

REEL Rangers Adventure: Volatile Moon

By Darrell T. Boyd

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Dedicated to William R. Wood

Special thanks to my wonderful mother, Corine Norwood.

I deeply appreciate the love and support of Joyce Morrow-Jones.

PROLOGUE

The Kettle Point Purge

During the mid-21st century, the consequences of global warming began to wreak havoc throughout Earth. Yet, a most unlikely and unnatural geological event – an earthquake in the state of Michigan - precipitated a perfect storm of environmental, industrial and political catastrophe that changed the game entirely. All attributable to the unique circumstances surrounding Michigan's natural gas hydraulic fracturing or “fracking” industry. The fracking process consisted of injecting high-pressure fluids into well-bores deep underground, inducing fissures in shale rock formations, thereby allowing natural gas to flow freely. This process resulted in millions of gallons of waste water “flowback”, which ironically was disposed of through underground injection. Compounding this scenario, Michigan illegally accepted radioactive sludge from other states for disposal by underground injection with the consent of the Environmental Protection Agency (EPA), and in collusion with the natural gas industry and state

officials. Most problematic, the radioactive sludge, formerly called, Technologically Enhanced Naturally Occurring Radioactive Materials (TENORM), could not be traced.

A man-made perfect storm of seismic activity developed from thousands of hydraulic fracturing wells, thousands of fracking waste water disposal wells, and thousands of illegal radioactive sludge disposal wells. Originating in the Antrim Shale Basin, the resulting series of minor earthquakes, like cascading dominoes, caused catastrophic damage to groundwater aquifers throughout the state. Toxic and radioactive waste water escaped into Lake Huron to the shores of Ontario, Canada. On day one, millions succumbed to illnesses, before the public was alerted that their drinking water was horribly polluted.

The Canadian government demanded an immediate cessation of all hydraulic fracturing activities in Michigan and access to every disposal well in order to monitor any possible source of pollution to Lake Huron. The State of Michigan, supported by the federal government, refused to comply with the demands of Canada. In a show of force, Canadian Armed Forces mobilized and assembled at Kettle Point, Ontario on the southern shore of Lake Huron. Michigan National Guard prepared for invasion. The United Kingdom intervened to stall the impending conflict. Due to the fact that government on every level failed to protect the environment, a non-governmental authority, was needed to assume responsibility - environmental, industrial and political. A relatively new organization assumed the leadership role, Renewable Elemental Energy Law Rangers – REEL Rangers.

Known as *The Kettle Point Purge*, a precedent was established to provide a platform for a non-governmental organization (NGO) to supersede sovereign authority. The consent of all parties elevated REEL Rangers to supra-governmental status. In the following years, hope to restore Earth's ecosystems persevered in the form of a growing global force. The year 2072 marked the 50th anniversary of REEL Rangers. Founded in 2022, REEL Rangers were established in order to advance and support renewable energy initiatives and programs that help to develop, sustain and safeguard the five renewable energy sources: Biomass, Solar, Geothermal, Wind, and Water. During decades of extraordinary expansion, REEL Rangers were recognized by every sovereign entity on Earth.

REEL Rangers Institute was established to advance the goal of ecological sustainability throughout the global community. REEL Rangers developed and implemented pragmatic and innovative methodologies for reducing the ecological impact of communities, corporations, and nations. The Institute established the following objectives:

- Promote sustainability projects and foster ecology education;
- Formulate methodologies for reducing carbon footprints;
- Provide measurable outcomes for sustainability projects;
- Promote ecological awareness and environmental justice;
- Challenge industries to proactively reduce their carbon footprints.

By 2070, the Institute maintained over 140 campuses around the globe, providing comprehensive curriculums in the sciences and the humanities. Starting at age 12 and continuing through post-graduate studies, students were cultivated to excel in environmental sciences and renewable energy solutions. The Institute encouraged each student to develop strength of mind, body, and character to the highest levels. The Institute fostered a universal *Restore Our Earth* spirit by inspiring enthusiasm, devotion, and strong regard for the honor of the REEL Rangers.

Part I

REEL Rangers Institute, Cleveland, Ohio, United North American States (UNAS)

“Ranger flight 913, this is Lakefront Control. You are cleared to land on runway 2A. Welcome back Deputy Chief Mays. Hey, how's the ride in that souped-up glider of yours?”

“Copy that Lakefront. And the LectricJet ride's as smooth as butter, as long as there's no headwind,” Mays answered jokingly. Dry-mouthed and damp with sweat under his flight-suit, Deputy Chief Tremaine “Tree” Mays, was anxious to get down to the Institute for his “meeting” with Chief Carvalho and get back to his shale-gas clean-up project in Ontario. Looking back to his right, Tree could see the orange-red glow of the sun setting into Lake Erie, illuminating the scattered clouds. Heading towards the shoreline, he saw starry white lights, dispersed like a constellation over a wide area of the expansive surface of the ocean-like lake. The Erie Wind Farm contained hundreds of huge wind turbines, each one shining like a lighthouse.

Releasing the autopilot mode of his LectricJet, Tree descended precipitously from cloud level to scant meters above the wave caps as he approached the Institute's lakefront airport. The adrenalin rush from his stomach to his head made his temples throb with intense pleasure mingled with the aching shift in altitude. Piloting the small two-seater electric engine jet was the sole self-indulgence he entertained while on duty.

