

CRITICAL REACTION

A N O V E L

TODD M. JOHNSON



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Todd M. Johnson, *Critical Reaction*
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For my Libby.

“The cost of cleaning nuclear defense sites like Hanford could be so high, and the contamination so great, we may just have to erect a fence around them and call them what they are: national sacrifice zones.”

unknown nuclear engineer, late 1980s

CHAPTER 1

OCTOBER 16, 2013

2:50 A.M.

PRIEST RIDGE, SOUTHERN BOUNDARY
HANFORD NUCLEAR RESERVATION

Under a moonless sky, he slowed the bay stallion as they neared the top of the slope. The evening breeze, strongest there on the narrow plateau at the peak of the ridge, slipped a gust of chill air through his jacket and down his neck. He pulled his hood up over his head.

Through his jeans, the stallion's thick winter coat warmed his thighs, wrapped bareback around its flanks. He pulled off his gloves and slid his hands up and under its thick overgrown mane, where the heat was captured like a blanket.

As feeling returned to his numbed fingers, the man straightened and gazed far down toward the flats below. A distant object glowed there, dipping and bounding across the dark desert a mile and a half further east—back in the direction from which he'd come. He raised the binoculars slung around his neck, grunting with satisfaction as the magnified object gained definition.

It was sagebrush, moving erratically over the desert surface—like a tiny runaway sun released from the laws of nature and glowing beyond any other source of illumination. Ten to twenty miles per hour, the man judged—propelled by a desert wind. Most people wouldn't have seen the small object from

this distance, he thought with a touch of pride, not without the binoculars. And if they could see it, would they believe what they saw? If he denied the proof of his own eyes, he'd feel as untethered as that illuminated brush out there tonight.

The trajectory of the glowing object confirmed their calculations, another source of satisfaction for him. Sliding the binoculars back beneath his jacket, he patted the stallion reassuringly on the withers as the animal pawed the ground, snorting thick clouds that quickly dissipated in the cold air.

He glanced back up as the shape bounded once more, arcing upward before dropping from sight beneath a fold in the ground. It didn't reappear.

The eddies of cold air slowed his will to press on. But the man knew he had to. The Hanford Works buildings stood to the northeast, stalagmites in the desert beyond his sight along the Columbia River. One of those buildings housed Hanford's central security. If he'd been detected on the nuclear reservation grounds tonight, cars could already be dispatched to search him out.

He had raised his heels to kick the stallion into motion when the horse whinnied and backed in alarm. Then he heard it: a ragged boom like a thunderclap from an unseen storm blowing out of the dark from the Hanford buildings. The man shushed the animal, gripping its mane tightly as the sound rolled and echoed off the surrounding hills before fading away.

Another boom followed, even louder, sending a ripple of alarm through the stallion. Then a third.

Thunder on a cold night like this? A landslide? An earthquake?

The last echoes faded off. He listened longer as a breeze whispered through the ground brush. Nothing more.

The horse rolled its head, impatient to go. He reassured the animal gently. But the cold air—so fresh in his lungs a moment ago—now tasted sour in the man's mouth.

His stomach lurched as the bay suddenly reared to full height. The man tightened his grip on its mane to stop a slide toward

its hips—just as the animal dropped back on its front hooves and launched itself into the black.

Over the stallion's hammering hoofbeats the man shouted for it to slow. Pulling desperately on the horse's mane to yank its head back and himself forward, the man prayed for even ground and to avoid the ridgeline to their right.

A dozen pounding strides passed before he could center himself on the bay's back. Then he loosened his legs' grip and leaned back, yanking harder on the mane. The animal began to ease its pace.

With the slowing beat of the stallion's strides, for the first time the man could hear what had made the horse lose control. The sound of it set his heart pounding.

Give me whatever you've got left, he whispered, leaning deep into the animal's shoulders again, tightening his legs and mouth-ing encouragement for speed once more. The animal was confused and hesitated—until he kicked its flanks hard, launching the stallion into a gallop.

Whatever you've got left. Whatever it takes to get off this high, naked butte, where the night currents from Hanford will reach long before settling to the desert floor below.

Behind him, the sound was unmistakable and growing ever clearer, rising up and up, striking a deep chord of fear in the man who feared very little. It was a warning siren screaming from one of the buildings of the shuttered plutonium factory, and even over the distance, it chilled him more than the wind ever could.

Because the piercing cry heralded a radiation release, in a wail as shrill as a tortured soul.

