot of people with a high skill set. That’s a big part of the overhead, but The Rock’s fuel expense is very low. Just the opposite as at the natural gas combined-cycle plant, they need fewer people but fuel makes up their major expense,” Stew elaborated.

A glow appeared in the sky behind The Rock. Frank jumped up and opened the 10-foot sliding door by three feet. As the cold winter night air entered the dining room, the screaming sounds of sirens from The Rock and the natural gas plant could be heard in the distance, joined by emergency vehicles speeding to the area.

“It must be the node,” Rhonda said as she walked up to look out the window. “The Rock and our natural gas plant share a SOMI substation. We call it a node. The thing is about six football fields in size. SOMI is our grid operator in this region and stands for Systems Operation Midwest Independent. It sits on the north side of the road closer to our power plant, but they both put power into it, and SOMI decides where those electrons are distributed from there. If that substation is on fire or something else happened to it, that would explain the loss of power.”

Ann Rutledge, head of the security detail in charge of the Austins’ property and Amy’s protection, came into the room and whispered to Frank, “We think the national grid might be under attack. We need to get all of you over to the Atomic Garage; it’s a much harder target than the house. In light of the prominence of your guests here tonight, Derek told me to escort all of you to the Atomic Garage. Right now. There’s a small probability there could be terrorists in the area.”

Frank nodded his understanding to Ann. The group was anticipating the news. “Well ladies and gentlemen, it appears our national grid may be under attack. Out of an abundance of caution, our security detail is asking us to move to the Atomic Garage right now. We can also

better monitor events from over there. Let's go, don't slow down to bring anything. We'll have security retrieve anything we need that is left in the house."

Frank slid the big glass door back all the way. The glow behind The Rock was more visible, and sirens from multiple emergency response teams were audible from miles away. The snow started coming down hard.

"Stew, grab Proton and Neutron. Let's go now everyone, huba, huba. Follow me," Frank instructed.

Kathy DeSable was stationed down the road from the SOMI substation as emergency vehicles sped by. She was under the bright light of TV cameras reporting live but not knowing who could view her live reports with such massive outages being reported. Good thing she was being picked up by the RBX Satellite Radio system. As the snow swirled around her and blew her hair back, she went live.

"This is Kathy DeSable of Channel Seven Action News about a quarter mile east of a damaged SOMI electric substation and the North Rocky Point Nuclear Power Station, known as The Rock. The nuclear plant's owner, Midwest Electric Power Distributors, MEPD for short, has informed Channel Seven Action News that they've shut down The Rock's single reactor as a precaution. The reactor and the plant are not damaged. Here's what we know. First, at approximately 7:45 p.m. eastern standard time, several explosions were detected at SOMI's big electrical substation, just around the corner from my present location. SOMI is the grid operator in this area of the country. Much of central Michigan and lower Indiana have lost power. Second, it's worth repeating, the nuclear plant shut down its reactor. We're being told the reactor and the plant are not damaged, and there is no radiation risk to the public. Third, officials are telling us

the problem isn't at the nuclear plant but at that substation next to it. The substation is also shared by a natural gas power plant, owned and operated by Chelsea Resources. Officials from that company informed Channel Seven Action News that their power plant is undamaged and powered down. Fourth, SOMI officials tell us when the substation failed, it had a ripple effect throughout the grid, acting like a domino effect. . .” Kathy DeSable paused and pressed her ear bud tighter as she held up a finger to listen to the breaking news come in.

“We’ve just learned that other substations within the national grid may have been attacked. It’s possible the explosions at the SOMI substations were not from an accident but from an attack. This may not be an isolated occurrence but a coordinated terrorist assault. We’re receiving scattered information at this time, but gun fire has been reported from three other substations located in New York, Florida, and Texas. It’s not clear at this time if the attacks are physical or cyber or both. And we have no way of knowing at this hour how much of the US infrastructure has been affected. The weather is also a factor here. Forecasters are predicting a surprise approaching blizzard that is now believed will dump as much as three feet of snow across most of southern Michigan, the biggest accumulation since 1978. Winds are 25 miles per hour with wind chills dipping to 15 below zero. The roads are drifting shut. It’s imperative that everyone stay inside and try to stay as warm as possible. Emergency personnel will not be able to respond to emergencies for hours. Please, shelter in place wherever you are until the blizzard passes and the possible terrorist attack on our grid is over. We’ll be monitoring the situation. Stay tuned into Channel Seven or the RBX Radio Satellite News channel 127 as we go to our national affiliate in New York City.”

As the Austins entered the Atomic Garage, Harshil had briefed everyone on Kathy DeSable's report, which he had picked up from the satellite feed on his mobile device on the way over. Everyone stood stunned silent in a small group. Stew pulled Joline aside, "Listen, sweetie, you're the mayor; it's time to lead. Isn't the hospital doing maintenance on its back-up generators this month?"

"Shit, they're only on battery power. They're going to be able to maintain low power for a few hours at best," Joline realized.

"Let's get over there and get ready to transport the critical patients," Stew suggested.

"Transport them where? We've got a blizzard out there and every hospital within 100 miles of a black out is going to be overwhelmed."

Amy stepped into the conversation, "Uncle Stew, let's get this group from Emrod busy. We've got a transmitter, two relays, and a receiver. Let's dedicate one of our Kohler generators for essential systems at the hospital. We're pulling natural gas from the underground pipeline connected to our property, but we've also got 2,000 gallons of propane on site. We should be able to produce enough power for their essential and life support systems for a number of days."

Ann stepped up, "The boss is on his way here. We've lost our drone coverage because of the blizzard. We're moving our two canine teams to the north property line to protect us from the park entrance just in case bad guys are headed in our direction now. I've got a couple teams watching the other sides of the property. Law enforcement is going to be too busy to spare any people. We'll need any of your guests who have firearms knowledge to see me, pick up a weapon, and get a quick refresher if need be."

Amy interrupted, "Ann, look, we've got to get some power over to the hospital or we're going to start losing people over there pretty fast."

“Let me get this facility fully secured first. What’s your plan for the hospital?” Ann asked.

The Belgian Malinois and her two human partners moved quickly through the dark, snow flooded forest floor. Derek Gifford, owner of Michigan Wolverine VIP Security, knew from first hand experience how a canine team member could provide a tactical advantage in the field. And he had more than a few stories of how trained military dogs with their highly sensitive sense of smell, agility beyond superhuman, and killer instinct for inflicting extreme violence on an enemy had saved American lives in war zones throughout the world.

As the small team made its way north through the Odina State Park with falling snow bringing visibility down to a few feet, their dog suddenly assumed a sit position. The dog’s handler held up his fist to halt his human partner who was following. The man and the women operator crouched next to their canine partner. The woman aimed her AR-15 with an infrared scope in the direction the dog was looking. She could see a human form moving quickly but methodically right toward their position. The subject was 50 meters ahead carrying a long rifle that was throwing off a significant heat signature. The information was radioed to the rest of the team, and the three operators took their positions.

At about 25 meters away, the canine was released. The two operators followed her, keeping their scopes on the approaching threat. They saw the dog tear into the person. The subject fell on impact as the dog aggressively went for the arm holding the weapon. Within 20 seconds, the two human operators came upon the scene. It was a man. He was trying to protect himself from the dog, as he reached for a hunting knife located in a sheath on his calf. He never reached it. The butt of an AR-15 hit him in the face and stunned him. The security team called

off their dog, disarmed the man, secured him, and did a wellness check on their canine partner. She was fine, and very proud of herself.

Within minutes, they were half dragging their prisoner to the Atomic Garage, as the other canine team did the best they could, continuing covering the entire north boundary of the Austins' property.

The west door of the Atomic Garage flew open and the prisoner, operator, then handler, and canine blew into the facility with the razor-cold wind. Once the handler saw the prisoner was secured within the facility, the canine team headed back out into the blizzard, which had dumped eight inches of snow in the last two hours. Derek Gifford, a decorated, battle-tested Army Ranger, escorted the prisoner to a desk chair, roughly sat him down, and pulled off his stocking cap and scarf. A grizzled, thin man, with a swollen jaw and bloody nose, looked up. He appeared to be about 70 years old.

"Hey, I know who that asshole is," Josh Manning yelled.

JOLINE HAD SET UP A COMMAND POST AT ALGONQUIN CITY HALL. The blizzard had intensified over the last two hours. As a graduate of Derek's security training, Joline had the city purchase a satellite phone and was able to communicate with various branches of the Michigan and national law enforcement agencies. She also had a military-grade walkie-talkie with a 100-mile radius range, which Ann had handed Joline as she left the Atomic Garage to head to city hall. Joline brought Bob James along to help prepare things at the hospital. She stayed in direct contact with Stew, who remained at the Austins' to help with the equipment and support everyone there as needed. As a retired US Naval Officer, he adapted quickly, listened, evaluated, and took action. Joline touched the outside of her coat pocket where her Smith & Wesson 38 Special Revolver reassuringly rested. It had a laser sight, although she knew in an emergency she would fire the weapon while it was still in her pocket or purse without any worry of a recoil catching on anything. And there would be no hesitation. It was surreal for the granddaughter of a World War II combat veteran and the mayor of a small American town to feel the need to be armed well into an ever-more violent 21st century.

Joline had dispatched two teams of city employees to secure two aerial lift platforms. The Emrod engineers would attach relay rectennas to them and then assist city staff in getting them to designated lines of sight between the Atomic Garage and the hospital. The parks and recreation director knew the best spots to place the relays and transmitters once he understood the challenge. Derek had five of his burliest guys attach the transmitter to the top of the Atomic Garage under Harshil's direction. While Bob James directed several physically strong city employees to get the receiver secured in a quickly built wood frame and mounted to the Buick

dealership's giant flag pole located across from the hospital's two huge generators under maintenance. Five large lines secured to vehicles parked around the pole base kept the receiver stable in the high winds. It faced north in an invisible straight line to the last relay in the chain two miles away. Cables from the receiver were run across the street to be hooked up to portals that the hospital's big diesel generators usually used. After quickly evaluating the electronics, Bob James, a city worker, and an Emrod engineer quickly employed MacGyver-type adaptations. Bob had to explain that MacGyver was a fictional TV character from his childhood who could make a bomb out of the stuff below a kitchen sink. The analogy was understood, and the connection was made. The rectenna receiver was now connected to the hospital electrical panels.

Frank set up the Atomic Garage electrical configuration so one generator could be dedicated to the hospital and the other to powering the growing command center in the garage. Amy was setting up all the instrumentation and controls for the power transmission. Since the power outage, the hospital had been operating with bare-minimum power. Three patients were being ventilated manually by nurses and aids. The temperature within the hospital was quickly falling below 55 degrees as volunteers and staff worked tirelessly finding coats, blankets, and bath towels to keep patients warm. A badly injured man brought in from a car accident needed emergency surgery and was struggling for his life. The dedicated nurses in the Obstetric Care Ward talked over their options once the hospital's batteries would run out, ending their ability to incubate their patients. The plan was to get the babies in their heated SUVs just outside the hospital's doors. One by one, they had started bringing their vehicles over. They would work in teams of two, and at daylight, after the storm subsided, would follow the Michigan State Police and snow plows in a caravan of nurses and premature babies to the University of Michigan Medical Center. Two floors down, a teenage female cancer patient in the ER was suffering from

an attack of diabetic ketoacidosis. She was being treated by an emergency room doctor, representing his first case of triage as other patients were evaluated and classified as less urgent. The ER was filling up fast.

“Stew, how long? We need that boost of energy at the hospital right now,” Joline urged.

“Minutes. Stand by,” Stew responded. He watched Frank, Amy, and Harshil working quickly but calmly on the instrumentation preparing to relay the power to the transmitter. Stew couldn’t think of a better team to work with in an emergency. Frank turned to Stew and gave a thumbs up.

Amy talked into the walkie-talkie. “Everyone all set?” Each station responded in the affirmative.

“Switching power over in three - two - one. Here it is.” Lights started going on inside the hospital, machines whirred and beeped, and indicator lights blinked. The hospital staff made sure every nonessential piece of equipment, light, or computer was off. They still needed to direct the energy to the locations inside the hospital where life and death was the issue.

The Emrod engineer, who had worked with Bob James and the city worker to make the final link to the hospital, hugged the city worker and hollered above the wind, “Holy shit, it works.”

“Isn’t it me that should be saying that?” the city employee yelled back. He slapped the back of the Emrod engineer. “Great job. You guys are unbelievable. This is one of the coolest things I’ve ever seen. Think about it, no transmission lines at all. Nobody is going to believe me when they hear this.”

“Okay fellas, there’ll be plenty of time to celebrate later; we’ve got a lot of work to do to make sure the juice keeps flowing. Let’s go back and see how much power we’re losing in the

transfer,” Bob James instructed as his years of nuclear reactor room supervisor experience took over.

Joline reported back to Stew, “It’s working; the hospital has power. Tell the gang good work. I love you; take care of yourself. Let Derek and Ann wear the capes today, okay?”

“Roger that. I’ll stick with the geeks, I promise. Love you too. Be alert, honey, this isn’t over.”

DRAFT

DEREK INSTRUCTED ONE OF THE PATROLLING CANINE TEAMS TO MOVE CLOSER TO THE ATOMIC GARAGE. With all the publicity Amy Austin had generated in her debate with Josh Manning, the attention to the new nuclear device she was working on in the Atomic Garage, and the fact that all these high-profile personalities had converged in this place and time, Derek and Ann were aware that their location could be the primary target. Shanta helped Amy and Harshil move cables and electronic equipment around, and monitor a couple gauges for them.

Josh was on the satellite phone briefing the FBI about the ancient rift within TES that was now legendary. As he recalled, it was a defection of about 15 key people that occurred. That defection was led by a disgruntled idiot known as Archie. An older version of that guy was tied, gagged, and duct taped to a chair five feet from Josh. Josh remembered that name because of the old, popular cartoon characters in the Archie series. He couldn't recall the names of the other dissenters who left TES with Archie all those years ago. He was still pretty young at the time and not yet immersed in the affairs of his grandmother's organization. But he did recall three of the defectors had later served time in federal penitentiaries after being found guilty of planning to blow up the Alaskan pipeline. With that information, the FBI was able to start following leads and getting some answers.

Josh handed Derek the satellite phone, "It's FBI Agent Dexter Tinley. He wants to speak to you."

"Agent Tinley, this is Derek Gifford of Michigan Wolverine VIP Security speaking."

“Derek, I read up on you. Thank you for your service to our nation. Look, we’re in the fog of combat right now, so I am going to share information with you that may or may not be relevant.”

“That’s much appreciated, Agent Tinley, what have you got?” Derek asked.

“As you’re aware, these attacks on our grid have been going on for years,” Agent Tinley started. “Tonight’s is massive. We know of at least six substations hit with small arms fire. But there were also a series of cyber attacks that hit at least a dozen more around the country. One working theory is that the Russians infiltrated our homegrown terrorist cells and coordinated the cyber attack with the physical ones. The cyber signatures appear to be Russian.”

“Don’t rule out that the Chinese may be posing as Russians,” Derek shot back.

“Affirmative, you’ve got a good sense of what’s going on,” Agent Tinley acknowledged. “Our grid operators and power companies to their credit have been doing a great job countering the attacks. The attackers may have underestimated how much harder the targets have become since that series of assaults on the power grid back in 2022 and 2023.”

“Sounds like they’ve had plenty of practice,” Derek added.

“True, but still, by our estimates we have 75 million Americans without power tonight. If they had done this just five years ago the whole country would have been blacked out for weeks. I am told we’ll start restoring power by tomorrow, and it should be days, not weeks, before we get most of it back on. A few weeks to months at worst for some areas. Still a tenuous situation.”

“Copy that,” Derek replied as he listened carefully.

“What’s unique about your location is the substation is the only one under attack directly next to a nuclear plant. I didn’t think of that right away. And it appears the bad guys didn’t either,” Agent Tinley revealed.

“Ahh, that means they didn’t think about the plant’s security detail then. And because The Rock is currently a high-profile asset that security was doubled in size and operating on full alert,” Derek voiced what Agent Tinley knew.

“They know now. That nuclear plant’s security team has two prisoners in custody. With you, that’s three shooters. They’re not talking. Turns out the good guys at the plant used the blizzard you’re having as cover and assaulted the bad guys who were busy shooting at the Algonquin Central Generation Facility next door. They just sent us images of two dead shooters laid out on a shoveled spot in the substation’s parking area. One of them was a woman, and I’d bet a beer her name turns out to be Jayla Smith-Ahmed, one of those TES spinoff nuts convicted of planning to attack the Alaskan pipeline.”

“Do you think the Atomic Garage is a target?” Derek asked.

“Okay, so you’re the terrorist,” Agent Tinsley role played. “You take out the substation. The area goes dark. You make your way to the Austins’, probably through the park, when there will be no emergency response available because the substation draws resources. You attack and destroy the whole Atomic Garage. Blow everything to hell, burn it down, maybe kill everyone there. That takes out America’s source and inspiration for a revolutionary nuclear energy technology. A technology my folks are telling me could lead to the US making cheap energy available all over the world.”

“Yep, and TES comes out the next day and says the new reactor here was the primary terrorist target, actually playing right into the terrorist risk narrative. It’s possible. Maybe that’s why Archie, the dipshit, here was heading in our direction?” Derek added.

Loud pings rang through the garage, and one of the outside Kohler generators changed pitch and seemed to be choking and struggling to keep running.

Ann yelled, “Gun, gun, gun, shelter. Get behind something. Get down. Get down.”

Derek yelled from his position near the kitchenette, “Everyone okay?”

Ann and Derek swept the internal area for breaches and shooters but didn’t see a threat.

“It’s one of the generators. I think someone is shooting at it from outside,” Stew yelled as he stood and monitored the controls.

“I don’t think the shooter could have been waiting this out very long. We would have picked him up before we lost our eyes. Is everyone within the perimeter accounted for?” Derek asked Ann.

Shanta yelled, “Where’s the guy who drove us here? He kind of gave me the creeps?”

ANN RAN OVER TO THE PROPERTY SECURITY MONITORS NEAR DEREK'S HIGH-TECH JUNGLE OF ELECTRONICS. She hit a couple buttons on the keyboard.

"Shit, he's not in the guard house guest suite," Ann shouted. "With all the commotion, nobody noticed the guy stepped out. He could have had the weapon mounted within the engine compartment of his SUV. I doubt he was able to hide it around here before tonight."

Outside, the wounded generator accelerated, backfired, and then died. The entire Atomic Garage went dark and silent as the second generator continued to hum. Frank turned on his mobile device flashlight and said, "They killed the generator we're using to power this place. The one sending power to the hospital is still on."

"Derek, the two, 1,000-gallon propane tanks are underground; the generator powering this facility is on the far northwest corner of the garage. The one powering the hospital sets right next to it, to the east. The shooter may be repositioning for a clear line of sight on that generator?" Ann reported.

Stew added, "He'd have to be on a slight rise, 200 feet from the northwest corner, the second generator would be sheltered from that line of sight. He's probably on the move right now. He's got a small dip between two rises and some thick brush to work around. And the deep snow will slow him a little."

"What's your estimate on how long it will take him?" Derek asked Stew.

Ann interrupted, "I noticed those lines of sight on my first recon of the property and made the transition without snow. It took me three minutes on a nice fall day in perfect weather and I was pushing it. Let's say just under five minutes."

“What about one of the canine teams?” Stew wondered.

“They’re not close enough, and the acoustics out there are such that they may not have even heard the shots,” Derek calculated. He looked up to the skylight in the ceiling. A mobile lift was under it from when the Emrod crew were getting on the roof to hook up the atmospheric power transmitter.

“Ann, get your rifle,” Derek instructed, pointing at the roof. Realizing the plan, Shanta and Amy helped Ann get her weapon in position and handed her her gloves and a dark wool hat, while Stew powered up the lift and lowered the bucket so Ann could get in.

“I am going out the west entrance and will draw his fire away from the garage,” Derek briefed. “He should be almost directly north of this building in about three minutes. He might take time to move closer thinking he’s going to enter here once he kills the generator. Ann, now listen to me, when you see his muzzle flash shoot him.”

Derek then slid out the west side entrance as Ann effortlessly scaled the ladder and popped the skylight open as snow and ice fell on Stew who manipulated the lift below her. She then slid through the opening, leaving the stormy winter sky whistling by. Her weapon was strapped to her back. She crawled on all fours to quickly move north on the ridge of the slippery metal roof. She slowed a little to make sure she didn’t monkey crawl right off the north end of the building. About 10 feet from the edge, she stopped, brought her weapon around, laid on her belly and slowly by consistently moved to the edge, pushing a little snow in front of her in case an infrared scope was on her. She slowed her breathing, looked through her ATN ThOR-HD thermal rifle scope, and scanned the tree line. She was hoping the shooter was more focused on his target, which hummed away directly below her position.

Ann toggled her walkie-talkie twice signaling Derek that she was in position. Inside the Atomic Garage, Amy, Harshil, and Shanta had taken shelter behind the reactor casings that they judged to be bullet proof. They pulled Proton and Neutron into the tiny space with them. Stew, Frank, and Josh took solid defensive positions with side arms, anticipating a breach from the north or west entrances. All three men had some familiarity with firearms, and Stew maintained a marksmanship status.

It happened in quick succession. A loud ping sound hitting the second generator, as the shooter moved in on his next objective. That was immediately followed by a barrage of automatic weapons fire with tracers streaming from west to east and hitting in the approximate area of the first shot. Then she saw him. He was lit up in her night scope, in a boot-lace-down kneeling position aiming west, behind a large tree, but exposed to her south-to-north line of sight. Slow is fast. She checked her rangefinder and ballistic calculator visible in her scope, then made several minor adjustments in her aim. She calmed herself, exhaled, and pulled the trigger. A flash of blood and brains sprayed into the raging blizzard night.

“The threat is neutralized. Derek, check in. Derek, are you all right?” Ann waited for 10 of the slowest seconds in her life.

“Roger that. I had to let Stew know we were secured to avoid friendly fire. Good shooting, officer. You just saved a lot of lives, probably including mine,” Derek reminded her as he wondered how she was reacting to her first kill.

“Last time I hesitated I ended up talking to lawyers for two years,” Ann remarked.

“No second guessing, your training kicked in and you reacted correctly. I’ve got your six on this, Rutledge. Just don’t fall off the roof,” Derek said.

One month later, Monday, February 21, 2028, Lansing Michigan

MICHIGAN GOVERNOR, MARTHA ROSEN HUNG UP HER DESK PHONE, “I CAN NOW CONFIRM THE RUMORS: PRESIDENT LINDQUIST IS PLANNING ON BEING HERE NEXT WEEK. He wants to visit the SOMI substation that was attacked, then over to The Rock to meet with the security team that took out the attackers. Those stops will be photo ops. Then he wants me to join him in a private meeting at the Atomic Garage located on the Austins’ property. He wants to meet and evaluate Amy Austin in person. His advisors are probably confirming that her open-source work on the advanced nuclear reactor she’s been toiling over is legitimate, which is the same thing those folks at University of Michigan have told me.”

Rosa Vasquez listened carefully and made a couple of notes in her blue folder with the State of Michigan image and the slogan *Pure Michigan* on the cover. Rosa’s friendship with Martha Rosen started in kindergarten. They were lifelong friends. Over the arc of their shared lives, they had double-dated in highschool, roomed together at Michigan State University, were bridesmaids at each others’ weddings, and were aunt number one to each other’s children. As children themselves, Rosa and Martha were traumatized by the apocalyptic narrative about the Earth’s climate. Starting in grade school, and all the way into adulthood, they had been environmental activists. They were all in on wind and solar. They protested to close down nuclear plants due to the potential catastrophic radioactive contamination an accident would cause. They were anti anything fossil fuel, and they grew to hate the greedy, dirty, profit-motivated oil companies. Renewable energy and strict conservation were the obvious path to saving the Earth, which was on a fast track to oblivion.

Then doubts crept into Rosa's mind. A few passing thoughts at first. Why did Jim Hansen, the NASA scientist who first alerted the US Congress to the looming danger of greenhouse gasses and the threat of global warming in 1988, become a supporter of nuclear energy? Was nuclear energy really as safe as the progressive Breakthrough Institute claimed? Could all those wind turbines and solar panels blanketing the landscape really produce enough power for civilization? She could understand why people hated the ugly things. Even John Kerry, President Biden's former Climate Czar, had turned pronuclear after actively leading the charge to stop the Department of Energy's Fast Reactor Program in 1994.

Rosa had read credible reports that wind and solar only produced a few percent of the world's total energy. In fact, every year, the world's industrialized and developing countries use more fossil fuel than ever. The world was fighting over fossil-fuel access again. The US electrical grid was so screwed up that Rosa was amazed the complex mess could power a toaster much longer. And after the last grid attack, many toasters were not working this morning. Then Amy Austin surfaces right in Rosa and Martha's backyard, with a message that rang true. It was a jolt for Rosa to watch this articulate, tall, passionate, young woman stand up for what she believed in with conviction, confidence, and empathy. Rosa had been soul searching. For the first time, she was questioning fundamental values she had believed in her whole life. What they had advocated for was not working. Time to reevaluate.

"From what I hear I don't think the president will be disappointed when he meets Amy Austin," Rosa guessed.

"Okay, what is the status of our beloved and wounded Michigan this morning?" the governor asked.

“Have you had a chance to read a brief of everything that went down that night at the SOMI substation and at the Atomic Garage on the Austins’ property?” Rosa asked.

“I have. Of all the states where the grid was attacked, we’re the only one that killed and captured any of the terrorists. And in a ‘You can’t make this shit up’ scenario, two billionaires, a movie star, a popular song writer, and possibly America’s next Einstein are all sitting at a residence that also comes under attack just a few miles south of the nuclear plant,” Governor Rosen sighed.

“Do you know of Derek Gifford, founder and owner of MWVS?” Rosa asked.

“Yep. Michigan Wolverine VIP Security. He’s been assigned as a backup to some of my State Police details in the past. A special forces veteran, I understand. He handled the training for the security team at The Rock,” the governor explained.

“That’s correct,” Rosa confirmed. “And he handles all the security for the Austins and the Atomic Garage. Apparently Derek’s daughter is a big Amy fan. When Amy rocketed into the public consciousness and announced she was working on a nuclear reactor in her dad’s pole barn, Derek stepped up and offered his security services for one dollar a year. It looks like we can thank MWVS for disrupting the terrorist attack on the SOMI substation and at the Austins’ Atomic Garage.”

“Rosa, do you think the Atomic Garage was the primary target that night? That the whole thing in attacking the grid was a spread offense type of thing, to keep our attention off the fact that this young woman may have come through with a leap in energy technology?” the governor asked.

“I’ve heard that theory being kicked around. It’s a possibility that we should not discount,” Rosa added.

“I find it amazing that the terrorists we killed and captured in Michigan were all former disgruntled TES activists from over 40 years ago,” Governor Rosen conceded.

“No kidding. What’s wrong with retiring to a beach, sailing, skiing, golfing, taking up a hobby, traveling the world, or volunteering for a good cause?” Rosa wondered.

“I suppose you could over think the psychology of it all. My opinion: They’re just narcissistic, self-appointed environmental bozos,” Governor Rosen opined.

“By the way, did you see it was Josh Manning who recognized the shooter captured at the Austins?” Rosa asked.

“I called the FBI after I read that,” the governor said. “I actually talked with Agent Dexter Tinley, who was in contact with Derek that night. He told me the FBI confirmed the suspects had former ties to TES. By the way, Tinley is telling his supervisors he believes the shootings that night were righteous. Apparently, Agent Tinley stated, off the record, that he wished he could have been there to shoot the bastards himself.”

Rosa scratched her nose as she was thinking about that last statement. “I suggest we give it another month to make sure nothing else shakes out on those shootings, and then we’ll most likely support the FBI’s conclusions on that investigation.”

“And how many Michigan deaths do we attribute to the entire state losing power that night, Rosa?” Governor Rosen asked the question she had been dreading.

“Not good, governor,” Rosa sighed. “We’re about to announce that our count went over 2,500 souls over the weekend. Of these, nearly 700 were lost in assisted living facilities, and 830 people in our rural hospitals. Those facilities either ran out of propane or diesel fuel to power their onsite generators, or the equipment was non-existent or not working. Some 217 people froze to death on our highways waiting for help. And we lost about 575 people who mostly died

alone in their apartments or homes of hypothermia or asphyxia from carbon monoxide poisoning due to gas stoves being used as furnaces, or fumes from gas generators, or because they ran out of life-saving drugs like insulin, heart medications, and antibiotics. Since the attack, there have been 200 suicides more than we normally have this time of year. The police are coordinating ongoing wellness checks with churches and other agencies.”

“The whole thing seems surreal,” Governor Rosen shared.

“It’s also worth noting neighbors from all over the state did save thousands of others,” Rosa sensed the governor needed to see a little silver lining in the tragedy herself. “There are many people sharing their homes with friends and neighbors right now, something that would be good to acknowledge.”

“It’s good to remember the world still has a lot of good people, and they step up in times like these,” Governor Rosen reflected.

“We were the hardest hit state because of the timing of the blizzard moving across the upper midwest, and the loss of so much power generation at the same time,” Rosa concluded the health report.

“Rosa, did you know Michigan is one of the top propane users in the United States and also stores more natural gas than any other state? And yet I adamantly supported my predecessor’s attempt to shut down the two-way, Line 5 pipeline that runs under the Mackinac Straits between Michigan and Canada. It moves more than half a million barrels of oil and natural gas liquids every day. That means refineries in Michigan, Ohio, Ontario, and Quebec would have lost about half their oil input if the courts had not stopped the State of Michigan back then. Under normal conditions that closure would have caused a hardship on people, resulting in an accelerated move to renewable energy instead of continuing a mindless dependence on fossil

fuels. But I was told, had that pipeline been down during the attack on the grid, the economy across the whole midwest would be in total collapse and thousands more would have perished.”

“Decisions have consequences,” Rosa stated. “Look Martha, we know each other better than we know ourselves most of the time. Still, I think I am going to surprise you when I suggest we rethink our position on nuclear energy.”

“Let me guess: Amy Austin has shaken your antinuclear beliefs?” the governor asked.

“Yea Martha, she has. She makes sense. She makes me want to support her when I am listening to her.”

“Well, the truth be known my friend, I’ve had the same thoughts,” the governor confessed. “But I don’t want to announce a new awakening about nuclear energy. Let’s send up a trial balloon and prepare the people who support me with this new perspective. Meanwhile, I can backtrack a little, and also buy a little more time to think things through.”

“Okay, what do you think about just supporting The Rock with their request to renew their license for another 20 years?” Rosa suggested. “Katie Evans at the Department of Energy is pronuclear and has the administration fully on board. Align yourself with her and the president on this single issue, and that should give us some wiggle room with the base that is still antinuclear. I think we’ll win over some independents in the process as well.”

“Do it,” the governor decided. “But let’s use the on ramp, not the launch pad, to announce this new direction.”