After a flawless landing, Tree waved off the ground shuttle driver and took the long walk across the tarmac to the HQ building for his meeting with Division Chief Carvalho. Tremaine carried an impressive physique at 1.84 meters tall, lanky, but well-muscled. Sporting a purple jumpsuit and cap with “Restore Our Earth” embroidered in gold, Tree looked regal with penetrating deep-set eyes, a thin beard tracing his well-defined jawline and skin the color of cinnamon. Although he appeared serene and confident, a surging anxiety now washed over Tree as his right eye began to twitch - a telltale warning of trouble on the horizon. It was a sure sign that he should proceed with caution and gird himself for the worst. These eye spasms, induced by a feeling of dread, taught him to prepare for potential calamity looming nearby.

A knack for dealing with adversity proved to be one of his greatest assets. Tree possessed an uncanny resourcefulness highly regarded by his fellow REEL Rangers. He also possessed the unique ability to provoke his adversaries to the brink of rage. Tree was summoned again to respond to charges for exceeding his authority as the recently appointed Deputy Chief, Industrial Refuse Reclamation Division (IRRD). This was not a designation of honor. It was his only opportunity to remain a Ranger after being booted out of the Forestry Division for similar misconduct.

Enjoying the lake view from his glass-domed office, Division Chief Carvalho reclined in an antique barber's chair from the 1950's loaded with hi-tech amenities. He savored this moment to clear his mind while meditating on the amber sun setting into Lake Erie's horizon. A brawny silver-haired Native-American, Carvalho resembled a bald eagle perched on high scouting for vermin below. He tended towards intolerance but was somewhat yielding in his turbulent relationship with Tree. Carvalho swiveled away from the expansive window view of the lake to

stare silently at Tree who strode ardently into his spacious, but scantily furnished office. Tree casually took a chair directly opposite Carvalho with no desk between them.

“Deputy Chief Mays, this is the seventh official complaint filed accusing your unit of using strong-arm tactics while monitoring industrial reclamation operations. Seven complaints in the past six months. That’s more than once a month that I handle your garbage!” argued Division Chief Carvalho.

“Now, listen up Chief...” Tree interjected.

“Listen who? No, *you* listen, you slime-water guzzling greenie. That uniform and insignia you wear represent REEL Rangers, not Texas Rangers. We do not carry a big stick because we do not enforce the law, we encourage compliance with the law! Our objective is to help corporations comply with environmental and ecological guidelines for sustaining natural resources. If you're having trouble with this concept, perhaps I'll send you back to the Academy for some remedial training. Just think back on why you were kicked out of the Forestry Division and sent to me to clean up industrial waste. Your people skills haven't improved, not one iota.” Mentally checking his pulse, Carvalho sensed it was too soon to get emotionally revved up before ultimately forcing Tree into a corner. Softening his crusty gruff voice, Carvalho continued, “The good news, Tree, is that you get to keep the uniform, insignia and rank, for a while longer. Now here’s the bad news. Your mission has changed, effective immediately. Surveillance satellites have detected surface temperatures well above the norm at the South Pole. Your job will be to investigate and report back to me what you find. Is that clear?”

“Chief, I understand that my methods have earned me some unsavory assignments, but sending me to Antarctica?”

“I beg your pardon Deputy Chief, I misstated. You are not to Antarctica. You are going to the Lunar South Pole where Megalith Lunar Mining operations are based. Yes, you with a small investigative team are going to the Moon. We are responding to a request from the Space Exploration Administration. You shall investigate anomalies cited in Megalith’s monthly reports to SEA regarding preservation of water ice reservoirs and other protected resources within the lunar soil, known as regolith. Megalith has been granted sole authority to mine the regolith in Shackleton Crater, at the South Pole. As you know, the Moon possesses an array of volatiles – precious elements and compounds that Earth needs desperately. Top among them is helium-3, which is required for our burgeoning nuclear fusion industry. That being said, verified ice pockets are considered “holy water” for future colonization of the moon. We need to make sure these ice pockets are not contaminated by volatile mining operations. And we must discover the source of heat emanating from the regolith. It’s supposed to be deadly cold at the surface. Minus 200 degrees Celsius, so I’m told. Report to SEA at Cheyenne Mountain, Colorado, ASAP. Is that clear?”

Tree did not respond. Thinking only to himself, “Investigate? On the Moon? If my suspicions are on cue, I must heed the warning signs with this mission.”

“Deputy Chief, is that clear?” Carvalho barked out angrily.

“Clear as a tornado warning siren Chief. Do you really think you have made a wise choice by selecting me for this?”

“Tree you insolent oil fracker,” Carvalho retorted but held back the bile oozing up in his throat. Taking a deep breath to center himself, Carvalho lowered his tone. “Tree, you are by all standards our number one asset for discovering wrongdoing. Moreover, your record is unmatched at identifying and preventing potential cover-ups and catastrophes. That is why your

eccentric attitude is tolerated as part of your total package. We need you on this, but for God's sake be a team player, *my team player*. This could be a dangerous mission Tree. I don't want to lose you as a result of your usual risk taking insanity. You've got this one chance to bring REEL Rangers to a higher standing. Will you do this for all of us? Placing your pride aside?"

"My pride was lost years ago Chief. I lost eight Rangers in the past ten years to industrial accidents in Nigeria, Brazil and Iran. You know why, and I know better. Now, it's the Moon? As ordered, I'll investigate and advise employing my instincts, and my team. But expect more of the same from me Chief, not less, if you want this job done right."

"Tree, you truly do not have a way with words. Adding insult to injury, you also specialize in driving me stark raving mad. If anyone else were to speak to me like this, I'd take pleasure in castrating them - man or woman. Take care of yourself Tree. Take care of your team. Sophie Lavoie and Luis Ramirez will join you at Cheyenne Mountain. Now please, get the hell out of my office." Carvalho swiveled his converted barber's chair towards the window.