2:46 A.M.

LAB BUILDING 5

HANFORD NUCLEAR RESERVATION

Twenty-five-year-old Kieran Mullaney winced as he crouched to adjust his worn pair of boots. The sharp pain had to be another

blister, this one on the sole of his left foot. He pulled his sock tighter. There was little else he could do.

Kieran looked up into the stare of his supervisor, Taylor Christensen. The man was standing impatiently by the entry-way to the “dark side” of Lab Building 5. Steve Whalen, the aging supply manager for LB5, chewed his gum indifferently from behind the equipment counter. They each were watching Kieran, waiting for him to follow Taylor through the door to start the night shift.

Maybe he should do just that, Kieran thought. Keep his mouth shut and start his shift. Because if he complained about his boots, they’d think it wasn’t such a big deal.

But it was a big deal. It wasn’t just the pain he’d endure for another shift from these tight replacement boots Whalen had given him last week. It was that nobody had told him where those boots had picked up the plutonium that made them confiscate them in the first place.

It also was Whalen’s smug attitude, like that of so many old-timers, the ones who’d been at Hanford as far back as when the place was still operational. Guys like Whalen looked down their noses at the youngest workers like Kieran. Whalen had been broadcasting his disdain for Kieran the whole two weeks he and Taylor had been substituting here at LB5. He was doing it now.

Whalen treated Kieran’s supervisor differently; he’d thrown some respect Taylor’s way since they’d arrived as stand-ins for the regular LB5 sampling crew. Kieran got it—Taylor had the look and walk of the third-generation Hanford man he was. Kieran was second generation, but he didn’t have the walk. He didn’t kowtow to the Whalens of Hanford.

Kieran straightened up to his full height. All right. It was their last night here. He’d push back a little.

“Red, I want my own boots back,” he said matter-of-factly, using for the first time the nickname he’d heard others call the tech. “The ones made out of real leather instead of recycled footballs.”

The equipment man squinted at Kieran from under gray eyebrows with a look like he was chewing lemons. “Well, aren’t you the smart one,” Whalen fired back with clipped words. “You can go barefoot if you’d like. But you’ll get back your own boots when they’re done testing ’em.”

“You took them last week and we’re heading back to our regular station tomorrow,” Kieran kept on. “What happened to ‘You’ll get them back in twenty-four hours?’”

Red Whalen cut him off with a wave of his left hand, raising a Geiger counter from the equipment shelf in his right as though it were something holy.

“Didn’t you hear old Samantha here cry out the other day when I wanded your boots for rads, boy? What do they teach you kids in training these days? That was the voice of a *protective angel of heaven*, shoutin’ that the soles of that leather tied to your feet had found some serious radiation on the dark side—heaven knows where. And all you can do is whine about wantin’ to get back those Walmart specials and take ’em home with you to Momma? Shame on you. I’ll tell you this once more: when they figure out where you got the contamination, the folks at headquarters will clean the rads off the boots and get ’em back to you. End of story.”

Some of the smugness had come off the supply manager’s face—replaced with stubborn anger. This was feeling good, Kieran thought. He held up his HEPA mask.

“How about my air filter?” he said. “I told you my first day here that this one’s too small. Feels like a kid’s snorkel. Don’t they issue you supply guys adult equipment here at LB5—”

Taylor took a step toward Kieran and grabbed the mask from his outstretched hand. “C’mon,” the supervisor growled through his thick moustache, then led the way through the security door for their shift.

With a final glance at Whalen’s flushed face, Kieran passed the equipment counter and followed Taylor into the dark side.

He only let his grin surface once he was through the door and out of the supply manager's view.

Looking at his supervisor's hunched shoulders, Kieran feared that he'd ticked off Taylor by baiting Whalen. He didn't want a lecture tonight about how "*nobody complained back when Hanford was making the plutonium that went on the trains to Rocky Flats. Everybody knew how important that mission was. This isn't just another job. . . .*"

Taylor had it in him, that vein of pride that rivaled the old-timers. But he must've known Kieran was just letting off steam, because the lecture never came.