“Got it. My mom used to say, ‘never say never, and life isn’t fair.’ She would get a kick out of us talking about supporting nuclear energy,” Rosa confessed.

The governor sighed, “Rosa, I am sure you remember what my mom used to tell us, ‘Fair’ is a word that describes a place with rides and games. Life has never been fair and never

will be. The sooner you little racoons get that through your thick little heads, the better you'll do in life.' So, let's keep working the problem. What's the status of the grid and power generation this morning?"

"Over half of the transformers were destroyed at the SOMI substation that serves The Rock and the Algonquin Central Generation Facility," Rosa reported. "There was a domino effect that damaged a lot of other grid infrastructure throughout Michigan and Indiana. Some damage in Illinois and Ohio have been reported as well. There's a worldwide shortage of transformers. They're big complex pieces of technology. I understand DOE is working 24/7 to track down as many as possible to get the damaged substations repaired. But it's going to take a lot more time, weeks in fact. Since the blizzard, we've had calm, cold weather. A high pressure system seems to have stalled over us. Our wind turbines are still, and the solar panels are still covered with snow and ice."

"Can't we get those solar panels shoveled off?" Governor Rosen asked.

"It would take days, nature will probably do it faster with less damage," Rosa pointed out. "But even then, the solar panels don't generate enough power to make any difference. As we come back on line we're going to need to use all baseline power. That means coal, natural gas, and nuclear. And we've really only got one hydro plant big enough to make a dent at about 11 megawatts. Wind and solar will have to wait for the grid to go back up before they can contribute again."

"I get it, restarting a grid is extremely difficult," the governor acknowledged. "Power generated has to be exactly matched to power consumed. SOMI will require dependable, baseline energy to turn everything back on and maintain that perfect balance at the same time."

“Let’s talk more about shooting electricity through the air,” Rosa said. “When I first heard the folks out at the Austins’ house saved all those people at Algonquin General Hospital by doing that, I thought it was some kind of joke.”

“I was nervous about approving more of those things,” the governor said. “That firm from New Zealand sent over more equipment via air. It looks like over the weekend they hooked up more stuff to the Algonquin Central Generation Facility and are transmitting the energy from The Rock and the Chelsea Resources’ natural gas plant to other substations in all points of the compass that have been cut off from their power sources within the state. It’s all experimental, let’s just hope it all keeps working.” Governor Rosen put her hands together as if in prayer.

“Agreed. As a precaution, though, we advised the Federal Aviation Administration and all Michigan airports to keep aircraft clear of those beams,” Rosa reported.

“Okay, give me a path to a brighter tomorrow. People need hope and faith that their leaders actually have a plan. What do you suggest, Rosa?”

“The people probably would tell us they don’t need leadership, they need electricity,” Rosa said. “We’re going to find ways to generate and transmit that energy to get us through this emergency, and then take a look to make sure our power infrastructure is adequate for the long term. Meanwhile, assistance is pouring into Michigan from Ohio, Indiana, Illinois, and Wisconsin. All our neighbors are stepping up big time. Retirees are temporarily going back into the workforce. People in the energy sector who have no power at home are out restoring power for others. It’s truly commendable. And hopeful,” Rosa teared up.

“We’re on borrowed time, Rosa. We’ve got all our cities on a dusk-to-dawn curfew. The mayors are telling me there are already signs of increased looting and break-ins on small

businesses. If this attack had caused the whole country to go dark as was the goal, we would be descending into a state of anarchy hell,” the governor sighed.

A young woman knocked lightly at the door and stuck her head into the governor’s office. “Excuse me Governor Rosen and Ms. Vasquez. There is breaking news on television that I am sure you’ll want to see. Turn on Channel Seven.”

Kathy DeSable was in the middle of a nationally broadcast update, “The US grid has been repeatedly attacked over the decades. And it’s been known that a massive and coordinated attack on the grid was just a matter of time.”

Images of flaming equipment at various substations filled the screen as Kathy did the voice-over. “Now the US Department of Homeland Security confirms that last month’s attack on our electrical grid was massive. Six substations were physically and simultaneously attacked by domestic ecoterrorists, while cyber attacks believed to have originated in Russia were launched against those same substations plus dozens of others in an effort to bring down the entire grid. It is unknown if China had a role in the attacks at this time. A thorough investigation is underway by the US Congress.

“FEMA authorities are telling us that more than 25,000 Americans may have perished so far as a result of the massive power outages. Michigan lost the most power as temperatures have been below normal for weeks. Still, things could have been much worse.”

Images of emergency workers pulling people out of cars and rushing others into ERs came up.

“Our substations’ defenses have been hardened over the last five years, and our grid operators performed well during the attack, preventing the full domino effect from taking the entire country down.”

The control room of an unnamed grid operator faded up, as technicians worked on computer monitors and headsets.

“Although some areas will go without power for as long as four more weeks, 80 percent of the areas that lost power should have it restored within the week. Stay tuned to Channel Seven, listen to RBX Radio Satellite Channel 127, or go to ChannelSeven.com/GridAttack to view a power map of the US, which includes estimates of when power is expected to be restored in every location.”

Kathy DeSable transformed in a look of concern.

“Reports of riots and anarchy continue to be a problem in Atlanta, Chicago, Washington DC, New York City, Baltimore, Philadelphia, Milwaukee, Oakland, Portland, Seattle, and Detroit. Food shortages are surfacing around the country. In what feels like a Middle Ages occurrence, the CDC is reporting growing numbers of people dying of starvation as grocery shelves go completely empty. Officials tell us food shortages are severe all over the country and will get worse before they get better. But estimates on death by starvation are purely hypothetical at this point.”

Images of rioters with burning vehicles in the background and police with protective riot gear came up. A close up of a national guard soldier looking at a protester threatening him froze in place.

“Governors in those states have called up the National Guard to restore order. Shortages of all commodities are going to be common for the foreseeable future. The White House is

announcing that President Lindquist will be touring the hardest hit areas in the coming days, and that every resource of the federal government is working to restore power and get aid to those in need,” Kathy said as she turned toward the camera and paused for effect.

“As Governor Rosen of Michigan recently said, ‘The only way we’re going to get through this is to help one another.’ This is Kathy DeSable signing off for Channel Seven Action News, reporting from the Courthouse steps in Algonquin, Michigan, the place that appears to have been ground zero for the biggest attack against our electrical grid in history.”

As Governor Rosen and Rosa stared at the TV in the governor’s office the morning international news segment cued up. A reporter at Channel Seven’s national affiliate in New York City appeared on screen.

“On the international front, India’s Ministry of Home Affairs reports an assassination attempt on a top Indian physicist was thwarted this past weekend. Both assailants were killed during the exchange of gunfire with an Indian counterterrorism unit. The physicist, believed to be Dr. Kasvi Aakanksha, was not injured in the attempt but is believed to be a key person in India’s nuclear energy community.”

A photo of the physicist came on screen. The picture showed her volunteering at some kind of rural setting. She was surrounded by children, all of them were laughing and clapping.

Governor Rosen stared at the flat screen for a brief time. “She’s beautiful. What could a person like that have to do with an assassination attempt? What a violent world.”

Rosa nodded her head in agreement as she stared at the screen. There was something about that photo of the Indian physicist that sparked a thought in Rosa’s subconscious. She’d sleep on it.

“Rosa, please clear my schedule today and have my car brought around. We’re going to Detroit and see what we can do to give the mayor a hand.”

“Motown here we come. I’m on it ma’am,” Rosa assured as she rushed out of the office to arrange everything.

DRAFT

Wednesday, February 23, 2028, Coromandel Coast, Indian Ocean

THE 25-FOOT, INDIAN-FLAGGED CARGO SHIP *PERCHERON* HAD A LATE DEPARTURE FROM THE PORT OF CHENNAI, INDIA. It was 10 p.m. before it set sail, heading on a southeasterly route. The captain set the speed at 18 knots once the *Percheron* was in open waters. He stood on the stern-facing deck of the bridge and counted the glowing lights from the coast-hugging fishing boats reflecting off the dark water. Once the lights from India's southeast coast slipped over the horizon, he re-entered the bridge.

The first mate announced they were about to enter the international waters of the Indian Ocean. The captain was instinctively aware of that invisible line after a lifetime at sea. He knew they were just under 40 kilometers, or about 25 miles, from shore. He smiled at the fact that only three countries on Earth don't use the metric system—the United States, Myanmar, and Liberia. The *Percheron's* destination was Ho Chi Minh City, South Vietnam, 3,800 kilometers away. That's 2,360 nautical miles, about a six-day sail at 15 knots. He still called Chennai, Madras. And Ho Chi Minh City, Saigon. Old habits die hard.

India's trade with Vietnam had been consistently increasing over the years and had just passed the \$25 billion per year mark. The United States and other western nations had been moving much of their manufacturing contracts out of China to countries like Vietnam, Cambodia, Laos, Bangladesh, and the Philippines since the COVID pandemic of 2020. Starting in early 2020s, the Chinese Communist Party's Chairman Guang Liang had become more autocratic internally, militarily more aggressive in the region, and was openly challenging the

United States for worldwide hegemony. The dynamics of international trade in southeast Asia were changing fast. The *Percheron* captain saw the chaos as an opportunity to profit.

The *Percheron* captain was experienced, disciplined, considered to be highly reliable, and didn't ask any questions. He demanded a premium for his discrete services, and he got it. He'd become an expert in dealing with the Vietnamese and the nuances of the increasingly dangerous round-about journey through southeast Asia to reach that country. Life was good.

Three miles south of the *Percheron*, six 24-foot, rigid-hull, inflatable attack craft bristling with weapons, slipped swiftly through the softly rolling moonlit sea toward the ship. Each boat carried eight highly trained elite Israeli Shayetet 13 Unit special operators. Two small observation drones flew ahead. The Indian ship's deck was free of any visible threat. At 1 mile out, three warriors launched off the bows of different boats using jetpacks. They flew low over the water and swung in directly aft of the ship. When the warriors approached the stern, they elevated to deck level, being careful to avoid any cables and equipment, and landed within 10 feet of the bridge tower. There was only 20 feet of landing area between the bridge and the stern guardrail. Within seconds, the warriors had stripped their jetpacks and armed their TAR-21 assault weapons. Using hand signals, two of them moved quickly up the stairwell to the bridge, clearing potential points of ambush along the way. The other headed to the engine room. His job was to stop the ship if orders from the bridge didn't make it down there in the next two minutes and 30 seconds.

The warriors entered the bridge in a quick walk. Before the captain and three crew members could even process what they were seeing, the mysterious raiding party had secured command of the bridge. Using hand gestures and single words, they ordered the captain to stop the ship. Then, they told him to call the entire crew to the galley. They handed the captain a note

composed in Tamil and English. They knew he spoke English as a second language. The note explained if he and the crew cooperated, nobody would be hurt. The warriors were interested in one metal shipping container. They would only detain the ship a short time and then be on their way. All cell phones, satellite phones, ship-to-ship, and ship-to-shore transmissions were being jammed for the time being.

The Shayetet 13 boats came alongside the stalled ship. Twelve grappling hooks were shot up from special handheld cannons. Each found purchase on the ship's deck railing, gunnels, and other outcroppings. Within 45 seconds, 18 more operators were aboard and headed to secure the rest of the ship. The others followed and began the search for the cargo they came for and to support the inbound helo team due above their heads in 30 seconds. A Sikorsky CH-53 Heavy Lifter helicopter, outfitted for the Israeli navy, was hauling a cargo net below its belly. It came over the southwestern horizon, just above the water at 225 kilometers per hour, about 140 mph. A few minutes later, the helicopter hovered above amidships of the *Percheron*. The pilot quickly lowered onto the deck below the full cargo net containing four large, black pelican cases and two hydraulic-assisted, large dollies adapted for this mission. Eight operators on deck placed two of the pelican cases on each dolly. As soon as the helicopter pilot got the thumbs up, he swung around to the ship's stern and hovered on station, providing cover from any threats coming from the Indian coast.

A gunner and a pilot each stayed with the assault boats searching for potential threats from sea. This left a boarding force of 36 operators. Just a few miles away, on another ship, field command monitored for any threats using drones and a satellite feed from above, and communication systems from an Israeli attack sub of the new Dakar Class from below. Each highly trained operator had a job to do. There was no guarantee that any mission would go

exactly to plan. This mission, named *The Percheron Affair*, required weeks of training due to the operation's high priority and complexity. Right now, the ship's bridge had to remain secure, and the 20-person crew needed to be accounted for.

The 20-foot, steel, shipping container that the operators were looking for was one of the last to be loaded and was atop the cargo stack, a task taken care of by an agent at the point of debarkation in Chennai. Three words kept the mission as simple as possible. Steel. Wood. Plastic. Their target cargo was packed in those materials, like a Russian egg doll. A small beacon attached to the inner Russian egg doll, also planted earlier by the Israeli Agent in port, was picked up by a portable tracking device. The operators were standing directly on top of the steel container they were looking for. Steel. They had to use the ship's crane to lift the steel container from the stack so the doors could be cleared. That done, two specialists then visually confirmed that the unused counterfeit, high security ISO-certified bolt seal they carried with them matched the real one on the metal container. The bolt was yellow, 1.6 inches long, with the correct seven-digit bill of lading number. Check. That done, they cut the bolt seal on the steel shipping container, pocketed the used bolt, and opened the metal doors. A team of eight started unloading the container while photographing each piece of cargo as they worked. The shipping crate they were after, the middle Russian egg doll, presented itself once half the items in the crate were scattered over the top of the other shipping containers they were walking on. Wood.

The red security tape was cut off the rectangle shaped wooden crate and stowed in a pocket. Then the crate's end facing the now open swing doors was gingerly removed with a small crow bar. Four familiar black cargo cross-bed pelican cases rested inside, retrofitted with extra grips. Each case weighed 193 kilos, about 425 pounds. They were heavy, but portable with the right manpower and equipment, which was exactly what the mission specs called for. Next,

the team leader matched the number on the pelican cases to the tag numbers he was given. A second officer confirmed the matches. Two thumbs up. The team leader smiled and called in that the target cargo had been located, “Plastic Russian egg doll hatched.” Plastic.

The standard cargo security GPS-tracking device inside the wood crate was left undisturbed. The tech operator knew the device probably was still transmitting its location to the shippers of the target package even though all the other electronic communication aboard ship was being jammed. No big deal.

Another operator scanned the pelican cases for excess radiation levels. They were only slightly more elevated than background radiation, as expected. The fuel had not been radiated, just enriched. Thumbs up.

The four pelican cases that the helicopter brought in were of identical look, make, and weight as the ones in the wood container. The real ones were taken out, and the fake ones put in. They were exchanged using the hydraulic-powered dollies from the chopper. Once inside the internal wooden crate that held the four pelican cases, nails were precisely pounded back in to secure the side; and a new length of identical red security tape was replaced in the same spot as the tape taken off. The wooden box containing the four pelican cases looked undisturbed. The confiscated pelican cases were hauled away and hustled over to midships. The helicopter crew had already lowered its empty cargo net to the deck, which was really the top of other steel shipping containers. The four heavy pelican cases were loaded onto the net along with the two hydraulic dollies. A thumbs up was given, and the chopper veered away as the precious cargo was lifted under its belly. The helicopter flew so close to the surface ocean spray could be seen in its wake as it disappeared over the southeast horizon.

Back on the ship's deck, a cleanup team made sure everything was in the exact position as before the raid via the photographs taken during unloading. Then, the technician shut the metal door and set the counterfeit ISO-certified bolt seal with the correct seven-digit bill of lading on the steel door latch. The crane was used once again to lower the 20-foot shipping container back into its place.

The three jetpacks had been gathered and lowered into one of the assault boats. Two operators stayed on deck. They tossed the grappling hooks used in the assault overboard as they were quickly reeled back into the boats below. Then, the last two operators jumped into the sea and crawled up into a waiting boat. The entire operation took 16 minutes. The ship's crew were gagged and zip tied, except for the captain, who was given a small dose of propofol that would wear off shortly after the raiding party left the ship.

Another small ship became visible east of the *Percheron*. As the six special-forces boats approached it 10 minutes later, its stern opened, and all of them were quickly pulled into the bowels of another Indian-flagged freighter. Its new heading was southwest.

The *Percheron's* captain came to and cut a couple of the crew free. He told the pilot on the bridge to get underway again at five knots on the previous heading. He took a couple deep breaths and let his vision clear as he got his bearings. To account for the *Percheron's* delay, he radioed the Indian Coast Guard and reported that they had radio trouble but now wanted to report that he suspected partially submerged, floating shipping containers in the area. He suggested other ships also proceed with caution at very slow speed.

The captain made his way to the galley. He called his crew around him and explained the immense inconvenience that would await them all if they reported the incident that just occurred. He pointed out they may even be jailed, even though nobody knew what was going on.

“And who other than us would be accused of being pirates?” the captain asked. “My friends, this is obviously an affair of large consequence that does not involve this crew. We are but throw-away pawns in someone’s larger game. I see no harm coming to us if we keep it to ourselves. But if we report this affair, there will definitely be much unpleasantness.”

Many crew members nodded in agreement.

“But it’s up to you,” the captain said while promising the crewmembers each a generous bonus for their silence. The crew voted to say nothing. The captain didn’t think anyone would believe such a yarn anyway. The teller of the story would be suspect.

The captain had a hard time believing the raid actually happened. Over an entire lifetime at sea, the incident was the oddest thing he had experienced. What could possibly be so important for such a high-level mission as the one he had just partially witnessed.

“I don’t care, and I don’t want to know,” the captain said to himself.

He leaned over the ship’s stern rail on the way back to the bridge. He took the note from his pocket that the Israeli commando had handed him when taking over the bridge. He wadded it up and tossed it into the Indian Ocean. He took a deep breath and smiled when he thought about the second payment of \$250,000 US being wired into his Cambodian bank account this evening.

Within two days, the crew aboard the *Percheron* had all but forgotten about the brief incident. History would never leave a trace of its occurrence.

Twenty-Five

Thursday, March 16, 2028, Tel Aviv, Israel

DR. ADELE WEISS, ADELE TO HER FRIENDS, AND ISRAEL'S GREATEST NUCLEAR PHYSICISTS, NOW IN HER MID 80S, LOOKED OUT AT THE MEDITERRANEAN SEA. She had been instrumental in both Israel's nuclear weapons and nuclear energy programs. And for many years, she had been Mossad's go-to advisor for all things happening in physics in Iran. She loved the unobstructed view of the sea from what she called her coveted, covered patio. It was mid afternoon, sunny, breezy, and cool at just 17 degrees centigrade. She loved this time of day and enjoyed a hot cup of coffee. Israelis' love for coffee is legendary. Her guest declined the offer of chai tea and also sipped on a cup of coffee. They'd come to know and respect each other, as they explored the world of physics at a depth most others in their community could not match. They also shared some of their dreams, experiences, and perspectives on current events. For now, they took in the sounds of the sea, birds, and wind as they sat silently enjoying each other's presence.

"I have enjoyed our time together, Kasvi," Adele said. "I am so sorry we had to kidnap you to get you safely out of India and to Israel to talk with an old woman. It must have been frightening for you, and that I regret."

"There was no other option. I see that now," Kasvi replied. "As soon as the men pulled me into the van they identified themselves as a special unit of the Indian government and told me they were there to protect me. Once I learned someone in the Indian Army was stealing imported Russian uranium made for advanced nuclear reactors, I had no idea who to go to for help. I was later told Israel's Mossad had learned I was at risk and intervened with India's Research and

Analysis Wing to make sure I wasn't murdered to keep me silent. My very own guardian angels."

"Killer angels would be more accurate," Adele chuckled. "At first, we were not sure why someone wanted you out of the way. We didn't know you had noticed a deficit in the incoming uranium shipments from Russia. But we started putting the puzzle together, and it became evident pretty fast what they were doing. It appears that stolen uranium was heading to Africa via Vietnam. Of course the public wouldn't know what HALEU, high assay low enriched uranium, was for use in fast reactors; but on its own, not enriched enough to be weapons grade. With many of the small modular reactors just now starting to go into production, HALEU is the fuel they require, and it is in extremely limited supply."

"How does their scheme work?" Kasvi asked.

"We're still checking out our hypothesis, but it appears a Russian general working with an Indian general was skimming a lot of the legitimate HALEU Russia was selling to India. Then they batch it up and send it to a South African official via Vietnam to make tracing it back to India more difficult. The South Africans take the shipments on consignment and then license foreign companies to use it in their test reactors throughout Africa. The perps end up making a huge profit on that fuel. There is some complexity involving hush money and extortion mixed in with this den of thieves, but that's the gist of it," Adele explained.

"Tell me more about the end users?" Kasvi asked.

"Well, as you know, there are many well capitalized start-up businesses around the world working on generation IV nuclear reactors and SMRs," Adele explained. "But their countries' regulatory processes are too slow or non-existent to approve use of nuclear fuel for testing and eventual factory production of nuclear reactors. Their regulators come up with all kinds of

imagined risks for nuclear energy. What if there was a reactor melt down every year at the same plant. . . what if terrorists took over the nuclear plant. . . what if a fire and an earthquake and a flood all happened at once. . .?”

Adele elaborated, “These antinuclear activists are malthusian morons who know nuclear energy would improve people’s lives. They just don’t like people. The big reason nuclear power is gaining in popularity is that people are terrified about climate change.”

“Yes, but as we both know other than nuclear energy, the proposed solutions make the problem worse, not better,” Kasvi frowned.

“Anyway,” Adele got back on track, “The officials in South Africa are promising to provide the nuclear fuel for new advanced reactors, small modular reactors that are near-ready or ready to be tested. The businesses behind these reactors will soon be able to pick a country in Africa, and obtain the fuel and support to test it. Apparently, they don’t ask too many questions about where that fuel is coming from.”

Kasvi nodded, “Ahh, I can understand their lack of curiosity.”

“Something has to be done, my friend. The green wall is a reality, I’m afraid,” Adele sighed.

“Indeed,” Kasvi grimaced. “So we live in a world where new nuclear reactors are being built, more people support them, but there is still enough opposition to nuclear energy to keep its cost so high that governments and corporations will simply not be able to afford it?”

“That does sum it up. Africa is the key to the future,” Adele opined. “It’s the only continent on Earth that is still experiencing population growth. Of the 100 largest cities in the world in 2100, Africa will be the home to 38 of them. Africa is mineral rich and has a massive

population with a lot of upside provided they can generate enough industrial heat and electricity to work their way out of poverty,”

Kasvi summarized, “So the South African Government, which has no hang ups about nuclear energy, lures in these small businesses building SMRs and tells them, ‘Come here to Africa, where you can put your nuclear reactors into operation and participate in the coming African renaissance, which may very well turn out to be a nuclear renaissance. Russia and China have made Africa a long-range strategy to achieve global dominance. If China or Russia can control Africa, or more specifically the Congo, they’ll have a monopoly on the world’s rare earth minerals. And nuclear power is the means to that end. It starts in South Africa then spreads north.

“Africa is an exporter of minerals powering our modern civilization,” Adele reflected. “But they’ll have to break with their history of subservience and find a way to get the third-party players out of the way between their mineral wealth and the world community.”

“That is a tall order. Africa will need help from the people who ultimately benefit from their mineral wealth,” Kasvi added. “What do you think will happen when the person in South Africa opens those pelican cases coming from India via Vietnam and realize they’re full of lead instead of HALEU?”

“I can’t get into too much detail, Kasvi, but their reaction will create a tell, a ripple in the water if you will. We’ll be watching for that and see who is behind creating a black market in HALEU. That said, we do want Africa to succeed. Having a peaceful and economically maturing African continent to our south is in Israel’s best interest. But there is too much risk that black-market HALEU could fall into the wrong hands, like Iran. It’s only up to 20 percent enriched, as you know, but it’s much easier to go from 20 percent to 95 percent than from uranium ore to 95 percent. Also, it would be much better for the West to provide nuclear power

technology in Africa. The operational safety, proliferation mitigation, environmental respect, and free-market model would serve Africa much better. And I really believe that is what the Africans wish would happen.”

“Why aren’t the US and Western Europe showing up to fill that void in Africa?” Kasvi asked.

Adele set her coffee cup down and answered, “Until very recently the world supply chain worked. Slave and child labor behind mining cobalt in Africa or making solar panels in China was out of sight, out of mind. And the fact all those inputs were fabricated with coal power in China was a footnote nobody seemed to notice. Everybody was getting what they needed ‘just in time’ as they say. Profits in the high-tech sector were skyrocketing; renewables were being subsidized with billions of dollars. A lot of people were getting very, very rich.”

“And to think I just loved science; I had no intention of getting wrapped up in all this international political intrigue,” Kasvi sighed.

“Kasvi, changing the subject, I haven’t asked you yet about Amy Austin’s M-LFTR-VI reactor, which she has been developing and sharing with the world. I heard your nephew, Harshil Varm, is living in Michigan and working at the Atomic Garage.”

“Irony isn’t it? Harshil calls it a small-world story,” Kasvi laughed.

“I am sure his math and computer skills are put to good use there. What do you think of her design for the version of the SMR she’s working on?” Adele wanted to know.

“SMRs are the rage lately, aren’t they?” Kasvi asked rhetorically. “I haven’t met Amy in person, but I have had many conversations with both Harshil and Amy. In addition to my questions, concerns, and ideas, they have tapped some of the brightest people in the world for

feedback. Along the way, they've changed their minds about a few of their ideas and objectively adopted best practices."

"Interesting. Give me an example of something they've changed their minds about," Adele requested.

"Okay. First, it's important to understand that Amy and Harshil are building the prototype for the power generation," Kasvi said as she became more animated. "The advanced physics and the alloy Sartorium make Amy's ideas novel. But as she explains, she sees the M-LFTR-VI as something that can be adapted to different needs. She says that one day in a 'blinding flash of the obvious,' she thought of the idea of a wheel. The wheel is basic, works the same way every time. But you can construct it a little differently, and the ways it can be used are endless. For example, you could change the coolant to lead or a gas like helium or carbon dioxide instead of a fluoride. And there are endless applications one can put to use outside the fission reaction. But that reaction has to be safe, efficient, and sustainable. Once that criteria is achieved, the application possibilities are almost limitless."

"Yes, they are," Adele agreed. "And let me guess. Because they now have their theoretical nuclear wheel, millions of other innovators can patent new combinations of applications, allowing the magic of property rights to push the technology. Ahh, very interesting."

"Yes, for example, Amy and Harshil have had numerous conversations with ThorCon," Kasvi said. "And the advantage of building nuclear reactors and operating them from shipyards is compelling. Three quarters of the people on Earth live within 50 kilometers, about 30 miles, from the ocean. The reactors could be placed on small ships or barges and sent where and when needed. You'll also notice on the Atomic Garage's open-source work data, they've explained

how to build what they call an encasement basement using several designs based on the materials available in different regions of the world. Poured walls, clay, cinderblock, old shipping containers, or hulls of retired ships, there are at least 20 suggestions for how to build it. You can even make the reactor casing itself very hot instead of cool based on how the Sartorium is fabricated. A hot reactor casing will prevent any tampering by bad players. It would be like trying to steal a hot stove. Keeping the reactors shipboard or underground will help keep them hidden and inconspicuous.”

“Very creative, bravo!” Adele exclaimed. “In fact, Kasvi, the idea is not entirely new. Did you know the US sent a nuclear barge to power the Panama Canal with 10 megawatts of energy. That reactor operated there until 1976. And the Russians, Rosatom corporation, put a nuclear powership in the Siberian city of Pevek in 2019, and it’s still operating.”

“The bottom line, Adele, is that the reactor is going to work as Amy claims,” Kasvi reflected. “Maybe better than she claims. Their new alloy Sartorium was inspired as part of meeting Amy’s specifications for her SMR rather than stumbling upon the alloy and adapting to it. Everything related to this project has been forward thinking. It’s the best work I’ve ever seen in the history of nuclear energy.”

“Kasvi, it’s so exciting,” Adele said. “This project was conceived by scientists, with solid guidelines about power production and safety, but no other constraints or agendas. With no criticism of others working on advanced reactor concepts, they’re designed to comply with outdated regulations and approvals to move their projects along in years instead of decades. Regulators may not know what to make of Amy’s M-LFTR-VI.”

“Amy and Harshil are a formidable team. They wanted to first make the machine they know they can make, then find a faster path through the regulatory process.” Kasvi reflected.

“How old are they?” Adele asked.

“Amy is now 20 and Harshil is 23. Both incredibly gifted in the sciences,” Kasvi said as she realized the obvious. “You don’t think?”

“Ahh, a budding romance maybe?” Adele diagnosed.

“Oh my, wouldn’t it be a forbidden love? My head was always so into technology I had not considered a romantic possibility between them until now. Wow, talk about a meltdown,” Kasvi shook her head.

“Oh many puns come to mind. But two very attractive and smart young people working together in close proximity. What would a 20-year-old Adele or Kasvi do?”

“When you put it that way, Adele, it does seem like a relationship that could go critical,” Kasvi laughed.

Adele’s assistant walked out on the patio, “I am sorry to interrupt. Ariel Raquel and Levi Katz have arrived.”

“Oh excellent, please show them in,” Adele replied as she continued to laugh. She winked at Kasvi.

“Please do not get up my friend,” Ariel announced as he walked onto the patio with the towering Levi Katz in tow.

“I wouldn’t think of it. Please have a seat. A new pot of coffee is on the way,” Adele said.

Both men nodded to Kasvi as they took a seat. They had interviewed her for many hours shortly after her arrival in Israel. They had gained a deep respect for her knowledge, bravery, and her passion for leading millions of Indians out of poverty through education and opportunity.

“What did we miss?” Ariel asked. “We heard both of you laughing on our way in.”

“It was girl talk, Ariel. You don’t need to know everything that’s going on,” Adele said as she looked toward the other man. “Levi, what news do you have for us?”

Levi Katz smiled, nodded and opened the conversation, “Ariel and I did have a chance to talk with the prime minister about your proposal, Adele. Of course, when he realized this was primarily your idea, his curiosity peaked. So I just put it out there, ‘Israel will build hundreds of Amy Austin’s M-LFTR-VI devices, provided the seed HALEU fuel for each machine via the tamper-proof, proliferation-resistant cartridge meets our security standards. Then we’ll offer the technology to our Arab neighbors and Iran.’”

“You should have seen the prime minister’s expression. I thought he was going to throw something at Levi,” Ariel reported.

“But once he knew we were serious, he just sat there,” Levi said. “No questions. No comments. That went on for about five long minutes. An eternity. Then a few good questions came. ‘Are you absolutely sure these reactors are proliferation proof?’ Yes. The used fuel in the core is contaminated as far as making it into a nuclear weapon is concerned. ‘And each unit will cost about \$10 million US?’ Yes. ‘It really doesn’t require an onsite technician, it just runs itself using AI?’ That is true. We could have a small staff onsite, but it’s not necessary for safe operation. We can monitor remotely. ‘And you say we can assemble them on small ships and send them anywhere they’re needed?’ Yes, sir. Very similar to the diesel-powered generator powering most of Lebanon today. Only this barge would be using clean, inexpensive nuclear power. And ‘they can’t melt down, they’re what do you call it, walk away safe?’ They can’t melt down, prime minister, because the fuel and the coolant are already melted as part of the design. ‘And tell me again, how long can they run before they need to be exchanged for a fresh one?’