Without another word, Tree stood up and walked out wondering what really motivated Carvalho to choose him for this mission. Over the past decade, his far-reaching itinerary included some of the most remote and desolate areas of the planet. Now, a voyage to a frigid dark desert on the Moon awaited. What a circuitous journey for a farm boy from Georgia. His Granny Lethia would surely watch over him on this new adventure, like always.

Tree only marginally resembled his namesake in appearance. Most people mistakenly assumed that the nickname "Tree" was derived from "Tremaine," who was first called, "Trey." Granny Lethia consecrated "Tree", during his twelfth year. She was always amazed at how he would climb the tallest trees and sit for hours just watching the sky, with a strong urging.

One steamy windless summer afternoon, twelve year-old Tremaine sought refuge from the heat through his favorite past-time, a walk in the woods to his sacred grove. He loved nothing more than to bathe in the ambient shade of the forest. Strolling blissfully down his habitual path, he suddenly halted, struck by the terror of what he did not see. His beloved grove of cherrybark oak trees was obliterated - cut down to wide circular meter-high stumps. A half-acre of tall robust shade bearing trees heartlessly laid to waste. The devastation felt more like a desecration piercing his heart and soul. The felled tree trunks were nowhere in sight. Instead, an enormous yellow machine on tractor wheels dominated the landscape. This monster perpetrator had sawed down and devoured his living treasures. Across its long body, the word, "Treeminator" boldly stated its purpose.

Trembling with anger and despair, Tree approached the vehicles elevated cab section and stretched his small frame to reach up and climb the ladder, seeking the operator. Reaching the top of the ladder, he clearly saw that the cab was empty, as the vehicle's engine sat in cold silence. He feigned a half-swallow, pooled together and launched an angry wad of spit at the cab's window. Satisfied, he climbed down to the ground. Determined to confront the desecrator face to face, he located the stump of his favorite tree and sat upon its surface, crossing his legs and arms with resolve. But a short while later, Tremaine curled up on the stump like an infant, softly sobbing himself to sleep.

Meanwhile, Granny Lethia was calling upon her neighbors to keep a lookout for Tremaine. Frantic with worry, she did not wait long before alerting the authorities, later that evening. The police soon joined the neighbors searching for Tremaine well into the dark moonless night - to no avail. After sunrise on the next morning, the Treeminator crew returned

to find Tremaine sound asleep on that very same stump. The crew astutely alerted the police to this seemingly lost boy.

Granny Lethia was sitting in a rocking chair on the large front porch waiting anxiously, as she sighted a police SUV turn into her driveway. Seeing Tremaine jump out of the vehicle, her brief sense of relief was stifled by a flash of anger. A police officer also got out of the vehicle and slowly followed, allowing Tremaine to receive his welcome home.

“Trey, where in God's name were you, I was worried sick to death. Folks all over the neighborhood been looking for you.”

“Granny, they cut down my best trees. All of 'em down to the stump! They can't get away with that and the police ...”

“Hush up now boy,” Granny demanded. At that moment, the police officer stood directly behind Tremaine.

“No harm done ma'am. Some tree workers found him asleep at their work site. The boy woke up mad as a hornet. I suggest you keep him closer to home for a while. That's about all I have to say. I'll leave the rest to you. Have a nice day ma'am.” The officer briefly shot a warning glare at Tremaine as he turned to walk back to his vehicle.

“Boy, what makes you think you can just go around causing trouble like this?”

“I'm sorry Granny, but my trees! They were my trees!”

Granny Lethia slowly lifted her right hand to her heart and sat back in her porch rocking chair with a deep breath..

“I mean, Granny,” Tremaine reconsidered. “My trees, they looked out for me, but I didn't look out for them.”

“Well, I guess you have good reason, but your reasoning ain't holding no water with me boy. For now, I'll just plant you in the back yard where I can keep an eye on you, *Tree* Mays. You are grounded until I say otherwise. Now get used to hanging 'round your tree friends out back.” When folks in town inquired about his adventure that day, Granny would just say, “My Tremaine turned out to be a Tree.” So the nickname stuck to him like tree bark.

In school, Tree excelled in science and his passion for ecology was fostered by his Granddad Lee who was a veterinarian and a farmer, descendant of Georgia farmers. In fact, the land they lived on had been handed down for generations. The family knew how to take care of the land and they instilled this passion in Tree, as well. As soon as he could walk, Tremaine followed Granddad Lee around the farm all day, everyday. When he learned to talk, there were always questions and more questions, “Grandpa why don't we plant cotton this season?”

“Tremaine, we need to give the ground a rest this season by planting soybeans to help replenish nutrients in the soil. I still work the land as my grandfather did. Even in this day of technology, if we take care of the earth, it will take care of us.”

While still in secondary school, Tree was recruited by the REEL Rangers Institute to study the environmental sciences. He eventually joined the environmental corps, working around the globe. His passion fueled his dauntless determination. Tree's life became his passion, living as a forestry steward, helping to safeguard fragile ecosystems. Since childhood, Tree identified with this prime motivation, making him a fierce and formidable ecology advocate.

