

Electromagnetic Pulse

“If I were you, Captain, I would turn down the contrast on your displays about now.”

The man in the airman’s uniform turned from the operations console where he was seated. He looked David up and down. It seemed to David the officer was trying to decide how to respond to this man in the rumpled red shirt, dirty blue jeans and tennis shoes. He felt the officer’s disdain until the man’s eyes stopped on David’s badges.

David wore two security badges around his neck. One was from CASA – Center for Astrophysics and Space Astronomy - and the other was from the Planetary Science Directorate, Space Science Department. Apparently, that was enough to command the uniformed officer’s attention. His eyes went back up to David’s. David smiled at the seated officer.

“What,” the man said, “is about to happen that might burn out our displays?”

“Well, Captain...” David looked at the man’s name tag, “...Ludwell. If you take a look at the feed from the SDO over there,” David pointed to a small screen at a nearby unmanned console in the Cheyenne Bunker underground facility, “...you’ll notice the CME that came from Tuesday’s X-25 flare is just about due to arrive.”

The Captain glanced at the small screen, and then acted immediately to protect the large array of video monitors on the wall in front of the underground bunker. Even with the contrast

turned all the way down, the monitors displaying outside views went white. Not just white, but a pulsating white blasted from each display attached to an outside feed.

Even in the hardened bunker, lights in every direction around them dimmed, flashed or popped. Sparks flew from conduit junction boxes. Electrical ground points exploded the concrete surrounding them. Some glowed red or white hot. Operator consoles went out. Overhead and wall lights fluctuated, went out then came back on.

Captain Ludwell jumped up from his chair, backed away from his station. Most of the other operators in the room did the same. One of the officers closest to the wall ran to the door of an adjoining electrical room, probably searching for a master switch.

“No,” several of the men yelled, but it was too late.

Electricity will always find the path of least resistance to the ground. The overload must have literally been astronomical. The junior officer grabbed the door handle, flung open the door and reached for the main breaker panel switch. The electric arc hit him before he could grab the handle delivering a sad ending to a promising career.

The entire facility went dark.

“Nobody move,” one of the senior officers shouted.

The emergency power came on after a few seconds. Lights flickered yellow, then white. Computers and monitors started up again. The main displays on the wall kicked into life. Most of them showed only static or a blank screen.

“Captain Ludwell,” the ranking officer, a Colonel Randle shouted out.

“Yes, sir,” the captain said.

“Why weren’t we on internal power before that... blast hit us?”

“Sir,” Ludwell said, “we were on internal power.”

“Then how do you explain what just happened?”

“I think I can help with that, Colonel,” David said.

The Colonel walked closer. “Well?” he said to David.

David resisted the urge to address the colonel as sir. The man exuded military bearing. His very demeanor reminded David of why he never had the desire to join the military like his father and grandfather. David viewed the military as a necessary evil. He needed them to get grants for his research. It didn’t mean he had to like them.

“Colonel Randle,” David began, “I assume you know all about EMPs, right?”

“Why don’t you give me a brief refresher, son?” the colonel said.

There was another reason David disliked the formal hierarchy of the services.

“The sun emits radiation all the time,” David started with the very basics. “We see it as light and feel it as heat, but it’s really electromagnetic radiation.”

The Colonel looked condescending. “Skip to the point,” he said.

“All right,” David said. “The sun also emits solar flares and CMEs or Coronal Mass Ejections on a regular basis.” If the Colonel had never heard these terms he gave no indication. He continued to stare at David.

“The CME’s only occasionally point to the earth,” David said. “When they do, they take a few days to arrive and we experience the auroras.”

“That’s nice, professor,” the Colonel said. “I’m sure they’re very pretty. What do CME’s have to do with EMP’s and how did this one get through our Faraday cage?”

“Well,” David said, scratching his head, “that’s the thing. A Faraday cage is of no use when it is grounded like you’ve done here.” The Colonel looked incredulous.

“The grounding just acts like an antenna,” David tried not to lecture. “It collects the electromagnetic energy and sends it throughout the grid.”

“Dr. Mitchell,” the Colonel said, “The brightest electrical engineers in this country advised us on how to protect this facility from EMPs.” Colonel Randle raised his hand and pointed it toward the ceiling.

“We’re over a thousand feet underground. Now you’re telling me a blast from the sun reached through solid rock and then somehow found our Faraday cage ...”

“Just like a magnet,” David said. “Someway, somehow, your engineers never figured on the strength of a solar EMP compared to the nuclear EMP’s you expected.”

“And just where did they go wrong?” said the Colonel.

“If they had consulted with an Astrophysicist...”

“Like you?”

“Like me,” David said, “But I wasn’t born yet. I would have told them they needed to at least double the distance between your cage and your electrical lines.”

“Unh Huh,” the Colonel said. “Aren’t you the scientist who advised us to bring this facility out of warm standby?” David felt the icy stare of the career military man.

David could see he was making no progress. “Look, what does it matter? I didn’t build this place. It’s over fifty years old, constructed long before we understood solar dynamics.”

David began to pace, feeling irritation rise within him. “The EMP obviously got through. Your electronics are fine but your electrical system is shot.”

The Colonel stepped in front of David, stopping his circular progress. “Calm down, son. I’m not blaming you. I’m asking for your advice. What other damage can we expect?”

“I wouldn’t be surprised if your generators burn out within the hour. You had better have someone inspect them. I wouldn’t want to be stuck down here without lights or air conditioning.”

The lights flickered, turned a dull yellow.

“I’d say it’s time to start for the tunnel out,” David said.

The Cheyenne Mountain nuclear bunker has two exits, but both are a long walk from the operations center in the middle of the mountain. David stepped out of the Operations Center to the nearby underground parking lot reserved for visiting dignitaries.

He didn’t like being underground. Rather be out under the open skies and the stars. The CME was a lot stronger than he expected, stronger than the Carrington event.

He found his car and got in. It started right up. Whew, that’s a good sign. At least I won’t have to walk out.

The drive out the eastern blast gate and down Norad avenue was uneventful. David turned the car up the 115 toward Interstate 25 for the ninety-minute drive to Boulder.

He mused as he drove through Colorado Springs. Where are all the cars? And why are there so many columns of black smoke all over the place?

Ah, must have been the EMP. Probably fried the electronics of all the cars out in the open. The smoke most likely came from overloaded power substations.

David looked at the gas gage on the car. Just over half a tank. Looks like I'll barely make it to the University. The EMP shouldn't have caused any roadway damage.

He looked up and swerved the car just in time. Crazy driver. Why is he stopped in the middle of the road? Then it dawned on him. I guess I'll be seeing a lot of dead cars.

Can't wait to get to the observatory tonight. Got to take some measurements before the flight to Washington tomorrow.

That's funny. What is this red dust starting to hit the windshield?

His ringing cell phone startled him.

"Yes, this is Dr. Mitchell...Oh, hi Gloria...Yes, I remember...I'll stop by the studio in a couple of hours. Wait, make that three. I'll need to clean up first. See you later."

Hmmm...maybe the EMP blast was less potent in some places. This was getting stranger and stranger. What is this red dust? Ah, yes. From the planet. How could he explain this one?

Volcanic ash. That's it. Should make for some beautiful sunsets. David grinned and began to whistle. Dr. Blackstone should be pleased with that explanation. Made perfect sense.