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THE THIRST QUENCHERS

Earth has more water surface than land surface—but that does not mean we have all the water we want to drink. And right now, America is already pressing the limits of fresh water supply....

BY RICK RAPHAEL

ILLUSTRATED BY GEORGE SCHELLING

"You know the one thing I really like about working for DivAg?" Troy Braden muttered into his face-mask pickup.

Ten yards behind Troy, and following in his ski tracks, his partner Alec Patterson paused to duck under a snow-laden spruce bough before answering. It was snowing heavily, a cold, dry crystal snow, piling up inch upon inch on the already deep snow pack of the Sawtooth Mountain range. In another ten minutes they would be above the timberline and the full force of the storm would hit them.

"Tell me, Mr. Bones," he asked as he poled easily in Troy's tracks, "what is the one thing you really like about working for the Division of Agriculture?"

Troy tracked around a trough of bitterbrush that bent and fought against the deep snow. "It's so dependable," he said, "so reliable, so unchanging. In nearly two centuries, the world has left behind the steel age; has advanced to nucleonics, tissue regeneration, autoservice bars and

electronically driven yo-yos. Everyone in the world except the United States Division of Agriculture. The tried and true method is the rock up on which our integrity stands—even though it was tried more than a hundred years ago."

He dropped out of sight over a small hummock and whipped down the side of a slight depression in the slope, his skis whispering over the dry snow and sending up a churning crest of white from their tips.

Alec chuckled and poled after him into the basin. The two young junior hydrologists worked their way up the opposite slope and then again took the long, slow traverse-and-turn, traverse-and-turn path through the thinning trees and out into the open wind-driven snow field above them.

Just below the ridgeline, a shelf of packed snow jutted out for a dozen yards, flat and shielded from the wind by a brief rock face. Troy halted in the small island in the storm and waited for Alec to reach him.

He fumbled with mittened fist at the cover of the directional radiation compass strapped to his left wrist. The outer dial rotated as soon as the cover lock was released and came to a stop pointing to magnetic north. The detector needle quartered across the northeast quadrant of the dial like a hunting dog and then came to rest at nineteen degrees, just slightly to the left of the direction of their tracks. An inner dial needle quivered between the yellow and red face of the intensity meter.

"We should be within a couple of hundred yards of the marker now," Troy announced as his short, chunky partner checked alongside. Alec nodded and peered through the curtain of sky-darkened snow just beyond the rock face. He could see powder spume whipping off the ridge crest twenty feet above them but the contour of the sloping ridge was quickly lost in the falling snow.

The hydrologists leaned on their ski poles and rested for a few minutes before tackling the final cold leg of their climb. Each carried a light, cold-resistance plastic ruckpac slung over their chemically-heated light-weight ski suits.

A mile and a half below in the dense timber, their two Sno cars were parked in the shelter of a flattened and fallen spruce and they had thrown up a quick lean-to of broken boughs to give the vehicles even more protection from the storm. From there to the top, Troy was right in his analysis of DivAg. When God made mountain slopes too steep and timber too thick, it was a man and not a machine that had to do the job on skis; just as snow surveyors had done a century before when the old Soil Conservation Service pioneered the new science of snow hydrology.

The science had come a long way in the century from the days when teams of surveyors poked a hollow, calibrated aluminum tube into the snow pack and then read depth and weighed both tube and contents to determine moisture factors.

Those old-timers fought blizzards and avalanches from November through March in the bleak, towering peaks of the Northwest to the weathered crags of the Appalachians, measuring thousands of predesignated snow courses the last week of each winter month. Upon those readings had been based the crude, wide-margin streamflow forecasts for the coming year.

Now, a score of refined instruments did the same job automatically at hundreds of thousands of almost-inaccessible locations throughout the northern hemisphere. Or at least, almost automatically. Twenty feet above the two DivAg hydrologists and less than a hundred yards east, on the very crest of an unnamed peak in the wilderness of Idaho's Sawtooth Mountains, radiation snow gauge P11902-87 had quit sending data three days ago.

The snow-profile flight over the area showed a gap in the graphed line that flowed over the topographical map of the Sawtooths as the survey plane flew its daily scan. The hydrotech monitoring the graph reported the lapse to regional headquarters at Spokane and minutes later, a communications operator punched up the alternate transmitter for P11902-87. Nothing happened although the board showed the gauge's cobalt-60 beta and gamma still hot. Something had gone wrong with the tiny transducer transmitter. A man, or to be more precise, two men, had to replace the faulty device.

The two men and the replacement gauge, trudged out again into the face of the rising storm.

Troy and Alec pushed diagonally up the snow slope, pausing every few minutes to take new directional readings. The needles were now at right angles to them and reading well into the "hot" red division of the intensity meter. They still were ten feet below the crest and a cornice of snow hung out in a slight roof ahead of them. Both men had closed the face hatches of their insulated helmets and tiny circulators automatically went to work drawing off moisture and condensation from the treated plastic.

"Wonder if that chunk is going to stay put while we go past," Alec called, eyeing the heavy overhang. Troy paused and the two carefully looked over the snow roof and the slope that fell away sharply to their right.

"Looks like it avalanched once before," Troy commented. "Shall we operate, Dr. Patterson?"

"Better extravagant with the taxpayers' money than sorry for ourselves," Alec replied, pulling the avalanche gun from his holster. It looked like an early-day Very pistol, with its big, straight-bore muzzle. "Let's get back a couple of feet."

They kick-turned and skied back from the sides of the cornice. Alec raised the gun and aimed at the center of the deepest segment over the overhang. The gun discharged with a muffled "pop" and the concentrated ball of plastic explosive arced through the air, visible to the naked eye. It vanished into the snow roof and the men waited. Ten seconds later there was a geyser of flame and the smoke and snow as the charge detonated deep under the overhang. The wind whipped the cloud away and the roof still held, despite the gaping hole.

"What do you think?" Troy asked.

"One more for good measure," Alec said as he fired again, this time to the right of the first shot. The plastic detonated in another geyser of smoke and snow, but the small cloud was instantly lost as the entire overhang broke and fell the ten to twelve feet from the crest to the face of the slope and then boiled and rolled, gathering more snow and greater mass and impetus as it thundered down the slope and was lost in the storm. The dense clouds of loose powder snow raised by the avalanche whipped away in the clutches of the wind.

"Well done, Dr. Patterson," Troy called as he leaned into his poles and moved out across the newly-crushed snow on the slope.

"Thank you, Dr. Braden," Alec called in his wake, "you may proceed to the patient."

They worked past the buried radiation gauge to the crest and then turned and came slowly back along the wind ridge, following directly behind the detection needle. Troy glanced at his intensity gauge. The needle was on the "danger" line in the red. He stopped. Behind him, Alec checked his drop slowly down the windward side of the slope, reading his own meter. When his intensity needle hit the same mark, he, too, halted about thirty feet to Troy's right.

"I'm dead on," Troy said, indicating with a ski pole an imaginary line straight ahead.

"I've got it about forty-five degrees left," Alec called, marking his position and a direction line in the crust with a pole. Each moved towards the other and from the mid-point of their two markings extended with their eyes the imaginary lines to an intersecting point some thirty feet from Troy's original sighting.

"Hand me the heat tank, doctor," Troy said, turning his back to Alec, "so that we can excavate the patient." Alec unclamped a hand tank and nozzle device from his pack.

With the tank slung under his arm and with nozzle in hand, Troy moved forward another ten feet, gauging the wind velocity. He aimed to the windward of the intersecting lines and triggered the nozzle. A stream of liquid chemical melting agent shot out into the wind and then curved back and cut a hole into the snow. Troy moved the nozzle in a slow arc, making a wide circle in the snow. Then he cut a trough on the downhill side for more than twenty feet. He adjusted the nozzle head and a wider stream sprayed out to fall within the already-melting circle. The concentrated solution was diluted with melting water and spread its action. As the hydrologists watched, the snow melted into a deep hole and the chemically-warmed water torrented down the drain cut to gush out on to the snow slope and quickly refreeze as it emerged into the sub-zero air.

Troy shut off the liquid and the two men waited and watched. "The gauge was recording ninety-seven inches of pack when it quit," Alec said. "Better give 'er another squirt."

Troy fired another spray burst of chemical into the now-deep hole and then widened the drain trough once more.

Then he began spraying a three-foot wide patch from the edge of the hole back towards himself. Immediately a new trough began to form in the snow pack and the water poured off into the hole surrounding the buried gauge.

While the snow was melting, Alec had removed his skis and stuck them upright in the snow. He

dropped his pack and unfastened a pair of mountain-climber's ice crampons and lashed them to his ski boots. In five minutes Troy had "burned" a sloping, ice-glazed ramp deep into the snow field, sloping down into a ten-foot deep chasm and terminating on bare wet soil. Sitting on the ground, slightly off center to one side of the original hole was the foot-round gray metal shape of radiation snow gauge P11902-87. A half-inch round tube projected upwards for three inches from the center of the round device.

Alec was down in the ice chasm, ski pole reversed in his hand. Standing as far from the gauge as possible, he dangled a leaden cap from the end of his ski pole over the projecting tube. On the third try, the cap descended over the open end of the tube, effectively shielding the radioactive source material in the gauge. Once the cap was in place, Alec moved up to the gauge and put a lock clamp on the cap and then picked up the gauge and moved back up the ramp.

The wind was screaming across the top of the slot in the snow pack as he pushed the device over the edge and then heaved himself out into the teeth of the storm.

He could barely make out the form of Troy fifty feet east of the original position of the gauge. The tall engineer had taken the replacement gauge from his pack and was positioning it into the snow on the surface of the snow pack. The replacement was bulkier than the defective unit and it was different in design.

This was a combination radiation-sonar measuring gauge. Placed on top of an existing snow field, its sonar system kept account of the snow beneath the gauge to the surface of the soil; the radiation counter metered the fresh snow that fell on it after it was placed in position. The two readings were electronically added and fed into the transducer for automatic transmission.

Troy hollowed out a slight depression in the fresh snow and pressed the gauge into the hollow, then packed the snow back around it to keep it from being shifted by the high velocity winds until fresh snows buried it. Satisfied that it was properly set, he removed the radiation cap lock and slipped his ski pole through the ring on the cap. He backed away, lifted the cap from the gauge and then quickly moved out of the area.

