

# The Delicate Crunch Of Marshmallows

by Tom Ligon

Zerk Feterson grabbed Farouk Karis by the collar of his Jumpsuit and threw the man so hard he nearly matched station spin. Farouk tumbled through the air across the shop deck, clawing for something to halt his trajectory. He snagged a fabricator with one hand and slammed ungracefully into a tool cart, cutting his forehead on a spare carbide cutter.

Farouk vaulted down from the cart nimbly in the low gravity and stormy back toward Zerk, who stood his ground. Several technologists Batched in shock, uncertain of what they should do, as the two circled each other like a couple of amateur gladiators. Zerk lunged at Farouk, who dodged the attack easily. The left over energy from the clumsy move left Zerk unbalanced, and he stumbled. Farouk took advantage of the situation and ‘planted a perfect right across Zerk’s jaw. Zerk recoiled, then renewed his assault, and the two men locked into a clinch, tumbled onto the floor, and left a trail of blood, sweat, and drill bits across the deck.

Their co-workers finally came to their senses and separated the two combatants, who, by that time were too winded even to shout genetically improvable insinuations regarding their opponent’s ancestry.

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“I don’t want to hear your damned excuses,” Erica Thompson told Zerk, still bleeding as he sat in a chair in front of her desk. “You are supposed to be a *professional*, not some brawling dockwalloper.”

Zerk struggled to sit still and take it. Inside he was still seething with unfocused anger, and he was unable to find anything to vent it on harmlessly. Erica wasn’t helping matters.

“Look, we’ve all got problems,” Erica continued “You ought to try *my* job sometime. I’m stuck between you guys and the Powers that Be. Everybody up here is bitching and moaning that they can’t get what they need to build the ship, and our ‘benefactors’ down on Earth are screaming for my head each time we miss a milestone. The only way we can pull through this is by working as a *team*. The more we fight each other, the worse it gets. It’s a lose-lose game.”

Zerk started to say something, and almost choked on the words. He sat there with an excuse stuck in his throat, and could almost feel Erica’s fingers squeezing on his windpipe, preventing him from purging the poison from his system. Instead of a word, a hoarse croak emerged. He broke into tears.

“Aw, fer Christsake, here we go.” Erica slumped tiredly into her work seat. “Go ahead, dump on Auntie E.”

It took Zerk the better part of a minute to regain enough control to speak. “I’m sorry. I don’t know what’s happened to me. I haven’t been in a fight since grade school. It was like someone else took over. And I know the thing that set me off wasn’t Farouk’s fault”

“So I guess now I have to hear what it was,” Erica sighed, “even, if it *doesn’t* make any difference. Oh, go ahead.”

“My project is the main air circulator for the ship,” Zerk said with a distinct quaver in his voice. “I’m way behind, and since it gets built right into the personnel core, I’ve got half a dozen people’s projects waiting on me. But I can’t get the materials I need and I can’t get time on the fabricators, so I keep getting further behind. Then when I came down to use the time I had reserved on the fab, I found Farouk

working on it. Someone had bumped me off the schedule for *his* project”

“Farouk is building form hardware for the core casting,” Erica observed. “That’s pretty important to the schedule, too.”

“Yeah, I guess so,” Zerk agreed unenthusiastically. “But I’ve been told my pay will be docked if my project is late. I’ll admit, I’ve made a couple of mistakes on it, but probably 90 percent of the delays aren’t my fault. It takes two hours to do a ten-minute job because we don’t have the right tools.”

“Then *make* the tools,” Erica said firmly, “Besides, they won’t dock you very much, and God knows we’re all up to our ears in money with nothing to spend it on. Hey, cheer up! Think of all the money you’ll have saved up by the time we get this baby finished!”

The effect that had on Zerk was the exact opposite of Erica’s intent. His face shriveled into a painful grimace and turned two shades redder.

“Ah, methinks I hit a nerve,” Erica commented. “What happened?”

Zerk sniffed a couple of times, then let out a heavy sigh. “All my life I wanted a piece of wild mountainside to call my own. Once I saved up enough from my earnings here, I had my agent buy a place I used to visit when I was a lad. Beautiful. About a thousand acres, bordering a lake, with a little patch of pasture for a horse or two. A place, where speed *is* not measured in fractions of cee, and the rocks stay put instead of drifting around. Cost a bundle, but I could afford it.”

“Sounds like something I used to dream of,” Erica nodded. “So what went wrong?”

“Turns out the last president’s mother was born there. A local group had it declared a historical landmark and sued me for an easement to it. I didn’t fight them. So they put up a stone marker on this little bluff where her trailer had been, opened it to the public, and there was an accident. A little girl fell from the bluff and was crippled for life. The group hadn’t bothered to get insurance, and I wasn’t covered as a public park.”

“Aw, geez, gawdamned lawyers,” Erica snorted. “Took you for the whole damned thing, lock, stock, and barrel didn’t they?”

Zerk shrugged with resignation. “And still get most of every paycheck. Probably will until I die. Hell, I expected it from the lawyers. It was the judge and jury that surprised me. The judge cited me with contempt for not being at the trial in person. Didn’t matter a bit that I had no way to get back from the Belt to Earth. And the jury seemed to think I made too much money for the work I was doing. Dr. Thompson, you wouldn’t believe how little respect we get down there.”

“Want to bet? That’s all I hear from ’em. Considering how much personal risk we each took to come up here, how little support they send compared to what they expect us to produce, and how stinking rich they expect to get on asteroid materials, I’d say we work pretty cheaply.”

“I don’t know. Maybe they’re right.” Zerk put his arms on Erica’s desk and laid his forehead against them. “Maybe this whole damned idea was screwed up from the start. What idiot decided a few hundred people could come up here in a couple of habitat modules with minimal tools and build a fleet of fusion-powered ships, anyway?”

Erica hesitated before answering. “Me.”

“Sorry.”

‘So am I, sometimes. Look, the concept is sound. This place is just dripping with raw materials. The Belt miners are only shipping back the rare earths and other high value stuff. The cost of raising materials to Earth orbit is too high for building large ships. The economics of this approach are good. And we’ll have more help arriving in about a month.’

Zerk raised his head for a moment. ‘Great, another week and a half lost, as we lash everything down, spin down the station, mate up a pair of habitat modules, spin back up, fix everything that went out of kilter in zero g, and find everything that wasn’t lashed down and floated into a corner. And let’s not even *think* about the toilet situation. I sure as hell hope they brought their own tools.’

‘Yup. And everything we said we needed two years ago!’

‘Gee, in another two years, maybe we can get all the stuff we’ve been without since then.’ Zerk plopped his head back onto his arms.

‘Oh, don’t be so negative. Once we get the kinks out of building this first transport, things should get a lot better.’

‘That’s not how I see it. The situation is going to hell in a handbasket, and as hard as I try, I can’t even slow it down. And, you know, I’m not sure I even give a damn anymore.’

Erica thought for a minute. ‘Tell you what, why don’t you take the rest of the shift off. I’ll see what I can do to work something out. You’re dismissed.’

When Zerk was gone, Erica turned to her computer and composed a short packet inquiry. The incoming electric rocket freighter would drop off two habitat modules full of technologists, then take on a full load of rare minerals. The ship had a small and cramped crew compartment, but they generally could squeeze in one or two more in an emergency. Erica hated to impose on the freighter crew for the eighteen-month trip back to Earth, but she didn’t see that she had a choice.

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Erica eased down the climbway into the mass of onlookers peering down to the deck below, where she caught a glimpse of the station MD. She elbowed through the gawkers, then clambered down the ladder.

Dr. Santi looked up as she came down the ladder. ‘No use hurrying now, Erica. He’s been dead for hours.’

Erica looked up at the curious technologists. ‘All right, you’re not helping the situation. Back to work.’ She turned back to Buzz Santi. ‘Cause of death?’ she whispered.

‘Suicide.’ Dr. Santi pointed to the vents in the berth, which had plastic taped over them. ‘Blocked off his air, closed the door...then he opened this.’ He held up a small nitrogen bottle.

Erica glanced at the makeshift body-bag. ‘Who was it?’

‘Zerk Peterson.’

‘Bloody damned hell. That’s who I thought it might be. He’s been having problems lately. Got into a helluva fight yesterday.’

Dr. Santi nodded. ‘I know. I had to stitch up his victim.’

Erica shook her head. ‘Poor guy. He was having trouble dealing with all the pressure we’ve been under.’

Turns out he lost all his savings to a lawsuit lately.”

‘I know. Everybody knows.’

‘Bad news travels fast.’

‘Erica, that’s *old* news. You mean you just found out about it?’

‘Guess I’m not on the gossip net. What I don’t get is, why did he do it? I thought we’d worked out a solution.’