Their boots clapped on the concrete floor of the first-floor corridor of LB5's dark side. Every Hanford building ever used for plutonium production had its dark side—the name everyone used for areas where plutonium was produced before the Department of Energy turned out the lights and closed all these buildings for good. Kieran had heard somebody say they chemically recaptured plutonium here at LB5. He didn't exactly know what that meant. Frankly, he didn't care. He worked for a company whose job was to do monitoring and testing ordered by Covington Nuclear—sampling for radiation in the air; checking the contents of aging storage containers with long-disused chemicals; taking swipes off the walls and floors for leaking contaminants or rads. Whatever else they told him to do. He didn't need a history lesson about the Hanford Nuclear Reservation for this job. Growing up in Sherman next to the place, he'd had enough of those to last a dozen lifetimes.

Kieran glanced at a plaque on one of the locked doors they passed in the empty hallway. At Hanford, that meant somebody had gotten a fatal dose of rads in the room, along with the standard compensation issued to the family. Kill boards the old guys called them—or agony plaques. The nicknames said it all: it was no way to die.

Kieran mouthed the name on the plaque they'd just passed:

Severson Room. Likely he died in the fifties or sixties. That's when most of them went; when production was so rushed that lots of corners were cut. He wondered who the man was, whether he'd had a wife and kids. Probably both. Most of these guys were family men, good providers given the top-notch pay out here.

Providers like Kieran's dad—a thirty-year Hanford man. They never worried about money, always had decent cars. Every Christmas topped the one before it. Trips to Disneyland every couple of years, and that surprise trip to Hawaii. College wouldn't have been a problem, that was for sure.

There was no plaque for his dad out here on the grounds, because he didn't get a sudden big dose of plutonium or tritium or some other rad that took you out in a flash. He got it slowly, sucking it into his lungs on long daytime shifts. Maybe eating what had settled invisibly onto his sandwich on breaks. Then hiding away deep inside him until the cancer surfaced in his bones before migrating to his lungs. Two years of chemo and he was gone the spring of Kieran's junior year of college

Nobody offered a plaque for that kind of death.

They passed a room numbered 140. There was no plaque on this door, just a number. He'd never worked in this building before last week—but the room number struck a chord. In a different Hanford lab building miles away was another room 140—the first room Kieran entered as a Hanford worker two years before. Kieran was Taylor's rookie assistant then, and the supervisor had started him out in a “clean” computer lab—one that wasn't supposed to be too crapped up because they'd never handled radioactive materials in the space.

But before they passed through the door, Taylor'd looked him in the eye and told Kieran to forget about “clean” rooms or “crapped up” ones. It was fine, Taylor had said, to reserve the HEPA mask just for emergencies, “*cause you can't really do your job with it on anyway.*”

“*But other’n that,*” the big man had commanded through that thick brush of lip hair he was so proud of, “you act like every room has the potential to dose you. I know they trained you that turbines in all these buildings pull the air through filters to scrub it—and that’s true. But if those filters caught everything, you and I’d be out of a job. Fact is, there’s hot dust in the cleanest room and any mote of it could end up in your bones or your thyroid. Think of this place like it’s full of black widow spiders: you don’t want to touch *anything* you don’t have to.”

Then, to underline his point, Taylor’d pointed up at the nearest sample of dark tape that lined all the Hanford walls at the eight foot level. “And don’t you *ever* let me catch you climbing ladders or standin’ on chairs above that line. *Never*. Because the dust on the light fixtures up there’s as thick as in your grandmother’s attic. You take in a mouthful of that and a girl’d be a fool to ever kiss you again.”

Those words rang in Kieran’s ears that first shift, making him almost tiptoe into the darkness of “clean” room 140 in that other building. Then Taylor had flipped the light switch behind him and Kieran had stopped like he’d stepped knee deep into soft tar.

Fat computer monitors and plastic keyboards lined tables and desks scattered around the room, each covered with the faintest layer of dust. Tools lay on benches like they’d just dropped from workers’ fingers. A calendar from the late 1980s decorated a wall next to lab coats still hung on hooks.

Kieran stood frozen, waiting for a shift of ghostly workers to shoulder past him, each layered in that same frosting of powdered dust, to pull on the old lab coats and take their places before the silent computers and benches.

Taylor had walked past and laughed at Kieran’s expression. “Relax. The crews left things like this after their last shift in ’89 ’cause no one told them they weren’t coming back. Nobody knew when, or if, they were coming back. Then the Berlin wall came down and *poof*. Job done.”

That conversation was two years ago. He still thought about it before every shift.

Kieran's mind returned to the present as Taylor, a step ahead of him, reached the stairwell of LB5. He followed his supervisor up the dimly lit stairs to the third-floor hallway. There they stopped. Taylor smoothed his moustache with a finger and thumb. Then he handed Kieran a clipboard and testing equipment.