Twenty-five years. Then there was more silence. I had thought about offering some explanation for why we were making this unusual suggestion, but. . .”

“The prime minister knows, Levi. There is no progress, no peace without abundant energy,” Adele said. “That alone is not enough, but peace and prosperity grow from a garden of abundant and reliable energy. Israel may be in a unique position to provide that to the region through this new SMR technology.”

“In my younger days, Adele, I would have thought of you as very naive,” Ariel added. “But you’re right; the way to undermine the world’s despots is to put power, real thermal and electrical power, into the daily lives of the people. The pursuit of a better life, once engaged, is a force that even evil can’t silence or control. People just need a little elbow room to pursue that existence.”

Kasvi had no idea this was being proposed to Israel’s prime minister. But now she was totally fascinated. “Did the prime minister approve of the concept?”

“The prime minister didn’t give us a green light just yet,” Levi said. “He’d first like to see a demonstration of the system at work. Power generation, safety protocols, energy transmission, and a sample of industrial heat being utilized. He wants to see the model operate at full capacity for six months. It must be stable. He said Israel will help with the model, but doesn’t want to go it alone. He said if he could base the Weiss Proposal, that’s what he called it, on a working model not a lab experiment, but in use in open society, in just one other location, he might be able to get the Knesset, that’s our legislature, to consider it after they got over the initial shock,” Levi briefed.

“Ahh the chicken and the egg dilemma?” Adele proclaimed.

“I call it the cover your ass dilemma,” Ariel laughed. “Of course such a working model doesn’t exist yet.”

“True, not yet,” Kasvi interrupted. “But it turns out a concept demonstration is being planned as we speak. The only thing missing is the nuclear fuel.”

“Hey, we just stole about 100 kilos of that from the bad guys. We might as well put it to use. What did you have in mind, Kasvi?” Adele encouraged.

DRAFT

Tuesday, July 25, 2028, Hoboken, New Jersey

JOSH MANNING HAD TAKEN A BREAK AFTER FILMING THE SCI-FI MOVIE, WHICH WAS NOW IN EDITING. It looked like the name of the film was going to be *Origin IV*. But its release date was still undetermined. Josh thought 12 to 18 months was probably a good guess before the movie was in theaters or streaming into homes. It was going to be a big hit. The chemistry on the set was great from day one, and just got better and more fun as the project matured. The actors bonded and worked together as a great team. Hector Conrad, the film director, was almost singularly responsible for Josh's Best Actor Academy Award winning performance in *Brady*. Josh had just followed Hector to the next project. A good director is the key to an actor's success. Josh knew enough about the entertainment industry to realize that if you can find the kind of subtle leadership that turns a mob of highly talented people with voracious egos and agendas into a single force with a common objective, it was a very special moment. It was magic. Many in his business, with much longer careers, had never felt that kind of creative exhilaration and energy.

Josh looked at his mobile device. He was running a little behind schedule for his TEDx talk held at the Stevens Institute of Technology, SIT, in Hoboken, New Jersey. He liked to stay engaged with universities in the northeast that had committed to participate in the Consortium for Climate Risk. The Consortium advised cities along the eastern seaboard about climate friendly practices. SIT had been a longtime advisor to New York City on climate change. Josh had learned a lot about climate change from SIT over the years, a resource his grandmother had also tapped during her career as an environmentalist.

This would be Josh's first talk since his Michigan experience six months ago. He had allowed Shanta to manipulate him into that meeting with Amy Austin at the Atomic Garage. Shanta pleaded with him to go "into the lion's den and face the beast in person." The beast being the nuclear reactor not Amy. Shanta called it common-sense diplomacy, an act of wisdom that would inform him and raise his credibility at the same time regardless of the course of action he eventually pursued regarding nuclear energy.

She had told him, "I am only going to say this once because I feel I am the only one in a position to point out what many people in the environmental community are thinking and would probably like to say to you, but they're intimidated by your fame and antinuclear reputation. It's this: These new nuclear reactors deserve a look; they need to be understood and evaluated. The Earth doesn't have a lot of options or time left, Josh.

"And right or wrong, Amy Austin has earned the right for you to shine your substantial critical thinking skills on her solutions to create abundant clean energy. Come on, Josh, A teenager taking on a world famous movie star and environmentalist in a very public way. She reminds me of you. What if her nuclear reactor concept really is different? What if this young lady is right? Or what if she's wrong about them? Josh, you have to go and see for yourself and quit listening to a bunch of people around you who spend most of their time bitching about everything. Listen to Amy. Ask questions. Think objectively. What is that technology about, not in an uniformed combative mindset, but an open one with no agenda other than discovering what's true? Baby, all I want is for you to be sure that whatever you commit your heart to is true. Then guess what? You become the storm."

Josh thought, of course the events of those days are now part of history. Nearly 100 million Americans lost power. Some for weeks. Thousands perished from exposure to the

elements, and lack of modern medicine, medical treatment, or food. And all at the hands of ecoterrorists who were once an influential presence within TES, the environmental organization his grandmother co-founded. And Josh was there, at ground zero, as he watched a small team of big-hearted people use their creativity, smarts, and energy to save hundreds of helpless people in a nearby community hospital and, in so doing, introduced the world to a technology called atmospheric power transmission. Shanta and he had spent five full days at the Austins' before they could leave. And in what is often an overused cliché, the events of those days changed Josh's life. He was still trying to get his head around it all. One thing he couldn't let go of was that during that experience he was once again engaged with a team that worked together. A highly creative, action-oriented, smart and confident group of people who acted a lot more than they talked. He had loved being a part of all of it. This time it was real life, not pretend. And he had never felt more fully alive and useful. His core mission in life, to save the Earth was still fully intact, but he came out of that week a changed person, never to return to the person he was before that week. Never to see the world with the same perspective. Never again coming to the same conclusions.

Josh's mobile device chimed. It was Shanta. He looked at the time as his driver maneuvered through the busy New Jersey traffic. They had just turned onto Washington Street. He could clearly see New York City illuminated in the morning sun across the Hudson River.

"Hey Sweetie, we're just pulling up to SIT. I've only got a minute," Josh said.

"I just wanted to say, no matter what course you take now, I am 100 percent in your corner," Shanta said. "I love you. Now go rock the next generation," Shanta said.

"Thank you. I know I am supposed to be wiser and older now, but in many respects I feel just as mixed up about things as when I was 17 years old," Josh confessed.

“You’re just as horney as a 17 year old, I can tell you that,” Shanta giggled.

“Okay, see you really are a bad influence. Hey, I got to go. I’ll call you when this is done. Love ya,” Josh signed off.

The time from the car to the podium was a blur. One moment he was in the backseat of the limousine and the next sitting on the TEDx-branded stage behind the host of today’s event. The President of SIT, Dr. Fran Read-Moore, read through Josh’s brief biography as a crowd of nearly 1,000 students, faculty, and the media settled in.

Dr. Read-Moore decided to add her own two cents before turning over the mic to Josh. “Briefly on a personal note, Josh, your grandmother, Elizabeth O’Brian had a profound effect on my life. Through her books, as a young girl, she sparked a curiosity inside me about nature. That curiosity naturally led me into biology, then material sciences, and ultimately physics. Her passion has touched many lives, and for that, we are most grateful you keep her work and legend alive. There’s no need to rehash the events of the last few months other than to say we are honored that you accepted our invitation to speak, understanding this is your first public appearance since the massive attack on the United States’ electrical grid.

Josh nodded and walked to the front of the stage. “Thank you Dr. Read-Moore, it’s an honor to be here. You know, to be totally honest, I can’t recall what the subject was that I was supposed to speak about. Instead, I thought I might use this forum today to make an announcement. On the way here I got a call from TES headquarters and they informed me that the request from the North Rocky Point Nuclear Power Station, near Algonquin, Michigan, to extend their operating license another 20 years and adapt to using MOX fuel was denied yesterday afternoon by the Nuclear Regulatory Commission. They cited the tritium leaks as the reason. That will probably kill every other older reactor from following that same path to using

MOX fuel. The NRC had delayed their decision because of the grid attack and resulting black out, so we just got their decision now.

“I know some of the atomic physics students and faculty in this auditorium are painfully aware that is what I advocated for. I should be happy. I would have been,” Josh choked up. “I would have been, if I had not gone to the Atomic Garage and experienced the attack on our nation’s grid from that very close vantage point. I was actually there that night at the request of my partner, Shanta. She writes some kick-ass songs, you might have heard of her? Long story short, in so many words, she told me to get my head out of my ass and go see what Amy Austin is working on for myself.

“Physics is beyond my pay grade. But as I look around this audience, many of you are about Amy’s age. She explained to me in a way I could understand how nuclear fission works. She taught me the difference between the operation of a Generation II Light Water Reactor and Generation IV designs. She showed me other advanced reactors that use melted fuel as opposed to uranium pellets and rods. She calls her reactor, the M-LFTR-VI. She’s assembling it now with a lot of brainiacs like yourselves. I am sure many people know she is putting her technology and progress out there on social media, full open source. How many here are following her progress?

“Not surprising. Almost everyone. Does it deserve to be called a Generation VI reactor?” Josh asked the crowd. Nearly all the hands went up again. “It’s unanimous, it does. Although she’s trying to think up a better name for it. I’ll get back to that shortly.

“Although many environmentalists share a progressive streak, and more or less a somewhat similar worldview regarding climate change, we split on nuclear energy's role in the world’s future power production. As you know, I was a no vote. I’ve been antinuclear for as long as I can remember. My grandmother was antinuclear war, and antinuclear weapons, and I don’t

think she wanted to see any government using physics for destructive advantage. But she did once say, ‘the nuclear genie is out of the bottle.’ I guess I’ve spent my life trying to put it back in the bottle.

“As I was observing Amy at work and the incredible family and friends who surround and protect her, it occurred to me that my grandmother, Lizzy, would have just loved Amy Austin. Lizzy would have listened, asked questions, challenged assumptions, and thought about what she was learning. And you know what? If she decided the information was valid, and the facts no longer supported what she had thought all along, she would change her mind. And she always taught me to be open to changing your mind if new information or facts indicate. She told me there is no shame in learning and progressing.

“Everyone here at SIT knows what a LFTR is and how it works, right? Ha, again a majority of hands. You guys are scary, you know that? Well, I know how they work now too, and I also understand the role physics can play in getting our world to net-zero carbon. I don’t know when that will happen, but I know we’ve got to get moving in that direction pretty fast. Maybe nuclear, solar, and wind can fit together to be a clean reliable source of power. I’m not yet sold on anything, even nuclear energy, being a silver bullet. But I am on the side of building new nuclear reactors as safely as possible. And do it now. That is why I am going into New York City this afternoon and proposing to the Terrestrial Ecology Society Board of Directors, better known as TES, to reconsider last year’s proposal from the Atomic Garage Movement and support nuclear energy as a primary solution to climate change.” The crowd stood in an extended standing ovation.

“Of course, TES is very antinuclear. And if they don’t want to change their position on nuclear energy, I’ll respect their decision. But I will resign. Some of you may not realize that a

foundation exists in honor of my grandmother, called The Lizzy. I and a few friends started it up to be an awards element to TES; that's where The Lizzy Environmental Person of the Year Award came from. If TES doesn't want to support nuclear energy, I will expand the mission of The Lizzy Foundation to support nuclear energy as a primary path to achieving net-zero carbon." Another standing ovation. "And either TES or The Lizzy will ask the Nuclear Regulatory Commission to reconsider their recent decision about closing down the nuclear plant in Michigan, in light of the events of these past six months. The nuclear plant is not currently leaking any tritium; and even if it was, it's in such small amounts it poses no risk to the public. I am now convinced of that.

"Here's another reality. The nuclear industry really sucks at public relations. I know because I've been kicking their ass in that realm all my life. It's easy. But, if they could explain this stuff like you guys do, like Amy does, they could win over the world. And Amy is right, she should name her new reactor. I have a suggestion if she's listening. A short story first. Many years ago when I was just a small child, my grandmother, Lizzy, I called her Nana, that's all she was to me, Nana. I didn't know she was famous. We were at a park on a beach in southern California. She had wrapped me up in a beach towel under a small tree and hugged me. We both silently looked out at the Pacific Ocean for a few moments. She told me why I should love nature and the Earth. And she instilled that love of nature and a lifelong commitment to protecting it, in me. I often dream about those few moments. I can see and hear her so clearly. The sounds, the smells, the blue sky and cool ocean breeze are so distinct. Even her light scent of a flower that seemed to accompany her everywhere. I kind of transport myself back to that moment in my life when I need to calm down and refocus. I dream about it in color. I can't recall any other of my dreams in color. Everything was just beautiful. Breathtaking. A little boy in awe of all of life

around him. I've never shared this story before. Nana was silent for a brief moment after she finished what she had to say to me, and then she noticed something. It was on the branch of a sapling tree we were under. Something moved. It was an insect. It was camouflaged as a leaf to protect itself. It blended into its habitat perfectly; it was elegant and beautiful at the same time. The realization that it's alive kind of hits the mind of a little boy like a light bulb going on. Nana said, 'Oh, look Josh, the *Walking Leaf*.' I think that might be a nice name for a nuclear reactor. *Walking Leaf.*"

PART III

“Nothing in life is to be feared, it is only to be understood. Now is the time to understand, so that we may fear less.”

— Marie Curie

DRAFT

Twenty-Seven

Thursday, September 21, 2023, Recorded at the University of Michigan's School of Materials Science and Engineering, The Fastest Path to Zero Guest Speaker Series, Ann Arbor, Michigan, on (28.7 million views)

GUEST LECTURER, UNIVERSITY OF MICHIGAN ALUMNI, FRANK AUSTIN, PHD,
CO-FOUNDER, THE ATOMIC GARAGE MOVEMENT AND INVENTOR OF THE ALLOY
SARTORIUM.

I am here today to address just three questions.

1. How did it come about that India and China have a population in excess of 2.5 billion people?
2. How did technology first enhance their societies, and then diminish them, then enhance them again?
3. And finally, what in the hell does this have to do with climate change and nuclear energy?

Some 50 million years ago two large land masses from what is now India to the south and China from the north pushed against each other impinging tectonic plates far below the earth's surface. So much internal pressure was created that the energy was released skyward in an area geophysicists call the collision zone. The Himalayas and the Tibetan Plateau were formed. The plateau runs 1,000 kilometers (621 miles) north to south, and east to west for 2,500 kilometers (1,600 miles) between India and Tibet. It's the world's highest above sea level plateau

consuming 2,500,000 square kilometers (970,000 square miles). It's 4,267 meters high (14,000 feet) and is surrounded by some of the highest mountains on Earth, including Mt. Everest and K2.

The Tibetan Plateau is the rooftop of the world and contains most of the freshwater on earth in the form of tens of thousands of glaciers. All the great rivers and fertile valleys of India and China were born in the shadows of these mountains. In an agrarian time, the areas of the Earth with the most fertile river valleys had the largest populations. They needed a lot of farmers. As the Tibetan Plateau fed the rich valleys with fresh water, north and south of its heights. Over time, the largest populations on Earth took root. The people of India and China represented one half of the world's economy for 2,000 years, which is half of all human history.

As a result of those ancient fertile valleys, today 2.6 billion people live in India and China. That's four out of every 10 people on Earth coming from that part of Asia. The Tibetan Plateau provided the two countries with a geographic barrier nearly as intimidating as the oceans that separate the United States from Europe and Asia. That made massive armed conflict difficult. So people born and raised in these valleys had time to live in peace and plenty, and thus concentrate on improving their standard of living. Both of these cultures contributed greatly to the education and spiritual development of their people, and the artistic expressions of their cultures. Those histories continue to inform us today.

Then the industrial revolution started in the western world around 1750 and ran to about 1850. People started using machines; they opened the world to chemical manufacturing; they produced iron and discovered steam power for transportation. Textiles started to be mass manufactured. The East India Company ruled India and opened trade routes between western Europe and the Orient, forever changing those cultures via trade and imperialism.

Farming became mechanized in the western world thus requiring less people to work the land, which provided them with more time to read, socialize, experiment, and think. In other words, they had time to make their lives better beyond the requirement of basic sustenance. In the year 1820, India and China still represented 50 percent of the world's economy. By 1952, just 132 years later, they represented less than 10 percent. The United States, on the other hand, represented near zero of the world's economy in 1820. Coming out of World War II, by 1952, the United States represented 30 percent of it. No longer did having the greatest populations translate into having the greatest economies. Our grandparents probably perceived those once great civilizations of India and China as crowded, poor, third-world countries.

In 1837, Charles Babbage set the world down yet another path. He invented the first mechanical computer, the Analytical Engine. It utilized an arithmetic logic unit (ALU). It was basically the first programmable computer to do math calculations. Almost 100 years later, the first digital computer called ENIAC came into existence and used vacuum tubes. Going into the 1960s, semiconductor transistors came into being. By the 1970s, integrated circuits led to the development of microprocessors. In 1980, the first commercially scalable personal computers came into being. Today each of you have more computer power in your mobile device than all of the greatest super computers through the turn of the 21st century. Each of your mobile devices can perform over 11 trillion operations per second. You have instant access to all the knowledge humans have ever produced throughout history.

As we moved from a mechanized-powered society to a digital-powered one, something else was happening. Technology was putting computer power in the possession of anybody, anywhere in the world. It was becoming smaller, faster, more powerful, and less expensive. This was also happening in Asia, and so the productivity of their people soared. As recently as 1978

China was still poor. Its gross domestic product was about the size of Zambia's. Since then, its GDP grew 10 percent per year. By 2014 it had lifted 800 million people out of poverty. They did that with coal, today China has more than 1,000 gigawatts of coal power capacity installed. By 2015 China and India were back to 20 percent of the world economy. Today China is the world's largest economy and will overtake U.S. domestic product around 2035.

India now with a population of more than 1.3 billion has grown its per capita consumption of electricity from just 34.2 billion kilowatt hours in 1970 to more than 1,250 billion kilowatt hours today. They also did that with coal. India only has 200 gigawatts of coal power installed. They'll work at adding more coal power as fast as they can, but realize they need to transition to burning their limitless supplies of thorium in advanced nuclear reactors.

In many ways, the geopolitical chessboard of that area of the world remains unchanged from the days of the East India Company and the British Empire. Each shipping lane is a choke point where China is applying pressure, and India is pushing back. The key commodity today, the one element essential to growth and prosperity, is energy. These countries need a lot more of it, and they need it fast. So far coal has been the go to source for producing more power generation. But ultimately the resulting smog taxes the population to the point of revolt.

China and India, unlike the United States, are fully committed to developing nuclear energy in both word and deed. They're pulling out all the stops. India is working on factories right now to build LFTRs, small reactors that burn thorium, which they have in more abundance than anywhere else on the planet. But thorium is everywhere; it is extremely dense; and we will never run out of it. Thorium-powered reactors to India means they can close their fuel loop within their country. They will not only become energy independent, but energy wealthy. And I've heard various estimates about how many new reactors are under production in China. People

who know tell me China plans to have 400 advanced reactors in full operation by 2035. But, Bob James, a person whose opinion I take to heart, thinks China is about to build thousands of these things in factories.

The ramifications of India and China becoming nuclear energy superpowers are mind boggling. The development raises far more questions than we have answers for. What will the geopolitical chessboard look like in Asia? How will India, China, and Russia carve up Africa? What will Europe do? What will be the United States' role as developing nations activate thousands of small nuclear reactors? In many ways, nuclear technology is the next progression for the world's economies. It's the next dense fuel in a historic arc that moves to ever denser fuels. Once again, technology becomes smaller, more powerful and cheaper. In the world of energy it seems to happen about every 100 years give or take.

There's a couple takeaways here. First, people who say we will not be able to mitigate the effects of climate change without the participation of India and China are correct. But India, China, and Russia to an extent are on a long-range path to move away from fossil fuels faster than the west. I don't for a second think India's and China's commitment to nuclear energy has anything at all to do with climate change. Coal is available to both countries, but the rest of the world will eventually sanction them for using it, and their own people will push back because it pollutes everything. Advanced nuclear reactors are reliable, safe, and will be very inexpensive. For some clue on how fast these countries could transition from coal to uranium and thorium just look at what happened to car production once Henry Ford invented the assembly line. In 1908, the first Model-T sold for \$825 dollars, about \$27,000 today. By 1925, it sold for \$260, about \$4,500 today. You're all familiar with Moore's Law for understanding the growth of

computational power. Basically a laptop computer today is about 98 percent cheaper and over 1,000 times more powerful than in the 1980s.

Now think of nuclear energy. We've got 80 years experience with it. It's near its 100-year anniversary, the time it takes society to transition to the next dense fuel. Now we're about to mix Ford's assembly line to build the hardware, with Moore's Law to establish advanced thermodynamics, at exactly the right point in history. Only this time, in my opinion, India and China, and maybe even Russia will be the ones to supply the world with nuclear energy technology. For the United States to lead, it would not take a technological breakthrough. The United States has the best nuclear energy technology in the world, and always has. But regulations born of unjustified fears keep our nuclear energy horse in the gate as the others break for the first turn.

My friends, the United States must lead the world in energy technology. Although we have a robust community of private companies building various Generation IV reactors, we now have no Generation III Reactors being built after Vogtle I and II in Georgia. The Nuclear Regulatory Commission is unable to grasp the innovation in advanced nuclear energy, making technology producers adapt their designs to old technologies. An image of a horse pulling a car comes to mind. From concept to approval, the NuScale Small Modular Reactor had to clear many barriers. Rather than bore you with the details, those barriers cost NuScale \$1.4 billion to clear before they got their first approval from the NRC. The hurdles for American nuclear innovators isn't technology, it's regulatory insanity.

Without the United States as the major player in Generation IV and beyond nuclear energy production, that void will be filled by India, China, Russia, and others. Watch the continent of Africa closely. It's the only place on Earth where population growth is occurring.

The continent is rich in rare earth minerals, and it's geographically gifted. The US should be making Africa a foreign policy priority and using nuclear energy as a way to establish long-range strategic relationships there. Leaders of developing nations know the US puts safety first, produces quality, is the most likely of all partners to prevent nuclear proliferation, and will value and protect the natural environment while raising the standard of living for all people. Given a choice, most foreign leaders would prefer to work with the US in helping to achieve energy equity for their citizens. But that's a lecture for another day.

Our nation's lack of historical awareness is creating a loss of diligence in not pushing innovation and killing or slow-walking promising new technologies. We're putting our kids at risk of growing up in an environment where they'll follow technological progress instead of lead it. Where their existence will be a life of diminishing use of energy and along with that loss, declining economic opportunity and quality of life. Their lives are now on track to being complacent, timid, unquestioning, and fearful. They'll find themselves being chronically behind the curve in the arena of global competition. They'll be in a constant state of catching up, of getting by instead of leading. Imagine your grandkids stealing technology from China instead of the other way around. But if we lead now with American technology and the civil liberty based values exported with it, the world will be a better place. Ladies and gentlemen, we have to get our act together and fast. Thank you."

Wednesday, August 28, 2028, Berkeley California, TES World Headquarters

Carson McMullen clicked off the big flat screen as the five-year-old video image of that dipshit hick Frank Austin faded away. He looked around the table at TES's Board of Directors. It had been a donnybrook at last month's board meeting in New York City when Josh Manning

bushwhacked the board by publicly announcing his ultimatum to a bunch of snowflakes at the Stevens Institute of Technology. Manning had suggested the board watch the old video of Frank Austin as part of their deliberation on his “proposal.” Carson almost bit through his lip on that one. But the board acquiesced. Sheep people. TES needs to go pronuclear, or pretty boy Josh Manning would resign. That was being decided now. Carson had always thought too much stock was being put into the actor. Carson thought a high-profile debate to shut down the Michigan nuclear plant would test Manning’s loyalty to TES and cement him into the role of an avid advocate in the fight against climate change rather than some objective intellectual moron he was slowly becoming. Josh had been put on the fast track to become the face of TES and now that strategy had blown up.

Carson knew the international issue of climate change, which he had a big part in cultivating, was the best vehicle to finally topple the corrupt capitalistic system that turned too many hillbillies into billionaires and made everyone else grow lazy, fat and stupid. Then they procreated. Righty-tighty, time to cut back on the consumption, stop having kids, and phase your sorry asses out of existence. In the past, he often made public comments that people just needed to stop having children for one generation. When he got a little carried away, he referred to humanity as locusts eating up the planet. More recently, he tried hard to get those video links out of circulation. Clearly, it was a regrettable lack of discipline to share what he really thought.

This damn video by Frank Austin hit on the primary motivation for more people giving nuclear energy a second look – if the United States doesn’t build out nuclear energy around the world, the Chinese and other countries would. Even Walmart shoppers buying cart loads of Chinese products didn’t like that idea.

It was the environmentalist tree huggers who started focusing on the issue of global warming in a big way. Apparently NASA served as the birdie in the mine. After 20 years of studying the Earth's climate via satellites put in orbit in the 1960s, one day in 1988 a NASA guy named Jim Hansen woke up with his hair on fire. He testified to a US Congressional Committee that global warming has started as a result of human activity. A few years later, the guy went pro nuclear energy, so he wasn't much good to TES. His testimony turned into a news alert; the Earth was heating up too fast. How did they know? Computer models of all things. A real-life crystal ball that a collection of savvy groups could use to direct government funding. They pegged the rate of atmospheric warming to carbon dioxide emissions. Brilliant. As Carson studied the history, to his amazement the tree huggers had indeed achieved significant traction with politicians, academia, non-governmental organizations, and the media over the then brand new issue of global warming. Of course, the same people thought the world was going to freeze over in the 1970s. But why quibble. Now those same folks were okay with cutting down old forest to burn wood for energy and call it biomass.

Carson really didn't give a rat's ass about the trees anyway. A sacrifice for the greater good, ecological casualties of war. We could grow more trees later. His focus was population control, but he had to approach that objective discreetly. For that to happen, smart people needed to be in control of the masses. The people in charge of things now had a collective IQ of a zucchini. He didn't believe for a minute that retreating populations in the developed world were happening fast enough, or at all. The Earth was way over its maximum capacity even if the population was reduced by a couple billion mouths. But demographic data made for great talking head fodder. China will collapse, Japan is doomed, bla, bla, bla. Idiots. China will just replenish their population with test-tube babies, or intelligent robots. Or take over Africa. Do they really

think the CCP will just sit there and say, “Gosh, we don’t have enough worker bees and consumers, guys.”

As it turned out, the concept of global warming proved to be a hard sell in the upper midwest of the United States, and most of Europe during winter months. Carson didn’t come up with the term climate change. It originated in 1979 when the National Academy of Science was trying to explain how carbon dioxide caused long-term changes in the Earth’s climate. Carson picked up on its scattered use of the term 32 years later. He started by correcting journalists that they were using the wrong words to describe what the science showed. Then he’d refer back to the 1979 paper. The politicians and media, having been blasted by climate deniers anytime a blizzard occurred, dropped any reference to global warming like a hot rock, and the term climate change found a home in their style guides. When it gets too cold, now that’s climate change too. If the weather gets nasty anywhere, guess what? Climate change. Kind of fun really. That slight change in phraseology was a lesson to Carson on the power of language. After that, he excelled at defining the agenda’s and the messaging of the cause he lived to fight for. Get control with other smart people. Confiscate and redistribute the capitalists’ ill gotten gains, then vastly reduce the number of people around the globe.

But in a ‘you can’t make this shit up turn of events,’ nuclear energy in spite of its radioactivity started to be given more positive press. Even Jim Hanson, the father of global warming hysteria, went pronuclear energy in the all-consuming agenda of reducing CO2 around the world. The mantra goes like this: Nuclear puts out a lot of power without producing CO2. Maybe nuclear energy deserves a second look as a solution to climate change?

Carson and TES didn’t need thousands of machines out there reducing the metric for CO2 emissions. So he focused on the industry’s Achilles tendon which he had a hand in

exposing then slashing at over the years. It was the budget busting, decades long, upfront pain of bringing a new nuclear plant online. His predecessors at TES had intentionally and successfully added enormous costs and time to building nuclear plants via putting up regulatory hurdles and suing everyone and everything involved with nuclear energy production.

Thanks to roundabout funding from some big oil interests that viewed nuclear energy as a competitor rather than a fuel option, the antinuclear agenda dominated the media. By the late 1980s, nuclear plant owners found they had to spend hundreds of millions of dollars in the planning stages of designing a new plant, and then build in up to four redundancies for every critical piece of equipment, and keep it all maintained for operational capability. They also had to deconstruct newly built rebar-filled concrete to comply with new regulations that went into effect retroactively. That more than doubled the price of building one of these power monsters. As far as the existing ones, Carson thought, those pocket-protector-wearing, crew-cut, white guys of the 1960s and 1970s made the damn things to last 100 years. They must have built pyramids in their previous lives. Who the hell put the geeks in charge of stuff?

So today Carson decided the focus had to stay on that high cost and time to build a new nuclear plant as a nonstarter. It meant nuclear not now, and could not get to scale soon enough to mitigate climate change before the seas washed over the sandy beaches of Florida, which the dumptrucks hauled to the coast from the interior. Numerous think tanks and liberal media outlets funded by the renewable energy lobby had done an excellent job of getting that high cost and long build time message across, and he would repeat that lesson to these dumbasses in front of him now.

“Look my friends, I understand,” Carson acknowledged as he rubbed his bearded chin. “And I think it was a great idea for this board to view the video of Frank Austin’s old speech

which has recently become popular and is unarguably a reason so many people are thinking about nuclear energy again. But the bottom line is the same, nuclear plants are too expensive to build, and they take 20 years to complete. Are we really at a point that we believe a 20-year-old woman when she says she almost has a model of a magic new nuclear reactor done? It's all smoke and mirrors, a fantasy. Even if the thing works, believe me, they're going to be extremely expensive to ramp up to scale. And they're so small they'll need literally tens of thousands of them. What do you think is the likelihood of that happening in your lifetime? If we let the politicians start jumping on the nuclear energy bandwagon, our adversaries in Congress will cut federal subsidies to renewable energy sources. And let us not forget that it's renewable energy companies that still fund this organization."

"But Carson, we owe Josh a decision in a couple days," one board member reminded everyone. "He made one hell of a good argument on the risk-to-benefit calculation of nuclear producing baseline CO2 free power. And he even pointed out that renewables actually do utilize a lot of fossil fuel during their mining and fabrication stages."