Dr. Santi shook his head. “That’s always the big mystery, isn’t it? From what I know and what his friends tell me, he’d been slipping into this state for a couple of months. He’d been indicating he thought there was no way he could improve his situation. Sometimes people kill themselves because they feel continued breathing is the only thing they have any control over.”

Erica nodded. “I kind of got that impression from him after our little chat yesterday.”

Dr. Santi cocked his head and looked at Erica. “What really mystifies me is that everyone says he cheered up a little after your conclave yesterday. He was joking around, even with Farouk. He was talking about working out a way to get his job back on track, and making the project work. Then a couple of hours later, poof, he’s in a blue funk again.”

‘Oh, dear!’

‘What do you mean, ‘oh dear’, dear?’

‘Excuse me, you may be right, stronger language is called for. Oh shit. I killed him.’ Erica squeezed her eyes shut and slammed her right fist against the wall.

‘All right, explain that.’

Erica kept her eyes shut as she slumped against the bulkhead. “A couple of hours after our little talk, I informed him that I’d booked passage for him back to Earth. It doesn’t take Freud to tell me I took away the last thing he had to live for.”

‘Erica,’ Dr. Santi said after a long pause, “this is the point where the wise old doctor tells the captain that it wasn’t really the captain’s fault. At the risk of triggering a similar incident, and hoping you are as strong as I think you are, I won’t lie to you. You came upon a fellow holding on to a ledge, by his fingertips, told him you were there to help him, and then you stepped on his fingers.”

‘Ouch. I deserve that.’ She opened her eyes and stared at the medical assistants passing the body bag up the climbway.

‘No, you don’t, but maybe you need to hear it. Erica, we’ve had a fatal pressure suit ‘accident’ there was no explanation for, dozens of fights, a couple near-fatal accidents and other work injuries due to people taking stupid shortcuts, and the crew’s morale is dropping steadily. We need to take a long, hard look at how we’re handling this project.’

‘You know,’ Erica said, glaring at Dr. Santi, “I really hate it when people say ‘we’ when they’re really talking about me.”

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The lights were out in Erica’s tiny office when she heard a soft knock on the hatch.

‘Come in.’

Raul Otoya stepped in and paused for his eyes to adjust. “Sorry to disturb you, Dr. Thompson, but I’ve been running some computer models and I think you need to see the results.”

Erica switched on a single work light on her desk and motioned for Raul to take a seat. “No problem. I was just trying to figure out where we’ve gone wrong.”

‘Funny you should mention that,’ Raul replied.

Erica directed a dirty glance toward Raul, but quickly followed it with an apologetic shrug. “You are looking, Mr. Otoya, at a sadder, but not much wiser, Erica Thompson. Between struggling to meet the schedule and worrying about crew morale, I’m flat beat. You got something to get us back on track?”

Raul started to say something and stopped to reconsider, “Well, I’ve made unacceptable recommendations in the past,” he said, cautiously. “Can’t say I’ve got anything new to offer in the way of solutions. I’d be happy to point out a problem, if you care to listen.”

‘You and about everyone else on the station,’ Erica grunted. “But I guess it’s your job to tell me just how badly I’m fouling up. What have you got?”

Raul moved around the desk to Erica’s computer. ‘You mind?’

Erica pushed her work-seat back. “Be my guest.”

‘By any chance, Dr. Thompson, do you know what the first binary digital computers were used for?’ Raul asked as he typed a string of instructions.

‘I may have heard it somewhere,’ Erica replied, “but if I did, I forgot.”

‘One of the first applications was for early missile projects. I think it was the old Polaris or Poseidon project, back in the nineteen fifties or early sixties. It was so complicated, at least compared to any other development program to that date, that they had to develop a system for scheduling based on critical path analysis.’ Raul flashed a graphic on the screen. It showed a complex parallel-path flowchart. “Each component had a lead time. Some had to be developed from scratch. Each subassembly had to be done on schedule, or it would foul up the schedule for the next higher assembly, and so on. Sometimes the process branched and came back together. Many different branches might need time on a single limited facility. They had to have a system for allocating resources, or they’d have half the work force sitting around twiddling their thumbs while the others were scrambling like mad.”

‘Hey, waitaminnit,’ Erica said with a scowl, “nobody here is sitting around, are they?”

‘No,’ Raul replied, “but a lot of projects are, while the people working on them are off handling some other crisis. Anyway, they came up with a system called PERT charting, and we still use something very much like it today.”

‘Sounds marvelous.’ Erica staled at the screen dubiously. “I’d like to think a computer program can solve all our problems.”

Raul struck two more keys and a graph appeared on the screen. It was low on the left, increased gradually for a while, then turned sharply up on the right and went nearly vertical. “Well, it won’t always solve them, but it can sure help you spot them. The flow-chart I just showed you was our original work-plan. It is, of course, quite obsolete. I’ve been trying to keep up with the organization and milestone, changes. Entered the best approximation I could. Turned the crank and this popped out.”

Erica squinted at the graph, but was a little too far away to read the axis legends and she was too tired to come closer. "I sure hope that shows our rate of progress, but somehow I doubt it"

Raul nodded. "How very perceptive. This is an index of backlog. In most production industries, a steady order backlog is healthy. In our case, we're supplying *ourselves*, and the backlog is increasing. That's deadly. After yesterday, you can take that literally. We're down here, right where the curve starts to go seriously up."

Erica made the effort to come closer to the screen. "Oh, bloody hell. You mean it gets worse?"

"Yeah. Geometrically. And remember, the computer just works with hard numbers. It can't factor in morale."

"So how do we fix it?" Erica asked, with panic rising in her voice.

"Beats me," Raul replied. "You're the program manager. I just plug in the numbers and report the bad news."

Erica glanced at Raul suspiciously. "You some alien death-zombie body-snatcher from space? The *real* Raul Otoyá never was stingy with advice."

Raul shrugged. "You've got the zombie pan right. This is like some damned computer cave game where the passages keep rearranging themselves. You think you've finally mapped out the maze, and, zing, the rules suddenly change. Like you've said many times, I don't have the big picture. That's *your* job. But you can take a peek in my crystal ball, if you think it will help. If I were you, I'd spend a day or two playing around with this thing, try resetting some priorities and testing some options."

Erica clicked a few menu options from the joystick on the arm of her seat "You be around to help if I get stuck?"

"Sure. Uh, Dr. Thompson, remember GIGO. Garbage in, garbage out. Like I said, this model is short on data. First step is to get down to basics and find out what's going on in the salt mines. Mind if I ask if you've been there lately?"

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Erica hadn't had her work grubbies on in months. She tried to remember the last time she had visited the project decks, or done *anything* but administrative work. It seemed like years, but she suspected it was only a few months.

The station was comprised of eight spokes rotating about a central hub. At the hub was the main constrictor hangar, Erica's destination. Two pairs of spokes were capped with habitat modules, offering approximately full Earth gravity for the crew during their off hours. Another pair was partly developed and awaiting the incoming habitat modules. There were two stubs where the final pair of spokes would be attached. Along the spokes were a series of shop decks where smaller components and assemblies were made. Each spoke also had a reflector/concentrator and greenhouse for growing part of the crew's food to supplement the output of the nearby agricultural station.

The differences in construction between the habitat modules and the rest of the ship were obvious as Erica climbed up toward the hub via a series of ladders. The habitats were assembled in Earth orbit from highly refined lightweight components shuttled up from Earth's surface at great expense. Similar to Earth-orbiting space station modules, they were the product of a bloated system of contractors and government bureaucrats who had been refining the design for perhaps half a century. All told, probably a

couple of million people had a hand in the design and construction of the habitat modules.

Climbing through the docking hatch into a spoke was like stepping backwards in time. Instead of lightweight aluminium alloy ladders with carefully molded composite treads, the ladders on the other side of the hatch were made of heavy asteroid steel rods bent and welded like something from a depression-era battleship. They were nicely hand-crafted though, and every bit as functional, which wasn't at all bad when you considered the tiny labor force that had built them. The battleship effect could be seen in most of the structure, although it was moderated by a light and cheery paint scheme. The structure had a satisfying solid feel to it.

Reaching up to climb another deck, Erica caught a whiff of something, glanced around to see if anyone was looking, and checked her underarms.

'Nope, it's not me.'

She sniffed the air around her.

'Geez, this place smells like a damned locker room!'

She climbed through the hatch to the next deck and spotted a technologist.

'Hey, how come it smells so bad in here?'

'Oh, hi Dr. Thompson,' the fellow replied, a little startled. 'Uh, sorry, but the reprocessor in this spoke is busted.'

'Well, I hope they fix it soon. This is *terrible*.'

The man shrugged. 'We've kind of gotten used to it. I guess it does smell a little worse than the rest of the station, but frankly, the whole place is a little ripe.'

Erica grimaced. 'Gotten used to it? How long has it been down?'

'A couple-of months, I guess. It still makes good air, you understand. Just doesn't get rid of the odour of dirty laundry and good, honest sweat.'