"Go check out room 369. It used to be a storage locker. Should be clean. Take air and dust samples then come back to me. I'll be here in room 301," he said, gesturing across the hallway. "Seems like a waste of time for our last night. The permanent crew should be able to handle sampling these corners of the building when they're back tomorrow. But there you are. And let's move it along. This is our last night here, so if we get the checklist done, I'm sending us home early."

Kieran took the clipboard and pouch of air and surface sampling equipment. Taylor had complained a few times the past week about "make work" projects that could've waited for the return of LB5's permanent testing crew—away now on some training exercise. He and Taylor hadn't been assigned to test any of LB5's lower level glove-box rooms, production lines, or anywhere else where plutonium had been handled in abundance—typically the highest priorities. But as Taylor often said, he didn't make up the work lists, he just got 'em done. His comments tonight were the closest Kieran had ever heard Taylor come to complaining.

Lab Building 5 was a long rectangle, its corridors stretching for nearly a hundred yards. Kieran left Taylor behind, trudging the distance toward room 369 at the furthest end of the third-floor hallway. As he walked, he marked his progress by counting off the hallway detectors bolted into the floor every fifty feet, humming as they continuously monitored the air for radioactive contamination. Each was crowned with small lights showing green if the air was safe, red if hazardous. They weren't

as sophisticated as the tests the lab would perform on samples taken by Kieran, but they reassured him. Like Christmas bulbs on shin-high pines, the green glow always comforted Kieran as he walked the Hanford corridors.

He was nearly to the hallway's end when Kieran detected a brush of heat on his right ear. Another step and it was gone. He stopped—then backed up. There it was again.

To his right was an interlocking pair of steel pressure doors labeled room 365. He pressed a hand against the metal surface. It was warm to the touch.

The temperature in these old buildings was carefully controlled. Kieran reached for his walkie-talkie to call Taylor. Except, he recalled, his super didn't like being bothered with half information. Kieran set the testing equipment and clipboard beside the door on the hallway floor and turned the knobs to open each of the double doors.

They wouldn't budge. He tried again, leaning into each of the doors and pressing with his legs. This time, they slowly gave way.

As he stepped inside, his equipment belt rattled. The sound echoed in the dark interior—just as a wave of heat and humidity rolled past and out the open doors behind him. An instant sheen of sweat rose on Kieran's forehead.

Startled, he swept the black with his eyes for a sign of fire. There was none.

His fingers found the wall switch and he flicked it on. Light flooded a cavern at least thirty yards deep.

The space was filled with aging industrial vats lining each wall, split by a narrow walkway down the middle of the room. Each of the containers was pierced by a collection of pipes and valves, giving the appearance of a ward of metal giants on life support. Some of the pipes led to adjacent vats; others angled into the floor.

The sight was familiar. Kieran had sampled these rooms in other buildings where he'd worked. This was a mixing chamber.

When this was a working production building, chemicals were stored in these containers for transfer to other vats for mixing, or to be pumped to labs and glove rooms elsewhere in the building.

The heat was coming in waves from deeper in the room. Kieran took cautious steps forward, the sweat thickening on his face the further he walked from the doors.

The slow pace finally brought him near the far wall. Here, to his left, hung a towering vat. It was eight feet tall at least, suspended from the ceiling with thick steel posts. The enormous cylinder looked like the queen of the room, with pipes angling into it from every direction. Among all the pipes stabbing its surface, the largest was a single iron tube that descended from its bottom perpendicularly into the floor. *Vat 17* was stenciled across its girth.

Kieran moved closer. Moisture was dripping in rivulets of sweat on all sides of the huge vat's surface, released, Kieran saw, from pressure valves near the vat's lid.

This had to be the source of the heat and humidity.

Nearly beneath the container, Kieran heard a splash at his feet. He leaned into the shadows under the vat.

The sole of his left boot stood in a puddle of pooled condensation from the vat's sides. Satisfied, Kieran straightened up—only to be jerked back into mid crouch. Startled, he looked down again.

The edge of his T-shirt had caught on another valve attached to the iron pipe extending into the floor. Kieran untangled it, then stood fully upright.

The surface of the vat was only three feet away now. Kieran reached out his bare hand and touched it gently.