Alec had stowed the bad gauge in his pack and removed a pressure pillow gauge to put into the deep hole in the snow. The man-cut chasm would serve as a partial gauge hole and, from a purely research point of view, it would be interesting to know how much snow would drift and fall back into the hole. The pressure pillow contained a quantity of antifreeze solution and some air space. As the snow fell upon the pillow and piled up, its weight would press down and the pressure upon the pillow would be measured by instruments and again relayed to a small transmitter for reading back at Spokane. The pillows were used in many flat open areas where snow pack was uniform across a large level surface.

The pillow in place, Alec again climbed from the chasm and was locking on his skis when Troy slid up. The ice-dry snow was driving almost horizontally across the face of the ridge and the two engineers had to lean into the force of the wind to keep their balance. Troy fumbled a small service monitor from his parka pocket and shifted it to the new radiation gauge frequency. The signal was steady and strong and its radioactive source beam was hot.

"Now is the time for all good snow surveyors to get the hell outta here," Alec exclaimed as he slipped his ruckpac onto his shoulders. "The gauge O.K.?"

Troy glanced once more at the monitor and nodded. "Hot and clear." He shoved the monitor back into his pocket and grasped his ski poles. "Ready?"

"Let's go," Alec replied.

Turning their backs into the wind, the men veered sharply away from the site of the new gauge and dropped off the crest of the mountain top back to the lee side of the slope. Out of the worst of the wind, they skied easily back down towards the timberline.

Once back among the trees, the visibility again rose although the going was much slower. It would be dark in another two hours and they wanted to be back at the Sno cars with enough light left to pitch camp for the night.

"I heard of a guy over in Washington," Troy said as they worked their way down through the trees, "that won the DivAg award as the most absent-minded engineer of the decade."

"Since you never tell stories on yourself, it couldn't have been you," Alec quipped, "so what happened?"

Troy schussed down an open field in the trees and snowplowed to a slowdown at the opposite side to once again thread through the dense spruce and pine.

"This joker did the same job we just finished," he continued. "He put the new gauge in place while his partner fished the old one out. Then he forgot that he had put the new gauge in place, uncapped mind you, and when they took off he skied right over it."

"Right over the top of it," Alec gasped.

"Yup," Troy said.

"What happened to him?"

"Nothing to speak of. Of course, he's the last of his family tree—genetically speaking, that is."

Fresh snow had completely covered their tracks made during the climb to the summit, but they wouldn't have followed the same trail back down in any case. Both men were expert skiers and they cut back down the shortest route to the Sno cars. A faint audio signal sounded in their right ears from the homing beacons in the snow vehicles. As they shifted directions through the trees, the signal shifted from ear to ear and grew stronger as they neared their cache.

A few minutes later they broke out into the edge of the small clearing with its downed spruce and the two Sno cars. From the carriers they extracted light-weight collapsible plastic domed shelters. A half hour later the domes were joined together by a two-man shelter tube and their sleeping bags were spread in the rear dome. While Alec was shaking out the bags and stowing gear, Troy set up the tiny camp stove in the front dome, broke out the rations and began supper. The detachable, mercury-battery headlight from one of the Sno cars hung from the apogee of the front dome and the other car light was in the sleeping dome.

By the time they had finished eating, the wind had died but the snow continued to fall, piling up around the outside of the plastic dome as it drifted and fell. Its sheltering bulk added to the already near-perfect insulation of the domes. The outer air temperature had fallen to minus fifteen degrees but the temperature below the surface of the snow held at a constant twenty-five degrees above zero and within the front dome with its light and stove, it was a warm seventy-five. The excess heat escaped through a flue tube in the top of the dome.

Both men had stripped down to shorts and T-shirt and now quietly relaxed.

"That's a goodly amount of precip piling up out there," Alec remarked languidly. "God knows we can use it."

"If this keeps up all night," Troy said, "we may have to dig ourselves outta here in the morning." He leaned back and surveyed the rounded roof above him. "Remember what I said this afternoon about nothing ever changing in DivAg?"

Alec nodded.

"Well, sir, here's another fine example of progress halted dead in its tracks," the lanky hydrologist went on. "For centuries the Eskimos have lived through Arctic winters in igloos, made of snow blocks, cut and rounded to form a cave in the snow.

"What's good enough for the Eskimos is good enough for DivAg. Here we are right back in the Ice Age, living in an igloo. If that stove used blubber or seal oil instead of chemical fuel, the picture would be complete."

Alec grinned. "Just because something is old doesn't mean it's no good, Dr. Braden," he said. "The Eskimos proved the efficiency of the igloo. We've just adopted the principle and modernized it. It still works better than any other known snow-weather shelter. But I didn't see you cutting any snow blocks with your skinning knife to build this snug haven, nor crawling for hours on your belly across the snow to sneak up on a seal for your supper."

"Technicalities," Troy scoffed lazily. "The point is, that here were are living almost under the same conditions that the primitive savages of the frozen north lived under for centuries." He belched gently and stretched his long legs luxuriously away from the webbing of the bucket camp chair.

"I must say that you seem to be enjoying it," Alec commented. "Primitive or not, I still like this better than those rat warrens they call cities today."

Nearly two miles above them, the replacement snow gauge, C11902-87, already buried in a half-foot of new snow, sent out a strong and steady signal. At midnight, when both snow hydrologists were sleeping soundly in their bags, hundreds of miles away in regional survey headquarters at Spokane, the huge electronic sequencer began its rapid signal check of each of the thousands of snow gauges in the five-state area of Region Six.

A dozen red lights flicked on among the thousands of green pinpoints of illumination on the huge mural map of the area indicating gauges not reporting due to malfunctions. The technician on duty compared the red lights with the trouble sheet in his hand. He noted two new numbers on the list. When he came to C11902-87, he glanced again at the map. A minute, steady green ray came from the tiny dot in the center of a contour circle that indicated a nameless peak in the Sawtooth Range.

The technician lined out C11902-87 on the trouble chart. "They got to that one in a hurry," he murmured to himself. Another figure had been returned to the accuracy percentage forecasting figures of the huge computers that dictated the lives and luxuries of more than a half a billion Americans.

Water, not gold, now set the standard of living for an overpopulated, overindustrialized continent, where the great automated farms and ranches fought desperately to produce the food for a half billion stomachs while competing with that same half billion for every drop of life-giving moisture that went into the soil.

In the winter, the snows and early fall rains fell in the watershed mountains of the continent, then melted and either seeped into the soil or first trickled, then gushed and finally leaped in freshets down from the highlands to the streams and rivers. As the great cities spread and streamflow waters were dammed and stored and then metered out, there was no longer enough to meet agricultural, industrial and municipal needs.

The cities sent down shaft after shaft into the underground aquifers, greedily sucking the moisture out of the land until each day, each month and each year, the water tables fell deeper and deeper until they, too, were gone, and the land was sucked dry.

There was water in the highlands, in watersheds and spilling unused down to the sea in many areas. Soon the cities and industries sent out great plastisteel arteries to bring the lifeblood of the land to the vast sponges of the factories and showers in home and food-processing plants and landrounits. Water for the machine-precise rows of soy bean plants and for babies' formulas and water for great nuclear power plants and water for a tiny, sixty-fifth floor apartment flower box.

But there was never enough and a nation finally could no longer evade the situation that had been forewarned and foredoomed a century earlier by the pioneers of conservation.

Only by total conservation of every possible drop of moisture could the nation survive, and to conserve, it is first necessary to have an accurate and constantly-current inventory of the substance that is to be conserved.

To the executive branch of the government had come the Secretary of Water Resources, and with the creation of the new cabinet office, the former cabinet posts of Agriculture and Interior were relegated to subordinate and divisional status.

To the thousands upon thousands of trained hydrologists, meteorologists and agronomists of the federal agencies of agriculture, interior and commerce fell the task of manipulating and guiding the delicate balance of the world's water cycle. The snows and rains fell upon the earth, to soak into the land, flow down the streams and rivers to the sea or to the great lakes, and then be returned to the atmosphere to fall again in the ageless cycle of life.

But the happenstance habits of nature were steadily being integrated into the control program of man. The rains and snow still fell where nature intended but man was now there to gauge and guide the moisture in a carefully controlled path through its cycle back to the atmosphere.

An inch or an acre-foot of water falling as snow upon the high mountains was used over and over many times and by many persons before returning to its starting place in the atmosphere.

With the age of nuclear power, the need for hydroelectric sources vanished and with it went the great dams and reservoirs with their vast, wasteful surfaces of open water that evaporated by the thousands of acre-feet before ever being utilized by man. The beds of the great rivers were dry and the cities spread upon them together with the new controlled auto-farms. Only the smaller rivers and streams continued to flow until they reached a predesignated flow force. Then they vanished, spilling down into tunnels and flowing for hundreds of miles along subterranean aqueducts into great storage reservoirs beneath the surface of the land and protected from the drain of the sun and wind. From these, each precious drop of water was rationed upwards to meet the increasing needs of the people. And still there was never enough.

It was still snowing when Troy and Alec awoke in the morning. The snows had drifted over both the domes on the windward side. They cooked a quick breakfast and then Alec began stowing the camp gear into its compact containers. Troy took a small hand shovel and crawled out through the double opening of the front dome and tunneled his way up out of the snow. Twin plumes of

vapor rose through the snow that curved in gentle hummocks over the buried domes. The tall engineer shoveled a short path to the downed spruce and cleared the way into the shelter where the Sno cars waited. He removed the protecting boughs and shoveled a short ramp out of the trough to the surface of the snow.

The temperature had risen during the night and the snow had changed from the crystal dry powder of the night before to fluffy, gentle flakes, falling in a steady curtain through the trees. Troy opened the side hatch of the bubble canopy of his Sno car and climbed in. He slid into the single bucket seat and with a flick of his finger set the tiny reaction motor into operation. Moments later heat filled the bubble and a cloud of steam moisture flared from the thrust pipes.

The ten-foot-long tapered Snow car sat on twin broad-planted skis in front with a single retractable wheel raised between them for snow travel. At the wider rear, another pair of short, broad ski blades rested on the surface of the snow on either side of a wide, continuous track assembly. A pair of handle bars, much like an early-day motorcycle, extended into the bubble from the front fork. The grips were studded with additional control buttons. Troy pressed one and the two rear skis rose on outrigger arms like a small catamaran to allow the Sno car to sink a couple of inches back onto the gripper track.

As the weight of the vehicle shifted to the track assembly it automatically diverted the tiny nuclear engine output from jet thrust to gear box drive. Troy settled himself in the seat and increased the power. The track started to turn and the Sno car glided slowly out from under the protecting branches and churned up the slight ramp to the top of the snow pack. He turned the front skis and plowed to a halt beside the tunnel into the domes.