'It may be honest, but it *stinks*.'

The fellow gave Erica a long, tired look. 'I'll drop what I'm doing and see if I can fix it if you want,' he offered.

Erica glanced back at his lab. 'What are you working on?' she asked.

'Nothing but the flow regulators for the main engines. Before that it was the APUs for the personnel decks. I dropped work on a new fastener fabricator so I could do *that*. Doesn't matter to me, though. I'll work on whatever you say.'

Erica shook her head. 'Stick with what you're doing. I'll see if I can find somebody else.'

'The fellow maintained the same tired stare for a few seconds. 'Sure,' he said, as if he were not, and went on his way.

Erica climbed through the remaining decks, feeling the centrifugal artificial gravity gradually decrease. It felt great, and she could hardly wait for the weightlessness of the hangar deck. The thought of almost effortless flight energized her, and the weight of her administrative duties seemed to disappear with the

gravity.

Not everyone around her seemed to feel the same, though most of the techs labored in stony silence, broken only by an occasional outburst of profanity. Erica thought she understood how they felt, but would have swapped her duties for fighting with a stubborn bolt in the blink of an eye if she could.

She reached the spoke airlock and labored through the two hatches to the hub. The hub was a large cylindrical compartment with one wall which appeared to turn, although, in fact, that wall was stationary while the spokes turned around it. She was about to close the second spoke airlock hatch when she rubbed against a black, gummy mass on the wall, staining a cuff of her jumpsuit. Erica clambered back through the airlock to the shop below, hung by one arm from the top rung of the ladder, and looked around until she spotted a familiar face.

'Kara, could you come over here for a minute'

'Sure, Dr. Thompson,' the woman answered. She bounded across the deck with two graceful leaps. 'What's the problem?'

'What's this black crud all over the inside of the hub?'

'Oh, be careful!' Kara answered. 'The only way that stuff comes out is with scissors.'

Erica glared at the stain. 'Now you tell me. So what is it? Two-day-old coffee?'

'Comet grease. The rotating seals were starting to break down, and we didn't have time to replace them. We couldn't spare the synthesizer capacity to make extra silicone grease to seal them with, so we distilled that stuff from comet tar. Plenty of it available from that little comet we snagged a couple of years ago. Seems to be working, so far.'

Kara handed Erica a shop rag. 'Here, this won't get it out, but at least it will get enough off that you don't leave little tar puppies all over the station.'

Erica pulled herself up through the hatch, then sat on the lip while she dabbed at the gunk on her sleeve. 'Oh, well, at least it looks like I *work* for a living.'

Erica tossed the rag back to Kara, then made her way back through the airlock to the hub. She glanced at the gummy mess on the slowly rotating seal. It was an innovative enough field expedient, she supposed, but it surely wasn't a satisfying long-term solution to the problem. She wondered how much air they were losing, and how soon they would have to spare a team to go find another comet to replace the losses. Small comets were not all that hard to find, but they were fairly fragile and it took a lot of time to rig a cradle to them, then gently apply enough delta-V to switch them from a headlong plummet into the inner Solar System to a gentle orbit matching the station. If they were lucky and could find one in a favorable orbit, the whole process would only take a few months. More likely it would take a year, possibly even two.

Another possible problem occurred to her, and she touched a spot near the seal. It was warm. The tarry comet grease produced much more drag than a properly lubricated seal should. That meant more power was going to the motors which maintained the spin differential with the weightless hangar. The reactor wasn't particularly oversized, and she could bet that some other energy needs were being curtailed. More important, if the motors burned out, the hangar would have to be detached - from the rest of the station immediately. Failing to do this quickly was considered about the worst-case scenario short of collision with an asteroid, and Erica knew the outcome well. If the hangar began to rotate, all hell would break out inside it within seconds, and it would render the entire station unstable within minutes. They

would probably have dozens of fatalities and would be set back about two years.

These thoughts were not comforting to a person standing in an area which would be outside in case of jettisoning. She sighed, then matched speed with a handhold on the hangar wall as it rotated by, making her weightless. She pulled once on the handhold to propel her toward the large hatch at the center of the hub.

The hatch of another spoke opened and a female technologist came through with a large magnet coil in one hand. "Can you give me a hand with this?" the woman asked.

"Sure," Erica replied, grinning and gesturing for the part to be tossed to her. The technologist smiled back and gently and expertly pushed the coil at an angle that neutralized station spin and sent the component directly toward the hub. When they had first started assembly, the trick would have been dangerous, but now it was as routine as tossing a ball. Erica snagged the coil neatly with her left hand, and waited for the tech to join her at the hatch.

They pushed the coil into the airlock together, then cycled through into the cavernous compartment beyond. The hangar was an immense asteroid-steel bottle blown from raw materials by the asteroid miners who had been grinding up native raw materials for rare earths years before Erica's crew had arrived. The miners had stockpiled enormous quantities of leftover raw engineering materials, and had become adept at simple but effective ways of fabricating structures from them. To build the hangar, they had melted a generous portion of nickel-iron with fusion fire, and made the bottle in just a few days. The thick walls had glowed red hot for a couple of months. After it radiated down to merely scorching, they finished the process by cooling it with gas from comet ice. While the bottle was cooling, they built the spokes.

The hangar was one of the key economy features in Erica's concept. The zero-g shirtsleeve environment made construction at least a hundred times easier than it would be using pressure suits. Even with the most efficient structure a million Earthbound workers could devise, such a station would have been prohibitively expensive to launch piecemeal, then assemble in Earth orbit. The other option would be to send down materials from the belt, but if they had the capacity to move bulk engineering materials in that quantity, they wouldn't have needed more ships.

Over a year had gone into fitting the hangar for production, and even so it had the crude appearance of an iron-age industrial plant. It was brightly lit using piped-in sunlight captured by a solar concentrator, not so much to save energy as to avoid the substantial bother of making and maintaining artificial lights. The end opposite the hub was an enormous airlock. Major ship modules and raw materials could egress through it, but it also served as a work area for vacuum and controlled atmosphere work. The most important such task was blowing aluminium foam, formed by pressurizing molten aluminium with hydrogen gas.

Sections of the ship structure were under assembly, moored to the walls with cables. Small teams of technologists were busy working on the engines and crew sections, although fewer people were doing the assembly than were working on components on the shop decks.

Erica donned a helmet and jet belt. The latter was to be used only as a last resort, if you became stranded in midair with no way to push back to the walls. If that happened without the belt, it could take ten minutes of arm flapping and blowing jets of air from your mouth to propel you back to a surface. That was plenty of time for someone to get a video camera, making you the butt of jokes forever. The noisy compressed air jet belt was usually quick enough to let you avoid being caught for posterity, but the echoing hiss also attracted attention to your lack of skill faster.

Erica held a special fondness for the fusion engines, which were her brainchild. She headed straight toward them. A team of four technologists were attempting to mount part of one engine to a major structural brace, and it didn't appear to be going smoothly.

'Trouble?' Erica asked as she floated in range.

'Oh, hello, Dr. Thompson,' one man replied. Erica recognized him as a group leader named Preston Heckmann. The others looked up for a second, then went back to struggling with the part. 'It looks as if we have got another warped brace.'

'Another one? Bloody damned hell!' They were mounting the second of the three engines. Since there was one brace of this type per engine, at least two of the three were bad. Erica would have been willing to bet the third one hadn't even been made yet. She waved at the rest of the skeletal ship. 'Haven't you people learned to blow aluminium yet?'

'We're learning, he replied.

'Like hell we are,' grumbled one of the men fighting with the brace. 'Maybe we're getting better at over-drilling holes and shimming, but we've never gotten better than 50 percent yield.'

The group leader frowned at the grumbler, and Erica caught the implication. She had been on the other end of situations like this, and had always known how stupid it was to insulate managers from harsh reality.

She patted the group leader on the rump. 'Heckmann, how about fetching your monthly milestone reports, will you, sweetie?' Heckmann scowled at the demeaning act, but dutifully pushed off toward his cubicle to fetch his computer.

She turned back to the remaining three, who were grinning like idiots. 'Now, how about filling Aunt Erica in on what's really going on down here.'

The men suddenly stopped grinning and glanced uncertainly at one another.

'Well?' Erica gestured, showing her impatience.

The man on her left raised an eyebrow. 'Good example?' he pointed a thumb toward Erica as he asked the man on the far right.

'Perfect. Happens just like that.' He slipped his wrench into a pocket on his right jumpsuit leg.

'Think I should tell her?'

'Why not? What have we got to lose?'

The one on the left turned toward Erica and drew a deep breath. 'I suppose you sent Heckmann off so you can directly ask us some questions?'

'Yeah,' Erica replied, cautiously. 'So...'

'Which means you can't trust him to tell you how buggered up things really are.' the man on the right volunteered.

'Well, that's what I'm here to see.' Erica hooked her right arm onto a conduit.