"People, you know how I feel," Carson took over again. "We should thank Josh for what he's done for us over the years. But going pronuclear would be the opposite of who we are. It's a lose, lose situation. The next time there is a nuclear reactor accident, and you all know there will be, we'll be complicit. If another country joins the, 'Hey, look we've got a bomb too' club, we'll be complicit. If Africa and other third-world countries pursue these mystical advanced reactors to generate power, they will have squandered their ability to leap from the Stone Age into a renewable energy future, and we will again be complicit. Let's keep building out wind and solar as fast as we can. Pronuclear energy advocates, by their own admission, think the density of radioactive uranium and plutonium cancels the need for all the above solutions to climate

change. They're not going to play nice; they think their nuclear reactors are magic. That means the end of wind and solar subsidies, and the end of TES right along with them. And when it doesn't work guess what? We go right back to burning coal and natural gas."

A woman at the other end of the table spoke up, "I agree with Carson. We should cut Josh loose, double down on our antinuclear campaigns, and push like hell to make sure the NRC doesn't reconsider their decision to renew the operating license for that Michigan plant. We should also come up with a strategy to marginalize Josh, he's in a position to do a lot of damage now to this organization and our causes."

The conversation went for another 20 minutes. Everybody had been conference calling, emailing, and talking endlessly about Josh's ultimatum. The media was camped outside TES headquarters waiting for the answer. The topic was beaten to death, and everyone was sick of talking about Josh Manning and the Atomic Garage. A motion was seconded, the board voted 12 for, 3 against to let Josh go. He was now a footnote in TES's long history. antinuclear campaigning was given the highest priority for the foreseeable future. It was time to step up and fight.

Carson smiled for two reasons. The TES Board of Directors vote went his way by the margin he needed. And he was pretty sure now that his secret role in attacking the United States electrical grid died with Jayla Smith-Ahmed.

Twenty-Eight

Saturday, October 21, 2028, Gulf of Mexico, New Orleans, Louisiana

HANK BOUDREAUX WAS HAVING A HARD TIME CATCHING HIS BREATH. He was laughing so hard he thought he was going to piss his pants. Gerald Griffith, a lifelong banker, had just hooked what was probably a king mackerel and was trying to get up and hand his pole to Hank. Gerald had said he had never even been on a boat before today, and now Hank believed him. Gerald tried to stand up to get away from the pole, but the first mate set him back down and strapped him in the fighting chair. Then the first mate laughed and spat out a quick phrase in Louisiana Creole, “Man up my friend, or I’ll chop off your testicals and use them for bait.” Then he winked at Hank.

Hank responded in the same language of the streets to the first mate, “If you cut a half inch off that guy’s pecker, he’d have a scab on his ass.” The common macho putdown sent the first mate into a fit of laughter.

The captain of the chartered deep sea fishing vessel had been trolling along an undersea cliff where he knew the imported game fish loved to hang out. It didn’t take long to get a hit. After about 15 minutes, two other guys’ lines got hit. Gary Daringer, an avid fly fisherman, was enjoying his day deep sea fishing on the big salt, as they called the Gulf of Mexico in this area of the US. It was a completely different experience than fishing inland rivers around the world. He caught a snapper. Francesco La Rosa, a lifelong fishing boat owner himself, and an avid deep sea fisherman had spent thousands of hours off the coast of New Jersey fishing for striped bass, Atlantic croaker, black sea bass, and red drum. Today, he was expertly reeling in a good-size grouper and enjoying every minute of it. Dinner would be great tonight.

Christian Sabastian was nursing a cold Ghost in the Machine IPA from Parish Brewing while learning about fishing, navigation, oil drilling, and hurricanes from the charter captain. Christian knew that charter boat captains knew the history, ecology, wild life, waterways, and political shenanigans of their homes better than any think-tank dweller, environmental activist, journalist, or college professor. Both men turned to the stern when a loud roar of laughter and applause went up as Gerald landed his first fish in his four-plus decades of life.

Hank thought it would be a good time to announce the next surprise adventure.

“Hey guys, we’re headed in now, but Rhonda organized another activity for us I think you’ll enjoy,” he announced. “A big yellow crew copter is picking us up back at the Marina. We’re going to fly out to Chelsea Resources Deepsea Production Platform, DPP2, and go on a tour. Rhonda’s father, Rex, was part of the early planning and lobbying to get that monster built, and Chelsea Resources still maintains a contract for part of that massive operation. Even though the rig went in 2014, about six years ago, they changed its name because people kept mixing it up with the Deepwater Horizon that blew up in 2010. Rhonda got the naming rights in honor of her father. The problem is every damn Greek and Latin god or name and acronym for being big is already taken by someone in the energy industry. So she kept it simple. It’s known as DPP2 now.

“Even though you work in or with the energy business, you can’t appreciate the technology until you see one of these things in operation,” Hank continued. “It’s going to be a 130 mile flight, which should take about 50 minutes. It’ll be fun and give us a little more insight into what actually makes modern life possible. And we’re getting a personal tour from the top dog out there, Company Man, that’s what they call the person in charge, and this time a she, Meg

Caldwell. Rhonda insisted Meg be one of the operators out there. The roughnecks can't say enough good things about her. I think you'll enjoy this."

"Now, a helicopter I can do," Gerald blurted out.

"Gerald, this isn't going to be like that flying luxury crib you take from the Hamptons into NYC everyday; this is a roughneck crew chopper," Hank said.

"That's fine with me. Just get me off this damn lil boat and away from that cutthroat pirate you call a first mate," Gerald demanded.

"Gerald, this little boat is 47 feet long, you talk like you're in a dingy," Fransico La Rosa laughed.

"How long before we get back to the marina? I feel like puking," Gerald announced. Everyone took a step back.

"Stay on the deck outside," Hank instructed. "Breathe fresh air, you'll be fine. We're about 45 minutes out."

As the charter turned northwest to head back to the marina, Hank maneuvered to get a little private time with Christian Sabastian. They headed over to the port side of the flying bridge and leaned against the railing. Chris retired from the US Army after 20 years with the Military Intelligence Corps. He was 45 at the time. After monitoring how energy related cash flows move around the world as he served his country, he knew he wanted to be part of that industry. So after his discharge he immersed himself in the energy business. Within six years, he was a partner of Raffael, Barton, Hernandez & Sebastian Energy Partners, LLC. Now in his mid 60s, he was at the top of his game, making millions of dollars and keeping his customers very happy.

"Chris, what is it you said the special forces guys say when they get in an unexpected scrap?" Hank asked.

“Why? Are you thinking about serving, Hank?”

“Maybe, in my own way,” Hank replied in all seriousness.

“Okay, good. They say if you find yourself in an unexpected fire fight you’re being ambushed. Disengage if you can,” Chris shared.

“That’s a good rule,” Hank admitted.

“Yea, but nothing is more pathetic to hear little fat ass executives and politicians who have never served spouting off about the military strategy of SunTzu, and about fighting this and that, or fighting for the people they represent. Most of them have never been punched in the nose their whole lives. You know the saying I like most that really applies to all of us?” Chris dared.

“No, I’d love to hear it,” Hank said.

“Mike Tyson said it, ‘Everybody has a plan until they get punched in the mouth.’” Chris quoted.

Both men had a good laugh. Chris then got to the issue they needed to talk over, “You still think that raid on the US electrical grid was a distraction, that the primary target was The Atomic Garage and the Austins?”

“I am not sure, it’s complicated, the jury is still out.,” Hank said. “What have you learned since our last communication?”

“Here’s what I know,” Chris exhaled. “The raid on the US grid was pretty well planned. It’s obvious some thought went into it, but the physical assaults were not conducted by tier one operators, more like competent amateurs. It was eerily similar to the attack on the Metcalf transmission power substation near San Jose back in 2013. They never caught the perps. The hacking stuff did have the footprint of a nation state, probably Russia. The FBI seems almost exclusively focused on the hacking part of attacking the grid. Some speculated it might have

been the Chinese posing as Russians. The FBI probably thinks the physical attacks were homegrown nut jobs who were duped. That part of the investigation is moving slower.”

“Makes sense, I guess,” Hank pondered.

“Since none of the other grid attacks that night resulted in any arrest or killed in action, there seems to be a little void in the investigation,” Chris pointed out. “I did a little background on the dead and the captured citizen terrorist who messed with the crack security guys in Michigan. The bad guys were about the right age to have been involved with the 2013 Metcalf grid attack. All that were involved in the Michigan assault were part of a TES splinter group. Ancient history now. Archie Ricard was captured by Gifford’s guys who were protecting the Atomic Garage, which you witnessed. As you’ll recall, Ricard was humping it across the Odina State Park in the middle of a blizzard, in a beeline toward the Atomic Garage when he got intercepted.”

Both men paused and enjoyed the expanse of the Gulf of Mexico as they looked toward its western horizon.

“Derek Gifford is extremely well connected and highly respected within the special forces community,” Chris continued. “The guy is one of their legends. And his company, Michigan Wolverine VIP Security, is in huge demand. Derek told me Ricard acted like the leader of the cell, but we both agreed it took more synapses than Ricard could fire up. But that dead gal, Jayla Smith-Ahmed, killed near that node serving the two power plants did time in a federal pen. She was the one Carson McMullen interviewed while she was serving time. She was part of the group planning to blow up the Alaskan pipeline in 2006 when the FBI intervened.”

“Do you think she announced she was thinking of doing that during career day when she was in grade school?” Hank huffed.

“Green radicalization and indoctrination of her while still a child would not be unheard of. I’ll bet she thought the Earth was being destroyed, and everybody might die if the planet kept heating up,” Chris reflected.

“Well, there is that. From her perspective, her future was an unfolding apocalypse. She had to do something radical,” Hank tried to empathize.

“Anyway, back then two other guys went to prison for that little Alaskan pipeline escapade with her: Paul Ronkowski and Harley Beckley each served a full term of seven years,” Chris reported. “Ronkowski and Beckley seemed to have behaved since getting out of prison. They’re each leading exemplary lives now. I don’t think they’d have anything to offer. They may know who was at the Metcalf substation attack because they were probably recruited. But Derek and I decided to let those two sleeping dogs lie for now. Why risk tipping off anybody that we’re on the hunt?”

“Okay, so here’s what I’ve got so far for my homegrown TES terrorists roster involved in the physical Michigan grid attack,” Hank pulled a sheet of paper from his pocket. “The Rock’s security detail killed Jayla Smith-Ahmed and Jason Crimmins. They captured one, Maggie Hinckle. Derek Gifford’s folks captured Archie Ricard, and killed Byron Montgomery who posed as the chauffeur for Josh Manning and his partner, Shanta. Maggie Hinckle and Archie Ricard are idiots. But there is a brain and resources beyond this group. Maybe it was Smith-Ahmed? I just don’t think it’s Russian operatives. Still, how did they know how to line up Byron Montgomery as Josh Manning’s and Shanta’s ride from Ann Arbor to Algonquin that night? Josh had told me Shanta had arranged that visit at the last minute, and Montgomery flew all the way from Texas to pick up those two in Ann Arbor, posing as their limo driver.

“We think it was that TES asshole McMullen who arranged that,” Chris said. “When Max Stevens, Algonquin’s sheriff, saw Montgomery’s picture in the news, after the grid attacks, he called Derek. He had recalled Montgomery’s face. Turns out there was a purse snatch in Hookstraw Park during the debate between Amy and Josh last year. The sheriff had gone through the security video to try to run down the perp. He noticed Carson McMullen in the crowd. The person next to him, who he obviously knew, was Byron Montgomery. The FBI told Derek that Josh had not told McMullen about his impromptu visit to the Atomic Garage. But Josh did tell TES’s top antinuclear activist, Bonnie Fogart, back at the Berkeley office two days before that trip that he suspected Shanta was setting up a surprise Atomic Garage visit for himself and Shanta.”

“It’s possible then that McMullen got that information from Fogart?” Hank thought.

“Not only possible. Highly likely. Turns out McMullen and Fogart are a thing,” Chris shared.

“Why, that little pecker, McMullen called a hit on Amy Austin, and maybe Josh Manning too,” Hank fumed.

“I agree,” Chris nodded. “Derek says the FBI thinks McMullen might be good for a first place trophy as America’s number one domestic terrorist. Meanwhile, Derek tracked down Smith-Ahmed’s former cellmate, Brittany Harper. She got out a year before Smith-Ahmed. Apparently, six months later Harper showed up at a Baltimore drug deal that went south. She was one of the shooters who survived. She had a leg wound and couldn’t flee the scene. She was operating on the periphery of the Mexican cartels. She’s back in for life with no possibility of parole. Derek promised her a more comfortable existence if she helped him.”

“Damn, that’s good work,” Hank conceded.

“Supposedly, according to our little jailhouse rat, Smith-Ahmed bragged that Carson McMullen was putting together her plan to take down the entire US grid years ago. She said McMullen was Smith-Ahmed’s puppy dog. But the trail kind of ends there for the moment. What do you want to do with this?” Chris asked.

“It’s pretty thin, circumstantial evidence at best. Let’s keep it in our pocket for the moment,” Hank suggested. “It sounds like the FBI is on it.”

Gerald Griffith leaned over the starboard rail of the rear deck and puked. The rest of the guys exchanged hundred dollar bills as the losers cussed at Gerald. The not pukers got two-to-one odds but still lost the bet.

“Shit, at first I was scared of dying, now I am scared I won’t. How much longer before we’re on shore?” Gerald asked as he wiped his mouth with his sleeve.

“Hang in there, buddy. We’re about to come off the Big Salt now, just a few more minutes. I’d be happy to take you fly fishing someday, you won’t get sea sick doing that,” Gary Daringer offered as he tossed a clean towel to his suffering shipmate.

The big yellow crew chopper flew over the charter fishing boat, and landed at the marina a half mile down the waterway on a helipad usually reserved for the Coast Guard.

Chelsea Resources Deepsea Production Platform, DPP2. The Gulf of Mexico

MEG CALDWELL SURVEYED THE GROUP OF GUYS STANDING IN FRONT OF HER.

She raised her voice against the hum of the equipment and the wind.

“Gentlemen, welcome to DPP2, one of the largest offshore, deepwater oil rigs in the world. We have two rules for our tours. Don’t touch anything, and do exactly what I tell you to do. If you break either of those rules, we’ll throw you off the deck and into the Big Salt.”

“If I was here about an hour ago, I think I would have jumped off willingly,” Gerald announced to a round of laughter.

“Well that would be a 16-story leap, a little north of 400 feet,” Meg revealed. “The Gulf floor out here is 3,100 feet down. And beyond that we’ll drill another four miles to hit the oil reserves. Advanced, chemically engineered types of insulation called High Density Polyethylenes (HDPE) inside our various 16-inch rotationally lined caissons, which defines our piping systems and make all this very deep and cold work possible. One of my favorite t-shirts says, ‘Hug A Chemist.’”

They walked along as Meg narrated the tour. “We have 345,000 square feet of deck space. The rig weighs in at 120,000 tons, about the weight of 300 jumbo jets, and the whole rig floats in place controlled by computer-monitored thrusters. It’s much more accurate than trying to anchor her. We also have our own 150-megawatt power plant using natural gas coming from the well mixed with diesel fuel stored on the rig. That’s enough power for 150,000 homes give or take. We like to mix the fuel for our own power generators at 50 percent natural gas from the wells. That’s gas that in the past would have been flamed off. We mix it with 50 percent diesel

fuel. But the Feds want to see less diesel in that mix, which makes it a technological challenge we don't have time to deal with. A total pain in the ass I was just working on when you guys came aboard."

"You have our complete empathy on dealing with that kind of micromanaging nonsense," Hank boomed over the background noise of the working well.

Meg nodded and continued her presentation, "We desalinate all the water we consume in drinking, bathing, and cooking. The water used in operations for cooling equipment and fluids comes from 2,000 feet deep. This allows us to use much less water and run more efficiently. Our underwater drills, intakes, and sensors move slow enough through the water in the depths where small, fragile, swimming sea life migrates so those little guys have time to move out of the way."

"Hey, I thought oil drillers were evil. You mean you go out of your way to respect wildlife. They forgot to include that in the grade-school lessons my kid brings home," Gary Daringer vented.

Meg smiled and continued, "It took 25,000 people from more than 30 states to build this rig. South Korea's Samsung Heavy Industries built the hulls of our four floats which were also a big part of the construction. It took seven years and 15 million man hours to complete DPP2."

"How much oil do you guys capture?" Christian Sabastain asked.

"We call it barrels of oil equivalent or BOE because a lot of what is captured is gaseous," Meg explained. "We do about 100,000 BOE a day and will extract more than one billion BOEs over the rig's life, which should be about 2050. We liquify the natural gas and then pump it and the oil via seafloor pipelines dedicated to each product to our nearest shallow water rig, which links to the dryland storage facility and refinery in the Port of Houston. Uncle Sam will realize 25 billion in taxes over the life of DPP2."

The group of six walked along with their hard hats and safety goggles on, looking at the massive equipment and just one shift of the nearly 200 men and women who lived 24/7 on the platform.

Meg picked it up again after everyone entered the massive control room, “We have 24 well slots. They connect to a subsea tree system then branch out to their designated reservoirs. Those systems represent a \$2.5 billion industry on their own.”

A visual of the undersea infrastructure was presented in a clear animation on a big flat screen monitor.

“We’ve come a long way from those 106 foot wooden oil derricks that drilled a single 60 foot deep hole at the dawn of the 20th century,” Meg remarked.

“What about waste?” Francesco La Rosa interjected. “You must have some contaminated water from the drilling, not to mention the massive amount of waste from supporting a 200 person crew out here.”

“Good question. Chad here is a Senior Process Engineer, you want to take that last question?” Meg offered.

“Sure, welcome gentlemen. Here’s the executive brief on DPP2's waste and recycling systems. Our goal is to continuously separate the solids from the liquids while keeping the drilling fluids flowing. We’ve got a big mixer. We collect the solid materials in the fluid using polymers and surfactants. Kind of a fancy way of saying we make mud balls. Then we centrifugally separate those solids. Those solids and contaminated liquids are stored respectively in cylinders in our floating hulls. When full, we remove those to a special transport ship that also brings us empty cylinders to do it all again. As far as the crew, 70 percent of all our waste is recycled.”

“Chad, what’s it like living out here? What do you do when you’re not working?” Gary Griffith asked.

“The shifts are 12 hours on and 12 hours off. We’re out here for two to three weeks at a time. There is a good amount of time dedicated to best practice safety training like evacuation procedures, surviving in the water, fighting fires, First Aid certifications, and spatial awareness.”

“Spatial awareness?” Francesco La Rosa questioned.

“It means knowing what is going on all around you all the time,” Chad answered. “Use your senses; see, hear, smell, feel, and trust those senses. Everything on an oil rig presents in its own unique way. When something is off, people can sense it immediately. It’s like not depending on your rear camera and brake system on your vehicle. Look in your mirrors as well. These rigs are safe to operate only because we all put safety first.”

“What do you do for entertainment?” Christian Sebastian wondered.

“I can speak for myself. I am never bored out here. This is really a small city. We’ve got great chefs aboard, and you can even hit a fully stocked self-service canteen anytime of the day or night. The food is great, well prepared, and healthy. We’ve got a fitness center and a full-time wellness coach available to us. There’s a clinic if you need it. There are no windows inside, that takes a little getting used to. And most of us share a room. But just when you think you’re about ready to strangle someone, it’s time to go home again. I think for the most part people who work on deep sea rigs work well together and there is incredible mutual respect. You’ve got to trust one another out here. And you never forget this rig is a technological miracle, only possible in a world generally prosperous and peaceful. It still just gives me goosebumps to talk about it. I am extremely proud of every single team member who makes this possible. I am honored to be part

of powering the modern world. And that's no bullshit guys; the technology on this platform is a miracle of human ingenuity as far as I'm concerned."

Everyone nodded in agreement. A couple of the guys patted Chad on the back as they walked by.

"Meg, so what happens to this rig and all the undersea stuff when it's time to decommission it all?" Gerald Griffith asked.

"Of course we don't just leave it all rusting out here as I've heard intelligent people accuse the industry of before," Meg sighed. "We end drilling, seal all the wells and remove the under sea equipment. To remove the rig, we pull a doubled hulled, 25,000-ton lift ship under the platform. Cut the platform from the floats, lift it up and bring the whole thing into drydock for disassembly. The process is called single lift dismantlement. The floating hulls are then rigged with navigation lights and left at sea. Later they'll be tipped on their sides, loaded on a flatbed ship to be disassembled on shore as well. At the end of the day, 98 percent of this rig is recycled. The last to leave the rig are flown off in what is known as the Golden Chopper. Maybe one or two of our children will be on that flight."

"So Meg, how do you feel about all the opposition to fossil fuels and the regulations limiting our access to known oil reservoirs?" Hank asked.

"I don't let it discourage me. Most people still don't know that you need oil to make asphalt, plastics, rubbers, lubricants, waxes, paint products, and as a feedstock for many other common products, including ammonia for fertilizer and hydrogen. Besides, my daddy used to say, 'Everyone is often wrong,' Oh boy, I am really on a roll now quoting daddy," Meg blushed.

"Not at all, we want to hear this," Christian Sabastain encouraged.

“Okay, turns out daddy was right. Consensus can be totally wrong. Back in the 1970s, the popular mantra was that oil was a sunset industry. Oil companies were encouraged by Wall Street and others to diversify away from oil. In the 1980s, we were lectured that synthetic fuels would replace oil. In the 1990s, hydrogen was going to be the end of big oil. In about 1981 Stanford put out a widely popular average of 10 computer model outcomes that forecasted the cost of a barrel of oil going for \$125 in 1990. The actual price in 1990 turned out to be \$45. It was supposed to be \$190 in 2000. It was actually \$42. I don’t know, I personally stay invested in fossil fuels because I understand the industry, and the basic concept of supply and demand. I’ll let you guys predict the future.”

“Do you think this talk about nuclear energy replacing fossil fuels is wrong like those old Stanford computer models were?” Hank asked Meg.

“I guess if my son told me he wanted to work in the nuclear energy field, I’d be very supportive of that. But if he said he wanted to work on wind turbines or solar panels, I’d be concerned he hadn’t taken a close look at the physics of those technologies,” Meg held her hands up indicating to all the equipment around her. “I just can’t see sunshine and light breezes replacing all this.”

Rhonda’s custom chime sounded on Hank’s mobile device. Hank looked at the text, Just landing now. Maria, Asami, and I had a good visit at the Atomic Garage with the Austins. They’re just finishing up the first series of testing on the first copy of the M-LFTR-VI. The gals were very impressed. Even Asami, our very own devil’s advocate. Amy is going to name the reactor *Walking Leaf*. Josh and Shanta are thrilled about that. See you on Energy X. Can’t wait to tour your new little boat.”

Hank responded, “Just finishing up with Meg out on the rig. We’re on our way in. Great tour. Thanks for setting it up.”

DRAFT

Thirty

Aboard the yacht EnergyX on the Gulf of Mexico

THE BERING 145-FOOT CUSTOMIZED SUPER YACHT CRUISED ALONG AT 12 KNOTS. The yacht had just come to an easterly heading. The passengers on the main deck stern could enjoy the array of colors from an October Gulf of Mexico sunset as the lights of New Orleans started to twinkle off the port beam on the northern horizon. The yacht called *EnergyX*, named after Hank Boudreaux's company, was equipped with twin Caterpillar C32 ACERT engines, carried nearly 8,000 gallons of diesel fuel aboard and had a 4,000-mile range. It also utilized an electric propulsion system for operating in close quarter harbors and when docking or disembarking. That gave Hank tongue-in-cheek bragging rights that his yacht was a hybrid. The full displacement steel hull and its advanced stabilization system made for minimal rolling and a comfortable ride at sea. EnergyX was a floating technological marvel.

The last thing Gary Daringer wanted to do was to get back on a boat and get seasick again. But Hank had convinced him the ride would be smoother than the fishing charter earlier in the day. And to Gary's relief, he was enjoying the cruise.

"Hank, Gary wants to know if you have a fishing pole aboard," Christian Sabastian joked.

"I am done fishing for today, thanks. In fact, I am done fishing forever," Gary replied.

"Hank, when you told me you bought a new little boat that you wanted to take the group out on, you may have understated your case just a bit. This is absolutely beautiful, and it seems very seaworthy," Rhonda Mattingly remarked.

Hank chuckled, “Thanks. She is a beauty. I’ve got some shake-down cruises coming up next week. I am really looking forward to it. But enough about my toys, time to call everyone to order, kiddo, it’s your show.” Hank rang a small bell mounted on the outer cabin wall.

“Ladies and gentlemen, please take a seat and let’s get started on the business portion of our little get together,” Rhonda announced.

As everyone sat down on the comfortable deck sofas, Rhonda stayed standing. “Thank you for coming. It’s been 16 months since we were all together at Big Bear Ranch in Wyoming. Everyone here is more or less up to date on everything that has transpired since then. The brief Maria sent out was pretty thorough. Remember our primary objective was to pick a design for the nuclear reactor we wanted to utilize. And to identify a team of people who, with our help and financial support, could bring it to scale. I think that has been accomplished with the Atomic Garage. Amy Austin is a well known young woman now, and the team that surrounds and supports her have managed, in our opinion, to have leap frogged nuclear energy technology by decades. Maria, Asami, and I were up there yesterday and today.”

Maria stood after getting the nod from Rhonda. The group respected Maria’s grasp of all things technical in the world of energy and were eager to get her opinion on Amy Austin’s true capability.

“I was skeptical but I have to admit, after spending a little time with Amy, there is little doubt in my mind that she is a one-out-of-a-billion STEM polymath. Harshil, a young mathematics genius and computer programmer from India who works with her, says he might just barely be Amy’s match in mathematics, but she is equally as strong in nuclear chemistry, metallurgy, biology, and electrical engineering. She loves machine shops of any kind and is up on all the latest 3-D printing technologies. They have just set up an industrial size 3-D printing

capabilities at the Atomic Garage. She's also comfortable with artificial intelligence. When I asked her how she found the time to keep up with all the information she needed to review and understand, she told me she didn't feel like that. She simply loves learning, figuring out hairy problems, and uncovering patterns in the chaos."

Maria continued briefing the group as the soft warm breeze of the Gulf kept the guests comfortable as the luxury yacht silently cut through the soft swells, "I asked Amy several questions about physics, engineering, and chemistry that a few experts briefed me on. I wanted to try to verify her depth of knowledge. She answered them expertly. She got right to the core of the complex issues in seconds.

Rhonda added, "It's clear the people who surround her know what they've got and know the world needs Amy's gifts right now. Plus she is a wonderful person. There's a balance to her. She's tall, athletic looking, her eyes are bright and challenging. She's got a bring-it-on attitude. She was an all-state cross country runner in high school and still loves to run. Her security detail rides bikes when she runs because she runs too fast for them. She likes hiking and is an avid bird watcher. She has a wonderful sense of humor, and she's inspirational."

"When I heard Josh Manning flipped on nuclear energy I couldn't believe it," Maria interjected. "He was one of the top antinuke guys on the planet, and the next thing you know he's an all-in advocate. But after hearing the account of what happened the night of the grid attack at the Austins' from Hank and Rhonda, listening to Josh Manning's pronuclear speech, and finally seeing that incredible Atomic Garage and meeting their crew, I totally understand that change in Josh Manning now."

Hank reflected, "Although our motivations may have been, at least initially, more capitalistic in nature than the people behind the Atomic Garage Movement, I think we share the

same vision for the future. Amy and the Atomic Garage Movement team are giving us an opportunity to play our patriot role again, and let our Capitalist tendencies rest for a while. So I do think we have found the micro nuclear reactor technology we need, and the people to help us bring it to scale. But more than that, we have a window of opportunity in front of us to provide the world with almost unlimited, clean, inexpensive energy. I want that for all the kids that come after us.”

“And I am sure the business opportunities will present themselves in time,” Francisco said. “This technology is highly disruptive, a situation all of us here seem to thrive in.”

Rhonda segued, “Let’s talk about what’s up next. We’ve got another situation developing. You’re all up on the fact that the Nuclear Regulatory Commission has denied The Rock’s application for renewing their operating license for another 20 years using MOX fuels, which are really going to be recycled nuclear waste that sits outside nuclear plants now.”

Rhonda continued her update. “The tritium leak got a lot of press. But the shipment of nuclear waste from the plants, then the production and fabrication of MOX, and then shipping it back to the nuclear plant is what the NRC is being a stickler on. There’s a hearing scheduled in Algonquin to take public comment on The Rock’s decommissioning plan. It turns out the Atomic Garage Movement has a plan. Maria, tell them about your conversation with Bob James.”

Maria set down her drink and started, “Bob told us Amy will present the NRC with a plan that’s within the realm of believability to reprocess the used nuclear fuel, located in those storage casks outside of The Rock. Our job is to make sure Jake Foresberger, the powerful senator from Tennessee is listening to Amy’s public statement. He’s not going to like the NRC turning Tennessee’s Oak Ridge Labs new processing plant into an abandoned and wasted Yucca Mountain type shell.”

“Conceived, built, never used, and buried, typical government playbook,” Gerald Griffith fumed.

Maria said, “Amy’s plan for getting The Rock’s license extended is pretty tight, and her pitch for the coming NRC hearing is designed to get the public weighing in on the issue.”

Hank clarified, “So the Atomic Garage Movement, with Josh Manning’s assistance and Amy as spokesperson, is going to use the upcoming NRC hearing to put forth a plea for common sense to the public, and a hot poker in the ass to Senator Foresberger of Tennessee, the chairman of the powerful Energy and Commerce Committee in the US Senate.

“That sums up,” Rhonda confirmed.

Maria added, “Becky Austin has also come up with a concept that would have the Michigan legislature pass a law to allow The Rock to sell carbon offset credits to the national voluntary CO2 Offset marketplace. The demand for carbon offsets vastly outstrips supply. The Rock could generate about \$500 million per year if it could sell CO2 offsets.”

“Didn’t Josh Manning once claim he led a net-zero life because he purchased enough carbon offsets to fly around the world on his jet?” Rhonda tried to recall.

“That’s why Josh is the logical guy to help Becky push the State of Michigan Nuclear Energy Carbon Offset Act,” Hank pointed out. “And let’s not forget he’s on our side now.”

“That strategy is a good path for winning license extensions for the older reactors. But what about the future?” Maria asked.

“The immediate future is a wall. The green wall we’ve all talked about. Hank tell them what you think,” Rhonda demurred.

“I think the world energy sector is just now hitting the green wall.” Hank said as he twirled his drink and walked around the deck. He positioned himself in front of the group with

the vast Gulf of Mexico softly silhouetted behind him. “A handful of multi-billionaires, people even richer than Rhonda, are funding non-governmental organizations, NGOs, that are anti-hydrocarbon and antinuclear. Those top 25 NGOs had total revenues of about \$5 billion. A guy named Robert Bryce calls them the Anti-Industry Industry. In my opinion, they want to destroy capitalism. And the media, in addition to ignoring that huge push, are claiming front groups sponsored by the fossil-fuel industry, including some of us here, are responsible for the pushback on wind and solar.”