Alec emerged with one of the camp kits and handed it up to his partner, then went to the shelter for his own Sno car. Troy stowed the kit in the carrier and dismounted and began digging snow away from the domes. Alec's Sno car pulled up alongside and the chunky engineer vanished once more into the domes to emerge with his own kit. Then he joined Troy in the digging operation. Fifteen minutes later, both domes were collapsed and stowed in the carriers. The men boarded their vehicles.

Inside the warm bubble canopies, air circulators kept the plastic free of condensation. Outside, the snow glanced off the treated surface, keeping it clear.

"Lead off, Dr. Patterson," Troy called out over the car radio.

Alec increased power and the track of his Sno car dug into the soft surface, then caught and the vehicle moved forward and into the trees. Troy fell into line behind the other vehicle as they drove down the gentle slope towards the snow-covered access trail another mile below them on the side of the mountain.

Out of the trees and onto the trail, both drivers shifted gears, dropping rear skis to the more solid pack of the trail and sending jets of steam shooting out from the thrust tubes of the Sno cars. Troy dropped back to stay out of Alec's vapor cloud as they now glided smoothly and easily along the trail. A bright red metal pole, topped by a small housing and antenna came into view on the side of the road. The tube went down through the snow and deep into the soil of the mountain side. Inside, electrostats read soil moisture at depths up to thirty feet and transmitted the information on automatic or demand signal.

Ahead, the vapor cloud from Alec's Sno car vanished as the trail dipped down the side of the mountain and the driver cut his thrust to let the momentum carry him on the twin set of skis. Troy gunned his car for a final burst of speed then cut rear drive and dropped swoopingly down the grade, whipping along in Alec's tracks. The trail curved sharply ahead and Troy gently manipulated the front fork skis into a snowplow to cut speed. His fingers rested lightly on the pressure switch that would open small scoops on the under surfaces of all skis for additional braking power. As a final resort, the engine thrust could be shifted from rear to forward reaction to bring him to a complete stop and even send the car backwards.

The Sno car whipped around and down the trail. As the roadway swung to the south slope of the range, the track in the fresh snow cut by the lead vehicle turned dark gray and then almost black. When the present storm had ended and before new snow fell again, the south slopes would again be stained with clouds of black, mono-molecular film, gushing out in clouds behind spray jets of the survey planes. Each successive layer was treated, lessening the evaporative surface effects of the sun upon the south slopes and holding as much of the moisture-giving snow to the earth for controlled runoff. A pair of fresh elk-tracks came down the side of the mountain and cut across the trail and Troy braked to peer through the trees for a glimpse of the animals. But they had vanished, frightened by the sudden intrusion of the men.

A half hour later and four thousand feet lower, the trail joined a wider and more traveled road. Alec turned onto the road and increased speed. A few minutes later, the Sno cars flashed by a sign reading "Elk City—4 miles." Alec cut speed and waited for Troy to pull alongside, then the two cars glided slowly to the edge of the wilderness community. At the outskirts of the little town the snow on the road came to an abrupt end. Chemically-treated paving kept the roadways warm and bare of snow. Ahead, the pavement into town was wet and glistening and even falling snow had stopped. Rear skis were again retracted and the front wheels lowered for non-snow driving

and then the two vehicles rumbled slowly into Elk City.

They came to a halt at the ranger station and dismounted.

"Let's call for a taxi and then go for a cup of coffee and another bite," Troy said. "I'm starved again."

"You and that hollow stomach to match your head," Alec grunted.

They entered the ranger station. Behind the counter, one of the four rangers on permanent duty at the station was transferring a radar storm plot onto a weather chart. He glanced up as the two men entered.

"Back so soon," he commented. "That was a quick trip. Get the job done?"

"Neither rain, snow or sun stops the Division of Agriculture in its appointed rounds," Troy said flippantly. "Harry, call Spokane and tell 'em we're ready for a pickup, please."

The ranger reached for a mike. "Spokane Region," he called, "this is Elk City station."

"This is Spokane," came the reply.

"Your two snow boys are here," Harry said, "looking for a lift. Can you send a 'copter after them?"

"Affirmative, Elk City," Spokane communicator replied. "We'll pick them up in about forty-five minutes."

"Thanks, Harry," Troy said. "We're going to take a walk uptown and get something to eat. If the chopper should get here sooner, tell him we'll be right back."

"O.K.," the ranger said, "but there's a pot of coffee on the stove in the kitchen if you want to save yourself the walk."

Alec grimaced. "I had a cup of that concentrated sulphuric acid you call coffee on the way up," he said. "No thanks, anyway. What do you make that stuff out of? Leftover road oil?"

"Man's drink for a real man," the ranger grinned. "Us forestry men learn to make coffee from pine pitch. Makes a man outta you."

"Huh," Alec sniffed as they turned to leave, "pine pitch is just sap and anyone who'd drink that stuff deserves the name—'sap' that is."

The ranger grinned as the hydrologists walked out.

Troy and Alec were walking back up the street to the station when the big cargo copter settled down to the pad at the rear of the station. They hurried their pace and got to their Sno cars. By the time they had driven around to the pad, the copter crew had lowered the ramp and they drove directly up and into the craft. A row of front-wheel racks studded the after wall of the cargo deck and Troy and Alec nosed their Sno cars into the racks. By the time they had cut power and climbed out, the crewmen had cargo locks on both vehicles.

The crew chief closed the ramp and punched a signal button. As Troy and Alec climbed up the gangway to the crew-passenger deck, the big jet rotors were already churning and the copter lifted into the again lightly falling snow.

The hydrologists settled into seats for the short ride to Spokane. The copter swung to the northwest, roaring a thousand feet above the snow-covered mountain tops. They soared over the Clearwater River that flowed to its confluence with the once-mighty Snake River at Lewiston where both vanished into a subterranean aqueduct. As they neared Spokane, the country began to flatten out into the great Columbia basin, where once nearly a fifth of the nation's entire electrical output was produced in a series of hydroelectric dams on the great river and its tributaries. A century ago, high tension power transmission lines and towers laced the face of the nation, carrying power from the waterways to the wheels of industry and cities hundreds of miles away. Like the dams, they, too, were gone and each industry and metropolis and village generated its own power with compact nuclear reactors.

The copter dropped down into an airways lane as it came over the edge of the suburbs of Greater Spokane. The air lane followed almost directly above one of the crowded ten-lane North American Continental Thruways that cut five-mile wide swaths across the continent from Fairbanks to the southern borders of Mexico; from San Francisco to Washington, D.C., and from Montreal to Vancouver.

As the chopper settled down over the heliport at Region Six headquarters, Troy and Alec climbed back down to the cargo deck and went to their Sno cars. On the ground, the ramp came down and they drove out of the copter and across the pad towards Snow Hydrology Section's motor park. The Sno cars were parked in the garage for a service check and with their ruckpacs slung over one shoulder, they headed for the offices.

The prominent peak of Mount Spokane north of the city gleamed intermittently as the sun began to break through the remnants of the storm now blowing away to the east.

"I hope I don't get transferred out of the Region," Alec said moodily as he surveyed the distant mountain.

"Why should you?" Troy asked.

"You never know what's going to happen when you step up a notch," Alec replied. "You know that both of us are due for grade promotion sometime this year to senior status. Depends on how many Grade One senior hydrologists they need in the Region."

"Snow is snow," Troy shrugged. "It doesn't really make that much difference to me. If they want me to move, I'll move."

"It's doesn't make much difference to you," his partner said, "because you're not married yet. But with Carol and Jimmy, it makes a lot of difference to me. It's bad enough living like we do here, jamming in against five hundred other families in the complex. The only thing that makes it worthwhile is the chance to get away from the city with the family on our days off. I want that kid of mine to know what real country looks and feels like. God help him if I should get transferred back east."

"You could always resign," Troy said half seriously.

Alec stopped dead in his tracks and turned to stare at him. "Are you out of your mind," he cried. "Resign from this for what? For the chance to be buried in a city or a bureau for the rest of my life? Never to see the mountains except on rare vacations and then with a guide on my back? Never to see a river flowing or fight a trout? Have my kid grow up with his only knowledge of the woods from history books with an occasional trip to the zoo to see what a deer or elk looks like. I'd rather half-starve as an autologger operator in some gyppo timber camp than live like that."

"I was just kidding," Troy said. "When it comes right down to it, I wouldn't be happy away from this either. Come on, let's check in with the 'Scourge of the Northwest.'"

At SHS headquarters, they dropped their ruckpacs by the door and Alec fished the faulty radiation gauge from his pack. Then they went in to report to Snow Supervisor Morley Wilson, known affectionately to his subordinates as "The Scourge."

The leather-textured face of the senior engineer turned up at them as they entered the office. Wilson's face was tanned and weather-beaten by the sun, wind and snows of a thousand mountains and it was rumoured that when he went up for annual physical examination, the lab merely ran pollution tests on the ice water that flowed in his veins instead of blood.

"I didn't expect you two back so soon," he said with a scowl. "What's the matter? Couldn't you get to the gauge?"

Alec laid the faulty device on Wildon's desk. "No trouble, boss. Just speedy work by your best juniors."

Wilson snorted. "You must have had the chopper land you on the ridge in spite of orders." He reached for the gauge. Troy and Alec exchanged smiles. The old man had received a full report of the conditions in the Sawtooths together with a check on their activities at least an hour ago. He knew what they had to contend with to switch the gauge—and he knew they knew he was just barking.

"Another one of the transmitters shot again," he muttered. Wilson punched the intercom on his desk. "Shiver," he called, "get up here and get this radiation gauge you said was so good."

In the communications repair section three levels underground, the senior comm tech snapped out a fast "yessir" and bolted for the door.

"What did you leave up there?" Wilson asked.

"We put a CS gauge thirty feet from the survey point," Troy said. "It was working fine and it's on a flat shelf with virtually the same pack and strata formation this one came out of."

"What's it look like up there," Wilson asked. The supervisor was nearing the end of forty years of service with Snow Hydrology and in his early days, the last vestiges of the crude "man-on-the-spot" surveys were still in operation.

Despite loud and emphatic defense and reliance on the new and complex techniques of electronic measurements, he still felt the need to feel the texture of the snows himself and to observe with his own eyes the sweep of the snow pack molded against the shoulder of a towering crag. Chained to the desk by responsibility, he used the eyes of his junior engineers and surveyors to keep a semblance of the "seat of the pants" technique of forecasting that he had lived with and lived by.