'So yuh start right in by tryin' to intimidate us,' said the one in the middle. 'Yuh know, Press usta be

kinda a reg'lar guy, 'fore yuh turned him into a brown-nosed lyin' paranoid."

Before Erica could respond, the man on the left chimed in, his previously barely noticeable Russian accent suddenly thicker. "In old country, is famous story of State Tractor Factory. Is so fouled up, cannot even put one nut and bolt together. At each level on way to Politburo, reports of progress get a little better. By time Brezhnev hears, is making a hundred thousand tractors a month."

'Yeah, I heard that one,' Erica admitted, looking dejected. "Am I really that intimidating?"

The men looked at each other, then back to Erica, and nodded.

Erica grimaced contritely. "Sorry. If I promise to try to stop, will *you* promise to give me the straight story?"

'Sure,' the Russian replied, back to his previous trace of an accent. "When this thing is finished, and we take out and crank engines up to about three-quarters thrust, the whole ass-end is going to come apart like a pair of cheap size six jeans on a size fourteen rump."

'Nah,' said the man on the right "Never happen. They'll never get the engines to run that well."

Erica glanced at the one in the middle, prompting him to add his two bits.

He shrugged. "Don't know *what* these yay-hoos'r moanin' about" He gestured toward Heckmann, darting back from his cubicle with a computer in his right hand. "Everybody knows milestones is more important than a ship that actually works."

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Erica jumped back down through the spoke airlock and looked around. She spotted Kara in a corner, one arm down inside of a large machine tool. Erica bounded over behind her. The tool was humming angrily, but didn't seem to be operating.

'Got a minute?'

"*Jee-zus H. Christ!* What now?" Kara dropped whatever she had been working on. It clattered down into the case, and she kicked the base of the machine. "Who the fuh—" She looked around and saw Erica. "Oh, sorry Dr. Thompson."

Kara pulled her arm from the machine. Erica noticed it was striped with grease, scratched, and bleeding slightly. She gestured toward the machine. "What's the problem?"

Kara glared at the machine like she wanted to grind it up for scrap right on the spot "Damned clutch again." She switched it off and the humming stopped. "Been acting up for a couple of years, and getting steadily worse."

Erica peered down into the works. "Is it safe to reach down in there with the power on?"

Kara shrugged. "It's either ten minutes doing that, or spend six hours tearing it down. Better than having the techs beat each other's brains out over lack of access."

Erica studied the gears, which matched the stripes of grease down Kara's arm. If the machine had suddenly started, Kara would have drawn back a nub. "Why not just fix it? For good, I mean."

Kara looked Erica straight in the eyes with the same tired look the first technologist of the day had given her. "That would be nice. But while we're dreaming, why not just finish building the upset forge and

thread rolling machines we were supposed to build in the *first* place?”

Erica gestured toward the cutting heads. “Everybody told me this tool was *perfect* for making fasteners.”

Kara reached over to the chuck and shook it. It rattled. “It *was*. Plus a lot of other things. In small quantities. But it is a *toolmaker’s* machine, not a mass production unit. We were supposed to use it and others like it to build *bigger* machines, then to make small quantities of specialty stuff. Instead, we’ve pushed it into production service, and run it at speeds and feeds it was never intended for. Poor thing done been rode hard and put away, wet. Same as the rest of the equipment we brought up.”

Erica glanced at Karl’s cubicle. “Can we go someplace more private? I need some honest answers.” ‘

Kara nodded, then pulled the key from the machine’s power switch and put it in her pocket. On the way to the cubicle, she grabbed a shop rag and started smearing the blood and grease from her arm.

Erica dosed the door. “Kara, you’ve been working for me for what, twelve years now?”

Kara looked up for a second. “Let’s see, I started working for you at the Supercollider in...yeah about twelve.”

‘Have I *always* been an intolerable bitch, or is this a recent phenomenon?’

Kara hesitated, her eyes darting about as she considered the answer. “You’ve only been an *intolerable* bitch for about two years. You started becoming a *bitch* about a year after we got up here. At the Supercollider, you were the best boss I’d ever had. When you won the Nobel prize, I was so proud to be working for you I could barely stand it.”

‘I had good help,’ Erica injected.

Kara shook her head. “Machinists are a dime a dozen. Technicians, maybe a quarter, Grad students, hell, they give *them* away in cereal boxes. People capable of figuring out, from scratch, the physics behind Higgs fields, how to create and manipulate them, and how to employ them to make controlled fusion simple... there is only one.”

Erica smiled, and shook her head. “I have stood on the shoulders of people who stood on the shoulders of giants, then stolen their lines. It bugs me that nobody seems to give *Higgs* any credit. And besides, the Higgs field work is just a spin-off of another crack-pot theory I’ve been cooking up. Anyway, I’m coming to the very painful conclusion that a pretty medallion does not necessarily make a very good program manager. With your help, maybe I can change that. Any ideas on where I went wrong?”

Kara sighed. “At the Supercollider, you were always on our side. If management made stupid demands, you always stood up for us. If we needed something, you fought to get it. I would have followed you to the ends of...” Kara broke into a giggle that brought tears to her eyes.

‘You followed me a lot further than that,’ Erica said, suppressing a snicker. She stopped suddenly. “Now I’m management, and I’m making stupid demands, and telling you to do without.”

Kara stopped giggling, and wiped her eyes with the greasy rag, adding more streaks to those already on her face. “You’re stuck in the middle. We know that. That’s why we’ve been putting up with it for so long. That, and because we believe in the same things *you* do. This project *ought* to work. It *would* work if we could just take the time to do it right. But the way things are going right now... hell, we might be lucky to make it home alive. We need the old Erica Thompson fighting *for* us.”

Erica sat silently for two minutes. “Thanks,” she said at last, and slowly left the cubicle, deep in thought.

=====

Shortly after Erica's departure, Buzz Santi entered the shop and spotted Kara, who was attempting to fish a wrench out of the bowels of a fabricator. "Hey, Kara, was Erica down here?"

'Yeah, Doc. You just missed her. She was headed downstairs.'

Buzz shook his head. He spoke in a low voice. "Don't want to see her. I'm snooping around behind her. How's she doing?"

Kara looked confused. "I dunno. Got a lot on her mind. Why?"

'Something I said to her the other day that I'm starting to regret,' Buzz replied. "Especially since it appears she is going around collecting bad news."

Kara shrugged. "Erica is tough. And feisty. She'll do OK."

Buzz didn't look so certain. "She's tired, Kara. From what I can tell, she feels defeated. For the first time since I've known her, she seems indecisive. I'm not sure she has any fight *left* in her. You were with her at the Supercollider. What do you know about the conditions of her departure?"

'Got fed up, and accepted *this* job,' Kara replied.

Buzz raised an eyebrow. "I hear a little different story. Some people say she fished part of the Supercollider with an experiment that went wrong, and got chewed out for it. Could she have resigned under pressure?"

Kara shook her head. "Don't *think* so. At least, that's not the way she tells it. But yeah, she did some damage, and they chewed her out."

'What worries me,' Buzz said, folding his hands, "is that Erica has known nothing but great success for most of her life, and now is facing two failures in a row."

=====

Erica stepped through the open hatch to Raul Otoyá's tiny office. "All right, what the hell is LVLPSPL?"

He looked up from his computer screen. "Low Volume Large Project Standard Productivity Level. I see you've been exploring."

Erica knotted her brow and twisted her mouth to one side, staring at him for a few seconds. "I know what that *sounds* like it means, but in that case, your numbers don't make any sense. What is it, *really*, and how do you come up with it?"

'It is a relative index of per-worker productivity, compared to the average productivity of similar industry as a whole,' Raul replied. "The classification of 'Low Volume Large Project' is for things like high-rise construction, ship-building, big research facilities, and other labor-intensive one-off programs. The other big category is 'Industrial Mass Production,' which is totally incompatible."

'Of course,' Erica replied, rolling her eyes. "But how can you compare us to a shipyard? We're having to develop everything from scratch."

'The analysis is set up to cover a wide variety of very different activities,' Raul answered. "The program is fantastically complex, and the data required is prodigious. Considers everything from component count, weight, and complexity installed to kilograms of waste material produced. It seems to work, though. For

instance, government-funded activities almost *always* show much lower productivity than free-market private enterprise.“

‘Shoo,’ Erica said, gently pushing Raul’s chair from his workstation while pulling up another for herself. She took her seat “Is this saved?”

Raul nodded, and Erica clicked through a few menus. She called up a graph which showed LVLPSPL on the vertical axis, and Years on the horizontal. The graph showed a steep rise from the left, an early and dramatic peak, then a gradual Decline to the right Midway across, the gradual decline acquired a distinct additional downward inflection.

Erica pointed to the early peak. “This point gives a value of five-point-two! Am I to understand that this crew was over *five* times as productive as the average of similar Earth industries?”

Raul nodded.