“Believe me when I say, if there were any fossil-fuel front groups pushing back on wind and solar I am in a position to know about it,” Maria insisted. “I know of no group funding a pushback against those systems. What’s happening is rural folks don’t like all the surface area wind and solar require. There’s even a few high-profile environmentalists now speaking out against renewables.”

“Most people don’t realize wind turbines make swishing and wooshing noises in various broadbands that negatively affect humans and wildlife,” Hank reflected. “A few of those big monsters just collapse each year too. One minute they’re working. The next they’re crashing to the ground. There seems to be no predicting it. Offshore wind turbines have been tied to killing the North Atlantic right whales and dolphins off our east coast. The dolphins just sink to the bottom when they die, but it’s kind of hard to deny something isn’t wrong with those train-car-size whale carcasses washing up on public beaches along the east coast. Wind turbines also kill large rare birds, bats, and migrating butterflies by the thousands and millions respectively. Those turbines also have a strobe effect with light, which causes headaches and makes sleep impossible, and they spew microplastics as the edge of the blades wear. Not to

mention incidence of blades falling off or breaking. And they cast shadows over thousands of miles of America's once beautiful horizons."

"I know from first-hand experience that rural folks from all over the world just took a page from the antinuclear community and used the same grassroots tactics to slow the buildout and add input costs to proposed wind and solar wind farms," Rhonda added. "I've read since 2015 there have been over 400 rejections for wind and solar farms in the US alone. And Chelsea Resources has two older wind farms that need to be replaced, and a new solar farm, both of which are hitting a dead end in getting licensed.

"Years ago we were complicit in this when we tried to slow the progress of nuclear energy. Call it the law of unintended outcomes or blow back. The whole damn thing has boomeranged," Maria reminded everyone. "We were protecting our fuel source, oil, against a formidable competing source, uranium. In retrospect, I admit that was short sighted and wrong. The fossil-fuel companies should have simply adapted to uranium as an additional fuel source.

"Well Maria, that was then, this is now," Hank declared. "If we don't stop this trend to sacrifice fossil fuels and nuclear energy on the altar of wind and solar energy, we'll find ourselves living in a pre-industrialized world. And it will happen fast."

Asami nodded in agreement, "There are a lot of very powerful people and organizations out there that don't want to see poor people in the developing world prosper. I didn't want to believe that for many years. But it's clear to me now, they want to reduce the world's population at almost any cost. They want to replace capitalism with socialism. They want a world order over nation states independent power; that's why they've worked so hard at eliminating borders in Europe and the United States. They hate the US Constitution because although much weakened, it's still their greatest obstacle to world conquest. They intend to control everything, everybody,

everywhere. They're arrogant, self-appointed, naive creatures who live in a bubble so far removed from reality, they don't know they're blathering hypocrites."

"Lincoln once defined a hypocrite in a letter," Gerald Griffith, a respectable amateur historian recalled. "Lincoln said, 'He reminds me of the man who murdered both his parents, and then, when the sentence was about to be pronounced, pleaded for mercy on the grounds that he was an orphan!' Once everything falls apart the people who caused the catastrophe are nowhere to be found. They disburse like cockroaches do when the light goes on. We've got to turn that light on very soon."

"Well said," Gerald," Hank acknowledged. "We could name most of those people and their organizations, highlight their interactions, and their Malthusian ways, but we've covered that ground adnauseam. We could spend months talking about their numbers, plans and deeds, and the ramifications of it all. We all damn well know that back in 2020 the COVID pandemic gave them the playbook for getting in control of everything, they just adapted it for climate change. It's time to stop them."

"We're all in, Hank. But how?" Gary blurted out.

Hank answered, "Rhonda had a talk with the Austins that we think you should know about. Rhonda!"

Rhonda took over, "Amy Austin is like her hero, Maria Curie. Or think of her as an Einstein, Tesla, Edison, the Wright Brothers, or another version of Elon Musk. She's transformative. And like when Musk collapsed the cost of getting objects into Earth's orbit, Amy is about to reduce the cost of nuclear energy to the point it will be affordable at the level of small businesses or organizations. About \$10 million for each 10-megawatt nuclear reactor – \$250 to

\$500 thousand per year to operate. The world needs to get back on its natural, historical trajectory of moving toward denser fuels.”

Asami interjected, “As all of you know, I pushed back on this plan at our last meeting in Wyoming. My interests, after all, are in building renewable energy systems. But I am not antinuclear. I do think there is a place for wind and solar power, that we can use all we know if we work together. And I want to give Amy’s technology a level playing field to compete on. I really like her. But no matter how basic and inexpensive the concept, I just don’t think we can scale her technology fast enough before fossil fuels and nuclear energy are confined to a side show by world NGOs and governments.”

Rhonda stood and took over the conversation, “Amy doesn’t think people need to see the new reactors scaled up and in full use on a massive basis. They just need hope. An alternative to the predicted global apocalypse. Something positive to grab onto right now. Something to advocate for that will make their lives better. They need to see an irrefutable demonstration of Amy’s advanced reactor’s capabilities. Once that is accomplished they will demand that technology be available to their kids and grandkids. That it becomes available to the world.”

Maria spoke next, “We still need nuclear fuel, specifically HALEU or plutonium to test it with. Amy and Harshil are going to start testing the reactor next week using water. Next month, they’ll move to molten-salt testing. Within a couple months after that, they’ll be ready to test with live fuel. And frankly, I agree with Asami, I can’t imagine any scenario where the Atomic Garage will get regulatory approval to have access to nuclear fuel anytime soon. And this project is maturing at a pace of about one week equals one year in terms of what most people are used to.”

Hank stood up. “We may have found a solution to getting the first reactors tested and in operation using nuclear fuel, HALEU to be specific. As you know, Rhonda and I got to know that crew at the Atomic Garage pretty well during the attack on our nation’s grid. They’ve entrusted us with a bit of intelligence we were not aware of. As it turns out, an opportunity might be developing. I can’t share the specifics right now. Let’s just say your presence will soon be requested somewhere on the western coast of India.

Thirty-One

Friday, November 10, 2028, Algonquin Central High School, Algonquin, Michigan

AMY AUSTIN STOOD AT THE DAIS OF THE NUCLEAR REGULATORY COMMISSION, NRC HEARING. Josh Manning had just taken a moment to voice his support of renewing the license and then, along with others, ceded his time to Amy as the opposition had ceded their time to Carson McMullen of TES. The NRC scheduled the meeting as part of protocol to take public comment from the local community on the plan for decommissioning the North Rocky Point Nuclear Power Station, known as The Rock. According to the chairperson of the NRC Decommissioning Committee, the process would be conducted by DeTek after they purchased what would be the idled nuclear plant from Midwest Electric Power Distributors. SOMI, the midwest grid operator, would replace the power from The Rock via Chelsea Resources' combine natural gas plant, called the Algonquin Central Generation Facility, across the street from The Rock, one coal plant near Muskegon, and another coal plant in northern Indiana. The whole decommissioning of The Rock would take 15 years and cost \$700 million.

It seemed as if Amy Austin had come out of left field and into the public spotlight when she debated Josh Manning over the topic of nuclear energy last year. It didn't take long for the media to discover that Amy wasn't just a young intelligent person with an attitude, but smart enough to hold her own in the glare of public scrutiny. The events since her debate with Josh – including his transformation to pronuclear, the US electrical grid attacks, and the growing interest in the small nuclear reactor she was making as the world watched – propelled her to international stardom almost overnight. The media and millions of people were watching the NRC hearing live. With gas prices and electric bills on the front of everyone's minds, people

wanted to listen to anyone with a potential solution. Carson McMullen had just addressed the NRC committee. He used the word radioactive, radioactive debris, radioactive accident, and radioactive poisoning 53 times. And he mentioned the Vogtle Georgia, Unit III and Unit IV costs and schedule overruns for the most recently built Generation III reactors that came online in 2023 and 2024 five times. It took twice as long, 20 years, and \$30 billion, 400 percent over budget.

The NRC Hearing was held at Algonquin Central High School's gymnasium to accommodate all the local people who wanted to attend. People needed ID to prove they lived in Odina County or Algonquin to enter the gym. Amy stated her name, and address. Then she said, "Ladies and gentlemen of the committee, thank you for taking my public comment. And let me apologize ahead of time for not sticking to the concept that The Rock is being decommissioned. I implore you to reconsider that decision and I am here to address the issues for which that premature announcement may have been based on."

It seemed to Amy that it was just yesterday when she had started advocating for nuclear energy at 12 years old. That was eight years ago. She recalled being frustrated with people who didn't seem to grasp simple data, couldn't use common sense, and had no concept of risk. They couldn't believe that nuclear power was a miracle that could provide energy equity to the world. She used metaphors, stories, and even simple experiments people could observe. It wasn't working. She wasn't changing minds. One day, during what were turning into regular rants that spewed pent-up frustration with her inability to communicate the facts about simple physics, chemistry, and math to people that were antinuclear, her father interrupted. He said, "Sweetie, listen to me. Give some thought and reflection to the concept that they do understand what you're saying." At first that idea confused her even more. But she came to think antinuclear

advocates obviously didn't see problems and solutions in the same perspective she did. That's when she started to realize that their vision for a better life could only be explained in religious or spiritual terms. Their vision for the future wasn't bad, it was good. Beautiful in fact. But too good. Too beautiful. The nirvana they seemed to pine for had never existed in human history. And in pursuing that vision they were actually making the environment they loved worse off.

Those against nuclear energy were willing to sacrifice large birds, desert tortoises, the North Atlantic right whale, and dolphins to wind turbine and solar farms. They shrank from any discussion that most solar panels were being made in labor camps by slaves of a modern nation state. They ignored the mountains of used wind turbine blades buried under huge mounds throughout the midwest. Or that innocent people including thousands of children were enslaved and dying in the Cobalt mines of the Congo, all in the pursuit of making more batteries for electric devices and vehicles. They paid no heed to mountains of old lithium batteries and solar panels leaching into the third-world countries' water tables where they eventually expired after the last vestiges of power drained from them. It amounted to third-world toxic dumping. And the environmentalists sat idly by as thousands of acres of old forest around the United States and Germany were cut down to burn the wood in biomass solid fuel boilers, and yet had the hubris to declare that practice carbon neutral.

When Russia attacked Ukraine in 2022, almost all the nuclear plants in Germany had already been retired. They were perceived as not needed because Germany could import natural gas from Russia as Germany built out their massive wind turbine and solar farms. Now Germany and other European countries were forced to burn all types of coal, and built a natural gas import infrastructure in record time. The thought that they would need to rely more on fossil fuels, and not less, by 2028, would have been inconceivable in 2021. Back then, the people in the world

believed it was on a path to being totally powered by renewable energy, in spite of the simple math in front of their faces that contradicted that belief.

All those revelations were life changing as Amy became aware of them. An awakening reality came into clearer focus for her. That there existed a powerful counter-force that would be arrayed against her for life. She thus concluded at age 15 that her life needed to be dedicated to applying science. She respected and appreciated basic science, the kind done early in labs and in controlled environments with strict controls on experimentation. But she would shine her light on those examples in history and in contemporary times when technology demonstratively improved peoples' lives.

She blinked and came back to the present, “First, the tritium leaks that TES claims are chronic at The Rock have not occurred since 2022, six years ago now. Bob James shared the data with this panel on the very low risk profile tritium presented in the five times it was detected at The Rock. I wouldn't hesitate to drink a tall glass of water with those levels of tritium. It would have been equal to the radiation emitted by eating eight bananas, or a couple bags of potato chips. No scientist would go thirsty worrying about minute traces of tritium in water. So it was surprising that any scientist would have signed off on the potential of a small tritium leak occurring in the future as a reason to shut down a perfectly operating 800-megawatt nuclear reactor.

“Second, the panel's primary concern seemed to be transporting The Rock's used nuclear fuel casks to Tennessee for processing into MOX fuel. I assume the return trip is not of concern as the radioactive isotopes from the used fuel would have been removed. But since this committee seems to think transporting used nuclear fuel, which this country does all the time,

cannot be done in this instance between Michigan and Tennessee, The Atomic Garage Movement, AGM for short, has two suggestions. . .”

“Excuse me, Mr Chairperson,” Carson McMullen of TES yelled as he stood in the crowd. “I object to this public comment. This hearing’s purpose is to comment on the proposed decommissioning process of this dangerous nuclear plant. It was not to be a continuation of the debate over its fate. That has been determined.”

“With all due respect Mr. Chairperson,” Amy shot back. “This is a public forum to hear what the citizens think about the decommissioning of The Rock. If what some of us think is that it should not be decommissioned for valid and enumerable reasons, including new information that needs to be considered, then it should be this committee’s duty to see that the citizens were allowed to speak on the record regarding this issue. Otherwise, our trust in the institutions that supposedly exist in our best interest are compromised. Even if in the end our counsel is found to be faulty, irrelevant, or simply not heeded, it was considered. That’s called a fair hearing.”

“I agree with Ms. Austin, Dr. McMullen, we’re not a court of law, or a legal proceeding,” The chairperson responded from the front table. “It is this committee’s role to evaluate public opinion if it’s related in any way to this plant’s decommissioning. And if indeed, new information is presented, that must be taken under advisement in decisions of this magnitude. But remember Ms. Austin, your focus shall remain on the decommissioning issue, and your time to make a statement is limited to the same amount of time we gave Dr. McMullen. And please folks, no more interruptions from the audience.”

“Okay, thank you Mr. Chairperson,” Amy continued. “So it seems producing additional nuclear ‘waste,’ or transporting current ‘waste’ are the two obstacles to extending The Rock’s operating license. Those issues are surmountable. AGM’s first suggestion is that The Rock use

down-blended plutonium from retired nuclear weapons to produce electricity instead of MOX fuel. New technology from Lightbridge, an advanced nuclear fuel producer, can deliver solid plutonium nuclear fuel. It's fabricated from retired weapons in a manner The Rock can accept with minor modifications, and then can burn that fuel with much improved production metrics. Meaning we'll get a lot better mileage out of the new fuel than we do now. The Rock can then become a demonstration site for other nuclear plants to do the same, and make turning nuclear weapons into a source of valuable, clean, CO2 free energy. In fact, all of you are well aware it's been done before with the US and Russia using the uranium from older, retired nuclear weapons after the fall of the Soviet Union. Let's do it again.

"AGM's second suggestion is to utilize the new advanced reactors on site. Advanced reactors are fast and operate at much higher temperatures than today's light water reactors. Thus they can burn various elements as fuel. These small reactors can burn the waste sitting in casks outside The Rock right now."

"Excuse me Mr. Chairperson, a question for Ms. Austin," a committee member interrupted. "The fuel in the casks would have to be reprocessed to be used in the advanced small reactors before it could be used. We'd have the same transportation challenge."

"True, that fuel needs to be reprocessed. There are several options. One idea is to build a small pyroprocessing plant using technology developed at Argonne National Laboratories. Place that plant within the same boundaries the casks are now stored at The Rock. Then place the new small modular reactors in the same area as well to burn that recycled fuel. If the whole country did this, we could power our nation for hundreds of years just using existing waste, or what I refer to as slightly used nuclear fuel. Those casks outside our nuclear plants are a national treasure; it seems incorrect to refer to their contents as waste."

“Ms. Austin, have you been to Argonne National Lab to observe this technology?” the committee chairperson inquired.

“Yes, I have. The chemistry is complex but well known and stable. The protocols for handling the fuel at every stage are well established now.”

“Thank you. Continue with your public statement.”

“So, this plan would accomplish two things. First, it would demonstrate denuclearizing weapons and turning them into clean energy using our older, big nuclear plants. Second, we would use current stocks of nuclear waste as fuel in new advanced smaller reactors located at the same site thus eliminating the need to transport it. And the new reactors will burn up almost all that existing waste as part of its high efficiency and operating temperatures. The waste after that phase is miniscule and requires about 400 years of storage instead of hundreds of thousands of years.

“The Rock can and should be this concept’s first demonstration site. I know one of the complexities in this situation is that The Rock’s owner is losing money and wants to sell the plant. A topic for another day is that nuclear plants can run full blast almost all the time. Thus, they should be able to sell their energy into the grid first. The current policy of forcing grid operators to first buy energy from wind and solar farms is backwards. The fact that The Rock loses money is the result of political policy dictating grid operations. That problem is easily resolvable if common sense becomes the guideline. It all sounds so complex, but just let the grid operators coordinate with energy producers without any regulatory mandates and watch how fast the grid stabilizes.

“That said, it appears the sale of The Rock from Midwest Electric Power Distributors, MEPD to DeTek will happen. I know DeTek does not operate Light Water Reactors like The

Rock, it dismantles those plants during decommissioning. But under our plan, they could contract with MEPD, to continue to operate The Rock after the sale. MEPD could keep the existing staff on at a reasonable profit and be off the hook for the losses they are now projecting in operating The Rock. That takes care of The Rock.

“DeTek is also building its own small modular reactor and being licensed to operate it as we speak. An assembly of those reactors could be used to burn the fuel coming from the onsite pyroprocessing plant I’ve proposed. This way we’re utilizing an existing approved nuclear site and feeding the power into an already established grid.”

“This is ridiculous,” Carson McMullen stood again from the front row of the audience. “The plant is shutting down. The SOMI substation near that property will be dedicated to receiving energy from wind and solar farms. And let’s not forget that the grid at this particular location was badly damaged in the recent attacks.”

“Mr. McMullen knows there is a solution to that problem,” Amy interrupted. “AGM, in coordination with the governor’s office, is currently petitioning the Federal Energy Regulatory Commission, FERC, to continue to allow atmospheric electric transmission from The Rock and the natural gas plant next to it, to the four substations it is currently sending energy to since our electrical grid attack. The FAA is prohibiting flights around those beams now without any interruption in commercial air traffic. Why not let us continue that process and improve upon this successful and promising new source of wireless energy transmission. Other states are going to be jumping on this technology because it solves so many terrestrial right-of-way issues. Nobody is screaming about radar, sonar, microwaves, or that your mobile device data is streaming through the air. Soon electricity will just be another invisible connection like your wi-fi and bluetooth.”

“Not to keep interrupting,” McMullen raised his voice. “But it has already been decided to shut down this nuclear plant and replace it with wind and solar. Ms. Austin is not respecting this committee’s decision. The people have spoken. This nuclear plant is to be closed down. Shut the damn thing down, and then let’s spend the billions required to deal with all that radioactive debris. Let’s not sit here in fantasy land about keeping it in operation and producing yet more radioactive waste.”

“Which brings up something else this committee should consider,” Amy smoothly used McMullen’s interruption to segue into one more thing she wanted on the record. “I know this doesn’t often get a prominent spot in news broadcasts. It turns out people don’t mind living near an operating nuclear plant but push back on living near wind turbines. Central Michigan’s citizens, along with other rural communities around the world, have pushed back hard on wind and solar farm build-outs because of their resulting high electrical bills and environmental damage. So, for TES to claim we can simply shut down nuclear and natural gas plants and replace them with wind and solar ignores the fact that wind and solar don’t work as a baseline energy source. And people don’t like them.

“I can’t think of anything better than reducing the number of nuclear bombs to make energy, using the existing nuclear waste in new advanced reactors to make energy for the next four hundred years or longer, and finally sending the electricity safely through the atmosphere without the need of transmission lines. That is a vision well within our technical capability right now. Energy should be plentiful, reliable, clean, and cheap in the modern world. This committee can take the first step to accomplishing that by extending The Rock’s operating license with these contingencies.”

Amy continued, “When President Lingquist visited us at the Atomic Garage after the grid attack, we showed him the work we were doing on *Walking Leaf*, the name of our new Small Modular Reactor. The President has demonstrated his understanding and support of nuclear energy and the importance in freeing US citizens to explore, innovate, and build our technological future. I can’t speak for the president, but if this concept isn’t technological innovation in practice, innovation we desperately need right now, then I don’t know what is. So I say Mr. President, please support this nonpartisan proposal to make our country energy independent and clean energy strong. Please reconsider your earlier announcement before the attack on our national grid, before thousands of Americans froze to death, or starved, or died in need of medical care due to lack of electrical energy. Keep The Rock going and extend its license another 20 years as outlined in my public comment. Thank you for your service and for the time you gave me to speak on this important issue.”

The chairperson spoke up, “Thank you, Ms. Austin. Now I understand Rosa Vasquez, Governor Rosen’s Chief of Staff has an announcement to make to this assembly. Rosa, the floor is yours.”

“Thank you Mr. Chairperson. Yesterday, Governor Rosen joined the Secretary of Energy, Katie Evans, in making a joint announcement in support of extending The Rock’s operating license. During her comments, Governor Rosen informed the Michigan Legislature that she would sign a bill that allowed The Rock, as we do state forests, to issue carbon-free credits to the voluntary US market for those credits. They would be tracked and traded using blockchain technology making the process fair, accurate, and hack proof. The revenue generated by this concept could be as high as \$500 million per year for The Rock, enough to help fund the plant’s operation and allow the owners to start reducing consumer electric bills.”

After her report to the Commission, Rosa was about to leave and report back to the governor when she noticed a beautiful middle-aged woman stand up with the Austins near the front of the gym. The woman gave Amy a big hug as Amy approached the group. An Indian-looking young man was rubbing Amy on the shoulder and kissed her cheek with a smile. Rosa punched the speed dial on her mobile device.

“Rosa, hello. How did it go?” Governor Rosen inquired.

“Well, we pissed off McMullen, no surprise there. Hey, I think Kasvi Aakanksha, that Indian physicist, is here with the Austins. She was the one who survived an assassination attempt back in India. Remember that her nephew, Harshil Varm, works at the Atomic Garage. Still, I wonder what she’s doing here now so close after the attempt on her life?”

“She probably met the Austins via her nephew and now they’re working together on that nuclear reactor,” Governor Rosen speculated.

“Do you recall that story about life not being fair?” Rosa asked.

“Of course. It’s a good lesson to remember, why do you ask?” the governor asked.

“Well, I’ve got an idea. I think it’s time for me to meet Dr. Aakanksha. Maybe we need an unfair advantage about now,” Rosa responded.

Thirty-Two

Thursday, December 14, 2028, Wuwei City, Gansu Province, Gobi Desert, China

GUANG LIANG, PRESIDENT OF THE PEOPLE'S REPUBLIC OF CHINA AND CHAIRMAN OF THE CHINESE COMMUNIST PARTY, known the world over as the CCP, glanced over at Zhi Dai, head of the Ministry of State Security as they toured SINAP, the Shanghai Institute of Applied Physics. There were two campuses, one in Jiading, a district of Shanghai. The other location sits at the hub of the historic Silk Road in Wuwei City. The small 67-hectare (165 acres) campus was becoming more important to China's future because of the advanced nuclear reactor work being done there. The world-renowned SINAP employed nearly 500 scientists and engineers, just under 100 professors, and 300 doctoral students. Guang Liang had always understood that nuclear fuel's density would make it the preferred source of power production in the world. He knew the geopolitical realities and nuclear power technology were now at an inflection point. That's why the Chinese Nuclear Society had 10,000 nuclear scientists and technology professionals. Nine committees worked tirelessly to ensure that China became the preeminent global leader of all things technical. And the teeth in the dragon was SINAP. The most important project at SINAP was the advanced nuclear reactor project.

The men were standing in the control room of the two-megawatt TMSR LF1, Thorium-based Molten-Salt Reactor nuclear energy system. At 63 years old, soft spoken, Kai Zhong was one of the Institute's most respected chemical engineers. He served as one of the SINAP deputy directors, but he was so approachable and low key his colleagues just called him Kai. Short at just under 1.6 meters (5.2 feet), and built like a reed, he wasn't much to look at, Minister Zhi Dai thought. But once Zhong started passionately explaining the technology behind

the first and longest running Liquid Fluoride Thorium Reactor, LFTR of the 21st century, he quickly won the respect and full attention of his two leaders. The exchange cemented Guang Liang's confidence in the man. Kai Zhong's formidable scientific reputation had been earned over a lifetime of dedication to the CCP. He would grasp the stakes. The reality of the moment. The difficulty of what was going to be asked of him. And he would, as he always had, find a path to achieving the objective.

China had taken a 10-year lead over the rest of the world in getting these new reactors in operation with Copenhagen Atomics, of Amsterdam, Dual Fluid, of Germany, Terrestrial Energy of Canada, and ThorCon of the United States, among others with similar reactors being tested around the world. Oklo, also in the US, was testing a smaller reactor of a slightly different design and was the icebreaker for reforming the bureaucratic Nuclear Regulatory Commission regarding the newer technologies used in generation IV reactors. But that reformation was late and too measured. Guang Liang believed in the old adage, "Never interrupt your enemy when he is making a mistake." But he also knew that Minister Zhi Dai wasn't one to depend on good fortune alone. China had assured – via its secret financial influence and outreach with US-based grassroots political action committees called PACs, non-governmental organizations, and sectors of the US fossil-fuel industry that nuclear power would continue to be an expensive and time-consuming proposition in the US. In fact, even to this day, private investment in nuclear power in the US was woefully inadequate. Guang Liang had lived for a time in Lincoln, Nebraska., and his son had received an Ivy League college education in the US. He knew from first-hand experience that the chaotic world of private capital was the fuel that always gave the US a technological advantage. For decades now, the US capitalist had no mechanism or even an appetite for investing in nuclear power. The antinuclear community had been highly successful.

It had made nuclear energy a high-risk, low-reward proposition despite the data against that argument. But America's obsession with climate change took unexpected turns and was changing that calculation. The rear-guard action in slowing US progress in nuclear energy was coming to the end of its era. People were taking a second look at nuclear energy because it didn't emit CO₂.

The rest of the world was still in the early test phases with generation IV reactors while China was already building the factories to mass produce them. SINAP had brought their Thorium-based Molten-Salt Reactor to critical, which means they started the fission reaction within its core in late 2022, two years ahead of schedule. The project's objective was to test the technology and prepare to scale up reactor production by 2030. Kai Zhong was part of the team assigned to stop the fission reaction in the test reactor in year five, then extract the interior salts and radioactive actinides for further analysis. Many of the salts and actinides would be useful in medical research. Zhong's team would also be able to see how efficient the reactor would be in utilizing the immense energy stored in thorium. One 650-gram (1.4 pounds) ball of thorium, the size of a tennis ball, could power every aspect of a typical person's 80-year high energy life in any advanced economy and do it without creating any CO₂ emissions. Zhong thought the most unusual thing about the project was how simple and safe the technology was. He recalled that even 30 years ago his mentors often marveled that the Americans did not develop and use these reactors starting in the 1960s. They believed that if the US had developed the technology at that time the world would have been very different in ways that couldn't be known. The Chinese physicists, chemists, and metallurgists working on the TMSR project were all schooled in the work done at Oak Ridge Labs in the 1960s, and 1970s in the US State of Tennessee. And the Chinese scientists were made aware of the work now going on by the young American Amy Austin on what she claimed was a Generation VI LFTR.

It seemed almost inconceivable to the Chinese that the Americans would allow that young woman to publicly share every detail of her work in real time. They were suspicious. But after close scrutiny and parallel experimentation using Amy's videos and open-source documentation, a committee of China's top physicists, nuclear engineers, and chemists reported that they believed the American had indeed made a leap in both the chemistry and use of a new alloy that accurately would define the reactor as Generation VI. A jump ahead in nuclear technology estimated to be 30 years. On the off chance that the Americans would realize what they had and put the technology on a fast track, they would leap far ahead of China's nuclear power development. The US may not have realized it yet, but they were in a position to build these nuclear reactors as fast as cars on an assembly line. That news reverberated to the top of the CCP. President Guang Liang, a nuclear engineer himself, understood the ramifications of this development. It was critical to China's strategic plan that the Americans continued to delay advanced nuclear reactor development.

Those ancient Oak Ridge Lab research documents were in the public domain, even though the Chinese were in the process of filing international patents on nearly the same technology. But Zhong's respect for those American scientists, many of them refugees from war-torn Europe in World War II, was unquestioned. The Chinese nuclear scientists realized that the early work done on these unique nuclear reactors, at Oak Ridge, Tennessee, a place he had visited, was novel. Now, decades later with better alloys, processes, tools, and experience, they could make improvements to it that were scalable and sustainable. The Chinese had been working at duplicating the work at Oak Ridge as early as 1970, and then with priority status since 2011.

What the Chinese did not anticipate, and still could not fathom, was the level of innovation that still came, like a fountain, from American laboratories, businesses, and universities. On almost every metric tracking the scientific advancement of a country, China was ahead of the US. It was a mystery to many educated Chinese how such a chaotic country with a terrible primary and secondary education system, an economy totally based on greed, a poor work ethic, a massive drug problem, millions of mentally and physically lazy and obese people, and deplorable leadership, still managed to produce elite performances in science, military, sports, and the arts. And now this. A young woman from a small US town produces a competitive nuclear reactor that drops the technology's cost and complexity by a magnitude. Overnight. The problem was China was already committed to their current design. There was no 100-percent assurance the American's LFTR would be validated in more extensive testing, or be able to be scaled up to mass production for several more years. China would have to go with the bird in hand.

Still Guang Liang felt he was in a baseball squeeze play – fully committed to stealing second base, but cut off unexpectedly and now trapped midway. The tag out seemed inevitable – a conundrum that 41 million Chinese baseball fans would understand. It was the reason Guang Liang was visiting SINAP today. China simply must increase its speed at producing its advanced nuclear reactors and beat the squeeze. Get their flag planted on the hill first. And he knew where that hill was.

The LFTR was underground, two stories below them. Zhong explained, “Mr. President, you were wise to preserve the thorium byproduct of our rare earth mining programs. We will have reserves of it to use in our reactors as they come off assembly lines. The thorium in this test reactor has now significantly transmuted into uranium-233 over the last five years. It's on its way

to operating on just the fuel it's breeding. As you know, one of our Academy of Sciences' Strategic Priority Research Programs is to use a thorium-uranium cycle to breed uranium-233. And I am happy to report that we are on schedule building the second generation of this machine, the LF2 with a capacity of 373 megawatts thermal. It should be operational in two years, in 2030."

President Guang Liang listened carefully without changing expressions. The men observed the monitors as Zhong told them what metrics they were looking at. Minister Zhi Dai broke the momentary silence. "China's growing demand for energy seems to be greater than our ability to provide it. Do you believe these molten salt reactors can rise to the challenge, Zhong?"

"Mr. Minister, I am sorry to say, not in the short term of a few years, under the current production metrics," Zhong explained. "Even though we hope to manufacture them, challenges remain in scalability even though the basic technology is very promising. This reactor has many advantages over our larger water reactors. They are a significant improvement. But to meet China's growing energy needs we'll need to rely on coal for some time to come. Nuclear will provide significant energy, but it will still be in single digits as a percentage of our total energy production, even 10 years from now based on the assets I see available."