"The pack is good," Alec reported, "and what we saw of the south slopes is holding well. It was snowing from the time we got into the area until we pulled out this morning, so we didn't really get a long sighting. But what we saw looked fine."

The old man nodded with satisfaction. "You two go get out of that field gear and then report back here in an hour. We've got a staff conference and I want you two in on it." He dismissed them with a wave of his hand and went back to the reports piled on his desk.

In the locker room, Troy and Alec peeled out of the snowsuits and changed into street clothes. "I wonder what's in the wind," Troy asked thoughtfully. "Must be something big enough to bug the old man into brain-picking, otherwise he'd never stoop to juniors before making a decision."

"Probably just wants to set up next summer's vacation schedule," Alec grunted as he bent over to slip on his shoes. "You can bet that if it were something important, he'd never be concerned with the opinions of the likes of us."

An hour later they walked back into the supervisor's office to find it jammed with the heads of all sections together with leading techs and junior engineers. "Go next door and grab yourselves a couple of chairs," Wilson barked, "and then get back in here."

When the full staff was assembled, Wilson stood up and faced the group.

"This won't take too long," he began, "but it's a problem that I want all of you to be considering during the next fifteen days because we have to come up with a reasonable solution to the problem—just another one that's been dumped in our laps."

He pressed a button on his desk and a mural, three-dimensional typographical map of the five-state Region Six flashed on the wall behind him. Across the top of the map was a line of illuminated numerical panels that shifted in values before their eyes, changing with the factor information constantly being fed into the computers. These were the constant monitoring reports from the regional computers on snow pack, moisture content, streamflow, water consumption and other that formulated the equations that the forecasters and ration controllers user in determining water supply allocations.

Hundreds of multi-colored lights on the map indicated industrial, municipal, domestic and agricultural water use facilities.

"We've been asked to assist in the critical situation in Region Five," Wilson continued. "Region Five included California, Nevada, Arizona and Utah. As you've seen from the combined western forecasts, snow pack has been much below normal this year in Region Five and has for the past three years. We've been piping a lot of water down the line and so far, they've been able to meet demands. But a new factor has entered.

"For the past three years, again as many of you are aware, Space Department has been gearing for the start of Venus Colony. I'm not expert in this field but from what friends of mine who are closely associated with the project tell me, there's a big difference in building a vehicle to carry a survey and exploration team and the technology involved in building both vehicles and life-support equipment for a colony operation. All of which leads up to the current problem.

"Our friends in Space have now firmed up the specialized equipment they want and the quantities. Prototype of all of this gear have been built and tested, mostly fabricated by the Southern California Space and Electronics Complex. Now they're ready to go into production. But the fly in the ointment is that it calls for five new production units.

"With the Southern Cal Complex operating under water deficits plus transmission costs for the past three years and with no improvement in sight, they just don't have the water to handle five more major industrial units. Their population census is also up again. This means the units will have to be located somewhere else, possibly only until the production schedule is completed; possibly on a permanent basis if Venus Colony pans out. The trained manpower pool is in Southern Cal Complex and it will have to be displaced to wherever the units are located."

Wilson paused for a moment and looked around the room.

"I can see that you're way ahead of me. And you're right. We've been asked to make a projection to determine if we can handle them in Region Six, preferably in the Portland-Seattle Industrial Complex or near thereto."

He indicated a stack of bound manuscripts on his desk. "These are copies of the full prospectus of the proposed units; power output, equipment, manpower, water absorption, water return, domestic and municipal demands, et cetera, for the project.

"I want each of you to take a copy, study it in the light of your specialty, and then submit your recommendations to your department and section chiefs within the next ten days. The departmental and sectional reports will be consolidated for my study and then we'll make our report to Washington.

"But let me give you this parting thought to keep foremost in your consideration. In all probability, whether we agree to it or not, we're going to get stuck with the units. We have the most dependable water recharge in the nation and we have the physical space for the units. Dislocating and trying to relocate just the people involved in this project is a monumental thing in itself and would be a virtual impossibility east of the Mississippi. You can bet your last cent that this was all taken into account before Washington ever politely suggested that we review the

situation and give our opinion.

"I don't think they give a damn about our opinions. They just want to see how lavishly they can operate with what we offer. So bear that in mind for my information. I need to know as close to the absolute last drop of moisture where this is going to put us and where we have to shut down and cut corners throughout the Region to accommodate the new industry.

"Now we're not going to get this solved or anything else done by my talking about it. Get out of here and back to work. You've got ten days to come up with the answer and you can expect to be saddled with the additional production units within one hundred twenty days. That's all gentlemen except to say that, as occurred when I asked you two years ago for a similar projection for the laser unit complex, I will not accept any solutions calling for a pogrom of all Anglo white Protestants between the ages of six and sixty."

The meeting broke up in laughter as the engineers crowded up to the desk to pick up copies of the prospectus.

Troy and Alec fell into step with Jordan Plumber, their section chief.

"One thing you have to admire in the old man," Alec commented, "he has faith in his staff to come up with the answers."

"Hm-m-m," Plumber sniffed, "he doesn't need faith. He's a realist from the old school. He knows that we have no choice and all that's left is to come up with a formula for living with the situation. It doesn't bother him a bit how we figure this one. He knows we have to work it out."

Back at their combination laboratory and office area, the trio split up to their respective cubicles to go over the report. Troy and Alec, as semispecialists in snow depth and moisture gauges, would study the problem from the viewpoint of increasing the accuracy and volume of their instruments in inventorying Region Six snowfall. Other members of the headquarters staff would tackle it from soil moisture content; stored water capabilities; increasing domestic, municipal and industrial water economies; while the meteorology men would venture even farther into left field via data, formula and Ouija board, to increase the potential future limits of their forecasts.

The key to the entire problem lay in streamflow forecasting. Accuracy in predicting the amount of water entering the vast underground reservoirs now had reached ninety-eight point three per cent. Yet in the remaining one point seven per cent was the equivalent of more than seventy-five million acre feet of water. The question now was—how much more water would the new units require and could the forecast be projected another tenth or more percentage points closer to supply than demand.

That was the basic problem. There were thousands of allied problems involved, ranging from where and how the additional water would be stored and channeled and how it could be used after the new factories had had initial use.

At 1630, Alec stuck his copy of the prospectus, together with some other more pressing reports, in his briefcase and headed for home. He stopped in the door to Troy's cubicle.

"You going to work all night?" he asked.

Troy swung his feet down from his desk and snubbed out his cigarette. "Nope," he replied, "but I thought I'd finish reading this before I shoved off. After all, I haven't got a section chief waiting for me at home with a stop-watch in hand to make sure I report in on time. All I have waiting for me at the apartment is a good, cold highball."

Alec grinned: "See you in the morning, doctor."

Troy swung his feet back up onto the desk and went back to the Southern Cal report.

In the parking lot, Alec found his little sport jet and fired up. He eased into the line of cars filing out of the headquarters compound and shot into the stream of homeward-bound traffic on the state expressway. The torrent of vehicles was moving along at an almost steady seventy miles an hour. Alec worked his way into the middle lane since he would be crossing the entire city to reach his apartment complex on the north side. The expressway roar turned into a hollow thunder as it threaded its way for five miles under the high NorCom Thruway that carried high speed traffic across and around the city.

Troy finished reading the prospectus about an hour later and then he, too, left the office. He drove to a small restaurant near Coeur d'Alene for dinner and then, yawning and tired from the night in the mountains and the work of the past two days, headed for his small bachelor apartment on the east side of Spokane.

He watched the vidicast for a half hour and then mixed a nightcap, downed it, bathed and piled into bed. He was sound asleep by 2000.

Across the city, young Jimmy Patterson played with his father, howled and talked his mother out of taking a bath and was put to bed. Alec and Carol curled up on the divan to watch the same show Troy was viewing. At 2030 they, too, were in bed and asleep. The sounds of the city were deadened by the high insulation construction of the building. Possibly half of the nearly three million residents of Greater Spokane were asleep in their beds shortly after midnight, but the other half were either at work or play when the earthquake hit.

There were three distinct and violent temblors, lasting from one to four minutes. The great buildings of the metropolis swayed, glass shattered and fell amidst the screams of frightened thousands. But the city was built to withstand fringe nuclear destruction and the damage was relatively light. The shocks rocked the entire Northwest and were felt from British Columbia as far south as San Francisco and east to Salt Lake City.

In his bachelor apartment, Troy was sprawled on the edge of his bed when the first shock wave struck. The shuddering, stomach-churning wave tossed him to the floor and a picture dropped to smash against the floor.

"What the hell," Troy exclaimed in shocked sleepiness as he tried to get up. The floor continued to sway under him. He got to his hands and knees and fought to orient himself and his thinking about what was happening.

His first thought was an explosion and he staggered toward the window. There was no sign of one. A minute later, the second and lighter tremblor hit and he grabbed for support.

Across the city Alec and Carol sat up wide awake during the last instants of the first jolt. Without a word and with a single mind, they rushed for the other bedroom to seize and comfort the frightened and crying Jimmy. They were clutching him closely when the second shock struck.

"It's a quake," Alec analyzed calmly, "nothing to be frightened about." He, too, walked to the window to see if there were outer signs of damage. When it looked fairly normal, he went back to the bed to help Carol calm the frightened child.

"Mother Nature is just shaking things into place a little," Alec told his son. "It's nothing to fear, old man. Come on, let's go out in the kitchen and get a cup of hot chocolate and then we'll all go back to bed."

Jimmy wiped his eyes and swung his feet over the edge of the bed. "Can I sleep in with you and Mom," he asked.

Alec ruffled the already mussed hair. "Sure you can, big fellow."

They went into the kitchen and Carol began making cocoa. Alec was fishing in the cupboard for the cookie jar when the vidiphone buzzed. He went to the wall and pressed the "Answer" button.

The worried face of Jordan Plumber snapped onto the screen.

"Alec," he said grimly, "get over to the office right away. All hell's broken loose."