Yongbyon, Korea (former Yongbyon, North Korea nuclear complex)

Sophie Lavoie, Aerospace Engineer, eased herself down into the pilot seat of the almond-shaped air car, *Hummingbird*. Powered by electromagnetic propulsion (EMP), *Hummingbird* could ascend hundreds of meters to hover motionless while surveying in any direction. Sunlight reflecting from the metallic green body made the air car appear to shimmer and oscillate, mimicking a hummingbird in mid-air. Extending four meters from its nose cone like a long cannon was the Magnetic Current Resonator. The MCR's cylindrical module was mounted in direct line of sight from the cockpit where Sophie was positioned to operate the device. The device was the first prototype, untested in the field. Facing the control panel, Sophie lifted her helmet visor methodically to allow the retinal scan to flash a beam of light into her coral-blue eyes, instantly logging her into the *Hummingbird* operating system.

As her eyes examined the control panel her mind wandered back to her eighteenth birthday gift from her mom and dad - a snow-terrain hover-sled. Sophie had been the first teenager in Sainte-Agathe-des-Monts, Québec, to own a hover-sled, designed to fly a meter above the snow and ice terrain. Driving the hover-sled she nicknamed *Solange*, Sophie felt empowered and liberated. During that winter in Québec, she explored the Laurentian Mountains at reckless speeds, testing the limits of the vehicle, as well as her piloting skills. "Thank God my parents couldn't see me!"

The cab of the *Hummingbird* was snug all around, giving her a sensual pleasure she had not imagined since those youthful thrills in the hover-sled. The *Hummingbird* cab felt amazingly similar and she smiled to herself as she input system protocols to prepare for testing the device. This was the first field test of the Magnetic Current Resonator, which created a virtual magnetic current designed to shield against ionizing radiation leaking through storage casks. The MCR was developed to render inert the ionizing radiation emitted from high-level radioactive waste from dry storage casks produced as a byproduct of nuclear weapons production. The energy required to isolate the radiation was prohibitive. If this device could safely seal these high-level nuclear waste casks, even temporarily, the global community would breathe easier.

"Control Center to Test pilot, verify your status," Luis Ramirez alerted Sophie in her helmet radio. As acting mission leader, Luis stiffly followed protocol, even though he and Sophie shared a close friendship.

"All systems check, ready to proceed Lu... I mean Control Center," responded Sophie, eager to fire up the device.

"Test Pilot proceed to containment grid number eight and await instructions," Luis ordered.

"Roger that, Control Center," Sophie truly wanted to chuckle at Luis' official demeanor, but thought better of it. "Might as well let him enjoy this, 'cause I'm the one having all the fun," she thought. Sophie lifted off without hesitation flying the MCR in minutes to firing position forty meters above containment grid number eight where a dozen huge steel casks stood vertically on a concrete pad.

"In position and powering up MCR. Targeting the storage units. Awaiting permission to discharge the device," Sophie could barely hold herself back from blasting the target with a virtual magnetic current.

"Test pilot, discharge for ten seconds when ready," Luis commanded.

Without a verbal response, Sophie opened fire on the target for ten seconds, hearing a loud whining sound from the module without seeing any visual effect at the target. Then a momentary flash of white light emanated from the target platform below.

“Test pilot to Control Center. I saw a quick flash, then nothing. What happened?”

“Copy that test pilot. We registered a magnetic charge but not the surge of magnetic current we expected. Prepare for another dis... stand by test pilot.” Luis cut off abruptly.

“Test Pilot, terminate mission and return to base, immediately” ordered Luis.

“What did you say? Terminate? Luis what the hell is going on down there, we’re in test mode!” Sophie exclaimed.

“Sophie, we have orders to abort this mission, please comply?” Luis implored.

“Roger that, dammit. Luis your orders better be from God on high or else!” Sophie snapped.

Luis Ramirez, also steaming mad, saw his vision blur as his mounting blood pressure activated his bio-monitor alert signal. Luis paused to inhale a gradual measured breath, acutely aware of the bio-monitor, which was worn by each Ranger in the field. The fact that Division Chief Carvallo himself called with the order to abort, only intensified his bafflement. A mission of this magnitude, aborted?

Luis, a nuclear physicist for the IRRD, joined the Rangers just two years ago. In that short span he had designed and engineered the MCR, which he unofficially named *Haymaker*. Not the typical Ranger adventurer, Luis worked for three years as a scientist for the CERN, the European Organization for Nuclear Research. After submitting numerous “anonymous” suggestions on REEL Rangers Eco-Blog, Tree had tracked down the source and offered Luis an opportunity to contribute to the discussions from within. In truth he told Luis to stop wasting his time with scientists and accomplish something that doesn’t take decades to make happen.

At the age of 32 Luis ascended to Team Leader, Research & Development for IRRD and an accomplished scientist, at the top of his game. Right now his anger was peaking as he sent an urgent alert to Tree by genie-ware, the synthetic skin computer-communicator that could be adapted to any part of the body. The genie-ware could even develop its own software applications based on a cursory description of the operations requested.

“Luis, sorry bro’, I got blind-sided by Carvallo too - didn’t even know he had intervened with you and Sophie, already. I’ll make it up to you Luis. Guaranteed! As for Sophie, I’ll be wearing a titanium groin cup when she greets me in Cheyenne. Hey Luis, Human Resources is alerting me, see you there,” Tree signed off.