"As you are aware, Zhong, India wants to move to thorium as their primary fuel source," President Guang Liang pointed out. "They have an abundance of it, and like China, no natural gas reserves. I am told they are aggressively testing the technology that the young American has proposed. And there is little doubt in my mind that the Indians will be all over Africa with that technology in a very short time. Africa is the key to Chinese hegemony for the next two centuries. We must be the primary energy provider on that continent. We must project our political and industrial power into that void now. We are at that crossroad. Now we must act."

“Should we also adopt the American’s design for the Generation VI reactors or push this, our own Generation IV project through at a much higher priority?” Zhi Dai, asked, getting at the crux of the issue.

“That is the dilemma, Minister,” Kai Zhong confirmed. “The young American woman did put the technology in the public domain, and it appears she did not hold back any critical detail. In my humble opinion, we should increase this project’s output. And also, what is it the Americans say? Ah yes, ‘grab the low hanging fruit.’ For instance, I think we can adapt our nuclear reactor to utilize the new alloy called Sartorium on several key pieces of equipment. We can also put to use a number of AI and chemistry solutions from American’s open-source project, reducing the complexity of our current reactor by possibly 20 to 30 percent. Those adaptations to our existing project will improve production by cutting down on the testing time and the human skills required in manufacturing and operations. My team has full confidence in our technology, and it can be enhanced with some of the new information from Amy Austin’s open-source project. We have reliable enough data, in my opinion, to produce these reactors in mass very soon. There are risks in speeding up and escalating the process, but it’s all math, and the risk can be managed.”

“As you know, we have been preparing to finance SINAP’s recommendations to produce 400 of the Thorium-based Molten-Salt Reactors your team has been working on by 2035. Specifically the LF2 with a capacity of 373 megawatts thermal,” Guang Liang summarized.

“That would come as an upside surprise to the world’s nuclear community, would it not, Zhong?” Zhi Dai interrupted.

“Indeed, that would be more nuclear reactors than anyone I know of in that community is projecting for us,” Zhong confirmed.

“And the truth, my friends, what we have to actually accomplish, must accomplish, is to use Zhong’s amazing technology to produce more than 40 Terrawatts of electricity by 2035,” Guang Liang revealed.

“Mr. President, you’re telling me we need to have 100,000 units of our LF2’s operating by 2035?” Zhong looked directly at Guang Liang to make sure he had heard the president correctly.

“Director, you look a bit shaken,” Zhi Dai smiled. “If you are not up to the task you need to let the party know now. My job will be to make sure that your team is getting all the resources you need to get this project to critical mass as quickly as possible.”

Zhong dismissed Dai’s comment and faced Guang Liang, “Of course, Mr. President, it is a simple matter of scale. With your support we can accomplish this goal. It is my honor and privilege to do whatever is necessary to re-establish China as the most powerful and influential country on Earth. It is the natural order of things for us to lead.”

“Director, your reputation as one of the world's top nuclear scientists is beyond reproach,” Guang Liang explained. “Your loyalty to me and the party have been demonstrated over a lifetime. The work achieved at SINAP and specifically on this project are incredible. My friend, the window of opportunity is open. It will not be so for long. We must get our nuclear technology scaled up before the slumbering Americans, or the incompetent Indians find a shortcut that provides them with a path to exporting energy along with their failed social systems.”

“As we discussed Mr. President, the world’s energy demand is greater than the supply,” Zhong said. “There may be some advantage of processing and assembling the reactors close to where they will be deployed. Where shall the first wave of the new reactors be required?”

“We must strategically place the first wave of the new reactors throughout Africa starting in our cobalt mines in the Congo,” Guang Liang explained. “I’d like to announce our nuclear energy partnership plan for Africa at next year’s Forum on China-Africa Cooperation. It will be our 10th convention with the African leaders. Sixty percent of all Africans surveyed believe China’s relationship with Africa is positive. But they would still prefer to work with the Americans instead of China. We have an opportunity to change that perspective. Nuclear energy can power Africa’s growth and move their entire population out of poverty. Who better to show them how to accomplish that than China? We have done it with coal. Now we shall do it with uranium and thorium. Same process, just a different fuel.”

“Africa’s population will double to 2.5 billion by 2050,” Minister Zhi Dia recited. “If we can show the world how abundant energy coming from Chinese nuclear reactors can transform Africa, the balance of economic power on that continent will at first tip to and then lean on China. Once successful in Africa, we can begin to use that same template in South America and improve our influence in that region giving us an offensive aspect to countering the Americans in their own backyard as they are in ours now.”

Guang Liang added, “Russia has created its own difficulties, which have distracted them in Africa. But the United States should not be underestimated. They will be in Africa with nuclear power, and talk of civil liberty. Think of each reactor deployed as a 100-year relationship with the community it resides in. China and our Road and Belt Initiative must dominate in Africa. Right now, the Americans may have a developing technological advantage. But China has a plan of action now, and the will to back it up. Speed is of the essence. The Americans have not yet prioritized Africa as a geopolitical commitment. And Minister Dia is correct, once Africa accepts Chinese nuclear energy, we will also be able to project power into South America much

more effectively. My friends, we simply must act. Chinese global hegemony for the next 10 centuries depends on getting 100,000 of these new reactors built by 2035.

Kai Zhong had lost his wife suddenly to COVID in 2021. Since then, he had been a more frequent visitor at his daughter and son-in-law's home. He tapped on the back door as he walked into the kitchen of the small country home. Dinner was on the stove. His daughter gave him a hug and a peck on the cheek. Yuyan was her name and she had married Zixen Sheng in 2018, before the COVID lockdowns. Zhong's wife seemed to radiate joy that wedding day. His daughter was beautiful. The groom was a tall handsome man. A respected engineer. And he loved Yuyan with all his heart, which was the best thing about him. Their wedding day was one of three of the best days of Kai Zhong's life. The others being his own wedding, and the birth of his daughter. Those three days were better than any of his many scientific achievements. Then COVID hit. Once his wife died, he felt his life might as well be over. He was angry with President Guang Liang for spreading the disease internationally, the lockdowns at home, the inadequate public healthcare, the cover up at the Wuhan lab, and the multi-year crackdown on his fellow citizens who protested being prisoners in their own homes. Zhong knew this type of tyranny eventually led to genocide or war. It was then, in the depth of his grief over the loss of his wife that his daughter and son-in-law who lived nearby approached him and invited him to be more involved in their lives.

"How was your day, father?" Yuyan asked.

"Interesting and challenging as always."

"No special visitors?" Yuyan teased.

"Now, daughter, how you acquire information is beyond me, and I don't want to know

how you do it. But please, you know I can't speak of such things," Zhong reminded her.

"Picking up secret communications is proving easier than transmitting them in secret. One skill informs the other I suppose," Yuyan whispered.

"Yes indeed. Just be very careful," her father advised.

The two little girls squealed when they heard their grandpa's voice in the kitchen. As they ran at him, he lowered his body as his sore knee and hip protested. He scooped them both closer in a bear hug. He nibbled on the three-year-old's ear and pressed the nose of the five-year-old like a button. Both little girls giggled with joy. His two granddaughters were a reminder that he and his wife had only one offspring because they were at child-bearing age during China's one-child policy. His wife did not care that she was pregnant with a girl. 'That's who is in there now, and that's the person that's going to come out of there alive.' And so it was. Now standing, he looked down at his granddaughters and rubbed their heads with total love in his heart.

His son-in-law stuck his head in the kitchen door from outside. "Father, a moment please," Sheng requested of Kai Zhong.

It was a routine. They walked silently to the modest, two-car garage located on the side. Five years ago, Sheng had purchased a classic American 1966 burgundy Pontiac GTO with a 389-cubic-inch, V-8 engine and a Tri-Power package. Along with a cam swap, the four-barrel carburetor jumped the horsepower from 325 to 348 horsepower. It had a beautiful parchment vinyl interior. The GTO was considered by many as America's first true muscle car. Thousands of Chinese collectors cherished the American muscle car era even though the cars were illegal to drive on Chinese roadways. But if you knew the right time of night, in the right places, you could take your car for an occasional spin. The two men had worked together at restoring the GTO,

which required importing a lot of parts and time tracking those resources down. They had bonded during the experience.

As the two men walked by the car, they both smiled with pride. Sheng pushed a permanent wall work bench aside, reached down, and pulled up a trap door. They walked into the basement, which was actually under and behind the garage above. The light flicked on. Both men stood in complete silence looking at the finished product.

“You’re done?” Zhong asked.

“Yes father, and tested out as far as we can take it now.”

“You know, Sheng, when I attended MIT in America ages ago, I went because of my love for science,” Zhong explained. “I wanted to bring that knowledge home to my country and be part of China’s reemergence into the 21st century. I was idealistic. What Yuyan and you know now, what my beautiful wife knew, but not one of my colleagues knew was that when at MIT I also discovered the founding documents of the United States. Their history has inspired and informed me since I discovered them. What the hell did they expect to happen, I wouldn’t notice. MIT is in Boston. I just believe the Americans. Freedom is the natural state of humanity; it’s what each individual instinctively cherishes.”

“Amy Austin named it *Walking Leaf*,” Shen reflected. “An appropriate name for a device being secretly built by hundreds in China and thousands around the world.”

“Once I was at a huge energy industry trade show in Dubai. There was a dance troop that put on a show for the assembly. It was a massive cabaret, very enjoyable,” Zhong recalled.

“Later at the conference, one of the keynote speakers ran a recorded slow-motion video of that show. A man in a massive gorilla suit walked right across the stage and through the dancers and singers. Nobody noticed it when the show was live. I agree with you, *Walking Leaf* is an

appropriate name for Amy Austin's nuclear reactor. We will put them right in the open where they are least expected. You did an excellent job in building it. I am very proud of you."

"I just followed Amy Austin step for step. Without your help it would have taken me two years longer," Shen admitted.

"The day is fast approaching now," Zhong whispered. "Then we shall learn the consequences of our decisions," Zhong whispered.

"Regardless of the consequences, father. It has been an honor to work with you," Shen said. "I am very proud to be part of this."

"I am too, Shen. I am too."

Thirty-Three

Wednesday, June 20, 2029, Berkeley, California

FBI SPECIAL AGENT DEXTER TINLEY WALKED INTO THE TERRESTRIAL ECOLOGY SOCIETY'S INTERNATIONAL HEADQUARTERS WITH A WARRANT FOR THE ARREST OF CARSON MCMULLEN. It was 8:30 a.m. and Carson had just gotten off the phone with a valued TES energy consultant, code for a mole he had spent seven years nurturing at the Michigan nuclear plant. There was nothing illegal about the confidential arrangement. The consultant always spoke in terms of hypotheticals and never technically violated the terms of his noncompete agreement with The Rock.

The old Michigan nuclear plant had 200,000 moving parts. If as much as a microscopic crack was hypothetically detected in the pressure concrete containment wall by ultrasonic coda wave interferometry or an invisible wisp of tritium gas was detected coming from a water pump during a routine check by a MARC 7000 Tritium sampler with a fixed dual ion chambers, Carson had all he needed. He could keep the public scared to death of nuclear power by any slightly abnormal reading coming from any of the nuclear plant's sensors. The problem was so many of those measurements were low level and not required to be reported to the NRC. But if Carson knew about them, could identify the internal data, and go public with TES's concerns the NRC was obligated to investigate further. When pressed for where he obtained the information, he would say an unnamed whistle blower inside the plant had contacted him at TES, and he was not going to reveal his source. Carson knew full well the issue in question need not be a legitimate safety concern, or result in any corrective action. But, as long as Carson knew about it, he could spin it as the Second Coming, and who in the media would know the difference? It's not like

anybody ever looked into anything, determined its relevance, or dug into the data. To his amazement, everyone had always just believed everything he said about nuclear plants and radiation, and repeated the bullshit until it became accepted orthodoxy. It was a riot, an endless form of entertainment and dark humor. He loved everything about what he was doing.

Carson was about to use the information he had just acquired to put another nail into the coffin of that damned Michigan nuclear plant. Then, he noticed a group of men and women with light weight, dark blazers heading toward his office on a quick walk. Everyone else in the TES office was paying attention now too. The visitors walked through the door of his office without knocking.

“Hey, what the hell is going on here?” Carson demanded to know.

“Carson McMullen?”

“Yes,” Carson responded.

“I am Special Agent Dexter Tinley of the Federal Bureau of Investigation,” Tinley announced as he held up his identification. “You are under arrest for the Federal crime of terrorism, which includes the attempted bombing of a property used in interstate commerce under Section 844, F, 2 and 3, the arson of a property used in interstate commerce under Section 844, (I), the ordering of a killing and attempted killing during an attack on a Federal Facility with a dangerous weapon under Section 930, (C), and the importation of illegal weapons under Section 18, US Code 922 of unlawful acts. You are also being charged with the crime of Treason under Title 18 U.S. Code 2381. Or as my redneck daddy would have said, ‘You in a heap of trouble boy.’”

Another FBI agent finished Mirandaizing Carson, cuffed him, and walked him out of the office into a bank of cameras and reporters waiting outside as the TES staff looked on with open

mouths.

Dexter speed dialed Derek Gifford in Michigan on his way out of the building. “Derek, we just arrested Carson McMullen. I am leaving TES headquarters in Berkeley with him now. You can watch it on the news.”

“So our theory about that guy panned out?” Derek wondered.

“Pretty close,” Dexter confirmed. “He bought an old diesel fishing boat in Los Barriles, Mexico, then hugged the coastline down to Columbia and took the same route back. We think he just drove back to the US nonstop from Los Barriles. He never published an account of his personal travels when he was posing as a journalist. And he didn’t mention anything revealing in that article he wrote for *May I Ask?* magazine on Jayla Smith-Ahmed’s quest to blow up the Michigan pipeline. But he did contribute to a travel article in a Columbia airline, Avianca’s onboard magazine in 2004, two years before we busted Smith-Ahmed. The article was about the best cafes in South America, and he bragged about The Varietale located on the southeast border of Bogota. Turns out Paul Ronkowski, one of the other triumvirate busted with Smith-Ahmed, does like his current life. He is the one who told us how Carson got to Columbia.”

“Let me guess, Paul was with him in Columbia?” Derek assumed.

“Yep. He’s older than Carson but was just divorced at the time. So he jumped at the chance to go down to South America with the younger guy, raise some hell, and come back with a score,” Dexter explained. “He told me they were in Bogota for about a month and that Carson spoke fluent Spanish. So when he started disappearing a couple times per week, Paul got a little paranoid alone. He followed Carson on three different occasions to the Varietale Cafe without him knowing. He said Carson got a table with the same guy each time. One time Paul got close enough to listen in. They were speaking English but the other guy had a Russian accent.

“I’ve learned the deal for the Russian RPGs took place there. As you suggested, we matched Carson’s DNA to those old RPGs. We grabbed his coffee cup and plastic spoon as he left his favorite coffee stop. The CIA tied his Bogota meetings to a Russian SVR Agent, that’s their foreign intelligence service. The guy’s name was Nikita Volkov. Our spooks think he turned Carson into an US-based operative years ago. But it’s looking like the Russian-based cyber attacks on our grid last year were not actually from Russia. Our smart folks think China’s high-tech DNA was behind the attacks. It wasn’t the Russians”.

“Think the death penalty should motivate that little piece of shit to sing a bit?” Derek huffed.

“One would think,” Dexter laughed. “I’m confident we can collapse the entire network now. Anyway, I wanted you to be the first to know. You’ve served your country well once again my friend. Plus, you’re really helping the FBI to earn back the trust of the public after our slapstick performance a few years back. You have the thanks of a grateful nation.”

“Thanks, and great work Agent Tinley, the same applies to you.”

It was one month earlier when Derek Gifford contacted Agent Tinley at the FBI with a hunch that should be checked out. He had discussed it in some detail with Chris Sabastian, a former Army intelligence guy now with an energy consulting firm and friends with Hank Boudreaux. Derek had struck up a friendship with Hank the night they worked together to defend the Atomic Garage and get power to the local hospital during the US grid attack.

In the past, as an Army Ranger, Derek had been involved, on the ground, in several covert intelligence missions in South America to disrupt the fentanyl traffic that was starting to flow into the United States like a river in 2019. The fentanyl would come in from illegal labs allowed to operate in China. From there, the powerful opiates were shipped to several locations

in South America and Mexico, then laced into cocaine, meth, pot, and used to strengthen other illegally manufactured opioids in South American and Mexican processing facilities. The cartels no longer were tied to the agricultural cycles of poppies to produce heroin when they could synthetically enrich their product with abundant amounts of fentanyl from China, a drug 100 times more potent than morphine. Most of those products ended up in the US.

Human slaves and illegal weapons dealers often used those same underground trade routes. China was now in charge of these networks since Russia's withdrawal from Cuba and the South American region left a vacuum. But those old ties to Russia still existed in the early 2000s.

The question for Dexter at the FBI was, "Is it possible that a young Carson McMullen might have been the client in Columbia for the Russian RPGs coming into South America via Cuba? The same RPGs that were confiscated by the FBI when they arrested Jayla Smith-Ahmed, Paul Ronkowski, and Harley Beckley in Montana before they could blow up the Alaskan Pipeline?"

"They were caught with those weapons in the trunk of their car heading north through Montana on the way to Alaska," Dexter recalled from reading the report. "Let me see, that was in 2006. A mere 23 years ago. They claimed the weapons were just put into their trunk and never knew the handler. They could have come into the country a hundred different ways."

"I wonder if Paul and Harley like their life now?" Derek inquired.

"Yea, I think it's time we had that chat with them. What's your working theory?" Dexter asked.

"A young American guy who speaks pretty good Spanish, hangs out in Columbia, maybe Bogota for a couple months getting the feel of things. At first, he poses as if he's interested in distributing drugs, but once he finds the right contacts he segues into questions about weapons."

Agent Tinley added the next line, “And he eventually uncovers the arms dealer he really wants to talk to. Maybe he sailed a boat down there; time was more expendable then, he was younger.”

“Right,” Derek picked up on the string of logic, “He picks up the three Russian RPGs and a stash of grenades for them, and sails home to California. Maybe he hides them in a little nook south of the US border in Tijuana on the sail home to have someone else pick them up and bring them across later.”

“Maybe he picked up more weapons than that. They came into the US via a tunnel with a shipment of drugs, maybe someone drove them across. But somebody with brains and creativity had to make the original deal in person, in Columbia,” Dexter speculated.

Derek suddenly had a thought, “Hey, maybe the guy fancies himself a writer and wrote the whole trip off by submitting a story of his odyssey to a travel magazine or newspaper?”

“Yep, I could see that,” Dexter complimented. “Think I’ll go back and reread that glowing *May I Ask?* magazine article he wrote about Jayla Smith-Ahmed back in 2008. What was the title of that bullshit? Oh yea, “Eco-Warrior’s Mission to Save the Earth.”

“If we place him in Bogata sometime between 2004 to 2006, he’s likely our guy?” Derek surmised.

“Your theory makes sense. Let me see if I can recreate a travel timeline for Carson’s 2004 to 2006. Post 9/11 will make that task a little less than impossible, but it’s worth a shot,” Dexter explained.

“Does the FBI still have those RPGs and ammo in evidence storage?” Derek wondered.

“We usually keep that stuff for 10 years then destroy it. But we may have kept Russian RPGs longer than that? You thinking DNA?” Dexter asked.

“Maybe, I am just watching too many cold case detective shows? My wife is addicted to them,” Derek revealed.

“Tell her the husband did it to get the insurance. But this is a good thought. I’ll check it out,” Dexter promised.

“Take care, take risks, kick ass, brother,” Derek replied

“We’ll do. Maybe my next call will be to inform you we’ve arrested Carson McMullen,” Dexter speculated

“Seems like you’ve picked up the scent. That would be a good day. Best of luck,” Derek said as he clicked off.

Thirty-Four

Tuesday, November 20, 2029, New Delhi, India. The 34th session of the Conference of the Parties (COP 34) of the United Nations Framework Convention on Climate Change

MARTHA ROSEN RAN AS A MODERATE IN HER CAMPAIGN TO BE GOVERNOR OF MICHIGAN. She couldn't believe she was about to wrap up year two of her first term. The tagline on all her campaign messaging was "No More Nonsense." A gaping void the size of the Grand Canyon had opened in the middle of the political spectrum by the time she threw her hat in the ring in 2027. The political class had replaced good governance with full-time fundraising for re-election and then moved to the most extreme positions to keep the money coming in. The strategy worked well to raise money for re-elections but it left 21st century politicians as a class, the most despised in American history.

Martha knew that politics was a balancing act between the two extremes of anarchy and tyranny, as explained in *The Federalist Papers, No. 9* by Alexander Hamilton. She sensed the public's political fatigue as the extremes pulled the nation and her state of Michigan apart. She was a student of President John F. Kennedy. She missed his brilliance, humor, and popular appeal in her own time. It was a past that radiated into her consciousness and seemed to leave the present barren of meaningful reflection. John F. Kennedy studied history, and he developed a keen awareness of where he was in the American story. Rosa Vasquez, her lifelong friend and now chief of staff, shared Governor Rosen's adolescent love of President Kennedy's Camelot era. They both knew now that their earlier perceptions of that history were rose colored, but there was enough truth in the tale to inform. Kennedy's speeches could only be described as quintessential American. Both women still listened to them for insight and inspiration.

Early on, Martha and Rosa formed a concept of what a good politician should be. Then they dove into the deep end of politics together. Rosa had always told Martha, “People don’t spend their days longing for political leadership; they just want to be left alone and have stuff like schools, policing, and infrastructure work. They want somebody to pick up the phone right away when they call 9-1-1. And they want to see their kids succeed. Beyond that, the politicians and media are all talking to themselves inside an empty barrel.” Of course, Martha Rosen knew politics was part of the human condition. It did require a kind of leadership that could present a vision, defend it, and advance it. But first Rosa was right, stuff had to work.

Martha loved Rosa for her clear-headed thinking, gift of observation, creativity, and a sixth sense for what the electorate was feeling. It had been Rosa that articulated Martha’s political passion, vision for a better future, and faith in people to achieve. They had won the governor’s election by a landslide after years of battling away in local politics. After Michigan’s electric grid was brutally attacked in her first year in office, the new governor knew that the infrastructure people wanted to work and depended upon was broken. Possibly beyond repair. That’s when Rosa laid out her audacious plan to tap into the existing dynamics of the Michigan centric relationship between the Austins, the friends of the Atomic Garage Movement, Kasvi Aakanksha, the Indian physicists, and one of Michigan’s billionaires in the energy business, Rhonda Mattingly.

The governor listened carefully to Rosa for a half hour straight. Martha finally interrupted. “Rosa, I think you might have lost your mind.”

“On which part of the plan?” Rosa asked.

“Starting right after you said, ‘here’s what I think.’ But just for grins, what should we do about it all?” her long-time friend asked.

“Have you ever visited New Delhi?” Rosa asked.

“Rosa, you know I haven’t visited New Delhi,” Martha sighed. “You’ve been around me your whole life. You know when I oversleep 10 minutes or if I am late for a dental exam for heaven’s sake.”

Governor Rosen did, to her own astonishment, after some argument and several adaptations, eventually agreed to Rosa’s plan. Now the day was here. She heard a knock on the door and Rosa greeting the visitor into the suite of the ITC Welcomhotel located on the same campus at the India Convention and Expo Center. Game on.

Governor Rosen had contacted the mega-billionaire, an Indian immigrant and US citizen, Sajan Ganguly about the plant he was going to be building for his company, ReFlecto Tech Industries. Its international headquarters was located in Austin, Texas. The company specialized in making glass wafers for semiconductors and the glass that goes into electron microscopes, space-based telescopes, lasers, and a host of other microelectronic applications. A new glass-wafer lab and production center was going to be built, and Michigan was one of three states left in contention to get it.

Sajan Ganguly had been surprised to get a call from Governor Rosen for a meeting. But when she said she too would be at COP 34 in New Delhi in just a couple weeks, his curiosity combined with the convenience got the better of him, and he agreed. He thought it was probably going to be about Michigan sweetening the pot to get his new glass-wafer plant. All good. He went to the meeting alone in case the governor wanted to talk about an off-the-record offer.

After polite introductions, Martha, Rosa, and Sajan sat down.

“Governor Rosen, COP eight was in New Delhi in 2002. I traveled here. It was a 15-hour commute by bus from my childhood home in Gujarat. I was just 16 at the time, but it left a

lasting impression on me,” Sajan explained

“What was that impression?” Governor Rosen asked.

“I recall thinking I was missing something, or all these people were crazy. India is the second largest CO₂ emission country in the world, and they were making pronouncements that if India followed them, my family would have starved to death,” Sajan said.

“What do you think now here at COP 34?” Rosa inquired.

“The speeches are sometimes silly. But there are a lot of movers and shakers here,” Sajan said. “I’ve made a lot of contacts and friends at the 10 or so COPs I’ve attended since my youth. I consider myself an environmentalist. These relationships have been rewarding on many levels. Maybe COP climate change goals can be achieved by some yet unexpected means. Most of the attendees are good people with good intentions.”

“Ahh, yes the stuff the road to hell is paved with,” Rosa interjected.

Before Sajan could respond there was a knock on the suite door from the Governor’s security detail. Rosa stood to greet the expected visitor. Sajan smiled but seemed a little uneasy.

A beautiful, middle-aged Indian woman dressed in a simple blouse and skirt entered the room. “Sajan, I’d like to introduce you to Dr. Kasvi Aakanksha,” Rosa offered.

Sajan glanced at the Michigan governor as if he had been set up. He quickly recovered. “Ahh, Dr. Aakanksha, I know who you are. It is a pleasure to meet India’s top nuclear physicist,” Sajan gushed.

Everyone sat around the small cocktail table. “Please call me Kasvi, and I am afraid I know of several Indian physicists who may contest your opinion of me.”

“They would be incorrect and rude to contradict that opinion. But let me ask, how is India’s plan for becoming energy independent by burning thorium in your advanced reactors?”

Sajan inquired.

Kasvi made a hand gesture to Governor Rosen. “Sajan, that is more or less what we wanted to talk to you about.”

“Oh, I see. Governor Rosen, I’m a difficult person to surprise, but must admit you’ve accomplished that feat today in spades,” Sajan revealed. “Please go on.”

Kasvi took over. She believed in getting difficult issues into the open immediately and to keep everyone from guessing. “Sajan, you’re one of a number of very wealthy Indian high-tech entrepreneurs who are now spread around the world. There are approximately 170 of them in India. A hundred more former Indian natives or second generation Indians are on the United States’ Unicorn investors list for high-tech investors. There and more in Great Britain and other parts of the world. I think you are the most trusted and loved out of that rather unique community.”

“I am not sure that is true, but I am a partner or friend to many of those people,” Sajan confirmed as he raised his eyebrows.

“And I assume all of you still love India, and you would be a citizen if our country allowed dual citizenships,” Kasvi speculated.

“That is true. I do have my OCI, Overseas Citizen of India, which allows me to move into and out of India, but I do wish I could have retained full citizenship. I needed to become a US citizen and was very sad to relinquish my Indian Citizenship,” Sajan shared as he teared up.

“Sajan, the people of India are falling behind,” Kasvi said. “Our demand for energy is far in excess of any predicted supply. That of course has immense political consequences. We’re going to fall back into the Dark Ages. My life has been dedicated to provide that needed energy. My problem is I am being stopped from doing that by an international soup of nameless

bureaucrats, some people at this conference, and bottomless political corruption here in India. I'm sure you heard my father and mother were killed because of their mission to make India energy independent, and also of the assassination attempt on my life?"

Sajan nodded. "I am familiar with your incredible story, and I did hear of that attempt on your life. I am sorry it all happened but relieved you have survived."

"Thank you for that. I've since been assured I am out of danger. But you have an energy problem too, don't you, Sajan?"

"I'm listening," Sajan replied with a poker face.

"Energy policies in the west are determined by politicians not engineers. Those policies ignore physics," Kasvi reminded Sajan of the obvious. "Massive amounts of surface area to collect dispersed energy. Millions of acres of farmland that could have been returned to nature or dedicated to food production now produces ethanol, a fuel that would never have been used in any free market. Forests are being turned into wood chips and burned up under the guise of biofuel."

"I am not sure what this has to do with me," Sajan reacted defensively.

"All of this means American high-tech companies are facing huge energy shortages in operations now," Kasvi declared. "You tell your customers and investors you use green energy. You surround your headquarters buildings with solar panels. But in truth you use fossil fuels to power your enterprises, and that source is now diminishing and skyrocketing in costs as it becomes as taboo as a social poison. Simple math easily demonstrates that high-tech data centers pull much more power than renewables could possibly deliver. And the carbon credit scheme is no more than a 'get out of jail' card for the time being. The private grids and fossil-fuel generators you and others have built are only dedicated to serve your operations. Because of

those private power generation systems, you'll stay in business as electrical energy is diminished and then portioned out to the rest of civilization. In my estimation, that is probably starting to happen now. You get electricity. Other people not so much. It's going to be much more than a PR problem."

"And if this is so, what is your prescription?" Sajan prompted.

"We need your intelligence, money, technological resources, and influence," Kasvi explained.

"Who are you referring to when you say, 'we'?" Sajan asked.

"The Atomic Garage Movement, a coalition of fossil-fuel entrepreneurs from the United States who have the vision to go from fossil fuels to nuclear fuels, India's Sulabh International Services Organization," Kasvi continued listing the parties in the powerful new coalition of the future. "Israel, Governor Rosen here, who plans to make the State of Michigan a Nuclear Enterprise Corridor for the United States, and of course a movie star and a songwriter who caused the world to pause and take a second look at nuclear energy while that accomplishment remained elusive to the scientific community. And we have recently added a new member to this list. India."

"How did Israel and India make this exclusive list?" Sajan wondered.

"It's a long story that has to remain untold at the moment," Kasvi said. "But if you want a clue, think of what both countries have in common."

"I see you believe in the Socratic method of teaching. Let me see, both countries are arguably democracies that defied the world, including defying the United States and the UN's International Atomic Energy Agency by developing nuclear weapons," Sajan guessed.

"Yes, indeed. It pissed some people off too," Kasvi added. "Israel and India have been

isolated by the nuclear energy community because we went down that path without the blessing of the already nuclear armed. The reasons for us developing nuclear arms back then are irrelevant to developing nuclear energy now. But that isolation from the nuclear energy community also means India and Israel may have an opportunity to overcome the burdensome and corrupt regulations that plagues nuclear energy advancement in the world.”

“Interesting. And what of Amy Austin, a person who seems to be one of the world’s top influencers right now in that space?” Sajan probed.

“Ah yes Amy, she desperately wanted to be here and appeal to you to join this team,” Governor Rosen said as she handed Sajan a virtual reality headset. “She’s wrapping up the testing on her *Walking Leaf* reactor as we speak. She recorded a message for you.”

Sajan took the headset and stared at it. “I am, of course, familiar with Amy’s story, if not all the details. I concede she is unique, maybe another Einstein. Her *Walking Leaf* nuclear reactor by all accounts is three decades ahead of current technology. Why do I have a feeling that once I enter this world there is no going back?” A full minute of silence passed. Sajan put the headset on.