Erica shook her head. “I know they’re good, but how can that *be*?”

Raul worked the joystick on the arm of his seat, bringing up a small spreadsheet. “I wondered the same thing myself. Nearly fell over hack-wards when the computer first spit, that number out at me. Came up with this.

	<b>Here</b>	<b>Earth</b>	<b>Ratio</b>	<b>Cumulative</b>
<b>Days/Week</b>	7	5		
<b>Hours/Day</b>	12	8		
<b>Basis Hours/Year</b>	4368	2080		
<b>Sick Hours</b>	-12	-47		
<b>Holiday Hours</b>	-0	-80		
<b>Vacation Hours</b>	-0	-120		
<b>Net Hours/Year</b>	4356	1833	2.38	2.38
<b>Workforce IQ</b>	140	100	1.40	3.33
<b>Supervision Gain</b>			1.25	4.16
<b>Enthusiasm</b>			1.50	6.24
<b>Tools</b>			0.83	5.18

‘In the first place, our crew tends to work twelve hours a day, seven days a week,’ Raul continued, pointing to the first section. ”That’s basically well over twice the hours most folks on Earth work these days. Next, they’re sturdy as oxen. They were all screened for excellent health, and are in the prime of their lives. They average about one sick day a year.’

Erica pulled out a calculator and checked the figures, then raised an eyebrow.

Raul pointed to several more lines. "Next, you couldn't make them take a vacation without threatening them with a stick. Every last one is a workaholic. You scared the rest off in the interviews."

Erica pointed to the next line, "Is this for real? Is the crews average IQ really 140?"

Raul nodded again. "Evidently you are a very talented interviewer."

'At least I did something right,' Erica replied. "But I'm a little humbled. My own IQ is just a few points over the crew's average."

Raul's eyebrows shot up. "You're *kidding!* I thought you must be off-scale. Well over 200, anyway."

Erica shook her head. "I make up for it with imagination and stubbornness. I see you assume their IQ gives a proportional advantage. Are you sure that's realistic?"

Raul shrugged. "It'll do for this demonstration. Seems like a reasonable trend, on the whole. I suppose morons would be better at some tedious jobs that would bore this bright bunch silly, but there are a lot of other tasks where the advantage probably varies with the square or cube of intelligence.

'Moving on, the next line has a supervision factor,' Raul continued. "We had a 25 percent advantage because we needed very little supervisory time. Nobody had to be *told* to do their job. The final two ones are wild-assed guesses to fudge the red suits to match the overall measurements, but they seem reasonable. These people were so fired up, and believed so much in What they were doing, I figure we had a hell of an advantage right there. I figure our cobby tools and ultra-raw materials pulled us back to the final result. I should probably have factors in there for no booze, no drugs, no TV, no pesky sales reps, no kids getting sick at school, but it would be another fudge factor on top of enthusiasm, and I'd have to counter it with an even more pessimistic assessment of our tools. The point is, you can see where the productivity could come from. The numbers are realistic."

Erica hit a key to back the display up to the earlier graph. "If I read this correctly, now they've dropped to a total of one-point-four, despite still working about the same number of hours?"

Raul nodded.

Erica pointed to the first drop. "Not hard to figure what caused this. That's when our sponsors started getting antsy, and demanded that I show them some results they could point to. Up to that point, we were still building the facility, not the ship. They complained that we weren't producing, yet this shows we were really cranking it out. So I screwed around with the priorities and started building the ship."

Raul nodded again.

Erica's finger slid down the graph to the downward inflection in the middle. "Also not hard to figure out what happened here. That's when they imposed Goal-Oriented Milestone Measured Management on us."

Raul nodded once more. "Exactly, at that point, all the team leaders effectively became unproductive supervisors who's primary duty was to monitor progress against the Go-Triple-M timetable. That in itself accounts for about a 20 percent drop in productivity. It also set a schedule that had nothing to do with realistic expectations or capacity."

Erica sighed. "And I went along with it, like an idiot. I changed priorities again. In fact, I've been doing it almost daily. The work that suffered was the building of jigs, specialized manufacturing equipment for things we needed in quantity, learning to cast that damned finicky foam in large sections, and other things which would pay off a little further down the road. To meet the new schedule we had to use the

toolmaker's equipment we brought up here with us as production equipment. Instead of making bigger and faster fabricators, we overloaded the little ones making bolts and widgets. Instead of building purpose-built chemical plants for bulk organics, we used the general purpose synthesizers we were supposed to reserve for specialty stuff. Down went the curve."

'Yep," Raul added. "All the while we were dipping into our stocks of replacement parts at an alarming rate. Carbide and diamond tips were being broken, and we hadn't built the facility to make boron nitride chips for replacement tools. Bearings were wearing out. Indicators were failing. When a machine was trashed too badly to be used, the load shifted to the ones that remained."

Erica stared at the screen. At last she said, "Mr. Otoya, I apologize. You tried to warn me about this. I didn't listen. I don't know what I can do to fix this screwed-up mess I've made, but, I promise, there will be some changes."

Erica got up and trudged toward the hatch. Raul stared after her. When she was out of earshot, he turned back to his computer. "Of course, *changes* are the whole freaking problem," he mumbled to himself.

=====

Erica Thompson paced back and forth in the cramped confines of her office, stopping periodically to examine the screen of her computer. "Come on," she muttered. "How long does a freedom of information order *take* anyway?" She checked her watch. Even allowing for the lengthy transmission delay, the inquiry should have gone through hours ago.

The computer beeped, and she dove for it, hitting the keys before she was even in her seat. She paged through the correspondence files and reports eagerly, stopping occasionally to read parts in detail "The scumbags," she mumbled on the average of once a minute.

=====

Buzz Santi knocked, thought he heard a faint reply, and entered Erica's darkened office. A single desk light was focussed on the only wall decoration, a crude and simple carving of a bearded elfish face in a small piece of oak branch. Erica Thompson had her work-seat reclined, and her eyes were closed.

Buzz began backing toward the hatch, when Erica stirred. "Sony, I didn't know you were taking a nap," he whispered.

'Oh, no!" Erica exclaimed, waving him back in. "Just lost in thought. Bright lights make me tired after a while, and the dark clears my head. Come in."

'We were worried about you, Erica," Buzz offered. "You've hardly been seen out of your office for three days now."

'Well, sometimes I get that way when I really get involved in a project, Buzz' Erica explained. "Raul Otoya snowed me a new toy about a week ago, and I've been learning how to use it. I've also been checking some records. I've pretty well figured out how we got into this mess. Now I need to see if I can get us *out* of it. Just took a couple of *big* steps in that direction.'

'Don't think you have to do it all at once and all by yourself, Erica. Don't be afraid to ask for some help."

Erica turned to her chair to face the computer. "Don't worry, there'll still be plenty for everyone to do when I come up with a plan. Come here, I want to show you something." Erica wiggled the joystick on her chair arm and brought up a display on the computer. Buzz stepped behind her desk and took a seat

beside her. Erica gave him a lesson in production statistics that lasted the better part of an hour. The productivity graph was on-screen when they finished.

‘You’ll recall that shortly before the first downturn, they announced the development of solid state sodium-proton cold fusion,’ Erica said, pointing to the left-hand peak. ‘The same basic mix of rare earths and metal oxide that make high temperature superconductors, gamma pumps, and tailored catalysts possible could also be used to make molecular-scale proton accelerators. Since these picotechnology molecules were essentially superconductors, there was already a partial Higgs field present. The electromagnetic force could be suppressed in the target node, and modifying two Higgs vectors could expand the strong and weak forces, enlarging cross sections to give better than break-even yield. Put gamma pumps around them to trap the energy, and *voila*, portable, clean, simple fusion power.’

‘I remember reading about it in the scientific literature at the time,’ Erica continued. ‘I didn’t miss its importance, but it seemed like a natural technological progression to *me*. I wasn’t following the news in the mass media, and neglected to consider how the economics would affect us. Rare earth futures quadrupled overnight.’

‘As a result, an ‘advisory board’ approached our sponsors and convinced them that they should push ahead posthaste with the transport development project. It was gently explained to me by our sugar-daddies that perhaps we should accelerate whatever construction phases we could, to try to mollify some criticism they were getting from their investors. So, like an idiot, I agreed to try.’

Erica pointed to the downward inflection in the middle of the graph. ‘This is where they formally imposed. Go-Triple-M on us. It was proposed by that ‘advisory board’ I mentioned. I finally took a close look at that den of vipers, and guess what?’ ‘What?’

‘If you made a list of everyone who wanted to build transports in Low Earth Orbit, and who argued that this scheme was unworkable, you would have the board who came up with that inane milestone schedule we’ve been busting our humps to meet. I’ve done a little back-calculating. I think they expected us to fail before this. We been doin’ *good*.’