Space Exploration Administration (SEA), Cheyenne Mountain, Colorado, United North American States (UNAS)

Tree, Sophie and Luis, clad in bulky padded silver flight suits stepped into the elevator cage that would carry them ten kilometers down the Linear Accelerator Launch Tunnel to the Auriga V spacecraft. Silently, the elevator began its slow descent. Luis stood mesmerized with sheer awe and terror, peering downward, unable to see bottom of the tunnel that was dimly illuminated with a thin circular band of fluorescent green every ten meters. Clutching both hands at the metallic rim at the neck of his flight suit, Luis pulled gasping for air. Clammy and constricted, he recalled his mother's warning from only hours earlier at her home in Denver,

“Luis, do not go up there, you cannot go. It's not a place for you to go.” Yet, here he stood at the precipice of his worst nightmare, with no escape, confined to cramped quarters for days on end with no fresh air to breathe.

“Sophie, the way you described this launch, I'm not sure the word *discomforting* is appropriate. You're saying that we're basically going to be stowed on the Auriga V in containers of jelly to keep us from turning into jelly when we launch through this linear accelerator like a bat out of hell?” Luis illustrated his understanding.

“Very good description Luis. Except that when we exit the tunnel, it will actually be more like a bolt of lightning. The energy field generated by the accelerator will help to shield us from atmospheric friction, once we exit the tunnel. We'll be safe, but we'll make a hell of a light show out there,” Sophie expounded adding a bit of humor. Luis stared blankly, eyes empty of awareness.

“Luis ... Luis? You OK, dude?” questioned Tree.

“Does he look OK to you, Tree?” Sophie interjected. She then pivoted directly facing Luis, blocking Tree's view and delicately slid her firm hands inside Luis' open helmet to either side of his temples, pressing gently. “Look at me Luis, only look at me,” she insisted. Luis stared into her coral blue eyes and suddenly felt immersed in the ocean gazing out into the endless sea. The sensation of floating, yet breathing normally, comforted him like a child in a wading pool bobbing on a rubber raft. Luis relaxed his muscles and drifted into semi-wakefulness for only moments that seemed go on and on. “Luis do you see me now?” Just as suddenly, Luis found himself staring into Sophie's eyes, fully awake and at ease.

“Sophie,” Tree whispered into her ear, “How did you hypnotize him like that?”

Rolling her eyes sharply at Tree, as a warning. She spoke directly at Luis, “All I did was help you push your anxiety from the foreground to the background, Luis. It's still there, but you won't be able to focus on it for a while. I gave you a kind of psychological sedative.”

“Cool. Whatever that was, Sophie, save some for later. I just might need it up there,” Luis added.

Tree could not resist the urge to tease, “Yeah Sophie, save me some of that *talk, touch and eye-taser technique*, just in case I start shaking in *my* boots.” In response, Sophie delivered a hard right elbow directly back to Tree's solar plexus, doubling him over.

Within ten minutes, they reached the crew cabin of the single-stage-to-orbit launch vehicle as the mission control voice chimed within their helmet speakers, “T-minus 30 minutes and counting. All systems check. Prepare to launch. All systems go.”

Part II

Megalith Lunar Mining Station - Delta Base, Shackleton Crater, South Pole-Aitken Basin

Captain Revelin North, COO of Megalith Lunar Mining, was smiling to himself again. He had a morbid habit of reassuring himself with a self-satisfying smirk when facing a potential threat. This time it was the imminent arrival of the SEA transport ferrying the REEL Rangers observers, sent to interfere with his mining operations. Revelin would make them regret making this visit.

“Captain North, please prepare for cool down stage in 5-4-3-2-1...” chimed the alto-toned computer voice ---- the Earth-gravity exercise chamber. Drenched in rancid sweat and coughing up mucous, Revelin grasped the side rails of the hamster wheel treadmill as it slowed to a crawl. His muscles ached under the simulated Earth gravity of the chamber where he, like every other staff, spent an hour each day. Knowing full well that this mandatory exercise would not fully counteract the muscle atrophy of low gravity life on the Moon, he was resigned to it. In six months, if all goes well, he would return to Earth on permanent disability, but quite wealthy indeed.

Exiting the chamber in low gravity and pulling on the handrails, Revelin easily propelled himself through the tunnel corridor towards the Delta Base Observation Deck. Delta base was forged into the upper Western wall, near the rim of the immense Shackleton Crater in the South Pole-Aitken Basin. Partially shielded from meteor showers and direct sunlight, Delta Base was ideally situated to receive shipments from lunar orbit and monitor mining operations on the floor of the crater, four dark kilometers below.

In permanent shadow from the sun, Shackleton Crater was bathed in darkness, yet teemed with activity. Across its 21 kilometer span lay hundreds of cones spaced in a hexagon formation. Each right circular cone stood 30 to 40 meters high and operated a volatile mine. Each mine-cone contained a robotic “proboscis” coil snaking hundreds of meters below the surface in a logarithmic spiral burrowing for pockets and veins of specific volatiles. Like a voracious honey-bee feeding and sucking through its tongue for the more precious volatiles, hydrogen, argon, and principally, helium-3. During the past decade, Earth nurtured a voracious appetite for helium-3, the primary fuel for nuclear fusion reactors. Megalith Lunar Mining controlled the supply which spoon-fed Earth's cities and industries.

Easing himself into the spacious recliner-style command chair facing the holo-view holographic monitor spanning the width and height of the stark observation deck. Revelin paused at his reflection in window mode before powering up the holo-view. Focusing his eyes for a moment on his face, Revelin glared at his deep-set eyes darkened even more by lack of sleep. His widow's peak had turned a dingy gray in the past year while seeming to slope further down his steep forehead. *What a torment to be relegated to this remote post where I can age so disgracefully.*

On some days, the command chair offered psychological comfort as it often lulled him into a day-dream about his better days as a naval combat ship Chief Engineer. Today, however, was not one of those days.