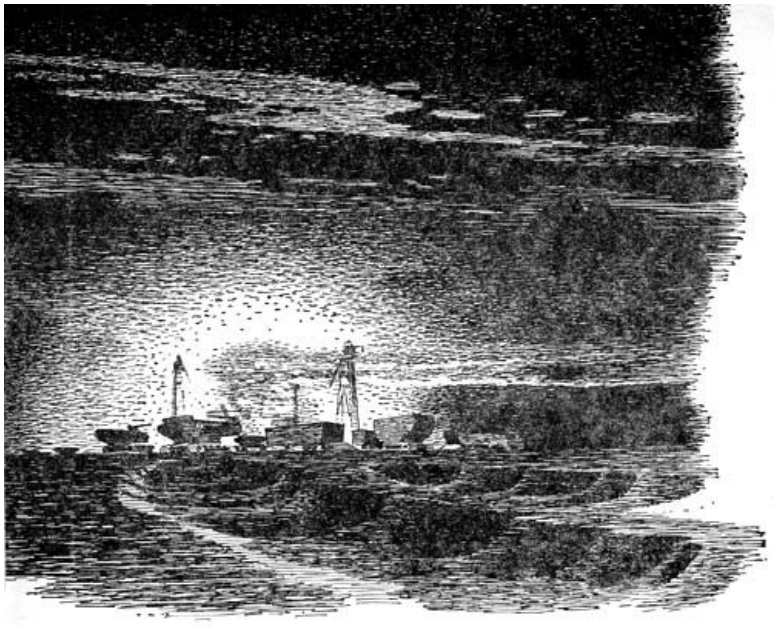
"I'll be there as soon as I can dress," Alec said. "What's happened?"

"The quake has cracked the Spokima Reservoir. Right now we've already lost nearly a million acre feet and God only knows how much more is going out. Snap it up." The screen went blank.

Alec turned to Carol. Her face was ashy and she bit on a knuckle to fight for control.

He put an arm around her. "We'll manage it, baby. I've got to go." He turned and hurried from the kitchen to dress. At the door he paused and turned back. "Fill up every possible container you've got empty with water. Right now! Fill the bathtub and half the kitchen sink. Just use the other half for drain. And make every drop count. I don't know how long I'll be gone but I'm sure they'll be cutting the domestic water off any minute now."

Alec heard the wail of sirens in the distance as he climbed into his car. Threading his way onto the expressway, he switched the radio to standard broadcast band.



"... Is little damage reported," the voice of newscaster said in matter-of-fact tones. "Seismologists at the University of California and Seattle University have placed the epicenter of the quake within fifty miles of Pullman, Washington. We repeat, there has been little damage and no reports of personal injury in the Spokane area. However, communications with the Pullman-Moscow, Idaho area have been temporarily disrupted. Early reports from the quake center seem to indicate possibility of heavy damage and possible injuries there. There is no confirmation at this time but stay tuned for details as they ..." the announcer paused, then continued. "Here is a bulletin just handed me from the Greater Spokane Municipal Authority.

"The quake has caused some minor damage to water mains in some areas in the city. Crews are now being dispatched to the scene to make repairs but in the meanwhile, domestic water supplies are being shut down while the repairs are in progress to conserve water supplies. Only emergency water line are being maintained for fire and disaster control. The Authority says water service will be resumed shortly and there is no need for alarm."

Alec shut off the radio and concentrated on the traffic. By the time he reached Regional headquarters, traffic flow was already increasing and he caught glimpses of family cars piled high with obviously tossed-in belongings, heading out of the city.

The gate to Region Six headquarters normally stood open twenty-four hours a day. Now it was closed as an armed security guard stopped him. The officer stooped and peered into the car. "Hi, Dr. Patterson, go right in." He waved to another guard on the gate and the portals swung open.

"What's the check for, officer?" Alec asked.

"I don't really know, doctor," the guard replied. "Must be something to do with the quake. All I know is that we got ordered to check all persons coming in and not allow anyone in who's not connected with the division." He waved Alec ahead.

Patterson parked his car and walked quickly to Snow Hydrology. He entered the offices to be struck by a bedlam of sound. Men were scurrying from cubicles, hands loaded with papers. Others were talking rapidly to distant vidiphone reporters. Alec skirted around one group huddled over some topographical maps and headed for his office.

From across the room Plumber spotted him and shouted: "Alec, staff briefing in the conference auditorium in five minutes."

Alec nodded and went into his office. He gathered a notebook from a desk drawer and then walked around the partition and looked in to see if Troy had arrived. Braden's coat was hanging from the back of his chair, but he was not in the office. Notebook in hand, Alec headed down the corridor for the big conference room in the adjacent wing. People from every section in the headquarters were streaming towards the same location and the outer doors along the corridor kept swinging open as latecomers dashed in.

Alec joined the crowd squeezing into the auditorium conference room. Inside, he looked around and spotted Troy against the side wall. He worked his way to his side.

"Hi" Troy said. "How's Carol and Jimmy?"

"They're O.K.," Alec said. "I told her to fill up everything in the house with water and I think she had time to get them filled before the water shut down. How bad is it?"

"It's not good," Troy said. "At this point, I don't think anyone knows just how bad or how good it really is. Spokima ruptured and is spilling but it doesn't appear to be going out too fast. The

worst situation seems to be in the Columbia Riverbed System. Unofficially, the grapevine has it that Moses Lake and McNary tanks have had it and God only knows how many aqueducts have been fractured. We're in deep trouble, buddy."

The babble of voices in the jammed auditorium stilled as the figure of Regional Director James Harbrace and his staff of sectional supervisors came onto the stage.

Harbrace moved quickly to the rostrum microphones.

"I won't waste words or time," he began. "As of ten minutes ago, Regions Five and Six have been on Emergency One Condition. They will remain on Emergency One indefinitely—certainly until we have had a chance to assess full damages to the systems and have made what repairs we can."

Emergency One conditions put all water control for the entire United States under the direct supervision of Harbrace and his counterpart director in Region Five. It meant all but emergency fire and disaster systems shut off; industrial supplies halted; domestic waters limited to a pint of water per person per day. Since it was midwinter, agricultural waters were not running in the Northwest. But in Region Five, already in short supply, only those crops nearing maturity and having essential food needs for the populace, would be given minimal supplies to bring them to harvest. The later-growing crops were doomed.

"Here's what we know right now," Harbrace turned to an illuminated map of the region and using a light beam indicator, began pointing to the various storage and supply facilities.

"Spokima is leaking at the rate of a quarter million acre feet an hour. We've got sub scanners working the bottom now to survey the crack. The bottom has gone out of Moses Lake and the whole east end of McNary is shot. Hanford has enough water in emergency storage to continue reduced power output for about another seventy-two hours."

The point of light moved east towards the Snake, Clearwater and Kootenai rivers in Idaho.

"All aqueducts leading into the Columbia system have been closed and we can give thanks that this has come in winter rather than in the spring runoff. Even so, we're going to have some flooding problems as the rivers back up.

"We feel that the aqueducts in the Pullman area are probably gone although we haven't verified. Our big problem now is to find out what transfer systems are still functional and start salvaging what we can.

"Secondly, if and when we can make repairs, we've got to get water back into the critical areas and figure some way of storing and valving to keep it functional.

"That's the big picture and it's damned black. Public Information is taking care of the video and radio information. We want to avoid panic if we can and to avoid mass exodus into outlying areas that couldn't possibly cope with the population demands because of the messed-up system. We've got to handle it where we are, keep the people in place and face it here. And by here I mean not only Spokane but Portland, Seattle and all the rest of the major cities. We live or die on this situation. Now let's get to work. You'll have detailed instructions from your section leaders in fifteen minutes."

Back at Snow Hydrology, Alec and Troy lighted cigarettes and waited for Plumber to show up with their assignments. Of all of the sections, theirs was the one which would have the least immediate action. The bulk of the emergency was falling on the waterflow and engineering sections.

"Let's go have a look at the profiles," Troy suggested. "This quake could have set off quite a few avalanches."

They went into the survey data room where a half dozen technicians were running bank scans of the gauges throughout the Region. At the desk on a raised dais in the center of the room, the junior duty engineer was poring over a fresh set of graphs.

"How's it look, Walt?" Troy asked. The young engineer looked up at them and smiled. "Hi Troy, Alec. Oh, not too bad from our point of view." He indicated the graphs on his desk. "We've had some shifting in loose pack and ice stratas along the Palouse Range, a little in the Sheep Mountain Range. But so far, we've been lucky. The worst one is right here, on Lookout Peak. She must have dumped at least a hundred thousand tons down the slope and into the valley and she stripped right down to the rock and took out every gauge on the way. Then it piled up in the valley and knocked out all but three gauges there. And they're reading anywhere from sixty-five to more than one hundred foot depths. We'll lose some of that if it's not lying right for retardation spraying."

The three engineers studied the new profiles as they came in from the techs. They were huddled over the desk when Plumber entered the room and joined them at the table.

"What's the word, Jordan?" Alec asked.

"Nothing for us right now," Plumber said. "We're to remain on standby alert, possible fill-in in other sections for the time being. Then we'll have to come up with some new figures as quickly as possible."

He glanced down at the charts and then asked the duty engineer, "How many positions knocked out?"

"No reports from sixty-eight gauges on this last scan," Walt reported, "most of them in Idaho. But there may be a few more before noon tomorrow. According to my last avalanche report before this thing hit, there should be at least ten more cornices that could have been cracked by this shock but that haven't fallen yet. It's still snowing over most of the Sawtooths but it's due to let up by dawn and a warming trend set in. That ought to trigger the others and when they go then we'll have just about all the replacement figures we'll get. What's the chance for more quakes?"

Plumber shrugged. "Seismology says we can expect settling tremblors for as long as four more weeks and possibly even another sharp jolt. I wish those guys were a little more scientific in their predictions."

Troy hid a grin. "Want us to get ready to head back to the hills, Boss?"

"No," Plumber said, "you two stay put for the moment. You just got back and unless I really need you, I want you here for the moment. I'll get a couple of other teams together to take care of the replacements. For the time being, see what you can come up with in some equations for the Pullman-Moscow potential east of the aqueducts. Break it down, stream by stream for me. I can't tell you which systems are going to be functioning or how we'll be able to divert if needed, so keep the equations at gate-head pressures and flow."

The two engineers nodded and headed back to their offices. Alec punched his home number on the vidiphone and Carol's face appeared on the second ring. "Oh, Alec, I'm so glad you called, honey," she said. "I've been worried sick since I heard the broadcast."

"You get that job done that I told you to do before I left," Alec asked.

"All filled," Carol replied with a smile. "What do we do now, darling?"

"You and Jimmy just stay put," Alec warned. "You've got a pretty good supply of food in the apartment right now. In the morning, go down to the store in the building and see what you can buy in the way of staples and long-storage foods. And get all the juices you can. Don't worry about the money end of it now. Spend it like it was going out of style."

"That bad, Alec?"

"Nothing that can't be handled," he replied, "but it may take a while and it may get awfully dry before it gets wetter. And listen Carol, you and Jimmy are to stay in the apartment and don't let anyone else in. You understand?"