His fingers recoiled from the scalding metal. In that same moment, he heard his pulse pounding in his ears. Heat shock, he supposed. Or nerves.

He'd had enough. Kieran reached for the walkie-talkie on his hip.

Only the pounding wasn't in his ears, he suddenly realized—and it was growing, not subsiding. Kieran turned his head to one side. The rhythmic pulsing was coming from Vat 17 itself.

An image flashed through his head of a thin-skinned teakettle expanding like a balloon as it reached a boil.

He was running before he was aware of a decision to flee, sprinting toward the distant doors with fear pricking his skin like a thousand beestings. Maybe he was imagining it, but the thump of the vat seemed to match his pounding steps, growing louder and deeper as he ran.

Please, don't blow; don't blow. The mantra cycled in his head. But he heard it from his lips as well, in rhythm with his breath.

The doors were nearing through his sweat-blurred vision: he was going to make it. He'd leave the room and round the corner into the hall, out of the path of the coming explosion.

Then another voice spoke with equal certainty that he was wrong. Because the doors, still twenty yards away, were arcing slowly shut, edged by the rising pressure in the room. And once they were shut, no power on earth would open them again in the face of that pressure.

His wet left boot slipped, nearly taking him down. He stumbled through two strides before straightening again, the boot squeaking angrily on the concrete floor as he regained his pace.

The voices were silenced as the exit drew near. Kieran leaned forward, vaulting toward the shrinking gap between the doors with outstretched arms. His left shoulder skimmed one door's edge; his right knee scraped the other one hard. Then the steel panels grabbed his outstretched left ankle like a vise as his body slammed to the hallway floor beyond.

He lay face first on the cold surface of the corridor. His left ankle was locked at an angle above him. His ribs knifed with pain where they pressed against the floor.

Kieran strained to look over his shoulder at the foot. The effort hurt his ribs, but he could just make out that his ankle was

still wedged between the mixing room doors, as the pounding sound leaked through the gap.

Kieran's muscles lit with panic once more. Sliding back toward the doors, he gathered his right knee to his chest and kicked furiously with his free foot at the nearest panel. The door yielded inches. He kicked again. And again and again and again. The fifth kick burst the door open for an instant and his left foot sprang free, stripped of his shoe and sock and layers of skin. Then the panels sprang instantly shut again, their final boom echoing down the empty corridor.

Kieran huddled on the floor, his muscles twitching, his clothes clinging with sweat. His ankle throbbed and bled. His ribs, forgotten briefly, now ached with pain at each breath.

He didn't care. Kieran sucked in wonderful breaths of cool air. He was safe. Safe in this peaceful space that was anywhere but in the mixing room beyond the heavy steel doors.

Metal groaned. Kieran opened his eyes and rolled to his back to look toward his feet.

The door panels strained on their hinges.

Kieran clambered to his feet, pain knifing the bloody bare one. He struggled into a limping run down the hallway, gripping his ribs with one arm. "Taylor," he tried to shout. The walkie-talkie tapped at his hip like it should mean something, but he kept shouting as he stumbled on.

A distant sixty yards or more away, Taylor emerged into the corridor. Kieran still heard the rising groans from the doors behind him and tried to quicken his pace. The supervisor's hands dropped to his belt, grabbing a HEPA mask hung there. He pulled it across his forehead and over his face.

Without breaking his stumbling stride, Kieran felt for his own mask—then sickened as Taylor lifted a second mask in the air.

It was Kieran's own, taken in the entryway to the dark side.

Still dozens of yards away, Taylor broke into a run toward Kieran with the second mask clutched in one fist. Taylor tried

to communicate a command with his other hand—but the big man had made only two strides in Kieran’s direction when the hall was swallowed by a roar and a shock wave that rocked the walls and floor, lifting Kieran from his feet as though launched from a spring. He twisted through the air, dust and flying paint filling the world—then his hips and back slammed the hard floor, triggering the screaming rib pain again and squeezing the air from his lungs.

The universe hurtled out of control as another roar shook the hall; then another. Kieran bounced off the floor with each succeeding cataclysm, consciousness slipping away—aware only of a final image locked in his mind like high definition.

It was the radiation monitors lining the walls between Kieran and Taylor’s prone body on the hallway floor still a hundred feet away. Through a haze of settling debris, Kieran could see the monitors, unmoved by the explosions, bolted solidly in place.

What made them curious to watch were the changing hues of their light bulbs—solidly green before, but now flicking to red, one after another, like runway lights racing away down the hallway away from him.