Now to the matter at hand. Powering up the holo-view by voice command, he signaled the volatile harvesting vessel operating deep within the crater, “Bumblebee Harvester, this is Delta Base, report.”

“Bumblebee Harvester to Delta Base, Chief Engineer Dawes reporting.” Dawes appeared agitated as perspiration beaded on his pallid and bloated face. The dim ambient lighting in the control cabin gave Dawes a ghostly glimmer. “Captain North, mining zone integrity continues to deteriorate at an accelerating rate. Recovery and processing of volatiles from the regolith is at maximum, per your orders, sir. However, contamination from the REGEER reagent is increasing exponentially, further compromising the regolith, raising surface temperatures and threatening lunar ice reserves.”

“Copy that. Step up recovery and processing and inform me of any further developments. That will be all Chief Engineer Dawes.”

“Beg your pardon, Captain North. As I reported, we are already operating at maximum capacity, sir.”

“Damn you Dawes, we're about to interrupt operations in six hours when the Rangers arrive to inspect our operations. We'll fall way behind on quota and commission. While I figure out how to manage this... this quagmire, your job is to speed up production. Now dig deeper and dig harder, Dawes!”

“Roger that, Captain.”

Revelin scowled at the multi-view as Dawes' image faded. “REGEEER be damned,” he cursed to himself. Revelin was never in favor of using reagents to optimize recovery of precious minerals from the lunar surface. The risk was not worth the reward. Now, Megalith Mining was forcing his hand with this experimental Regolith Element Extraction Reagent, REGEEER. His orders from the board of directors were to “deal with the Rangers and get back on schedule ASAP with shipments to Earth.”

Sixty hours after leaving Earth, the Auriga V spacecraft docked with the Lunar Orbital Command in order to transport its passengers and equipment to the cargo-pod shuttle. Tree, Luis and Sophie strode slowly up the wide ramp to the cargo-pod gate fully encased in arctic white spacesuits.

“All aboard REEL Rangers. You may remove your helmets upon entering. There's air to breathe inside the vessel,” chimed an ambient female alto-toned voice. “I am Vera, your operating system, fully enhanced to service this special mission. Your equipment has already been transferred on board and your workstations have been installed as specified. Behold.” Suddenly, an ovoid door seemed to sketch itself in the wall ahead and just as quickly swished open to reveal a stark white chamber with numerous hexagon panels forming its interior in the semblance of a sphere. The focal point of the chamber was a hexagon platform supporting three workstations facing each other in a triangle with a holo-view at its center. The trio entered the chamber led by Tree.

Tree propelled himself through the portal, enjoying the light on his feet effect of low gravity. “Welcome lady and gent, welcome to our fabulous lunar quarters for the next five days,” he presented gliding his arm skyward and bowing forward like a circus master of ceremonies.

As if on cue, Sophie took one bouncing step past Tree eyes wide open and curious. “Oh yeah? Where's the head in this... Hey better yet, where's the damn pilot?”

“Ranger Sophie, I am a Class A cargo-pod pilot with over seventy hours of flight-time logged into my system,” chimed Vera.

“So you're the damn pilot! Should've known” Sophie laughed. “Luis what do we do if the system goes down?” Luis had silently found his way to his workstation and was already fiddling with the holographic system interface, mesmerized by the technology. “Luis, are you there or trippin' somewhere again?”

“I hear you loud and much too loud and clear, like always. And besides that *Sophia*, this ain't the type of system that could possibly crash. Check this out Tree. There are modules in this pod behind those wall panels for just about everything... chem lab, supplies, lavatory, showers, food dispensers, medical, emergency evacuation, whoa! Emergency E vac?” Luis felt his lungs spasm for air at the thought.

Tree alerted Sophie, “Hey get over here I think he's ...”

“OK. I'm OK. Just nervous about being out here” Luis said delicately.

“It's alright little Louie, Mama Sophie got your back” she offered with a glance and a giggle.

“Guys, it's time to get down to that crater mine so we can rattle their chains and get back to our real work. Vera you're in charge ‘til we dock at the station.” Tree declared.

“Roger that Deputy Chief. Strap in REEL Rangers. We're swooping down into deep dark Shackleton Crater at South Pole-Aitken Basin.”

The Rangers silently searched each other's eyes for recognition of this bit of humor coming from Vera. No one found it funny. Especially not Tree, whose eyelids began to quiver. “Here we go. Somewhere down there is a threat to us,” Tree thought to himself.

Vera released the cargo-pod from its dock on the orbital station with no sound or apparent movement.

After several minutes had passed, Sophie chimed in. “So Vera, we're ready to launch anytime now, unless you need a co-pilot.”

“No need Ranger Sophie, we launched six minutes ago. You can watch our progress on the holo-view or experience our flight in virtual space mode. Which would you prefer?”

“Luis it's up to you. Ready for the really real, free-fall effect?” Sophie teased.

“I can always just close my eyes or maybe just vomit in zero gravity with puke floating all around us. Are you ready for that *Sophia*?” Luis retorted.

“For Francis' sake guys, let's behave like we work as a team, at least until our return trip. Vera let's go virtual mode please.” Tree ordered.

“Copy that Ranger Tree,” Vera responded. In an instant the interior of the pod faded to pitch blackness. Gradually ambient light appeared as the southern hemisphere of the moon phased into focus. The effect was dizzying and disorienting as the rugged cratered lunar landscape loomed closer from their near-side approach. Even Sophie tensely gripped her chair's harness straps having no sensation of being seated inside of the cargo-pod. Nothing inside the pod was visible, only the alien terrain edging ever closer in shifting shades of brown and gray craters within craters and a horizon of strangely green massif-like mountain ranges.