Buzz bit his lip for a minute. ‘Well... Erica, you’ve just told me we’ve been programmed to fail. Maybe that means we’ve got nothing to be ashamed of, but I’d hardly say this is *good* news.’

Erica ‘tapped the left-hand peak. ‘Five times the productivity of comparable workers on Earth, Buzz. Look at it. How can that much talent, surrounded by plenty, of energy and more raw materials than they know what to do with, *possibly* fail if you give them some freedom and get out of their way? The only limit up here is human talent, unless we allow ourselves to be held back by contrived limitations. If we stop squandering our most precious resource, I think we will succeed.’

Buzz stared at the graph and pondered. ‘So, how do you propose to fix things dirtside if they’ve already got it in for us? We’ll obviously never be able to keep up with their timetable.’

‘For starters,’ Erica leaned back in her seat and looked at her watch, ‘in about...eighteen minutes...they’ll be receiving a list of grievances, naming names and citing facts, which I intend to be the basis for a lawsuit. Basically, I’m suing for breach of contract due to the imposition of new rules after we were stuck up here, and demanding that they allow us to go back to the way this place was supposed to run in the first place.’

Erica winked at Buzz. ‘I’m really starting to like this communications delay. Waiting hours for a reply makes me less inclined to fire off a hot-headed response, like I used to.’

Buzz chuckled. ‘The way you feel about lawyers, I’m a little surprised you’re trying a lawsuit. You don’t

actually think you will succeed, do you?"

Erica shrugged. "Not a chance, at least in court. But it'll aggravate the *hell* out of 'em, and it may buy some time for us to prove we're right I'd bet we could manage enough restraining orders to tie them up for two or three years. This is also going to get some media attention. I sent copies to a dozen news agencies. We've been getting some bad press, and it's time we changed that. But I have a couple of fallback plans."

"Uh-oh. I hear mischief in your voice." Buzz squinted suspiciously.

Erica grinned impishly. "Plan B, I'm thinking of buying each and every one of the scoundrels a copy of Heinlein's *The Moon is a Harsh Mistress*. Give them something to think about"

"Erica, you *wouldn't*"

"Buy them classic reading material? 'Course I would. Then there's plan C. We ignore 'em."

Buzz blinked a couple of times. "You might want to *think* before you cut the umbilical cord\_\_\_"

"Oh, come off it, Buzz. How many science fiction stories have you read where the colony had to do this very thing? *Every* author has at least one. This was so predictable, I'm ashamed I didn't see it coming. *Had* to happen. It's just human nature.

"Sure, we need stuff" Erica continued. "Been needing it since before we got here. Haven't been *getting* much of it, and when we do it's two years late. We generally find a way to make it ourselves. And maybe they'll cut off our pay. So what? We can't spend it up here anyway. And I know we could have the first ship built *way* before they could, far cheaper, with more copies sooner. Hell, if we have to we can go independent and *sell* 'em the damned ships. They couldn't say no. The whole bloody world economy may *collapse* if they can't supply rare earths for the energy industries."

Buzz grimaced. "Well...we aren't *absolutely* self-sufficient. I suppose we can get by indefinitely on the so-called food we raise, but I know a lot of our coworkers want meat culture equipment so badly... I was going to say they can taste it, but the problem is they can't And maybe half of my medical supplies are produced by proprietary genetic engineering. I couldn't duplicate the technology in twenty years. I'd need their cultures."

Erica considered his arguments for a while, "If we have to, maybe we could fund our own mission. Better yet, we could whip off a smaller ship and go get the stuff ourselves. But, let's face it, most things we'd be doing without, the Jamestown settlers had never even dreamed of. OK, so they had meat. Geez, what I wouldn't give for just *one* bacon cheeseburger right now."

"Erica, I'm really starting to regret bringing up the subject of meat," Buzz lamented, patting his belly, "Let's get back to the main topic. Assuming we can get these monkeys off our backs, do we really have what we need to finish this ship, or are we ignoring another problem?"

"We could really use more people," Erica said thoughtfully. "Even with the new crew, if they don't launch the last pair of habitats, we'll still be about 25 percent understaffed, mostly astronics specialists. We could end up with a big, dumb brute of a ship, but I'm confident we could whip up a good enough system to make it fly. Hell, we're not trying to build some fancy, over-engineered techno-money-hole like those idiots who're giving us all the trouble want. What we're building is the DC-3 of space. We just want a simple, solid, reliable transport that's quick enough to do the job and economical to operate. Meanwhile, the jerks dirtside would be cutting their own throats. They'd be slowing us down, and they'd have to wait longer for the ship. That's a lot more of a problem for *them* than it is for *us*."

Buzz nodded.

Erica continued. "One more *big* problem."

'What's that?'

'I'm a *lousy* manager.'

'I dunno, you've—'

'Damned near run this outfit into the ground with all my freaking fiddling and reprioritizing. Buzz, before I took on this project, I'd never supervised more than a dozen people at one time. I was strictly middle management, and I bitched long and loud when the folks at the top got priorities screwed up with politics. Then I won a Nobel prize, and suddenly everybody, including myself, figured I could handle *anything*, even taking a small crew to the far reaches of space to build the biggest, fastest rocket mankind had ever created.

'I've done things that I swore I'd never do. I've talked people into making do, used up our capital equipment, and jerked folks from one task to another until they think the most important job is the last one they were bitched at about. They've accepted stupidity as Standard Operating Procedure. No *wonder morale* is so low. Every *one* of them was smart enough to know what a crock I was handing them. The only wonder is that they've gone along with it instead of handing it back to me.'

"Inverted" Buzz grinned, picking up an empty coffee mug and holding it upside down.

Erica returned the smile, took the cup, and held it over her head. "'Bout here." She turned the cup back over, looked into it, and sighed theatrically.

"Know what I really miss?"

"Real coffee," they said in unison, and sighed again.

"Come to think of it, I think every science fiction author predicted *that*, too," Buzz observed.

Erica leaned back in her seat and swiveled it so she could gaze at the little carving spotlighted on her wall. "And I miss working with my hands. I can remember carving that as a kid, in summer camp."

Buzz closed his eyes. "Summer by the lake. Sailing in that silly little boat that always had the most dubious-looking green stuff growing under the floor."

'Spring's 'golden hour.'

'Birds in trees.'

'Cats, sitting in windows *watching* birds in trees.'

'Thunderstorms, watched from a warm, snug house.'

'Getting dressed up and going out to a fine restaurant.'

'For a good steak, with broccoli and a real baked potato.'

"One thing I *don't* miss is my relatives asking me when I'm going to start a family," Erica said with a scowl.

The doctor nodded. He knew her medical history.

“But, God, do I miss kids.” Erica’s voice cracked a little as she said the last word.

“Skiing,” Buzz offered to lighten the mood.

“Snowball fights,” Erica countered.

“Sunrises\_\_\_“

“... And sunsets.“

Erica sat quietly for half a minute, looking longingly at the little carving. “What I *really* miss, more than anything else, is sitting around a campfire telling spooky stories, smelling smoke and enjoying it instead of wondering if we’re all about to die, listening to all the little sounds in the woods, watching the stars, spotting, satellites passing by and preparing the most exquisite delicacy known to mankind.”

Buzz nodded. “Premium grade kosher hotdogs.”

“Huh! Carnivorous cretin!“ Erica huffed. ”There is nothing, not even the puffiest French pastry, which can compare to the daintily delicate crunch of a *perfectly* toasted marsh-mallow. Buzz, you are looking at the world champion marshmallow toaster.“

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Kara had just picked up a tray when she spotted Erica Thompson at a corner table, pushing overcooked peas and mashed potatoes around on her plate. Kara studied the physicist, remembering the firebrand who had once made science fun. Erica looked much older now, and so tired.

Kara ladled out an assortment of allegedly nutritious vegetables and a lump of something off-white (rice or grits, hard to tell). She stood at the end of the line for a moment, wondering if she should voice her concerns. Finally, she strode over to Erica’s table.

“Mind if I join you, Dr. Thompson?“

Erica looked up, surprised. “Oh, not at all. Please do, Kara.” *She* paused for a moment as Kara sat down. “And, Kara, do you mind if I ask why you don’t call me ‘Erica’?”

Kara cocked her head slightly. “Institutional habit, I guess. The unwritten law at the Supercollider. Sign of respect.”

“Humph.“ Erica rearranged her peas some more, staring at her plate. ”Homage to people with advanced degrees? Kara, do you realize you are smarter than me?“

Kara was startled by the remark. “That’s not true, and you know it”

Erica looked up from her plate. “Oh, but it *is*, I just saw your test scores. Your IQ is five points above mine.”

Kara choked on a spoonful of carrots. “You’re *kidding*” she managed after swallowing.

“You, and a nearly a third of the crew,“ Erica replied, returning her gaze to the potatoes. ”This place is a damned Mensa convention. Who do I think I am, anyway, trying to tell a crew as smart and resourceful as this how to do their jobs, anyway?“

‘Somebody has to run things,’ Kara replied. ‘They picked you because you had credentials that brought respect.’