She nodded.

"I don't want you or the boy out on the street under any circumstances. I'll probable be here at the office for at least another day, but if I'm not, then we won't be away for very long. I don't know when I can get home, but I'll call you every chance I get."

"All right Alec," Carol said. "I love you, darling. Do be careful."

Alec smiled and blew her a kiss and then snapped off the connection.

Troy had picked up the latest revised ten-, thirty and sixty-day meteorology predictions and was beginning to lay them up against the strip segments of the snow profiles from north to south along the length of Region Six. He was engrossed in the problem when Alec stuck his head in the cubicle.

"I'm bugged," the chunky engineer said. "Got a moment to talk?"

Troy shoved the papers back and waved to the chair. "Have a seat doctor and unburden yourself. Relax, let your mind go blank. Tell me about your childhood. Did you hate to take baths? Does the sound of flowing water stir subconscious hatreds in you? Dr. Braden will analyze all your problems."

Alec grinned and palled out a pack of cigarettes and offered one to his partner.

"Now that I think about it," he quipped, "I used to tangle almost every day in fifth grade with a kid that looked just like you. Seriously, Troy, I've got a wild idea and I want to try it out on you before I hit Jordan or The Scourge with it."

Troy leaned back and put his feet on the desk and listened.

"Actually, this is a little out of our line," Alec continued slowly, "but something we did up in the hills day before yesterday brought this on. The idea stems from the way we excavated that gauge, yet it calls for an entirely different idea and technique.

"Now I haven't the slightest idea how bad Spokima is cracked or just where the crack is, but I think there may be a way to recover some of the lost water. And if it works, it might be used on Moses Lake and McNary."

He paused and pulled a pad of scratch paper towards him and brought out a pen to make rough sketches. Troy swung his feet off the desk and leaned forward to watch.

"The idea came to me," Alec said, continuing to sketch, "from the runoff trough you cut to carry off the snow melt from around the hot box. Now just suppose that the crack in the reservoir is along the bottom side, although that doesn't really make much difference ... yet it might make the operation a little easier since it would concentrate the leak runoff.

"We know the reservoir is set in the bed of the Columbia from the confluence of the Spokane River down to old Grand Coulee. And we know just what the strata formations are both below the reservoir and in the aquifer downstream. That lost water is going into that strata and is going to work its way down the slope of the terrain but it's also going to level off on the first bedrock strata it hits and that's where I think we can stop it.

"If we ran a deep and big enough bore down ahead of the flow and cut a catch basin and then dropped a series of pumps into the basin, I think we could save a lot of that water by getting back onto the surface."

Troy studied the sketch for a minute. "How are you going to sink a bore that fast?"

"Laser," Alec replied simply.

"It would take one hell of a lot of industrial laser units," Troy murmured thoughtfully, "but, if we could get them, it just might work. What do we do if we can get the water back to the surface?"

"Same story," Alec pointed out. "If we can get the bores down behind the old Grand Coulee Dam, then we cut a channel and drain it into the old surface reservoir. Oh sure, we'll lose some surface evap until we can get it back down underground again. But that would still be one helluva lot better than letting millions of acre feet just seep out to sea. And if we had to, we could use the lasers to cut a channel around Grand Coulee and let it run down to the Okanogan where it would go into the Lake Chelan reservoir."

Ten minutes later, Plumber and the two juniors were closeted with Supervisor Wilson, going over Alec's plan. When Alec was through talking, Wilson flipped a switch on his desk intercom. "Harbrace here," the speaker sounded.

"Jim," Wilson said, "this is Morley. A couple of my harebrained kids have come up with an idea that makes sense and looks like it might salvage a lot of lost water. But we've got to move on it right now if it's going to work."

"Get them over here," Harbrace snapped.

Six hours later, the first light of the cold winter morning began competing with the batteries of floodlight tubes banked around a rocky, gravel-based site in the dry bed of the Spokane River. More than three hundred men had been thrown into the experimental project and for three hours a steady stream of huge cargo carriers and aircraft had been piling equipment around the site. A cluster of men stood around a compact pole-beam laser unit aimed at the ground. Upstream a line of metal poles extended up from the dry river bottom for a mile.

"This should be the last one," Alec said. "Let 'er go."

The laser operator fired and the light beam shot down into the earth, burning a narrow hole. "We'll set this one at one hundred and ten feet," Alec told the operator. The man nodded and turned back to his control panel. Two minutes later another metal pole was dropped into the hole. Projecting from the bottom of the pole were several soil moisture detectors. Extensions were coupled on section by section as the electrodes dropped down into the hole. A dozen of the eight-foot sections went down with the last section projecting from the river bed. A technician slapped a meter box onto the connections. "Dry here," he reported.

Alec, Troy and Harbrace, together with Wilson and a half dozen engineers from research and hydraulics and two laser engineers, consulted substrata profile readings.

"Well, if this scheme is going to work," the senior hydraulics man said, "this is the place to try it. We're still ahead of the seepage but not for long. We've got a good quarter-mile of deep rock for the sump hole. Let's try it." Harbrace nodded in assent and the group dispersed to the side of the dry river bed. Alec and Troy trudged up the shallow slope to a mess truck sitting on the flat. "Nothing we can do now but pray," Alec muttered. They picked up cups of hot coffee and walked back to the bank to watch the operations.

The light laser unit had been moved out and ten huge crawler cargo carriers with van were being mover into a wide circle around the last soil moisture stake. Crews were unshipping the beam heads of the giant industrial laser guns and making power connections to the series of mobile power reactors that had been set up on the riverbank.

When all of the units were in place and connected, the crews pulled out. At a safe distance from the bore site, a master control panel had been jury-rigged to control all units simultaneously. Two programmers and a pair of operators sat behind shields while the senior hydro engineer took a place between them and focused on his remote video eye at the site. A quarter of a mile away, vehicles still moved up with new equipment, but the remaining vehicles and other gear had been pulled back from the river bed to the bank.

The hydraulics chief looked around at Harbrace and waited. "Let's try it," the director ordered.

"Three seconds at a time," the engineer ordered. The programmers checked the timer cutoffs for a final time. "Ready?" The operators nod.

"Fire," the engineer yelled.

Ten massively concentrated beams of high intensity light waves slammed into the gravel bed. The earth shook and a great cloud of dust arose from the site, momentarily hiding the laser units. A light morning breeze drifted the dust downstream in a minute.

Ten huge holes gaped in the river bed underneath the laser beam heads mounted on adjustable cranes out and away from their power units.

"Fire," came the order again. This time there was nothing but the trembling of the earth as the beams cut a molten path through rock, clay, sand and boulders.

"Measure," the engineer ordered. A radar gauge bounced a beam off the bottom of one of the holes. "Eighty-seven feet," the technician called out.

"Change to a two-second shot." The programmers changed timing.

"Fire and measure."

"One hundred and seventeen feet," the tech called out.

"That's it," the engineer ordered. "Core it out."

Twenty minutes later, a hundred-foot wide bore extended down to bed rock. While the lasers were coring out the hole, six cargo cranes on their 400-ton carrier chassis had been moved into position. Now the cranes hooked onto three of the lasers, two cranes to each unit. Minutes later, the light beam units were lowered to the bottom. Additional video monitors together with portable lights followed them down into the hole. The lasers were aimed upstream and began burning a fan-shaped cut into the solid rock. The other three lasers were lowered down to join them and the great catch basin began to take shape.

If the geological survey was correct, the basin would be a good ten feet below the water-bearing gravel strata that should be carrying the bulk of the lost water from the ruptured underground Spokima Reservoir fifteen miles upstream. The river bed lay in a slight natural fault and the water should follow beneath the old river bed without too much side loss.

In a half hour the six units had carved out a cavern in the solid rock fifty feet high and extending six hundred feet upstream from the vertical bore. The engineers divided the units, three to a side and began widening to each side of the old stream bed and then working back down towards the surface bore.

While the work was going on beneath the ground, technicians maintained a constant monitoring of the moisture gauges upstream. The first of the four huge, sealed nuclear sump pumps had just touched the floor of the basin at the vertical bore when the tech at the gauge farthest upstream yelped, "It's wet!"

Harbrace and the hydro engineer jumped for the communications phone.

"How deep is it?" the engineer snapped.

"Forty-two feet," came the reply, "now it's forty-seven. Moisture content increasing. This is the head and it's coming fast."

"Get those lasers outta there," the engineer roared, "and get those other pumps down, fast."

More cranes were clustered around the grate hole and the three other pumps went quickly to the bottom. Down in the cavernous basin, the laser rolled quickly back to the bore hole where crews slammed magnaclamps on them and lofted them to the surface.

By the time they were starting to rise, three more closer gauges were reporting underground water flow.

As soon as the first two lasers reached the surface and were swung onto the gravel bed, they were sent waddling on their tracked carriers a hundred feet upstream beyond the upper end of the underground emergency cavern. The beams were set on angle and seconds later the light lanced out and down into the earth, smashing down through the strata and punching two great holes into the roof of the upper end of the cavern. Clouds of superheated steam gushed out of the twin punctures as the beams shut off. The beams had burned through the head of the seeping

waters. Now the other four lasers were on the line and in rapid order, a dozen more holes were on punched down through the bed and into the catch basin. The upstream roof of the cavern fell in for forty feet and a torrent of mud cascaded into the basin.

The instant the last beam closed down a roar arose from the workers clustered about the lip of the vertical pump bore. A wall of water came surging down from the upstream end of the cavern and smashed into the bore hole wall in a muddy, seething maelstrom. The strata-borne water had found the hole and were pouring down into the cavern and catch basin. The water began rising in the walls of the hole, sealed into a shining shaft of fused rock and silicon by the laser beams.

"It works," Troy yelled, pounding his partner on the back, "you harebrained son of an engineer, it works."

Alec's face was wreathed in smiles as the two of them hurried down the bank to the edge of the bore. By the time they reached the lip, the water level had risen past the underground upstream mouth of the catch basin and was boiling steadily upwards past the sixty-foot mark towards the surface. Despite the vent holes and the volume of water seeping through the strata from the ruptured Spokima Reservoir, there still wasn't enough pressure to raise the water level much above the fifty-foot mark, once the catch basin filled. That was the purpose of the four nuclear pumps in the sump hole. Their great million-gallon-a-minute jets forced the bore hole water up to the surface and kept sucking up the waters cascading now into the cavern.