“Alright enough of this already.” Luis pivoted his chair to a rear view and could thankfully see the distant blue-white swirls and striations of a three-quarter sphere Earth, like a giant marble in the starry background of space. “Hey look at this view. Would love to click my heels right now and chant, “There's no place like home.”

“Amen to that brother,” Tree tagged on.

“Attention REEL Rangers, five minutes to landing at Delta Base, Shackleton Crater. Upon docking this vessel will reconvert to fully functional working and sleeping quarters. You can see the mountain range above the crater coming over the horizon now.” Within minutes they could see the sunlit jagged-edged rim of Shackleton crater and the blackness below.

“Looks like a black sea. Hard to gauge the size of it from this perspective. How big is that crater anyway?” Tree asked to no one in particular.

“Twenty-one dark kilometers across and four clicks deep,” Luis answered gloomily. “And cold as ice from hell with a temperature approaching 90 degrees Kelvin, that approximately minus 180 degrees centigrade to you laymen.”

“Hey Sophie that's more like your native weather than ours. You should feel at right home down there,” Tree jested.

“Up yours Tree, no pun intended,” Sophie countered.

“Attention Rangers, please attach your helmets as protocol requires and prepare to dock at Delta Base.”

Revelin North strode down the long alabaster corridor towards the cargo dock accompanied by his two muscular and grisly-looking technicians, Hawthorne and Krasnov. Krasnov wore a shaved scalp and a dark shadow beard that could not detract from his Neanderthal-like facial features dominated by a bulbous nose. Hawthorne, a head taller than Krasnov, wore a high and tight blond haircut that accented his beak nose and deep-set hollow eyes. The trio was clad in the black thermal undergarments meant only to be worn under the miner work-suits. The undergarments had the look of sculpted and padded body armor. North's sole intent was to intimidate the arriving visitors as dramatically as possible upon their very first encounter.

As the airlock to the cargo-pod opened, Tree was the first to emerge unlatching his helmet as he walked down the short ramp to face North, eye to eye. Tree glared shamelessly into the hawkish eyes of Revelin North, ignoring the technicians altogether. Recognizing the attempt to intimidate, Tree thought to himself, “So this is it ... the source of my premonition!”

North standing erect with fists at his hips and yielding several inches to Tree, directed his angst towards the tall leader of the pack, “Welcome to Delta Base, Ranger Mays is it?”

“Deputy Chief Tremain Mays,” he corrected. “And these are my REEL Ranger associates, Dr. Sophie Lavoie, Aerospace Engineer and Dr. Luis Ramirez, Nuclear Physicist.”

“Welcome aboard. Now if you will follow us to the observation deck where you will conduct your investigation,” North commanded as he motioned to his technicians to lead the group down the corridor.

“Just a moment Captain North,” Tree interjected. “After flying the better part of 400,000 klicks, we're still 4 klicks short of our destination. Our orders from the SEA allow for on-site investigation of the mining zone. That means ...”

“I know what that means Deputy Chief,” North, intolerant and impatient under normal conditions, felt as exposed as if he were naked on the lunar surface. His survival instinct was not hinged on self-preservation but motivated by eradication of any threat to his survival. Now, coerced to relinquish his feigned hospitality for the safety of his own morbid mental comfort zone, North devised the way forward. “Indeed, you shall have access to the mining zone, but *only you*, Deputy Chief. The only way to dock with the volatile harvester is by surveyor-skiff. It only seats two, and we only have one available. I will pilot us down to *Bumblebee*. Your associates will monitor from the observation deck. Is that clear Deputy Chief.”

“Clear Captain North, clear as a tornado warning siren.” Tree's answer was a coded message to his Ranger comrades to take extreme caution and prepare to improvise should a hazardous situation unfold.

Looking to Sophie at his left and Luis to his right, Tree appended his coded message, “You heard the Captain. You guys have a bird's eye view of the situation.” Code for watch like a hawk and be prepared to act swiftly.

“As ordered Deputy Chief,” Sophie mused, “I've been missing out on all the fun lately. No fair!”

“Actually, I had enough of an adventure just getting here, thank you very much.” Luis shot a warning glance at Sophie.

In the docking bay, Tree and North stood together at the pair of airlocks stationed just below their feet. Tree stared down through the transparent airlock to the compact rear cockpit of the surveyor-skiff, a back-to-back two-seat flying vehicle. The compartment appeared too small to accommodate Tree's large frame. Already, he regretted challenging North without any hesitation or forethought. But the man was unnerving to look at. Moreover, reasoning with North did not seem like an appealing option.

“Your attention, Deputy Chief. When I open your airlock, just plop yourself down into the seat. You’ll land softly in low gee. After that, allow the life support harness to gently attach and contour itself to your body. It’s a customizing feature that will fit you like a glove, head and torso,” North explained concisely. Tree perched on his tip-toes to lift himself up over the center of the opening hatch and softly landed buttocks first on the seat that seemed larger than it appeared from above. Stretching out his long legs seemed to activate the life support harness now snaking from behind the seat to gauge his dimensions. Crossing diagonally across his chest from lower left to upper right and lower right to upper left through a saucer-size red disk that served as a buckle and monitor, joining in symbiosis with his flight suit.