Erica poked a tunnel in the cold potato paste and herded the peas into it. ‘That may all be behind me,’ she, lamented, bringing down the roof of the cave on the peas. ‘Just did something we all may regret. Filed a lawsuit against our sponsors. Probably get us all fired.’

Kara blinked, at a loss for words.

‘Well?’ Erica looked up. ‘Come on, say something positive, like you usually do.’

‘It’s about bloody time,’ Kara stated. ‘How’s that?’

‘That’ll do.’

‘Welcome back, Dr. Thompson. We’ve missed you for a *long* time.’

‘Erica.’ Erica grinned. ‘OK, Erica.’ Kara took a bite of beans and chewed them thoughtfully. ‘Um, Dr. Sahti was asking about you the other day. Sort of got me wondering about some things.’

Erica picked up a forkful of the trapped peas and shoveled them into her mouth. ‘Buzz playing mother hen again?’

‘Yeah. He was worried that you might be taking this kinda hard, especially after that incident at the Supercollider. Wondered if two failures - I mean problems in a row were getting you down.’

Erica looked up suddenly. ‘Two failures?’ She hesitated for a second, then guffawed suddenly, sending little bits of peas and potatoes flying. ‘Mmmmmph. Sorry, here, have an extra napkin. Kara, I won’t say I’ve been a bang-up success *here*, but what happened at the Supercollider was *anything* but a failure. Maybe I’ll tell you about it someday.’

Kara studied Erica, whose eyes had suddenly developed a twinkle.

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The following message was broadcast to all computer mailboxes on the station:

*Dear Colleagues:*

*A lot of you will read that opening and groan. The last time you got a memo from me with that opening, you followed me up here.*

*You have my apologies for how badly things have turned out lately. I think my first line then was something to the effect of, “I quit.” But I wasn’t management then, nor was I responsible for screwing up the program. Now, I am. Therefore, I hereby fire myself from tile position of program manager, effective one week from today.*

*I am appointing Raul Otoya as my replacement. That’ll teach him not to bitch. You should all give him your condolences when you see him.*

*Since we haven’t built our transportation home, I guess I’ll have to stay here. That means I’ll need a job, preferably one that will keep me out of your way and make enough use of my abilities that I rate my breathing air and ration of mush. I think the perfect position is something along the lines of “Researcher Emeritus and Wizeden Advisor” so that’s what I propose to be.*

*In my last week, I hope to set in motion some changes which, with Raul's skillful management, will hopefully get us back on track. The first step in this is to order a general shutdown of all construction on the ship. The only job-related work to be done for the next two days will be whatever is necessary to keep the station life support running safely. Everyone is to take two days off to catch up on sleeping, laundry, reading, pursuing the opposite sex, and any other essential personal activities that you have been putting off for several years.*

*The remainder of the week will be spent fixing and building stuff to make our lives more pleasant, and getting ready for a picnic which will be held seven days from today, at Zulu noon, to celebrate my firing. Either bring an amusement or contrive some sort of interesting food dish in sufficient quantity to assure that we are all suitably overfed. Raul, you can work out the details.*

*The succeeding six months shall be spent repairing, building, and improving the production capacity of this facility, with such efforts to continue as needed to assure the most timely completion of the first transport.*

*My final official act will be to leave you with the following set of general operating rules for the project.*

### *THE RULES*

- 1. Our mission is the construction of transport category spacecraft. All useful work to this end is done by the technologists. Team leaders and administrative officers exist solely to support the technologists in the accomplishment of the mission.*
- 2. It shall be the duty of all employees to remind team leaders and administrators of Rule 1 as frequently and firmly as it takes to assure that it is followed.*
- 3. No person is to work more than forty hours per week directly on the construction of spacecraft. Those wishing to work additional time toward the mission may work on improving production equipment, methods and capabilities, Extra work is also permitted on improving the general standard of living, research and development of new technologies, and other worthwhile efforts.*
- 4. All employees shall be required to use accrued vacation time in excess of one week for each year of service. Employees found violating this provision shall be forcibly ejected from their work-place by their fellow employees, with the following express orders 'Enjoy yourself.' This order shall be phased in over the next twelve months, on a rotating basis to be worked out among yourselves with a minimum of bloodshed.*
- 5. All employees are encouraged to develop sideline businesses providing food, luxury, convenience, amusement, housing, and similar items for barter credits, to be pursued in spare time, provided these activities do not interfere with normal duties. Technical items for trade with other Belt production facilities may also be produced. Goods and services for transport production normally a part of employment duties shall not be permitted as barter items. To facilitate this activity, the station shall provide, at nominal charge against salaries, such surplus materials and production capacity as are available and appropriate.*
- 6. Every time you do at task, try to find a way to do it better than before.*
- 7 Bad ideas are not to be adopted as policy or put into practice.*
- 8. Anyone caught using the acronym GOMMM, the phrase it represents, or my variation thereof, in other than a derisive context, shall be required to recite Rule 7 a minimum of 500 times. For the*

*first offense.*

9. All employees shall, on company time, spend five minutes a day looking out a porthole and appreciating just where it is that they are. *Pretty wonderful, ain't it?*

10. Build the best damned spaceships you can.

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Buzz entered the safety cubicle wearing a faded T-shirt and shorts instead of the usual jumpsuit. "Raid!" he yelled, causing *the* two poker-playing technologists to scatter their cards and chips.

"Sir?" one said, amidst a slow rain of cards in the tight gravity.

"Just kidding. I'm six months overdue on a safety survey. Thought I'd get it out of the way." Buzz slipped into a seat at the monitor console and began testing the system.

The console was computer-monitored, but also had direct fail-safe indicators for critical fire and air circuits. Partway through the survey, Buzz found an indicator which would not respond when queried. He pulled the panel, and found a bypass jumper.

"What the...? Who screwed with the gas detector in Chem 5?"

One tech came over to look at the jumper. "Beats me, sir. We're stand-ins. Only been here a couple of hours. I could see if anyone's got the lab reserved."

"Do it," Buzz ordered as he pulled the jumper. The circuit responded with an immediate alarm condition. "Oh hell What does that mean?"

The computer answered. The sensor was non-specific, but was detecting significant quantities of abnormal compounds in the air, possibly toxins or combustion products.

"Sir," the tech reported, "Dr. Thompson has had that lab reserved for two days."

"Damn!" Buzz grabbed a breathing mask and a fire extinguisher. "I should have kept a better eye on her after that memo. I hope she hasn't done something stupid. Come on, grab your gear." Buzz pressed a silent alarm to page a replacement emergency team.

Seconds later, they were two decks down, outside the chemical instrument bay from which the alarm originated. Buzz cautiously touched the door to see if it was hot, then pulled the handle and opened it a crack. No smoke emerged. "Doesn't look like a fire, anyway."

Buzz handed his fire extinguisher to one of the safety crewmen, switched on his air-quality monitor, then checked the fit of his mask. He pulled the door open and stepped inside. His two assistants followed with fire extinguishers.

Erica looked up from her work, annoyed. "Damn! I thought I'd deactivated the alarm."

Buzz looked around. Nothing was burning, but Erica was hiding a tray in a drawer under the bench. On the bench was an electric hot-plate which was running orange-hot and producing a thin curl of smoke. He pulled his mask back and sniffed cautiously. It *almost* smelted like wood burning. He pulled the mask off. "Damn, Erica, that's what had us worded. After that tiling with Peterson, I dunno. I just thought—"

"Thought I might be doing myself harm? And miss this picnic? Buzz, are you out of your ever-loving *mind*? Do you *know* some of the stuff people are fixing up for it?"

‘Well,’ Buzz paused just a second, ‘I’ve been smelling all sorts of interesting stuff cooking.’

‘You hear about the hot tub?’

‘Just rumors. There’s also some wild talk about raiding the peanut oil stocks and heading for the hangar. Oh, and a couple of techs are building what looks like a dunking machine. The target flapper is marked ‘Rule 2.’

‘Uh-oh. Wonder who that’s for?’ Erica winked. She pointed to the firefighters, and a small crowd of curious on-lookers gathering outside the hatch. ‘Chase those nosy rascals out of here and I’ll show you the top secret project *I’m* bringing.’

Buzz turned to his assistants, shrugged, and shooed them outside. When they were gone, he turned back to Erica. ‘Campfire?’

‘Even better.’ Erica retrieved the tray from the drawer. It contained a stick and a sheet-metal mold. She plucked a white object from the mold and skewered it on the end of the rod. ‘We may be a little limited in fancy food up here, but we sure as shootin’ can come up with a little sugar and starch.’

Buzz moved closer. ‘I’ll be damned.’