"Get back," Harbrace yelled at the men still near the edge of the hole. "When it comes over it's going to blow and backwater."

Troy and Alec joined the workmen and technicians hurrying back to the safety of the riverbank. Two minutes later a deep-throated gurgle echoed in the cold morning air and huge bubble, then a geyser of water shot up into the air in a cloud of moisture and vapor spray. It fell back to the dry river bed, spread once again upon the gravel that had known only the gentle touch of rainfall for three-quarters of a century and then boiled and roiled in a gathering head downstream rolling loose boulders and logs in its teeth.

The water level in the river bed continued to rise and a backwater began forming, extending nearly a quarter of a mile upstream before it stopped. Now the bore hole was visible only as a muddy boil of turbulence churning in the center of the newly-flowing river.

The regional director came over to Troy and Alec and slapped the pair on the back. "You two have done a terrific thing here," he said with a broad smile.

"Not me," Troy protested. "This was all Alec's idea. I never thought the thing would work."

"Where's the water going?" Alec asked.

Harbrace pointed downriver to the hidden wall of the old Grand Coulee Dam around the curve in the river bed. "We're dumping into the Grand Coulee until we can get it back underground, probably into Chelan. Meanwhile, we're going to see if your idea can be used at Moses lake and McNary."

The great convoy of equipment and men was already on the move to join the other task forces of similar equipment already on site at the two other major damage locations.

"Nothing more for us to do here now, and the hydraulics people can take it from here," Harbrace said. "I'm heading back to Spokane. You two want to ride back with me?"

They turned and walked towards Harbrace's personal copter waiting beside the road a couple of hundred yards away.

Without warning, the earth began to shift beneath their feet and the trio staggered on the rolling surface. From deep within the ground came a brief but ominous rumble. Harbrace stumbled and would have fallen as the ground shook had not the two younger men caught him. The shock was over in less than a minute.

"My God," Harbrace breathed, "not again."

He spun and looked towards the river. A wash of waves from the flowing current lapped against the bank but from the center of the stream the waters continued to boil. All three men silently watched for a full minute. From the south where the tail of the convoy was still visible, a light survey car came racing back down the road towards the river.

It slid to a halt beside the bank and Hall, the senior hydro engineer, leaped out and came running towards the director and the two junior engineers.

"Is it still pumping?" he panted anxiously as he surveyed the waters.

The four men eyed the boil for another half minute. Now it was just a churning pool in the middle of the waters, no longer bubbling higher than the surface of the waters. "It's still pumping," Hall muttered, "but something's wrong."

He jumped for his car and grabbed the radio. "Swenson, Baker," he called, "hold it up. Get that

pump-monitoring rig back here on the double. And get the rest of that gear turned around and headed back this way. We've got more trouble."

The other three men had walked to the survey car. "What do you think's wrong," Harbrace asked.

"I dunno," the hydro engineer said. "Maybe the shock triggered the pile dampers on one of the pumps. Maybe something else." He squinted at the barely churning waters over the bore hole. "Can't say until we get a monitor on those pumps. If it's just a malfunction in one of the units, I can dump another one down there. If it's something else, we'll have to see then. One thing's sure, they aren't all pumping."

The pump section vehicles had been hauled out of the convoy and were already pulling up along the riverbank before the rest of the convoy of heavy equipment was turned around.

In the big monitor van, technicians already were running remote checks on the underwater pumps. The engineers and the director climbed into the van to wait the word.

"Number One's O.K.," the section chief reported, "so's Number Two." The three technicians at the monitor panel punched and re-punched banks of buttons and switches and watched the patterns on oscilloscopes.

"Something sour on Number Three," the chief said. "Can't say what yet."

"Skip over to Four," Hall ordered. "Let's see if that's O.K., then you can go back to Three."

In two minutes Number Four had been checked out in working order. The analysis concentrated back to Number Three pump.

"I'm getting a steady pile reading," the board man reported, "as a matter of fact, it's running a little hot. But no response to damping effect. She's running wide open."

"Yeah," the section chief muttered as his eyes shifted along the array of scopes on the panel, "I see that, but why aren't we getting any head pressure?"

The board men continued to run new series of response checks on the rest of the pump system. Outside, the head of the heavy equipment convoy came to a halt and the crews climbed out to wait beside their vehicles.

Five minutes later the board men finished their checks and then conferred briefly with the section chief. He came over to the engineers.

"I think we've got your answer," he said glumly, "but I don't think you're going to like it. The best we can figure out is that the shock must have created some kind of a lag turbulence down there and when it was over the water piled into Number Four and slammed it over on its side. Or maybe the shock just tipped it over. In any case, it's either clogged the intake or jammed the nozzles. We don't know which. And it's jammed the dampers."

"So," the hydraulics chief shrugged, "we put another unit down there."

"It's not that simple, Mr. Hall," the monitor chief continued. "That pile's running wide open and no place to go. It's got to be stopped or she'll blow right outta there. And if Four goes—blooey, there go the other three."

The chief engineer sagged. "No chance of getting the dampers to respond?"

The monitor man shook his head sadly.

Hall ran his hand tiredly over his face and stared silently at the flickering oscilloscopes as if to force the damping device into functioning by sheer will power.

He sighed and straightened up. "All right," he said, "how do we shut it off. Is there an outer manual system?"

"There is," the monitor chief replied, "but in all likelihood it's jammed, too, by the shock or tip-over—and I'm more inclined to buy the tip-over than anything else."

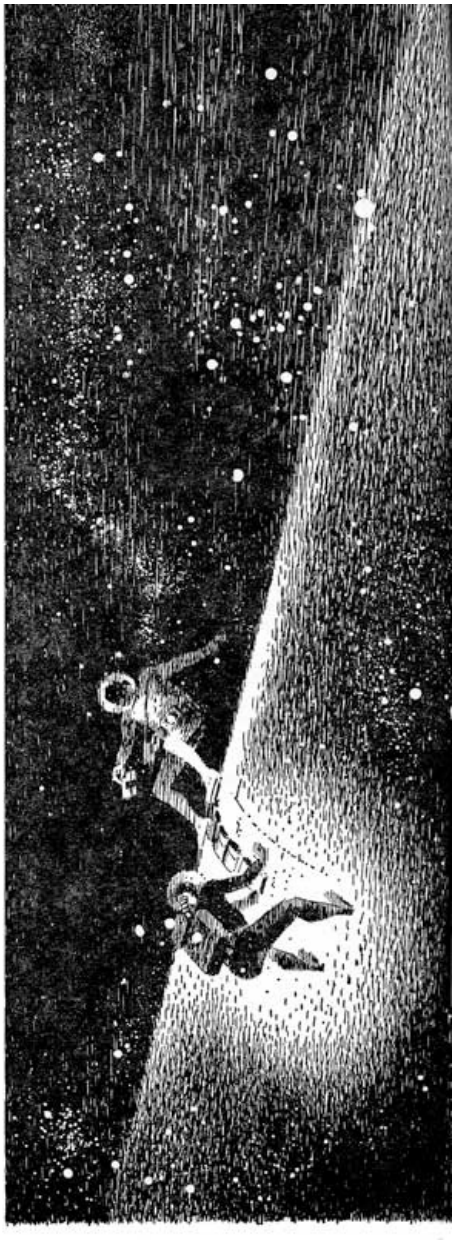
"Any other way to shut it down?" Hall queried.

"Just one," the chief said. "Blow her apart chemically before she goes critical. And that, chief, is a real tough one. Someone's got to go down there and clamp some plastic blocks in the right place on the pile housing. Even then, there's the chance that she might blow in the wrong direction and the whole shebang will go up in big, fat mushroom cloud."

Hall's eyes saddened. "If that's it," he sighed, "that's the way it has to be. Let's get with it. Where does the plastic go?"

"Better check that out with Barton in the main rig," the monitor chief replied. "He's got the prints and he can show you the exact spot on one of the spare pumps. Oh, and Mr. Hall," he paused, "you'd better hurry it up. She's leaking a little of the pressure down there but not nearly enough. I'd make a quick guess and say that we've got less than two hours to either shut that pile down or relieve the pressure. And if she's tipped, the time in

getting it back up and checking out damage on the pump system is going to take too long and it might not be repairable. The best bet is to blow her."



Hall nodded and with Harbrace and the junior engineers in his wake went to the central pump section vehicle.

Walking to the other vehicle, Alec looked at the water with stricken eyes. "God in Heaven," he said aloud, "I never thought it would end this way."

Harbrace broke stride and took Patterson gently by the arm.

"None of us did, Alec," he said. "This isn't your fault. You had a fine idea and it worked. What happened afterwards is no worse than the original quake that caused the damage. If this thing blows out, we won't be out any more water than we would have been if you hadn't come up with the idea in the first place."

"That's not what I meant," Alec said in a shaken voice. "If this does blow out, not only do we lose the water but we're going to contaminate this aquifer with radioactivity from here to the mouth of the Columbia."

"I know that, too," Harbrace replied softly. "It's still not your fault, son. And we're not licked yet. Come on."

Twenty minutes later, a double strand of durasteel cable stretched across the three-hundred-foot wide current, suspended between the raised crane towers of four of the mammoth crane carriers and passing twenty feet above the churn of the bore hole.

Hall and a half dozen of his section chiefs stood at the base of one of the makeshift towers. The chief hydraulic engineer had a headset clamped on for contact with all the working units.

He turned to one of the men standing by. "Get me a pressure reading on that hole," he ordered. "I want to know how much weight it's going to take to get down through that mess."

"Why not just shut the other three down while we go down into the hole?" the assistant asked.

"Calculated risk," Hall said. "If she's going to blow, it isn't going to make any difference if the others are shut down or not. And, if we can keep pumping while we're working, we're staying ahead of the flow from the reservoir. Get me that reading."

The pressure report was back in minutes. "It'll take at least a four-ton mass to get down there fast and keep from being bucked around."

Hall looked around, "What have we got that's small enough and has that weight or better?"

"How about a van tractor?" one of the supervisors suggested. "They weigh closer to six tons but they're pretty compact."

"Fine," Hall snapped. "Rig it."

The bulky, almost square, tractor was rolled up and the rigging crews were swarming over it, clamping suspension cables from the running pulley that would ride the cable across the current.

"What's the radiation report?" Hall asked monitoring.

"Still building," came the reply. "But we've got a leak somewhere, Mr. Hall. We're getting readings from the water down there. Not too much yet, but it may change our time factor. I'd either get on it fast, chief, or let's get outta here. That thing can go any minute now."

The tractor was rigged. Hall turned and bawled, "Where are those divers?"