Just moments later, the two prepared for launch seated back-to-back in the narrow vessel with North in the forward facing pilot’s compartment. In total silence and without the sensation of motion, the skiff eased out from the ambient light of the dock near the rim of the crater wall. Tree shuddered watching the dock portal iris-out of sight. Peering skyward towards the jagged crater rim close above, Tree glimpsed an outline of sunlight brushing the uneven precipice above Delta Base, where sunshine bathed the cliffs surrounding Shackleton Crater. Under the observation deck's translucent dome, Sophie and Luis could feel daylight and see starlight, while he embarked into absolute blackness.

The skiff itself emitted no headlights whatsoever. The feeling of sensory deprivation was numbing. Tree could not even feel the self-awareness of normal breathing. Thoughts drifting, Tree imagined himself, fully grown within a womb still attached to an umbilical cord. But the womb was not that of his mother. Then just as the anxiety threatened to overwhelm him, the skiff abruptly spun 180 degrees, placing him in the forward, and accelerating into a nosedive. Then, impossibly, the landscape exploded with illumination. The skiff seemed to careen down the brightly lit crimson-red crater wall at a thirty degree slope into the crater abyss. The light emanated from the pocked and pitted surface as the skiff flitted scant meters from the crater wall, dodging sharp outcroppings randomly spread down the steep descent.

Instinctively, Tree reached up with both hands to grab hold of the upper straps of his harness to brace himself, not against gravity, but fear of impact. Somehow the skiff had pivoted placing him in the forward position heading downward. But, he had no control of the vehicle. He was flying into a red-hued wind streaking by in his peripheral vision. Abruptly, the skiff began spinning clockwise, along its long symmetry axis, spinning Tree to his right, head pressed to the cockpit window, further disorienting its unwelcome passenger.

Gradually, the skiff’s oriented itself with Tree in the rear-facing position as the nosedive decelerated perceptibly. As the declination eased, becoming less steep, the crimson-red surface shifted to a sunset orange landscape dotted with baseball to beach ball-sized impacts. Tree gazed out across the alien surface feeling isolated and exposed. Abruptly, the skiff stopped at the edge of a cliff overlooking a range of hills hundreds of meters across. An undulating band of aqua-blue light eerily adorned the hilltops, alternating to sea-green and back to aqua-blue, like ocean wind waves. Unaffected by the wavelike motion, the skiff eased forward towards the hilltops. At

this moment, Tree attempted to gauge its height peering across the indigo blue chasm below. The bottom was not visible. Looking up into starlit space, Tree felt adrift in outer space.

Lurching downward, the skiff homed in on its unseen destination toward the crater floor. As the skiff descended, the cartoon-like landscape was diffuse with ambient indigo-purple light that negated any view of the myriad stars seen moments ago.

“Almost there, Deputy Chief. Gave you the scenic view. What do you think of our moonscape?”

“Thought I had died and gone to hell. The scenic view?”

“Thanks to navigation via holographic mapping mode. *Holo-nav* we call it. With no real daylight down here, we use our surveyor-skiff to continuously map the 400-plus square kilometers of Shackleton Crater. That means most every rock and nook and cranny. All in spectacularly color coded topography. It’s the only way we can operate in this abyss.”

“Well, Captain North, I am duly impressed and amazed. Cannot say that I enjoyed the ride, but I’m sure you enjoyed my distress along the way.”

North smiled to himself thinking, “Ooh, that was just a taste of what’s to come my Deputy Chief!”

“*SS-1 to Bumblebee*, we are approaching mine-cone 11, sector G for a close-up inspection before proceeding to your dock. Make room for two, Chief Engineer.”

“Roger that *SS-1*. Making ready accommodations for two,” replied Chief Engineer Dawes. Two additional crew would strain the environmental systems of *Bumblebee* at a crucial time. “Why did the Captain allow this untimely visit?” Dawes wondered.

“Alright Deputy Chief, from here on out pay close attention. I’m providing you with a crash course in volatile mining, and there will be a pop quiz afterwards.”

The skiff drifted in a slow, steady descent to the surface illuminated by indigo to deep purple hues emanating from the uneven rocky desert of regolith. Tree refocused his eyes, adjusting to the nearly monochrome terrain. He knew that the canopy cover was transparent, but it helped him to relax by imagining that he was looking through a tinted glass windshield. Upon closer inspection, the regolith surface just below the skiff began to shimmer a soft translucent silver-white. The skiff continued so close to the ground that it could have been rolling on tank treads. His view orientation flashed to a new scene sharing the same forward real-time view as North. In the near distance, sparkling copper cone-shaped structure appeared as their destination.

The cone stood several stories high with a circumference as wide as a large grain silo at its base. Hovering atop the mine-cone, loomed the volatile harvester, *Bumblebee*. True to its namesake, the vessel consisted of a brilliant metallic yellow exoskeleton with dark brown contours separating the head, thorax and abdomen. As wide as a wide-body aircraft, but modeled on bumblebee anatomy, the wingless harvester hovered sustained by three pairs of “legs” that functioned as thrusters, enabling its bee-like mobility. *Bumblebee* suctioned volatiles by extending its long proboscis-like tongue appendage through an orifice at the apex of the mine-cone structure. The skiff approached and circled the wide base of the mine-cone that vibrated with earth tremor force while emitting a steady low-pitched humming sound.

“I can hear it. How is that Captain? Does sound travels in this near vacuum?”

“Not so much. It’s not your hearing, Deputy Chief. You are feeling surface vibrations from the mine. The mine-cone uses a drilling coil to forage deep into the regolith in a logarithmic spiral. That spiraling coil extends outward and downward for hundreds of meters. It does this by

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