3:01 A.M.

LAB BUILDING 5

HANFORD NUCLEAR RESERVATION

“Gin.”

Patrick “Poppy” Martin cast a narrow-eyed grin and spread a handful of tattered cards across the edge of the desk. “That puts me out.”

“Geez, Poppy, you had my seven,” Lewis Vandervork spat, tossing his own cards.

Still grinning, Poppy reached out and patted the younger man’s shoulder.

“Of *course* I did.”

Outside, tiny droplets slid down the window of the rooftop guard shack surrounding them. Poppy stood and squinted out of the glass.

The rooftop guard shed was located along the north end of Lab Building 5, making Poppy's view from the window a southerly one over the full length of the vast roof expanse. A tall smokestack for LB5 stood apart from the building off to his left. It was difficult to make out now because he could see a thin cotton veil of fog rolling across the tarred roof surface from the desert, the moisture sparkling in the glare of the overhead perimeter lights surrounding the building grounds. "Deal again," he said to Lewis. "Let's play one more hand before we walk the roofline."

Lewis grunted and gathered the cards. "I will," the younger man said. "I got time to clean Beverly before we go?"

Poppy shook his head. "You can clean Beverly at the end of the shift, like always. You treat that rifle better'n I treat my wife."

Lew smiled, shaking his head. "That's the difference between my army training and your navy training, Pops. I know how to treat my weapon—and my woman. So, the building manager downstairs told ya we're done in a few more days here?"

Poppy nodded. "He left me a note with my time card. Said the permanent security detail finishes its training early next week and we're gone."

None too soon, he thought. Even in a place as spread out as the Hanford Reservation, this building was isolated. Coming here added twenty minutes to Poppy's usual daily commute, each way. And LB5's small permanent crew—eight most evenings—were just plain unfriendly when they crossed paths with them. He looked forward to getting back to his job rotation nearer to home.

Poppy listened to the sputtering of the fan on the corner space heater that filled the shack with hot, dry air, then the ripple of

cards as his companion shuffled. Through the glass, he could make out the small cafeteria building that perched on a hillock twenty yards beyond LB5's southwest corner. Every evening shift since he and Lewis got transferred here for temporary duty, he'd seen people coming and going from there around this hour—registered on his log as HVAC workers. As though in confirmation, the door on the small building swung open and two figures emerged. Poppy watched as they turned and started down the hill on a sloping driveway that quickly led them out of his sight along LB5's west side.

The sight of the workers reminded Poppy: just four more hours on his own shift tonight. Then it was home in time to see his wife and visiting grandson before heading to bed. Later today, after he was up again, they'd have Suzy's fettuccine. What had she told him to pick up on the way home? Bread and . . . something. She was right: he should have written it down.

He glanced at his watch. It was time to walk the roofline and check in with the front office. Poppy reached for his jacket beside the gun rack. "On second thought, Lew, let's—"

His fingers brushed the jacket collar as the reinforced steel roof rippled under his feet like it'd been hit by some monstrous sledge. Poppy's knees buckled and he grabbed for the desk edge as the window splintered into a fine web. The computer monitor bounced from the desk, shattering on the ground; drawers from the corner file cabinet crashed to the floor; and over a fearful howl from Lewis, Poppy's eardrums were smothered by a piercing explosion to the east.

The sound was coming out of the smokestack, he thought, his ears aching—then he was down completely as a second even more violent wave slammed through the roof, like a tsunami crashing onto its surface. Then the terrifying crescendo of a third concussion rocked the shack, lifting the desk from the ground and heaving the window glass from its frame in a final shattering collapse.

This is it, Poppy thought—surprised that he could think at all, that he wasn't frightened past any sensibility. He looked across the floor at Lewis, twenty-five years younger and terrified, clawing at the shack floor with his fingernails as though it could shield him from the maelstrom boiling up below.

How pointless, he thought with a sharp pang of pity as a tear curled down Lew's cheek.

You might as well accept that no amount of steel's going to save us, 'cause something's gone critical down there, he thought. *And you and me and the poor boys working below are about to go up to God in a hellfire mushroom cloud of heat and blood and radiation.*

With that, his mind began a slide toward resignation and a strange welling of peace about it all. He started to mutter a prayer.

Then, as quickly as he'd begun, Poppy stopped. The world had gone silent and still.