Alec Patterson and Troy Braden stepped out of a nearby van, dressed in pressure suits and tanks, their helmet flaps open. Alec had a heavy belt of ultra-high explosive plastic lashed around his midsection. Troy carried a rack of small clamps strung across his shoulders.

"Where do you think you two are going?" Hall roared. "Get those suits off and get outta here."

"Shut up and listen," Alec snarled. "I started this. I'll finish it. This idiot partner of mine hasn't got any better sense than to go along. We haven't time to argue, so just listen.

"Both of us have been trained in hydrology and have made many dives before. We've both used this plastic and we've both handled hot stuff, probably more than any of your people. Your man has checked us out on the pump assembly and we know just what we're looking for. Let's go."

Hall glared at the pair for a second and then whirled to the rigged tractor. "Get that canopy off that thing," he ordered. "They can ride it down in the seat."

He turned back to the junior engineers. "Got lights?" They both indicated a pair of sealed handbeams on their belts. "All right, get aboard."

"Casey," Hall called over the intercom, "got that communications line rigged?"

"All set, boss," came the answer. "It will run out the cable and down the cab. I've left them plenty of slack to move around when they get down there."

"O.K.," Hall waved to the riggers, "everybody get outta here. Casey, plug them in."

Alec and Troy had entered the cab. The communications man leaned over and coupled the phone system into their helmets and then waved at Hall.

"You two hear?" Hall demanded.

"Loud and clear," Alec replied.

"All right," Hall ordered, "let's get with it. This is a general order. All vehicles and personnel not directly involved, pull back a full mile."

Men and equipment began moving away.

"O.K., Number One crane, lift 'em."

The crane operator on the near bank eased his gears into motion and the six-ton tractor lifted into the air with Alec and Troy aboard. When it was five feet above the ground, the crane on the opposite shore began hauling the draw line and the vehicle swung out over the water.

"Now listen closely," Hall ordered the pair in the swinging vehicle, "from this point, you are in control. Stop your slide over the hold by just yelling "Stop." Number one crane is your up and down operator and also will pull you towards this bank. If you need to go forward or backwards when you get inside the hole, just say which way and both crane carriers will move in the direction you want. Got it?"

"Affirmative," Alec replied.

A second later he yelled "Stop." The pull halted and the heavy vehicle swayed just a foot above the churn in the waters. Alec waited a minute until the tractor quite swinging and then ordered, "Let's go down."

Number One crane began paying out cable and the tractor and men slipped beneath the surface of the turbulent waters.

Surging, silt-laden water rushed upwards past the sides of the heavy cab and swirled around Troy and Alec. Both were clamped into the seat by a steel mesh belt and the waters tore and whipped at them. Despite the six-ton mass of the tractor, both men could feel it quiver against the thrust of the waters rushing and breaking against its undersurfaces. Although both had turned on their powerful suit lights, the lamps made only a dim glow in the surging waters. When the tractor had dropped some thirty feet, it was Troy who yelled "Hold it!"

The downward motion stopped.

"Let's get back against the wall," Troy yelled over the roar of the torrent. "Those pumps are pretty well to the center of the bore and I don't want to come down on top of one of them, even the bad one. Move back!"

On shore, both cranes began inching up stream.

In the thundering bore, the tractor bumped against the wall of the hole. "Hold it," Troy shouted. The carriers stopped. "Take 'er down."

Again the massive vehicle descended into the depths. The roaring became louder with every foot and the constantly dinning noise rattled the earphones of the crane and carrier operators. Hall stood on the bank, his eyes glued to the thread of cable vanishing beneath the waters.

The tractor was bumping against the wall with more violence and the engineers could feel it tip and sway as the turbulence increased from below.

"I think we're too close to Number Two pump," Alec yelled. "Let's get a little more offshore." On the far bank, Number Two crane began hauling the pulley towards him.

The undersurface bobbing lessened. "That's good, Number Two," Alec shouted. The downward motion continued.

As suddenly as it began, the turbulence almost ceased and the sound diminished in the black, watery hole. The big nuclear pumps stood thirty feet high with their great jets at the top. The tractor had descended blow the level of the jet thrust. At the same instant, there was a forward motion and the tractor began to sweep toward the downstream wall of the bore.

"Drop us, fast," Alec commanded. "We're being sucked."

Number One crane operator slammed his release button and the tractor fell with a jarring crash to the floor of the catch basin. On the floor, its mass held it in place against the drag of the three huge pumps and the natural flow of the water.

The water was clearer and their lights penetrated a few feet into the black-green hell around them.

"You see it?" Alec asked his partner.

"Not a thing," Troy replied, "but we can't be more than a few feet from it. It's got to be somewhere in front of us and I think a little to my side. The suction drag doesn't seem quite so heavy over here."

"Number One," Alec instructed, "give us a fast one-foot lift and drop it immediately. The current will move us."

The operator took up the slack in the cable and then gave a short burst of upwards pull and slammed the release. The tractor lifted and was carried forward about five feet before it slammed down again and stopped.

"There it is," Troy yelled, aiming his light to the right front of the tractor. The beam picked out the massive casing of Number Four pump. "Let's get in close." On instructions from the submerged engineers both cranes lifted and hauled briefly. The tract slammed into the bulk of the disabled pump. Troy and Alec played their lights over the plate.

"This is the bottom plate," Alec said. "It's tipped all right. Got to ease around to one side."

Again the cranes dragged and lifted and the massive tractor scraped along the bottom plate of the overturned pump. Suddenly the vehicle whipped forward. "Drop it," Troy yelled, and the carrier smashed to the basin floor.

They were alongside the main outlet tube, now tilted downwards on an angle towards the floor of the basin. Below them and under the curvature of the tube was the pile housing. The explosive had to be placed at the point where the pile housing, the pump base and the outlet tub met.

Currents of water still swirled around them and tugged at the two men. But it had much less force than during the downward descent. Alec unclamped the seat belt, then slammed his magnetic clamp suit boots against the outer plates of the carrier. His suit buoyancy dragged him into an awkward crouching position and he swayed and fought against both the upwards lift and the current swirl.

"Let's go," he said.

A hundred and seventeen feet above them, Hall and the crane operators could hear the hollow clang of the magneboots as the two engineers inched their way back alongside the tractor to a spot where the tractor hull touched the pump housing. Alec cut one foot loose from the vertical side of the tractor and slammed it against the pump base and then quickly shifted the other foot and began forcing his way down under the curve of the tube. Troy followed.

In the shelter of the base and tube, the current no longer pulled at them and it was only the suit buoyancy to battle. It took them three minutes to struggle their way to the juncture point. Alec wedged himself in with his back against the housing above him and carefully began unwinding the explosive belt he was wearing.

With his feet clamped on the vertical wall of the pump housing and knees locked in a skier's stance, Troy handed over the first of the magnetic clamps. Alec took it and carefully clamped the end of the plastic explosive belt against the pile housing. They worked slowly but steadily until the entire band of explosive was in place along a five-foot arc of the housing.

During the entire operation, neither man spoke and on shore, the listeners could hear only the heavy breathing of the pair and an occasional muffled sound of a clamp going into place.

When the plastic was locked down, Troy carefully unclipped a timer fused from his belt and handed it across. He spoke for the first time since they left the tractor. "It's set for seven minutes." In the wavering light of the murky waters, he saw Alec glance up at him and then gingerly insert the fuse into the explosive.

"Get moving," Alec ordered. Troy started inching his way back along the pump housing wall. Alec waited until Troy moved into the gloom and almost out of sight, then flipped the water-tight switch that activated the fuse. The device was armed. In seven minutes, if the pile didn't go critical before then, the charge would detonate—whether they were back on the surface or not.

He shoved himself free of the pile housing and followed Troy back along the wall of the base. At the hull of the tractor, he made the foot-at-a-time crossover and again fought suit and current to get back to the cab. The seconds ticked off into the first minute and into the second. Ahead, Troy had reached the aperture of the cab door and reached in to grasp the end of the steel safety belt. He hauled himself into the seat and looked back for Alec.

The other engineer had just reached the cab. He swung a leg over the sill and at that moment, a surge of current whipped his suit. He twisted, grabbed for a handhold and missed and shot up towards the surface. In that same instant, Troy shot up out of the seat, holding the end of the belt in one hand and grabbing for Alec's ankle with the other. He caught it and clutched. "Up, fast," he screamed.

The tractor snapped up under them and threw both men against the seat. Alec seized a control handle and hauled himself into the seat as the vehicle surged upwards. Under full power, it was whipping towards the surface and now, the water pressure was holding them down. The timer passed the four-minute mark when the six-ton carrier burst out of the water in a geyser of spray. The cable whipped and almost threw them from the cab. Then there was a spine-snapping side jerk as the Number One crane operator began smoking the cable pulling them to the shore.

Thirty seconds later the tractor slammed to the ground. Hall and the crane carrier driver were waiting. They reached in and jerked the two engineers from the seat and half carried them to the rear of the massive crane carrier. The operator had already leaped from his cab and was lying prone, face down on the ground.

Troy and Alec, together with Hall and the driver, stretched out alongside each other in the dubious shelter of the carrier and waited.

The seconds ticked off. A minute later, a small geyser of water shot up a few feet from the surface of the water and seconds later they heard a slight rumble. Then there was only the sound of their breathing and the rush of water in the river.

Hall jumped up first while the others were still scrambling to their feet. He raced to the radio after a hasty look at the river.

"Monitor," he called, "what's the story?"

"They got it, boss," monitor answered. "The pile is dead. You've got some hot material in the water but it's dissipating fast. All other pumps in good order."

Hall broke into a big smile. He walked back to where Troy and Alec were struggling out of their pressure suits.

In the distance, the director's copter was lifting from the ground and heading towards the riverbank. A few minutes later, while a new pump was being lowered into the bore hole, the copter took off en route to Spokane. The two junior engineers were aboard. When it landed at Region Six heliport, Alec jumped from the ramp and ran to the nearest building. He found a vidiphone and called home.

Carol's worried face appeared and then lighted when she saw her husband.

"Honey," Alec said, "You can go ahead and bathe the kid now."

He came out of the building to find Troy waiting. They grinned at each other. At that moment, Supervisor Morley Wilson came hurrying by.

"All right you two," he snarled, "so you've solved one little problem. Remember, you've got just nine days left to give me an answer on those new production units." He hurried away.

Troy gazed at Wilson's departing back.

"That's what I like about working for DivAg," he murmured. "Nothing ever changes."

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