“Hello Sajan, this is Amy Austin recording this from the Atomic Garage at my home in Michigan. I am sorry I could not be with you today.”

There was a 3-D image of Amy talking as she stood by what looked to be a completed *Walking Leaf* Nuclear Reactor. Sajan couldn’t help but think it looked like a simple small water tank, like the kind he’d seen hundreds of times on tall building roofs or small towns throughout India. He tuned into what Amy was saying.

“I’ve thought a lot about what to say to you. What we’re about to do from a technological perspective will work just as it did in the 1960s only better. Of that I have little doubt. What will

happen when people see this technology work remains to be known? But see it they must because it exists. And I think they will see its potential. I think it will give them hope.

“The images coming up now are from a secret video smuggled out of Katanga, in the Congo of Africa. Katanga has over one-third of the world’s cobalt reserves, more than the rest of the world combined, and 10 percent of the world’s copper. Without cobalt, copper, and the other rare earth minerals of the Congo, there is no high-tech world, no electric cars, no mobile devices, no space exploration, no flat screen TVs or supercomputers.”

As Amy narrated, the 3-D visuals showed hundreds of children digging with their hands and crude shovels, small boys climbed into holes and came out with shirts full of heterogenite, the ore cobalt could be extracted from. The images were so real Sajan could feel the heat, grit, and exhaustion. Smell the human sweat and human waste. Hear the endless crunching under foot, shovels and other tools hitting the hard ground all around. See the hundreds of sooty, tired people moving around in the glaring sunlight, around the highly toxic open pit mine. Then an image of a dead boy laying in the dirt. It was frozen for a few seconds. His filthy little face and lifeless eyes burned into Sajan’s brain. His own son was about the same age. The child had a look of anguish on his death mask, his last thoughts unimaginable to a modern citizen.

Amy continued, “Imagine if all the fossil fuels on Earth were located in one place the size of three or four of our central United States, and that is cobalt. China controls 70 percent of that mineral by propping up ruthless tyrants who victimize the communities around the mines that operate as modern-day slave states. Imagine if your cotton shirt was still produced from slave labor in the southern United States. That is what is happening in the Congo with cobalt, the product input of the high-tech world,” Amy voiced over the images of lives who have lost all hope on an earthscape that resembled hell.

Sajan hit pause, slipped off the virtual headset, and softly whispered, “Kasvi, I am doing all I can to remedy this situation.”

“Sajan, nobody, and I mean nobody anywhere up the supply chain considers themselves responsible for the poor artisanal miners in this video,” Kasvi explained. “Even some Indian companies need to be reigned in, in the Congo. The authorities above these people simply sneak their lodes into the legitimate supply chain, down the road and everybody in high tech says, ‘Hey, we’re good.’ Harshil’s friend who smuggled these images out of the Congo at risk of his life told us there was not one representative from a high-tech business anywhere around, nobody enforces any laws, those poor people are just being sacrificed and nobody really gives a damn. Nobody really cares.”

Sajan slowly put the headset back on. There was an image of a tall, thin, young man digging in a surface that looked like Mars. Amy’s image in the Atomic Garage and narrative filled the screen again.

“My father and his colleagues are working hard to come up with an alloy to replace cobalt, but even with their advanced knowledge, he tells me we’re years away from accomplishing that. In fact, cobalt is often used in alloys and makes up a small percentage of our own new alloy, Sartorium.

“As we speak, China is increasing its presence in Africa and specifically the Congo. And we’re hearing China plans to use nuclear energy in Africa to gain the advantage there for centuries to come. Meanwhile, our team here in the US is stuck arguing with citizen idiots and wading through government red tape that would take us at least 15 years to get to scale in what could be brought to scale in a few years. The US nuclear hierarchy celebrates when after an original 12,000-page application grows into another two million pages of documentation and

then finally a new reactor concept is allowed to go through a decade of testing. In short, China is going to hand the US its ass if we don't stop being stupid," Amy ranted.

"I'm listening, Amy," Sajan said out loud to the video image of her, more to demonstrate his interest to those in the room, than anything else.

"That's the bad news, Sajan. But here is the good news," Amy beamed her beautiful smile.

An image of a huge Sulabh Complex came into focus in the virtual world. The beautiful Indian music of a sitar, flute, and mridangam played as the image came into focus. It was a public sanitation area, where people could use a toilet, take a shower, wash some clothes, and obtain clean, fresh drinking water to haul away in pull-wagons that could hold four, 20-liter plastic bottles. Everything was clean to the point of being immaculate. The wash house was enormous with hundreds of shower heads divided into mens' and womens' wings of the building. The image went to a wide angle as if Sajan was flying on a drone. There were water towers around the facility. Water towers that looked like the small nuclear reactor Amy Austin had been working on. A large solar panel array facing each direction of the compass rested atop of a tower located on the edge of the Sulabh Complex property. A sewage processing and water treatment plant operated four soccer fields from the complex.

In the distance was the ocean, the drone-effect zoomed in, and the viewer was transported inside a desalination plant through a large series of massive plumbing, and piped up to the Sulabh complex. The facility also had the same solar panel array on top of it. The drone flew back to the Sulabh bathhouse, and the images became animated cutaways of the facility. Below it was a small mechanical plant that took the human waste and processed it into fuel, then burned it in a generator above ground. At an area about one soccer field away, underground in an

encasement basement, a now familiar *Walking Leaf* nuclear reactor was generating power. A small turbine on the surface was transmitting energy by underground wire to the bathhouse, and the extra energy was transmitted by the rectennas on top of the facility. All around the horizon receivers were taking that electricity in and distributing it inland via beams of energy.

The next series of simulations outlined the thorium fuel cycle in India and demonstrated how thorium would allow India to become energy independent. The image showed how India's people could live in a world where energy equity was a human right, a world where what was accomplished in India could also be accomplished in Africa, South America, Indonesia, Eastern Europe, really everywhere. Thorium was plentiful around the world. And the technology was in place to untap it.

Sajan took off his headset. He sighed deeply as he made contact with each person in the room. He decided to relent, "What exactly do you suggest I do?"

Kasvi took over, "First, you've got to get as many Indian billionaires on the bus as possible. The image you saw of the Sulabh Complex in the virtual animation is being built for real right now as a model demonstration within the Madras Atomic Power Station property in Kalpakkam, where I work. We'll be transporting it to a nearby demonstration site."

"Second, we'll give you and your high-tech buddies the nuclear power source required to power your data centers. But more importantly to get to the bottom of the cobalt supply chain in the Congo, and then the rest of Africa. If you do it under the banner of the United States with US investors, you should meet with broad acceptance in Africa. Those small communities in the Congo need lots of dependable energy to process cobalt locally. We've got to take all the middlemen out and empower those communities. We can mine cobalt using safe, sustainable, and environmentally responsible protocols. The CCP might not believe this but China can also

benefit because World War III will probably have been averted if this is accomplished.

“Third, India will adopt nuclear energy on an accelerated scale, and be a model for that African transition as our team leads the scientific community in closing the Indian nuclear fuel loop, and finally becoming energy independent. It would not be incorrect to say one of our *Walking Leaf* reactors could be built in a garage. And indeed they are being built in such environments all over the world as we speak – in many cases by underground nuclear scientists who object to totalitarianism and endless wars. It is a modern day World War II type of French Resistance, only peaceful.”

“Sajan, we need the brains, money, and commitment of all the successful Indian entrepreneurs to form the tip of the spear and push us through the admittedly narrow path we have identified,” Rosa added.

Governor Rosen emphasized, “The end of that path is a place of unlimited, clean, and dependable energy. An academic paper once commissioned by Robert Kennedy spells out the many ways this could have changed the world starting in the mid sixties. I think it is still applicable today. You’re on the hot seat, my friend. We can’t do this without you. You’re in a position of power, at a time when the crossroads of history meet. I know you want to make the world a better place, Sajan. We need your help, and the help of your friends.”

Sajan was clearly shaken. But he wasn’t rushed. He sat back and closed his eyes. His amazing mind reviewing old information, weighing it against new information, calculating, projecting, and estimating.

“How extraordinary,” he commented “I really didn’t see this coming. There is a logic here. She, I mean Amy Austin did this. She did it intentionally, didn’t she?”

“Yes Sajan, she did. She knew what she was doing. She started a competition. A chain

reaction, if you will,” Kasvi confirmed.

DRAFT

Thirty-Five

Thursday, July 18, 2030, Shiv Nadar University Chennai, India

KATHY DESABLE WAS GOING OVER HER NOTES AND TALKING WITH HER PRODUCERS. She would be doing the voice-over of a visual series of events, over the span of the last three years, that she had witnessed and had been reporting on all along. As a veteran reporter for Channel Seven Action News in Michigan, she was the go-to person for all things related to energy. In mid 2027, she was covering the ongoing feud between the powerful environmental organization called the Terrestrial Ecology Society, known as TES, and the small pronuclear group, the Atomic Garage Movement, AGM for short. It started with a letter from AGM to TES. It was an appeal for TES to give nuclear energy a second look and to consider the technology as a desirable renewable energy source. AGM was asking for TES to return to its pronuclear roots. TES's position at its founding in the late 1950s was antinuclear war but pronuclear energy. It wasn't until antiwar and antinuclear protesters took over TES's board in the mid 60s and went all in against nuclear energy.

TES overreacted to AGM's 2027 open letter by turning their response into a major media event and sending the well known actor Josh Manning, their high-profile spokesperson and grandson of TES's founder, Elizabeth O'Brian, known to the world and those she loved as Lizzy. So it was that the actor flew into AGM's backyard to debate the cocky teenage girl, the daughter of an accomplished scientist, and prevent her from becoming a problem to TES in the future.

"Let's pull the weed out at the roots," Carson McMullen, TES's Executive Director, advised his board at the time.

That debate pitted Josh Manning, a seasoned environmentalist, antinuclear activist and Academy Award winning actor against an idealistic and unknown 19-year-old Michigan woman who took up the cause of the pronuclear community. The debate was over the license extension of a single reactor nuclear plant called The North Rocky Point Nuclear Power Station, or The Rock for short. The debate took place in rural Michigan at the home of The Rock, and Amy Austin's hometown. Back then Kathy DeSable couldn't believe her luck that an A-list Hollywood actor was coming to central Michigan. It was the classic David versus Goliath story. With similar results. The debate went internationally viral, erupting into a perfect global energy crisis storm.

Then in early 2028, Algonquin, Michigan, was the epicenter of a massive terrorist attack on the United States electrical grid. Kathy would often say to her colleagues, "Nobody could have ever imagined the series of momentous events that occurred since the day of that debate." But as she got to know Amy Austin and her extended family better she didn't say that anymore. Kathy knew nobody could predict the way the future unfolded day to day. But just maybe Amy Austin was that rare individual who might be able to put her finger on the scale and move the ship of progress a degree or two. And in so doing set a course for a safer port beyond the horizon. The journey would still present unexpected challenges and setbacks. Everyday would provide a bit of new information and require adaptation. Some days, it would be two steps forward and three steps back. But the destination would be a constant. There was no guarantee the ship would arrive. The distance and time to the destination could be shortened but it was a treacherous course. Kathy had long ago made a silent pledge to herself to follow and report on Amy's odyssey to her final destination whether that be failure or success. It was the story of a lifetime. Today, for the first time since that debate in the park at Algonquin, Michigan, Kathy felt

Amy had finally and safely arrived at her first major destination in life. Southern India of all places.

When TES's Carson McMullen was arrested by the FBI and a list of his crimes were made public, it was clear he had a secret life. The TES board met, and everyone who had supported Carson and advocated against nuclear energy resigned to save the organization. Hanah Rule-McBride, a former board member, a retired university president, and a chemist by training, was asked to serve as TES's interim president. She had spent years trying to nudge TES to consider a pronuclear energy position and consider nuclear as a renewable energy source in the battle against climate change. She resigned after a yelling match with the TES board over the issue back in 2024. Her first act now, as interim president six years later was to reconstitute the TES Board of Directors. The TES board then sent a letter to AGM, Attention: Amy Austin. TES announced it had reconsidered the original 2027 appeal from AGM to adopt a pronuclear policy position. Moving forward TES would advocate for nuclear energy. The TES board members explained they may not actively support the licensing extension of existing nuclear plants, but they wouldn't oppose those efforts either. After all, they did have a membership base that would need a little time absorbing this change. But they would advocate for advanced reactors provided the safety metrics lived up to their claims. Josh Manning deferred a TES invitation to return to the fold. He wanted to see TES walk the talk for awhile.

As Kathy DeSable took a deep breath, she looked around. She was on the campus of Shiv Nadar University in a beautiful open area on the 100-acre campus. Dr. Kasvi Aakanksha and Amy Austin smiled at Kathy from their tall chairs as they waited for the news anchor to take the chair in the middle of them. Off to the side, sitting on a comfortable armchair, totally immersed in the role of spectator and witness to history was Dr. Adele Weiss, Israel's greatest nuclear

physicist, and now close friends with Kasvi and Amy. They were located at the entrance of a beautiful teardrop-shaped park. The entire campus had the feel of a botanical garden.

The Channel Seven Action News team picked the small brick plaza at the park's entrance located at the narrow part of the teardrop for the set. The show was going to be transmitted to an international audience via Channel Seven's parent organization, RBX Satellite Affiliates. And 100 hand-picked pronuclear Substack influencers were set up to report on today's event, paid for by RBX, who would be rebroadcasting clips and entire shows from those pieces, and tapping into the formidable nuclear-energy credentials of those influencers. It was estimated that total global viewership for today's demonstration and events would approach one billion views. When humanity at all levels of the social strata face the prospect of a low-energy, life-declining lifestyle, a promising near -future, abundant-energy technology gets attention.

An elevated, large circular fountain with a tiered rise and a modernistic square concrete column rose 30 meters high from the center of a shallow pool that formed around the base of the column. The structure was located in the middle of the campus like a nucleus and was two soccer fields behind the TV set. The campus track and soccer field rested 800 meters behind the high column, on the other edge of the campus property. The location was ideal. It was in Chennai just a 30 minute drive north from where Dr. Kavi Aakanksha worked on India's Kamini fast reactor.

Live interviews were scheduled for all time slots throughout the day. A panel of experts would weigh in throughout to add commentary and insight. A virtual science fair would report on new energy technologies made possible due to the unique capabilities of *Walking Leaf*. An international online conference of nuclear scientists and operators would weigh in with the technology's meaning and predict how it would alter the future. To some of the more senior people in the crowd, the day was reminiscent of 1969 when a man first walked on the surface of

the moon. Questions and comments were already pouring in from around the world. There seemed to be a growing understanding that a new dawn of nuclear energy had arrived as Alvin Weinberg predicted four decades earlier. The founder of Oak Ridge Labs in Tennessee, whose teams built and tested historic nuclear reactors similar to *Walking Leaf* over 70 years ago, was present in spirit, and represented by his proud living descendants.

Bob James was scheduled to give an update of the now approved 20-year license extension for The Rock. It turned out the NRC's deliberation over the transportation of used nuclear fuel to Oak Ridge, Tennessee, from Algonquin, Michigan, and other US nuclear plants for processing into MOX fuel got the attention of the highly influential Senator Jake Foresberger from the Volunteer State. If US nuclear reactors were going to burn recycled nuclear waste, then Tennessee, with the largest operating facility to process that waste into MOX fuel, was sure as hell going to be in the game. When the powerful US Senate Appropriations and Energy and Commerce Committees joined the secretary of energy, and the president in supporting The Rock's license extension, it was game over. The NRC, after a self-review that included all stakeholders and the public, was in the process of being completely revamped, streamlined, and set up to serve a fast moving private sector safely and effectively as mandated by the US Congress.

India's prime minister was on the docket and going to explain what thorium was and how India was going to use that abundant fuel to bring their nation to a new robust economic level. Israel's prime minister was in attendance with prepublished talking points suggesting that abundant, safe, clean, and reliable energy was the foundation for finding a path to peace in the Middle East. He would say that Israel would find ways to work with its neighbors on that

concept. That commitment was well received by the global community, and the politics of change was brisk in the power brokers' back rooms and hallways.

European leaders were in awe of *Walking Leaf*. They would also be talking about more demonstrations of the wireless atmospheric transmission of energy that eliminated the need for physical transmission lines on Earth, and could even transmit solar energy from space to Earth's surface. The European Space Agency was also on hand and already building a space-based atmospheric transmitter with Emrod. And a host of experts in multiple disciplines were going to share ideas and concepts of how to tap into energy produced by millions of small modular reactors. *Walking Leaf* opened a whole new set of possibilities and had ignited a new level of innovation around the world. Teachers would talk about how kids were enrolling in science classes by the millions, online training was booming, and engineering schools and the basic electrical, plumbing, and construction trades were adapting for what promised to be a new renaissance on Earth.

"Now that looks like a full agenda," Kathy DeSable deadpanned to her producer.

Sam Benetiz had been building Sulabh Complexes around India for the last 10 years, including installation of the required small water tanks manufactured by the Groundwater Consortium in the US. When the duplicate shape of those small water tanks were used as a reactor casing for a *Walking Leaf* reactor, they were printed using custom recipes of Sartorium, based on the end users' specifications for thermal heat transfer and other functions. Sam was using his friend Harshil Varm's blueprints for setting up the Sulabh Complex model facility on the campus soccer field, and although functional was more like a plywood movie set because they would have to remove it after the event. Sam and his crew also built a small basement on

the soccer field exterior and then fit a prefabricated lining into it, it was called the encasement basement. The first *Walking Leaf* reactor in history would be housed there and plugged into the campus's grid after the event. It would contribute all the power generation to Shiv Nadar University. The reactor would need to be refueled in 25 years, but the cost of doing so was small. The cost of the reactor and installation was borne by Rhonda Mattingly, Hank Boudreaux, and their study group which had formally adopted Rhonda's name for them, *The Strange Bedfellow Club*, but just *SBC Resources* would do for public consumption. The upfront capital costs were then amortized over the reactor's 100-year anticipated life. The numbers boggled the mind. Abundant, dependable energy available anywhere, anytime, to anyone made the 1954 hope for nuclear energy presciently voiced by then Chairman of the Atomic Energy Commission Lewis Strauss, "It is not too much to expect that our children will enjoy in their homes electrical energy too cheap to meter."

Rectennas were put on the structures around the soccer field and on top of the concrete column in teardrop park. Originally the rectennas had looked like giant solar panels, but they had been improved and now they too were encased in shells that mimicked the shape of the small water tanks.

As its first official public act, SBC Resources had adopted a strategy committing their members to move from fossil fuels to nuclear fuels in the United States over an acceptable transition time. In addition to funding the *Walking Leaf* reactor for the Indian university, SBC Resources had collectively raised \$11 billion in venture capital to achieve its goals and support nuclear energy proliferation throughout the world. Just a month prior, SBC Resources had joined Emrod in opening their first US-based office and were busy executing the plan drafted at Rhonda's Big Bear Ranch in Wyoming back in June 2027. The original draft was improved upon

over the years. The first two *Walking Leaf* factories had broken ground in Chelsea, Michigan, where Rhonda's father, Rex, had founded Chelsea Oil shortly after World War II. The town of Chelsea was in Michigan's new nuclear development and research corridor established by Governor Martha Rosen and the Michigan Legislature. The other *Walking Leaf* factory was going to be in New Orleans. The first *Walking Leaf* reactor to come out of the New Orleans factory would be used to power the Chelsea Resources Deepsea Production Platform RDPP2. Subsequent reactors would start replacing natural gas peaker plants to back up intermittent wind and solar energy without creating a CO2 footprint. After that hydrogen production, desalination, and heat process for industry.

Sajan Ganguly did recruit high-tech billionaires of India descent and those also living in India to fund and lobby for *Walking Leaf* reactors to power their data centers and the communities that produced their rare earth inputs for their products. He had flown into Chennai a week earlier to help prepare for the event after spending the prior month living among and documenting the lives of artisanal cobalt miners at an Indian-controlled depot near Kipushi in the Congo of Africa. Sajan was on a mission, and before he was done, he would focus 21st century high-tech businesses to be present and active at the very bottom of their supply chains. The stakes were too high not to act. Once his documentary was released, he had no doubt about how to converge billions of more dollars, and deep commitments to rescuing these poor people and help Africa build a sustainable economy. No amount of evil in the world was going to prevent that from happening. And as far as Amy's *Walking Leaf* nuclear reactor, Sajan would challenge anyone to explain why that reactor and others were not the solution to climate change. Really, what else was needed?

Harshil Varm, Frank and Becky Austin, Stew and Joline Grassley, Bob James, Josh Manning and his fiancée Shanta, had all been on campus for a week placing the *Walking Leaf* reactor prototype that had been made in the Atomic Garage in the encasement basement, sealing it under ground and then testing all the operating functions. Russ Hackett, President of Emrod, flew in from New Zealand with the requested equipment and the same four engineers who were at the Atomic Garage the night of the US grid attack. The four Emrod engineers were instrumental in saving the lives of the patients at the Algonquin, Michigan, hospital as they transmitted energy through the atmosphere to that facility from the nearby Atomic Garage.

Derek Gifford and Ann Rutledge, who provided security services to the Atomic Garage, joined Ariel Raquel and Levi Katz of Israel's Mossad who had pre-arranged to have the HALEU nuclear fuel delivered to India's Department of Atomic Energy. The International Atomic Energy Agency, IAEA, was invited to Michigan months ago and read in on the project. They were given full access to *Walking Leaf* or any other supporting technology they wished to examine, although all of it was online for anyone to view. The IAEA team's questions and advice were excellent and incorporated into the *Walking Leaf* protocols. That HALEU fuel that Israel provided was now inside the water tank shaped *Walking Leaf* reactor and ready to be activated, otherwise known as going critical.

Two days earlier, Dexter Tinley of the FBI and his CIA counterpart showed up with some US-based intelligence to provide more information to the security detail on the ground in India. All the foreign security personnel in India worked with India's Central Bureau of Investigation, CBI, and Research and Analysis Wing, RAW. Together they had tracked down the source of the assassination attempt on Dr. Kasvi Aakanksha's life to Imran Khanna, an India army general, and Yuri Mikhail, a corrupt Russian arms dealer. Mikhail had disappeared, and Khanna was now in a

high-security prison. Their entire criminal network had been dismantled. The security for the event and afterward would be an international team effort. But with the good guys in charge, communication was open, cooperation was standard, and the mission was clear. The protection was robust but unobtrusive. The same as it would soon be in the Congo and other areas of the developing world tapping into the power of modern technologies.

Governor Rosen was scheduled to make a remark on behalf of the United States at the opening of a celebration gala later in the day. No doubt Rosa Vasquez had spent a lot of time honing that message for her good friend and boss. Rosa was also present. It would be the kind of day when future historians would want to know who was in the audience here. But Amy and Kasvi had insisted that the day not turn into a political event, so there were some bruised egos. Today was a triumph of good people who put themselves at risk, supported an underdog, and did the right thing against the safer path of appeasing the failing status quo. The untold story of history, good things happen when good people act together, was the lead story today.

Kathy DeSable sat down between Amy and Kasvi. The set was dark. Only one tech held a mobile device to stream a live recording. All three women smiled at the mobile device. The entire campus went quiet. A dog barked. The birds were chattering in the background. The breeze was warm and mild. It was a beautiful morning. Then the set lights went on. The fountain in the background came to life and a horn sounded at the soccer stadium across campus. On a table in front of the three women was a modest, wooden pedestal. Resting atop of it was a light bulb reminiscent of the one Thomas Edison's team invented in 1879 at Menlo Park, New Jersey. Amy smiled because she knew that Edison's real breakthrough was the powerful 19th century dynamo that provided that light with energy. Then the light went on. The crowd of invited guests and students around the campus cheered. Kathy looked at Amy Austin and smiled.

Amy laughed, "It worked."

There was a celebration at the Shiv Nadar University's soccer field that night. Governor Rosen gave an eloquent short speech. Amy thanked everyone. Kathy DeSable had served as Master of Ceremonies and network anchor all day. The special crowd of guests and students gathered for fireworks and a free concert at the university's soccer field, with *Walking Leaf* producing steady power just behind the stadium. The small stadium's lights turned off with the exception of one spotlight on the small theater in the round located at the center of the field. Shanta walked into that spotlight looking beautiful and happy. She had her guitar with her. The crowd applauded in anticipation of something special about to happen. She asked Amy to come on stage and sit by her.

Shanta said, "I wrote a little song for my friend Amy Austin. I wanted to sing it for her sometime ago, but the gig got canceled because some bad guys turned the lights off. You might have heard that story. Is everybody charged up and ready to rock and roll? The song is called. . .

Megawatt Mama

Chorus: Megawatt Mama's in town and she's amping it up

the sparks are ready to fly

Join the fun at the dock and be ready to rock

There's lightning in the sky

If you're feeling kinda blue and have nothing to do

Come on down to the shore

Let down your locks kick off your socks

We're hotter than the core

The AC's flowing the transformers glowing

The birds on the wire don't care

The battery's charging the girls are hot

Static electricity runs through our hair

Chorus

The current's buzzing, the keyboard's roaring

And the circuit board's a trippin

The dancing's approaching the speed of light

The electrons are a zipping

The reactors hot and the beer is cold

And the chill is leaving the air

The waters glowing, the photons are flowing

It's radioactive down there

Chorus

Pick up the pace, leave this rat race

Oh my, the insulators are gonna melt

Sling shot the moon you'll be at Mars by noon

Heading to the Kuiper Belt

Let's go nuclear and party all night

Tesla would be so proud

So raise your arms, kick up your heels

And get ready to get loud

There's lightning in the sky. . .there's lightning in the sky. . .there's lightning in the sky. . .

DRAFT

Epilogue

One year later, Algonquin, Michigan, the Austins' family home

IT WAS A BRISK FALL MORNING. It had rained the night before, but the sun was fighting its way through the partly cloudy skies of central Michigan. Now that it was a little cooler, Proton and Neutron could go for longer walks in Odina State Park. Joline arrived with the 'boys' and were greeted by Amy and Becky. Frank, Stew, and Amy's boyfriend, Harshil, were all in India helping Sam Benetiz complete the first 10 Sulabh Complexes there to be nuclear powered. Two of those were combined with nuclear-powered desalination plants turning the salt water from the Indian Ocean on the east coast, and the Arabian Sea on the west coast of India into potable water. Excess power from the complexes would be transmitted to nearby towns and used as its officials determined.

The *Walking Leaf* factories in Chelsea, Michigan, and New Orleans, Louisiana, were almost finished and would start mass producing the reactors within the next three months. For now, the *Walking Leaf* Fuel cells were being manufactured in India and Israel under the close supervision of the Atomic Garage Movement and the International Atomic Energy Agency in cooperation with representatives of any country agreeing to the *Walking Leaf* safety and ethical protocols. In those countries, there was no reason to develop an underground network of *Walking Leaf* reactors, as was happening in authoritarian regimes.

Since the first demonstration of *Walking Leaf* working at Shiv Nadar University in Chennai, India, last year, it had become clear that nuclear energy technology was now accessible to many more people. The Atomic Garage had open-sourced its development of *Walking Leaf*, and almost every developed country on Earth was building a *Walking Leaf* reactor somewhere

knowingly or unknowingly within their borders. This forced the nuclear regulatory bodies from western nations and other democracies to come to an agreement on international standards.

From a nuclear regulator's perspective, everything had changed overnight. Not the least of which was that almost anyone with access to fundamentally sound scientific processes and a relatively modest amount of capital could build a *Walking Leaf* nuclear reactor. The genie really was out of the bottle. Some groups were sanctioned by their countries as was happening in Israel, India, South Africa, Argentina, Mexico, and much of Europe. More nations were adopting the practice of providing nuclear fuel to their small businesses building *Walking Leaf* reactor fuel cells.

The first generation of *Walking Leaf* reactors required HALEU as the only proliferation-resistant nuclear starter fuel available. HALEU was rare and only available via nation states. The HALEU was wrapped in a thorium blanket, and once the thorium was exposed in a reactor, it transmuted into a fissionable nuclear fuel, Uranium-233. HALEU as the kindling, thorium as the log. Some early *Walking Leaf* reactors were tasked to produce more U-233 instead of using it all up to produce power. U-233 could also be used as a starter fuel. That extra U-233 would then be used to start up new *Walking Leaf* reactors, and a perpetual fuel loop could be maintained. The U-233 coming out of a *Walking Leaf* reactor was totally proliferation proof, not just proliferation resistant.

Amy had engineered the reactors so U-233 would be useless as a weapon. She did that by contaminating the U-233 with a little U-232 inside the reactor core. The "contaminated" U-233 was still an excellent nuclear fuel, but useless for building a nuclear weapon. If that chemical process inside the reactor were altered, Harshil's AI system, which governed the operation of all *Walking Leaf* reactors shut down the reaction and destroyed all the pure U-233 inside the reactor.

Also, the nuclear reactor casing shell and piping were made of Sartorium. Sartorium served as an ultralight shielding that made standing next to a nuclear reactor no more dangerous than standing next to a running combustion engine. With the help of scientists from all over the world, Amy had spent an entire year addressing the public's fear of radiation. Soon, people started to accept the reality that a fission reaction did not pose an elevated risk to the public. Amy found that educational campaign much more difficult than building *Walking Leaf*.

For nuclear plant regulators the old school of micromanaging nuclear reactor and nuclear plant construction was now obsolete. It was time to think outside the dome. Focusing on a suspicious weld, or a pump vapor leak, or a microscopic crack in a containment dome inside a specific giant facility with thousands of parts and miles of piping operating under extreme pressure were now irrelevant exercises with advanced reactors. You could put a *Walking Leaf* reactor in the back of a pick-up truck. And the new Rankine gas turbines could be hauled around in a second pick-up truck. A new regulatory process was needed because of Sartorium's non-corrosive and thermodynamic properties, and the fact that the fuels and coolant were all one in the same and melted down as part of the physics.

Protocols for manufacturing, shipping, operation, radiation monitoring, troubleshooting, and decommissioning were established. These protocols would be international in scope, monitored by AI and audited on a regular basis. The days of talking about specific pieces of equipment inside a plant were coming to a close. And public tours of facilities using advanced nuclear reactors were approved. Millions of school children would decide to become scientists because of the thousands of educational tours that took place at small nuclear plants everywhere. A science renaissance was spreading around the world.

Frank, Stew, and Harshil had stops ahead of them on the way home from India. First in Africa to do a preliminary assessment with Sanjay Ganguly on bringing in the first five *Walking Leafs* into the Congo of Africa. The reactor would power life-support systems for the working populations, including clinics, schools, transportation, water purification, law enforcement, and the power to sustainably operate the cobalt mines. Then the trio would head to Israel where the triumvirate would hook up with the engineers from Emrod, Israel, and the Palestinians with a plan to beam nuclear-powered energy into the West Bank and Gaza Strip from Israel. The second step would be to assist the Palestinians in placing their own *Walking Leaf* reactors within their territory. The new reality of unlimited energy and atmospheric transmission was like the shackles coming off humanity. Anything seemed possible. It wasn't a singularity by a long shot; it was just a solid step forward for life on Earth. Iran didn't accept Israel's offer of talking about receiving Israeli built *Walking Leafs*. But the country's citizens and the world community were putting enormous pressure on Iran's leadership to join a more peaceful world.