Poppy braced for another inevitable blow; he heard Lewis moan through tightly clenched teeth, his hands now clasping his knees in a huddled ball. But the blow didn't come. The only sound other than Lewis was a breeze rattling the few remaining shards of the pulverized windowpane.

Poppy tried to assemble his thoughts, which drifted like scattered smoke. Then he was swept with a rush of exultation that he was alive.

Poppy pushed himself to his knees. His wife and grandson—he'd see them after the shift. The hunting trip next weekend—he'd still do it. He was alive.

The despair was leaching away, replaced by a different, vague impression. There was something he had to do. Poppy reached out and shook Lewis's shoulder. "Lew," he heard his voice say, through the ringing of his ears. "Lew."

The young man's moans stopped, but his eyes were still glassy. He should call someone for Lewis. No. He couldn't do that. No

one should see Lewis like this. And besides, that wasn't what he had to do.

Poppy rose, wobbly, and stepped toward the gun rack. He fumbled with the keys to unlock the padlock, watched himself withdraw an M-16 and a full clip, and forced his fingers to load the weapon. His boot kicked something. He looked down. It was a flashlight. He leaned over carefully and grabbed that too. He pulled on his jacket and stepped outside.

The fog seemed thin in the bright spotlights. Poppy stepped onto the tarred roof surface, surprised that it was still solid beneath his feet.

His head ached and his limbs felt drained, but his thoughts were assembling now. Why was he here? To check the ground along the roof perimeter. What for? Observation. Look for injured. What else? There was something else even more pressing.

Sabotage.

His Hanford training rushed back like an accelerated recording. If there was an explosion, the first duty of this post was to monitor the building exits for saboteurs—while maintaining contact with the central office on the front of LB5. If he observed potential saboteurs, he was to shoot. No, no, no, that wasn't it. He was to shoot . . . to kill.

All strength had been wrung from his legs, but he forced himself into a disjointed jog across the length of the roof toward the southern edge, where the building's rear emergency exit emptied out onto the grounds below. He pushed through the cotton in his mind to tick off the evening personnel log: the night building manager and assistant, front side offices; supply tech, dark side entryway; two sampling techs somewhere inside; HVAC engineer on the front side, second floor, north. Then there were two HVAC maintenance guys on the grounds tonight—probably those guys in the cafeteria building. So the only exits likely to be used were out the north, on the front side.

Poppy shifted the rifle to his left hand and reached for the walkie-talkie on his hip to check in.

The hand closed on air. Poppy slowed. He'd forgotten his gear back in the shed—his walkie-talkie, his mask. Everything except the rifle and flashlight.

Poppy turned—and was startled to look directly into Lewis's flushed face. Beverly was slung over Lewis's shoulder and in his hand he extended a walkie-talkie. The young man's eyes were red and swollen, full now with a different kind of fear.

“Pops—ya can't tell . . .” Lewis pleaded in a hoarse whisper.

Poppy took the walkie-talkie. “Don't know what you're talking about.”

Relief flooded Lewis's eyes as Poppy pointed toward the eastern roofline—the only side of the building with emergency exits other than the south, where Poppy was headed. “Check the east. The emergency exit on that side's out of the lower level. Nobody should be down there, so anyone coming out is a presumed target.”

Lewis nodded his understanding and then trotted off in that direction, unshouldering his rifle as he went. Poppy punched the Talk switch on the walkie-talkie as he faced back to the south.

“Central, this is Roof 1,” he called as he began his run. “Central . . .”

He'd taken only two strides when he saw, through the wisps of fog, a gash of green and orange hovering in the air along the southern end of the building. Poppy slowed, trying to trace it with his eyes and make sense of the image.

It was a garish plume pumping from the top of the smokestack, where it stood now fifty yards to Poppy's left. The plume was pouring out of the tall chimney, drifting like a contrail down onto the roof of LB5, then flowing across the roof surface like an enormous snake, its snout tumbling along the tar in front of Poppy, headed toward his right. At its nearest point, the cloud seemed about twenty feet away from Poppy, but it already formed

a barrier between him and his goal of reaching the southern edge of the roof.

He pressed the walkie-talkie switch again. “Central, Centr—”
 “We hear you,” a voice crackled from the device. “Is the roof intact?”

It sounded like the LB5 night manager, though Poppy’d only met him twice. And what was he talking about? “*Is the roof intact?*” Was that all they were worried about? He pressed the Transmit button.