Erica put a drop of liquid on the burner, which produced a puff of grey smoke. ‘You’ll be blessed. I’m still working on the smoke. I’ve managed to synthesize most of the components, but I think there must be some sort of catalysis going on involving glowing coals that I’m still not getting. Here, hold this. Not too close. That’s it, now rotate it at about two RPM.’

Erica positioned a sniffer over the burner, then picked up a cylindrical piece of wood with gouges in it and prepared to shave off another piece.

Buzz recognized the carving from Erica’s childhood. ‘Erica, stop. That’s too precious to burn!’

Erica turned the carving over and glanced at the face on the other side. ‘What? This piece of junk, precious? Buzz, I’m flattered, but I’d burn it to a cinder if I thought it would help morale up here. Don’t worry. Truth is I never finished it. The back is supposed to be *flat*.’ She dropped a wide sliver onto the burner, and it burst into flame momentarily. ‘But don’t waste it! There, that’s right. Not so close! Now, it’s *perfect*.’

Buzz pulled the marshmallow away from the burner and admired it.

‘Not bad, for an amateur,’ Erica observed. ‘With my help of course.’ She turned to the gas analyzer. ‘Got something here. Computer doesn’t have a name for it though.’ She reset the instrument and put another sliver on the burner.

Buzz touched the golden crust of his prize and determined that it needed to cool a bit. ‘Erica, if I’m not mistaken, somewhere in inventory we’ve got a couple of dozen two-by-fours.’

‘No good,’ Erica replied without taking her eyes from the analyzer’s display. ‘Aircraft-grade fir. Terrible for cooking. Besides, they’re emergency supplies. Don’t worry, I’ll get this.’

Buzz plucked the delicacy from the skewer. Erica turned to watch as he cautiously placed it in his mouth. He bit down, and smiled as broadly as good manners would allow.

‘How was it?’

Buzz savored the flavor before answering. “Erica, that was terrific. I don’t remember ever eating one that was so *light*. And it tasted sort of... I don’t know...”

‘Fruity?’

‘Yeah, sort of.’

‘That’s because we don’t have corn syrup. I used a mixture of sugars which is mostly fructose. Primarily because the sugar we *have* is mostly fructose. And they’re about twice as fluffy as any commercial marshmallows, due to my secret process, which I will not reveal, although, if you keep in mind where we are, you may find a few clues. Also, I use just a trace of peanut oil to keep them from sticking to the mold. Notice how that improves that oh-so-deli-cate crunch?’

Buzz nodded. “Absolutely. A masterpiece, my dear. I’m sorry I said what I did about hotdogs.”

‘You’re forgiven. Especially if you’ve found a way to whip up some kosher franks for the picnic.’

‘Sadly, no.’ Buzz hung his head. “Even if I could, perhaps it would not be wise for the station sawbones to suddenly show up with meat.”

The comment struck Erica cold. She lapsed into a distant stare and did not reply.

‘Oops,’ Buzz said as he recognized his blunder. “I didn’t mean to bring up painful thoughts. Forgive me.”

‘You’re not the one who needs forgiving, Buzz. God help me, I’m a heartless bitch. Here I am joking and fixing these silly balls of goo, after I killed a man.’ Erica’s chest heaved.

‘Enough of that,’ Buzz ordered. “Forget what I told you back then. Zerk Peterson did *himself* in. You failed to help him. I failed to help him. His co-workers failed to help him. But we’re no more to blame, and probably less so, than those lawyers who cleaned him out, and those consultants who came up with GO—oops, almost said it.”

Erica looked up, a trace of a smile showing at the corners of her mouth. “Thanks. You can say it. I’d have counted it as derisive.”

Buzz grinned. “I’ll play it safe until I find out what the *second* offense brings.”

Erica plucked a pair of fresh marshmallows from the mold, while thoughtfully considering the issue. “Hmm, I wouldn’t think there’d be too much need for additional punishment. I’ll have to give it some thought. A punishment to fit the crime, and one as ridiculous as GO... whatever. A pillory, perhaps?”

Buzz arched an eyebrow, then nodded “Both equally effective in keeping us from doing our work, I suppose. Speaking of punishment fitting the crime, Erica, you were *awfully* rough on yourself in that memo. Do you really think firing yourself was called for?”

Erica laughed. “Oh, God, Buzz, I can’t tell you what a *relief* it was to have an excuse to quit! Once we got past the design stage and down to the nuts and bolts, I was absolutely *miserable*. I belong in a lab, dreaming up stuff the mundanes think is impossible. I was working on something on the Supercollider so wild it would knock your socks off. Time to get back to it.”

‘OK,’ Buzz conceded, “but you took the blame for everything that went wrong. That’s not fair.”

‘Doesn’t matter. I’m to blame for enough of it, and I don’t mind shouldering the rest, especially when I only have to carry it to the nearest airlock and dump it. Poof, its gone! The only aftereffect is that

hopefully I will never be asked to take such a job again.“

‘Yeah, but those bastards—“

‘Are at least as much to blame as me. Yeah, I know. But what I’m trying to do is put this mess behind us by ignoring them, I don’t want to encourage the crew to grouse about dirtside management. I want them to take charge of their own destinies. Which, by the way, they failed to do, making the guilt a little bit theirs, too. All in all, I’d rather everyone just nod, agree that I’ve done the right thing, and pick up where we were in our innocent glory days.“

Buzz thought about it for a moment, then nodded agreement. “While we’re on the general subject of the memo, I was sort of wondering about some of those rules. One, two, and the last five are easy enough to understand. Forced vacation, sure, to prevent burnout. But can we get the ship built on time with just forty hour work-weeks?”

‘Nope. Well be about a year late according to Raul’s *original* schedule,“ Erica said with an evil smirk. ”Serves the greedy sons-of-bitches right. *Their way* would have probably taken fifty years, if Raul’s prediction was right. Besides, down the road, I think they’ll get the rest of the ships *sooner* than we’d originally projected. Rules three and six are intended to encourage improving productivity, something this crew should *do exceptionally well*“

‘OK,“ Buzz acknowledged, ”but what does this rule about outside business have to do with building the ship?“ ,

‘Not one damned thing,“ Erica replied. ”It’s a promise I made when I invited my co-workers at the Supercollider to join me up here, and which I conveniently forgot. It has to do with building a life. It has to do with rewards we can touch, instead of fat bank accounts with vultures hanging over them ready to take them away. It has to do with living in a reasonable facsimile of a home, instead of a shoebox in a numbered habitat module. Except,“ she winked and touched her right index finger to her temple, ”just *maybe* things like that could perk the enthusiasm factor up a notch or two.“

Erica sliced off a generous sliver of wood, then turned the lights off. The lab was lit only by the glow of the burner and the display and indicators on the analyzer. “Ah, there, I knew part of the effect was missing.” She held her confections over the sweet spot of the burner.

‘I wonder if I have time to come up with a credible chocolate bar?“ Buzz mused aloud. ”And Kara knows how to bake. Maybe some graham crackers?“

‘Mmmm.“ Erica smiled contentedly. ”Life is good, Buzz. Everything is so *perfect*.“

Buzz cocked his head slightly. “I don’t know. There’s light at the end of the tunnel, but *perfect*?“

Erica nodded. “Perfect I’m in space, learning to build spaceships. I’m exactly where I should be when I need to be there. Kara told me about your concerns. It reminded me of why I took this job. If you promise not to tell, I’ll let you in on a very special secret.”

Buzz crossed his heart.

‘I didn’t exactly *fry* part of the Supercollider, Buzz. I damned near blew it up is what I did,“ Erica continued. ”I was testing a theory I’ve been working on since junior high. Lost all my data except for the most important part. I found a new form of energy. Just when it was becoming obvious that my tests, on any useful scale, would have to be continued in space, I received this job offer. I figured I might just get a chance to continue my research up here, away from prying eyes and interference, and use my discovery

to build a much faster ship.“

Buzz looked up from the marshmallows, just beginning to form a faint golden crust. ”Crimmy, Erica, the thing we’re building will already drop transport time by a factor of *six*. How much faster do you need?“

Erica leaned over the burner, watching for exactly the right moment “Depends on where you want to go, Buzz,“ she said, pulling the sweet morsels away from the burner. ”Instead of months, what if we could make the trip in *minutes*?“

Buzz frowned. ‘Come off it, Erica. Even at nearly the speed of light, it would take around an hour.“

‘True, Buzz,“ Erica said, smiling slyly. ”But that limitation doesn’t apply any more. There is a faster form of energy.“

Dr. Santi’s jaw went slack, and he stared at Erica, trying to comprehend the magnitude of what she was saying. She slipped a marshmallow from the skewer and into his gaping mouth.

‘Don’t bite down, it’s still pretty hot,“ she warned. ”No promises, you understand. Hell, I have my doubts I can build a ship that can withstand it, much less if the people in it can. like I said, I’ve only run one good test, and it demolished the detectors. But stick around. Things could get interesting up here.“