As they walked through the park Joline broke the silence. "Amy, I hear you're going back to U of M to finish up your undergraduate degree and then pursue dual PhDs in nuclear engineering and materials science? You could probably teach your professors that stuff."

"I just want to be a student again for a while," Amy said. "The last year has been a whirlwind. I'll always nurture the role of *Walking Leaf* reactors in the world. But I know they can be better, and there are some interesting developments occurring with fusion reactors. Not to mention the nuclear engines now being developed for space travel. Besides, now that I am famous, Josh and Shanta have taught me clever ways of disguising myself so I can move around in public with a little freedom."

“No matter what you decide to do sweetie, we’re always here for you,” her mother reminded.

Amy watched Proton and Neutron as their ears went up. Something in the forest got their attention, and all their instincts kicked in. Somewhere in that forest was a movement that Amy could not detect, but the greyhounds with their superior eyesight saw something. Predator and Prey. The hunter and the hunted. Clearly the past four years was an exercise in not being spotted by predators’ skilled observances. Amy said what was on her mind, “I know you two didn’t want public recognition for your role in getting the whole world building *Walking Leafs*, but without you two we wouldn’t be here today.”

“You’re being too kind,” Joline quipped.

“And you guys are too modest,” Amy insisted. “I know Aunt Joline, it was you who suggested to Uncle Stew to use the familiarity of those small water towers that had become popular all over the world. Millions of people had gotten so used to seeing them that when we made *Walking Leaf*’s casement look like those, we could ship our nuclear reactors right on the back of pick-up trucks or erect them in the open if need be, and nobody would give it a second thought.

“And mom,” Amy went on, “When you watched Ann working on her dad’s old 1957 Chevy in the Atomic Garage. Remember she told you her dad could identify the parts of America’s classic cars, but the younger guys never knew what they were. You then discovered, on your own, that those old cars are coveted around the world. Almost nobody would know whether the parts were authentic or not. All those guys from Oak Ridge Labs back in the 1960s worked on their own muscle cars in their spare time. It wasn’t a leap to establish that kind of hobby with today’s nuclear engineering communities around the world. Once we got the word

out, all the scientists who wanted to make contact with us went to American classic car auctions and shows, or accessed the website where those cars were talked about, parts sold, and cars traded.”

Amy continued, “For those that couldn’t build *Walking Leafs* based on the open source system because of lack of tools or lack of stealth, it wasn’t too hard to reconfigure the engine compartment, muffler systems, gas tanks, shocks, and other parts to be taken apart on the other end and transformed into a *Walking Leaf*. And for those who had 3-D printing technology, we filled those muscle cars upholstery with bags of powdered Sartorium that could be fabricated in their shops. I know a number of our faux classic American muscle cars were shipped to various locations in China. But even then, they kept the bodies and ordered enough real parts to get those old cars running and visible enough to dampen any suspicion about what may be going on in those Atomic Garages around the world.”

Becky added, “And think about how much Hank Boudreaux helped by mixing our muscle cars and parts in with his oil rig supplies and mining equipment. He flew that stuff all over the globe in his Boudreaux Energy X cargo planes.”

Joline interrupted, “Remember how your mom pressed Harshil in explaining how he communicated with Kasvi without anyone knowing?”

“Yes, he told her he used blockchain code, the same software used by crypto currencies,” Amy answered.

“Your mom studied blockchain technology nonstop for two months and came back with a way for us to verify authenticity and communicate with rogue nuclear scientists in despotic countries,” Joline recalled. “When Harshil got where your mom was going with that idea, he was all in. It was just a matter of enhancing the confidential communication system he came up with

to stay in touch with Kasvi. And now we can communicate with, and verify the authenticity of our peers reaching out to us, who are trapped in regimes they'd rather not live under."

"The bravery of these people is so inspiring," Amy teared up. "Kai Zhong, one of China's very best physicists and his family are risking their lives by smuggling HALEU nuclear fuel into the country and using their first *Walking Leaf* reactors to breed more U-233 to start future rogue reactors. I say a prayer for them every night."

"And let us not forget Ariel Raquel and Levi Katz," Becky said, "Mossad informed Derek that they figured out how the Russian and Indian generals were skimming HALEU coming from Russia into India. Derek shared his experience from the days he was undercover in South America and in a joint operation with Mossad. He had intercepted a shipment of Uranium being smuggled from Russia to Cuba then to Venezuela for delivery to the Iranians. Turns out the US was originally alerted to that scheme by Israel."

"Derek, Ariel, and Levi then laid out a plan to copy the illegal drug cartels, arms dealers, and terrorist cells to form a similar system of smuggling with good intentions," Becky explained. "And now we have an underground, 'white market' for fueling *Walking Leaf* reactors via Israel, using our tamper-proof, proliferation-proof fuel cells, made of Sartorium, of course. Hundreds of secret garages and basements exist in China, North Korea, Venezuela, Cuba, throughout Africa, and other places where people are trapped against their will. Those hundreds of places will soon be transmitting electricity to thousands of places around them. Instead of using a stick to suppress people, we will be using a carrot to free them. That's real power."

"And mom," Amy added, "You're the one who showed the World Bank how despots inside Africa are pillaging their own country's natural resources and how to cut them off, confiscate their ill-gotten funds, and get that money into the non-governmental organizations on

the ground that could do something to help. And it was you who almost single handedly convinced them to fund nuclear energy projects in developing nations, as you educated the public in those countries through the non-governmental organizations you were already working with.”

Becky added, “Once Sajan came on board and pulled the fire alarm in the high-tech community over the Congo, the Indian titans of high tech responded. It was a group of them who got the World Bank to wake up and help them clean up the lowest rungs of the supply chain that makes modern life possible. They’ve just started to improve things in the Congo even though China isn’t going to let their presence in Africa go unchallenged. I am afraid the road ahead is going to be difficult.”

“Yea, but you know the saying, Becky, ‘if it was easy. . .,’” Joline trailed off.

“And Joline, we can’t forget that it was Stew who originally met Kasvi’s mother, Sahana Neeraj when working for NASA in India,” Becky acknowledged. “Once Sahana tragically disappeared a year after Kasvi’s father was murdered, Stew was so distraught he couldn’t locate her two girls. Then years later, Kasvi, as an adult, reached out to Stew for help. That was a transformative time for Stew. He was pissed about all the corruption he was seeing in the world. Together Stew, you, and Kasvi pledged the remainder of your lives to fight the corruption that crippled the world. That mission has, of course, now been adopted by everyone in our international Atomic Garage Movement. We wield the sword of good over evil. No longer providing scientific achievements for bad purposes, but only for the betterment of all life. Life’s too rare to squander it. Stew was right when he said, “They’re in our garage now. Our rules.”

Amy shook her head, “And then there’s dad. He builds a successful business that funds all of this and comes up with an alloy that will do more good than anyone can possibly fathom

right now. Without dad, without Sartorium, without his wise and patient council, none of this would have even started to come together. He'll always be my hero."

"It's been difficult," Joline admitted. "But when I look at you, Amy, and all the others who have been part of this, I can't help but think we're blessed to be together in this place and time."

"You know," Amy declared, "Because of what we've done here, I'd like to think that right now somewhere in the world is a child who has a light to read by tonight, a mother who doesn't have to spend this coming entire day washing clothes, fetching fresh water, inhaling noxious gasses in the confines of a small living quarters, or working with her kids in a field or a mine for a couple dollars a day. Or an ill person who finally has someone they can go to to be diagnosed, treated, and healed. Maybe there's a family who will sit down tonight, somewhere in the developing world and, thanks to the wonder of a splitting atom, can finally ask their children the question every child should dream about."

"What's that, Amy?" Joline asked.

"What do you want to be when you grow up?"

They all walked down the wide, hard packed path in Odina State Park, Proton and Neutron enjoying every moment of the walk.

Becky said, "Hey guys, we better pick up the pace. Josh and Shanta are expecting us at the old State Theater downtown for Josh's premier of Origin IV. It looks like it's going to be an international blockbuster movie."

As they picked up the pace Amy started singing, *Megawatt Mama's in town and she's amping it up, the sparks are ready to fly, join the fun at the dock and be ready to rock*

There's lightning in the sky.” Becky and Joline joined in, *There's lightning in the sky, . . .*
there's lightning in the sky. . .

DRAFT

Author's Note

IN OCTOBER 2021 A PRONUCLEAR ADVOCACY GROUP GENERATION ATOMIC SENT AN OPEN LETTER TO THE POWERFUL ANTINUCLEAR ENVIRONMENTAL GROUP, THE SIERRA CLUB, asking them to reconsider their opposition to nuclear energy and return to their original 1960s-era position of supporting the technology. Some Sierra Club members also signed the letter. The Sierra Club responded that they remain unequivocally opposed to nuclear energy. I had already been working on a fiction manuscript about nuclear energy but couldn't get this exchange out of my head. Like writers have been doing from time immemorial, I kept asking, "What if. . .?" I couldn't resist. I put down the first draft of my manuscript, started over, and this version is the result.

The Sierra Club, however, is not the model for the Terrestrial Ecology Society (TES) in this story. I needed TES to be headed by a psychopath antagonist and be evil to its core. Of course, the Sierra Club is not that. In fact, all the bad guys in this story are fictional. But many of the pronuclear and tech organizations are actual companies in real life, Copenhagen Atomics, Emrod, and Lightbridge are just three examples. Full disclosure, I own stock in Lightbridge and have invested in Emrod.

At the time of the Generation Atomic letter to the Sierra Club, I was engaged with a group of people working to keep the Palisades Nuclear Plant in southwest Michigan from closing (see acknowledgements). Palisades was shut down in May 2022 but there remains a possibility it could operate again. They need Amy Austin at this point. The plant is located about five miles south of South Haven, Michigan, on a beautiful, pristine stretch of Lake Michigan, right next to Van Buren State Park. Thousands of people over the years used to anchor their boats in Lake

Michigan, in front of Palisades and swim in the warm non-toxic water discharging into the lake. That summer recreational pass time was stopped after the 911 terrorist attacks in 2001. My wife and I grew up in that area of Michigan, and we still spend the summers in South Haven. From age two through middle childhood, I lived on Algonquin Lake near Hastings, Michigan. The Palisades plant was the model for the fictional nuclear plant, The Rock, including the natural gas plant across the highway, and the big grid substation on the Palisade's property. Hastings was the model for the fictional town, Algonquin, also named after the real lake. Got that? Please, don't drive around central Michigan looking for Algonquin, Odina State Park or The Rock, they don't exist. Chelsea, Michigan, however does exist, and there's a great restaurant there called The Common Grill. The University of Michigan in Ann Arbor, Michigan is also real, just in case you're from Ohio.

When someone reads a fiction story, they're ultimately promising the author they'll try to suspend reality and go for the ride. For this story, my role was to make that stretch as short as possible. To make the story seem real, I leaned heavily on, well, reality. Technology is more advanced than where the public thinks it is. The nuclear energy technology in this story is mostly true. The fictional part is that I made the *Walking Leaf* reactor smaller, lighter, less expensive, and more powerful than Generation IV reactors being tested all over the world right now. The fictional alloy, Sartorium, largely made that possible.

At one point, during the research for this story, I was on a conference call with a Small Modular Reactor innovator, Dual Fluids', Dr. Götz Ruprecht, Dr. Björn Peters, and Daniel Weißbach. They're located in Germany. I was asking for assistance to make the *Walking Leaf* specs I wanted to use seem as realistic as possible. The conversation was fun, and they really got into the weeds on the technology. Finally one of them seemed extremely disappointed that the

shielding would, at the end of the day, simply be far too heavy to create the reactor I wanted to build. He seemed sorry to inform me of this. It was at that point I reminded them I would use Sartorium to solve that problem. There was silence as they all looked at one another for clarification. They had clearly thought they missed something big. I had to remind them they were talking to a fiction author, and Sartorium would be my fictional alloy. Sartorium helped me fill what is a shorter gap than many realize between reality and fiction. Still, it's apparently easier to build a fictional nuclear reactor than a real one. That said, these guys know what they're doing and really believe Generation IV reactors are elegant and could decarbonize the electrical grid of a country by 2034.

Small Modular Reactors called LFTRs are real and did run at Oak Ridge Labs in Tennessee in the 1950's and 1960s. We're revisiting their work now with improved alloys, chemistry, and eight decades of experience with fission. Your grandchildren will know all about LFTRs because they'll be prominent in their lives. Maybe they'll give them good names. As research for this book I wrote a free nonfiction guide titled, *The Quick Read Nuclear Energy Guide, 21 Easy-to-Understand Q & As*. It takes less than an hour to read if you don't click on a link. If you click on all the links, it will take 150 years to read. It's in plain language and worth the time for anyone who wants a yellow belt in cocktail party nuclear energy icebreakers. I mentioned that guide in this story with Bob James, the old nuclear reactor driver, as the author. You can access the real PDF version of the guide for free on our website, AtomicGarageMovement.com or order it on Amazon.

In fact, we made our website a fictional extension of the book. It's as if the Atomic Garage and the Atomic Garage Movement exist. You can see images of the Atomic Garage, a map of the Austins' property, watch videos made in the Atomic Garage, listen to Shanta's song,

Megawatt Mama, or even buy merchandise, and read about all the things the characters in this story are up to. Amy Austin may even have her own Substack newsletter soon. We also have a long list of resources and links to all things nuclear energy to get you started on your journey of learning if you're interested.

I am not a scientist. I consider myself kind of a C+ to B- student in most things (I'm also a tough grader). But I am determined when motivated. If I didn't understand something, I just re-read, re-listened, re-asked questions, or re-watched a documentary or video. Don't let the topic of nuclear energy intimidate you. It all makes sense once you get your head into it a little. I wrote this story because I am dedicated to advocating for nuclear energy. My beliefs about nuclear energy are voiced by the characters in this story. I've also debated antinuclear activists in real life, listened carefully to them, and visited their websites for insight and understanding. I almost always come away thinking they simply do not understand the density of nuclear fuel. It's almost incomprehensibly three million times more powerful than fossil fuels. If nuclear fission had just been invented today, almost everyone would think of it as miraculous as if an alien ship landed in Times Square. It's nearly impossible to overstate the power, small footprint, cleanliness, safety, and sustainability of this technology.

The subject matter is my fuel. I am not one of those people who has had a lifelong ambition to be an author of a novel. In fact, I find them much easier and more enjoyable to read than write. But I did develop some story-telling skills in the hardscrabble world of writing direct marketing sales copy and newsletter publishing as part of my career. I even blogged for a few years on the subject of workplace wellness. I am retired now, some would say chronologically gifted, but I'm attempting to trail my biological age by a few years. I've got to write another couple books to see what happens to Amy and where the world goes from here.

I can't sign off without addressing the subject of climate change. Regardless of your degree of concern, and in contradiction to the Sierra Club and some others, nuclear energy will need to play the lead role to mitigate that threat. If you don't believe the climate is changing, or a changing climate is not an existential threat, nuclear energy is also going to be required to achieve energy equity in the developing world and is soon going to be less expensive than fossil fuels for generating process heat and electricity. Alan Medsker, a respected pronuclear activist in Illinois (90 years old at the time of publication) told Emmet Penney on the podcast *Nuclear Barbarians* that, "Nuclear energy is the bipartisan issue of our times." I couldn't agree more. All paths to the future intersect at the fission solution.

The world really does take about 100 years to move to the next more dense fuel to produce power and energy. Like going from wood to coal, coal to oil and natural gas, and natural gas to nuclear fuels (uranium, plutonium, and thorium). The green wall explained in the front of this story is what I believe is unfolding now. But things can change. How? Sometimes seemingly insurmountable problems are solved starting with one passionate person. That passion inspires a couple more people, and a chain reaction sweeps the world.

Acknowledgements & Lots of Other Fun Stuff

THIS BOOK WOULD NOT HAVE EXISTED WITHOUT THE SUPPORT AND ENTHUSIASM OF TONY SARTOR. Unfortunately, Tony passed away unexpectedly before *Chain Reaction* was completed. He was thrilled by the idea from day one, participated in endless discussions related to energy and climate, and read multiple drafts of the manuscript and related research. Tony's advice as both an engineer and a voracious reader was especially valuable. The fictional alloy, Sartorium, is named in his honor. He earned his PhD in Engineering at the University of Michigan in the 1960s, so when he lobbied to have U of M be the institution of higher learning in this story, I acquiesced. Then it became obvious that the state of Michigan should be the home of the Atomic Garage. Tony was a quintessential American entrepreneur and a dedicated and patriotic servant to our country. He was the Commissioner of the New York City Port Authority on September 11, 2001, and he served in that role until the Freedom Tower was completed in 2014. Thank you, Tony, for all your great questions, level-headed advice, and endlessly interesting conversations. You made the world a better place.

To Alice Sartor for sharing Tony and supporting this project. You're part of our family forever.

My long-time co-worker and friend Jen Cronin is the editor for this book. She is a master *edutainment* writer and editor. I wanted people to have an enjoyable experience as they learned the often-underappreciated story about nuclear energy, and Jen was the perfect person to have my six on that mission. Her extensive journalistic experience in the fields of health and energy guided me in blending the ultimate high-tech world of fission with a fictional one. We didn't

want to get so technical that we lost readers just learning about the subject of nuclear energy but also not so simple we lost people familiar with it. No matter your level of scientific expertise and knowledge, I hope you enjoyed this story. I think with Jen's coaching that goal was accomplished. If not, I take full responsibility.

I'd also like to thank Joanne, my partner in life and best friend, for putting up with me talking nonstop about what I was learning about physics, climate, nuclear history, and the politics of energy. During a book project, the writing is demanding and although mostly enjoyable, is a sacrifice of physical absence and not being present in spirit that's inflicted upon people close to the author. Joanne was supportive and more than understanding during the project, which spanned five years in total. The next book will go much faster. Honest!

I would also like to acknowledge my canine team of Bobby, Levi, and Dunkan. They were at my side for hundreds of hours of research and writing and were great rhetorical question listeners. Proton and Neutron in this story are a nod to our love of all animals, everywhere. Wildlife is another reason we advocate for nuclear energy. Nuclear plants require a tiny surface footprint, and nature thrives around them. If you've ever been outside of an operating nuclear plant, the area around them is clean and they're incredibly quiet. Karma.

A special thanks to Eric Myer, founder of Generation Atomic, for his suggestions, interest, and support for this project. Eric and his team have made a major contribution to getting the world to take a second look at nuclear energy. When they sent a letter to the Sierra Club to reconsider the Club's opposition to nuclear energy, I absorbed a neutron from that exchange, which released the energy that powered this story. Generation Atomic rocks!

When I am not writing about nuclear energy, I do the best I can to advocate for it. My real-life experience in joining the Protect Nuclear Now (an adjunct of the Climate Coalition) campaign to save the Palisades Nuclear Plant in southwest Michigan was invaluable to understanding the difficulty and complexity in keeping America's No. 1 source of carbon-free, safe, and dependable energy cranking. I'd like to thank Valerie Gardner for leading the Palisades effort and taking the time to teach me about the voluntary carbon credit market and the potential for using blockchain technology in verifying the source of those credits. I'm personally not in favor of using carbon credits. I agree with those that think they're a "get out of jail card" for businesses that don't want to admit they need fossil fuels to survive. But if there is no going back, nuclear plants should be able to issue them. I want to thank Gary Kahanak for his leadership and insights, James Hopf for sharing his deep knowledge about nuclear energy and for referring me to others to advise on specific technical questions about small modular reactors, Ryan Pickering for always showing up at NRC public meetings and advocating, reaching out to the indigenous community around Diablo Canyon, and the willingness to store used nuclear fuel in his garage if the Government is still looking for a place, and to Isuru Seneviratne for his knowledge and common sense in nuclear energy advocacy. And to all the others in the Protect Nuclear Now community who worked tirelessly to save the Braidwood and Byron nuclear plants in Illinois, and the Diablo Canyon nuclear plant in Southern California.

Thank you to Nicholas Culp and Mick, formerly spokespersons for Entergy (owners of the Palisades Nuclear Generating Station at the time, and previous owners of the Indian Point Energy Center Nuclear Power Station in New York) who, over several conversations with me, patiently explained a nuclear plant owner's perspective on the political and regulatory process,

power-related economics, and physics related to the retirement of a nuclear plant. It turns out it's tough to save a nuclear plant when its owner is incented to shut it down.

Thanks to Götz Ruprecht, Björn Peters, and Daniel Weißbach of Dual Fluids in Germany for brainstorming how a very small, immensely powerful nuclear reactor might work in the future. They believe the real technology is elegant, ready, and scalable. In fact, their website states, "Once Dual Fluid power plants are in serial production (estimated 2034), we could decarbonize the electric grid of an industrial country within a decade." That level of confidence exists in every Small Modular Reactor producer I researched or talked with.

To Gordon McDowell, one of the leading influencers in the pronuclear movement, for sharing how the physics in *Walking Leaf* might work, and for turning me onto his database (GordonMcDowell.com). If you really want to know more about nuclear energy, start by watching the videos Gordon has posted on his website. See his 6.5-hour YouTube video *Thorium*. You'll binge watch it.

To Jeremiah Josey at the Thorium Network for the emails and phone calls to brainstorm how advanced nuclear reactors may impact the world. He suggested that any futuristic story about nuclear energy needs to address the role that Africa (the only continent on Earth with a growing population) will play in that future. The Thorium Network calls nuclear energy, *fission*, and reactors, *burners*, which initiated a discussion about the importance of language. The name *Walking Leaf* for Amy's reactor had already been determined when Jen and I talked with Jeremiah, but we worked it into the plot in more depth after that conversation. Language should be at the top of mind for how we talk about advanced reactors.

To Robert Hargraves for the back-and-forth emails talking over the concept of a fiction novel on nuclear energy, and for looking at a very early draft of the manuscript. Your book, *THORIUM energy cheaper than coal* was such an important resource during this project, I kept a copy right by the keyboard. Thank you for your years of advocating for nuclear energy.

Thank you to Bruce and Darby Fetzer for joining the advocacy, on-the-ground, in Southwest Michigan to keep Palisades operating. And for reading drafts of the non-fiction guide, and *Chain Reaction*, and offering invaluable advice, suggested resources, and insightful observations about technology and ethics in our future world. This is a subject area Bruce is eminently qualified to comment on via a long career dedicated to carrying on his Uncle John's vision at the Fetzer Institute. One of several fundamental questions John Fetzer asked was, "How can the insights of science and the power of technological innovation be utilized to explore the capacities of the mind and spirit?" This is a question that character Amy Austin thinks about a lot in the novel and, as she pursues the answer, helps her to change and grow. To Darby Fetzer who works tirelessly to get people of all perspectives engaged in civil discourse and debate concerning the issues of the day. Both of you are a testament to the power of curiosity, kindness, and wisdom. To Richard Roberts (Riggs) who worked at Palisades safely assembling and disassembling scaffolding, a perpetual job at a nuclear power plant. Thank you for reading the non-fiction guide and drafts of *Chain Reaction*, and sharing your perspective of what it was like to work at Palisades. The plant employed 600 people, most of them were not working in the control room or directly on the reactor.

To Scott Kinney of Rolled Alloys, thank you for your explanation of how new alloys are being made that have similar qualities imagined in Sartorium. And for your perspective on how

3-D printing is playing a fast-growing role in the way alloys are applied in various industries. You gave me some great ideas for how to use Sartorium in *Chain Reaction*.

Thank you, Jared Woltersom, a supply-chain expert and a wizard of global logistics, for helping me think through the boarding of the Indian cargo ship, Percheron. How do you board a moving ship in a distant ocean, make off with 1,700 pounds of priceless cargo, and not leave a trace? Difficult, but not impossible if Jarod's advising you.

To Klaus Berner of Berner Machine Labs, a master machinist, renaissance man, and friend. Your curiosity and appreciation for all things engineered, manufactured, and made beautiful as well as functional rubbed off on me. Klaus re-engineered an 1870s era Edison stock ticker tape machine for a business I owned in the 1990s as part of a financial literacy concept. The machine worked, hooked up to the internet, and spit out stock prices in real time. You can see it operating during a brief scene in the movie, *Road to Perdition*, and the HBO series *Boardwalk Empire*. We'll put one in the Atomic Garage in the next book.

Thank you to Rush Doshi for your fascinating TEDx Fulbright talk, *Old geographies, new orders*. When Frank Austin gives a guest speech at the University of Michigan in this story, it was inspired by both Rush Doshi's TedX Talk; and his book, *The Long Game, China's Grand Strategy to Displace American Order*, also informed on China's perspective in this story.

Thank you to Siddharth Kara, author of *Cobalt Red, How the Blood of the Congo Powers Our Lives*. This brilliantly written book is hard to read because of the brutal truth it tells. All consumers and stakeholders involved in producing the power and conveniences of modern life need to be aware of Kara's story. In *Chain Reaction*, there is an effort to get to the bottom of the supply chain in the Congo of Africa, and finally do the right thing.

Thank you to the late Rachel Carson, author of *Silent Spring* (1962), where she legitimately called out the premature and “overuse” of DDT (the first modern synthetic insecticide). She has also written and illustrated a collection of breathtakingly beautiful books about our natural world. They are each timeless and highly recommended. For example, *Under the Sea Wind* (1941), *The Sea Around Us* (1950), *The Edge of the Sea* (1955), and *The Sense of Wonder* (1950). Carson can be credited with planting the seeds for the antinuclear movement that started in the 1960s and grew from that point. Many of her arguments had merit and should have been addressed years ago. Had they been, nuclear-energy history may have gone down a much more productive path. Rachel Carson was the influence in creating Josh Manning’s grandmother, Lizzy, an environmentalist who founded the Terrestrial Ecology Society (TES) in 1958. Manning’s life is driven by his grandmother’s respect and advocacy for the natural world. His perspective is used in the debate against Amy Austin, and his changing perspectives through the arc of the story always come back to the lessons he learned from his grandmother.

To Byron Donalds, US Congressional Representative for Florida’s 19th District, where our residency has been since 2012. He’s my representative and is one of the most pronuclear legislators in Washington, DC. Representative Donalds is building a bi-partisan coalition in Congress to support advanced nuclear energy development. I’d like to take some credit for that, but he came to that position without me. He has my full support in that endeavor.

The international nuclear energy community is huge and growing fast. There is far too much going on for any one individual to fully absorb. In addition to the people already mentioned, the following have informed and inspired me even though we have never had direct contact; Michael Shellenberger, Founder of Environmental Progress. . . Kristin Zaitz and Heather Hoff, Co-Founders, Mothers for Nuclear. . . Mark Nelson, Managing Director, Radiant Energy. . .

Robert Bryce of the Power-Hungry podcast. . . Rod Adams of Nucleation Capital and the Atomic Show podcast. . . Chris Keefer, Decouple podcast. . . Kirk Sorensen, Founder of Flibe Energy. Kirk discovered, preserved, and made the world aware of the incredible work that was done on molten fuel test reactors, at Oak Ridge Labs in Tennessee in the 1960s. Kirk's videos on YouTube and TED Talk inspired a whole generation of nuclear advocates. . . Bret Kuglemass, the other Hosts, and all the guests that shared their experiences and knowledge on the Titans of Nuclear podcast. . . Seth Grae, CEO Lightbridge. . . Greg Kushnir, CEO Emrod. . . Isabelle Boemeke (alter-ego Isotope), a Brazilian model and possibly the first to be considered a nuclear energy influencer. . . Matthew Wald of the Build Nuclear Now initiative, an adjunct of the Breakthrough Institute. . . Todd Allen, Founding Director at University of Michigan's Fastest Path to Zero. . . Grace Stanke (Miss America 2023), a nuclear engineering student and leader of a social initiative, Clean Energy Clean Future - Grace we may need someone to play Amy Austin in the movie. . . Alan Ahn, Senior Resident Fellow (Todd Allen is Senior Visiting Fellow) for Climate and Energy Program – Thank you for publishing the Third Ways Advanced Nuclear Map, where there are now 150 projects around the world. . . Patrick Moore, the sensible environmentalist. . . Oliver Stone for producing the documentary, *Nuclear Now*. . . Sean Kenney, of the Rock Logic YouTube videos. . . John DeWitte Founder and CEO of Oklo. . . Thomas Jam Pederson Co-Founder of Copenhagen Atomics . . . and Dr. Kathryn Huff, Assistant Secretary, DOE, Office of Nuclear Energy.

To everybody, everywhere who have worked to make nuclear energy the most powerful, clean, and by magnitudes safest form of power in human history, this book is also for all of you. I hope it helps make your jobs a little easier in explaining the miracle that is fission.

For a full list of nuclear energy resources, including many of the books, websites, podcasts, Substack newsletters, and videos produced by those mentioned in this acknowledgement and others go to AtomicGarageMovement.com. The Resource Center is the same one we use when conducting research for our own books. That said, the rest of the website is a fictional extension of our stories. Here are some of the things you'll find there and we're adding to it all the time.

Found on AtomicGarageMovement.com:

- An introductory letter from Frank Austin
- The technical specs and illustrations for the *Walking Leaf* reactor and The Rock
- A map of Algonquin, Michigan
- Floor plan of the Atomic Garage
- A photo album of real things used in the story
- Shawn Connors' biography. But if you've read this book you probably know me pretty well now. So tell me about yourself. My email is on the website and below.
- Activities, contests, programs and projects to promote nuclear energy via the arts.

Coming soon: An animated tour of the Atomic Garage, videos made by Amy Austin and Harshil Varn, and much more. And pretty soon Shanta's song, *Megawatt Mama* will be debuted.

I read all my emails and try to respond to each of them. Drop me a note at

Shawn@AtomicGarageMovement.com

The Atomic Garage Movement was formed to advocate for nuclear energy in popular culture by telling nuclear energy's powerful story through the arts. We're looking for authors,

screenplay writers, animators, illustrators, musicians, sculptures, painters, and documentary producers to help nuclear energy become part of a positive experience in popular culture.

Here's a great way to advocate for nuclear energy - RIGHT NOW. It just takes a few minutes. Write a review for *Chain Reaction*, here's how:

- If you liked this story, by posting a star rating (five stars is one suggestion) and short (or long and gushing) testimonial, you'll help create a Chain Reaction in getting more people interested in this book, and the subject of nuclear energy. Think of it as an act of nuclear energy advocacy.
- Just go to the Amazon.com site.
- Call up *Chain Reaction* by Shawn Connors.
- Click on the book.
- Scroll down to where comments are.
- You'll see a box on the left below the Customer Review ratings data that says, *Review this product, share your thoughts with other customers.* What would Amy Austin do? I think she'd write a beautiful review right now.