“The roof—I don’t know yet. It looks okay. But we’ve got another problem. There’s a plume—a big one, green and orange. It’s coming from the smokestack and heading across the roof in front of me.”

Chemicals? Radiation? What was in the thing?

There was a pause over the speaker. “Repeat.”

He did so.

Another pause. “Hold on.”

As he waited, Poppy gauged the flowing cloud again. Its nearest visible edge still appeared at least twenty feet ahead of him, but now he thought he detected a metallic taste on his lips and a mild sting brushing his cheeks. He took a step backwards and peered more closely at the plume. The thick mass was flattening and broadening on its journey across the roof—dissipating at the edges so that its true depth was disguised in the light fog.

Poppy stepped back another full stride, then glanced to his right. The nose of the plume was now approaching the roofline in that direction, to the west.

The HVAC workers leaving the building on the knoll, he thought. They were walking on that side of the building, into the path of the cloud.

Poppy pivoted right and forced his legs into a stumbling run. His weakness still slowed him, like he was immobilized in a dream. Poppy cursed himself and his inability to accelerate.

“Roof security,” the walkie-talkie came to life. “Please repeat. You said a plume?”

How many times did he have to say it? “Yeah,” Poppy said, still jogging. He forced out a description of its color and movement between gasping breaths, ending just as a final stride brought him to the western roofline.

Sucking air, he scanned the paved path three stories below, leading from the knoll to the plant entrance.

The workers were visible now, moving slowly and uncertainly—but directly into the path the plume would soon take when it fell from the roof of the building.

Poppy realized that the walkie-talkie had gone silent. His throat felt raspy and he coughed as he pressed the Call button. “Listen, you’ve got personnel out here. On the west side. Repeat, west side. You’ve gotta sound the take-cover siren. Repeat, there are personnel out on the grounds.”

As he finished, Poppy felt his chest tightening and a thickening in his throat. The plume, he thought; he’d swallowed some of it. He turned his head to spit and clear it. Why weren’t they firing up the sirens?

“Do you hear me?” he called again into the walkie-talkie. “Please respond.” It crackled with static.

The workers were stopped in confusion—one looking back toward the cafeteria on the knoll, the other pointing the other direction, toward the front of LB5. Their hands were waving hurriedly.

Poppy tried to shout a warning, but his throat caught. *It’s settling into my lungs*, he thought, as in that instant, his lungs spasmed. He doubled over in a fit of wracking coughs, so violent he felt as though he were trying to tear his lungs right out of his body. He forced his lids open.

Through eyes drowned in tears, he saw that the men had turned toward LB5’s front side and were beginning to pick up speed—still unaware of the plume rolling off the roof and toward their path.

Poppy tried to relax and slow the coughing that tore at his lungs. His mind and chest filled with rage at his impotence to stop the cloud rolling to embrace the men below—or even shout out a warning.

Poppy's breath still came in wheezing gasps too weak to call out, but he felt the coughing taper for a moment. He dropped to his knees, unslung his rifle with arms weak from the convulsive coughing, and pointed it skyward. Another spasm was coming on. He ignored it and cupped the trigger in his finger to squeeze.

There was a crackle of a rifle. Poppy's finger still rested gently on the trigger. He hadn't fired yet.

He twisted to look across the roof to the east. There he saw Lewis, leaning far out over the other edge, his rifle extended past the roof line and pointed toward the ground.

What had Lewis shot at? Because if Lew pulled the trigger, it was nearly a sure thing something went down.

Another wave of retching coughs overtook Poppy. Before they could double him over, he squeezed the trigger three times in succession. Then the barrel came down and the weapon dropped with a clatter onto the roof.

His eyes were misted over, his lungs aching, as Poppy forced himself to look down his own side of the building. The men had stopped and were looking up in his direction, a dozen feet from the cloud splaying across the yard toward the path, widening as it rolled. Poppy waved frantically back away from the plume, toward the knoll and the cafeteria. The men turned and ran an instant before Poppy was down on all fours, shuddering with spasms again.

In the next seconds, just as Poppy gained a moment's break from his retching, two things happened so quickly he could barely tell which came first.

A rising chorus of take-cover sirens screamed from the four corners of the grounds, blasting with such fury that Poppy fal-

tered—barely catching himself from tumbling over the edge to the ground below.

In that same instant, the grounds were plunged into darkness with such suddenness that Poppy felt as though he'd been dropped dizzily into a deep, black hole.