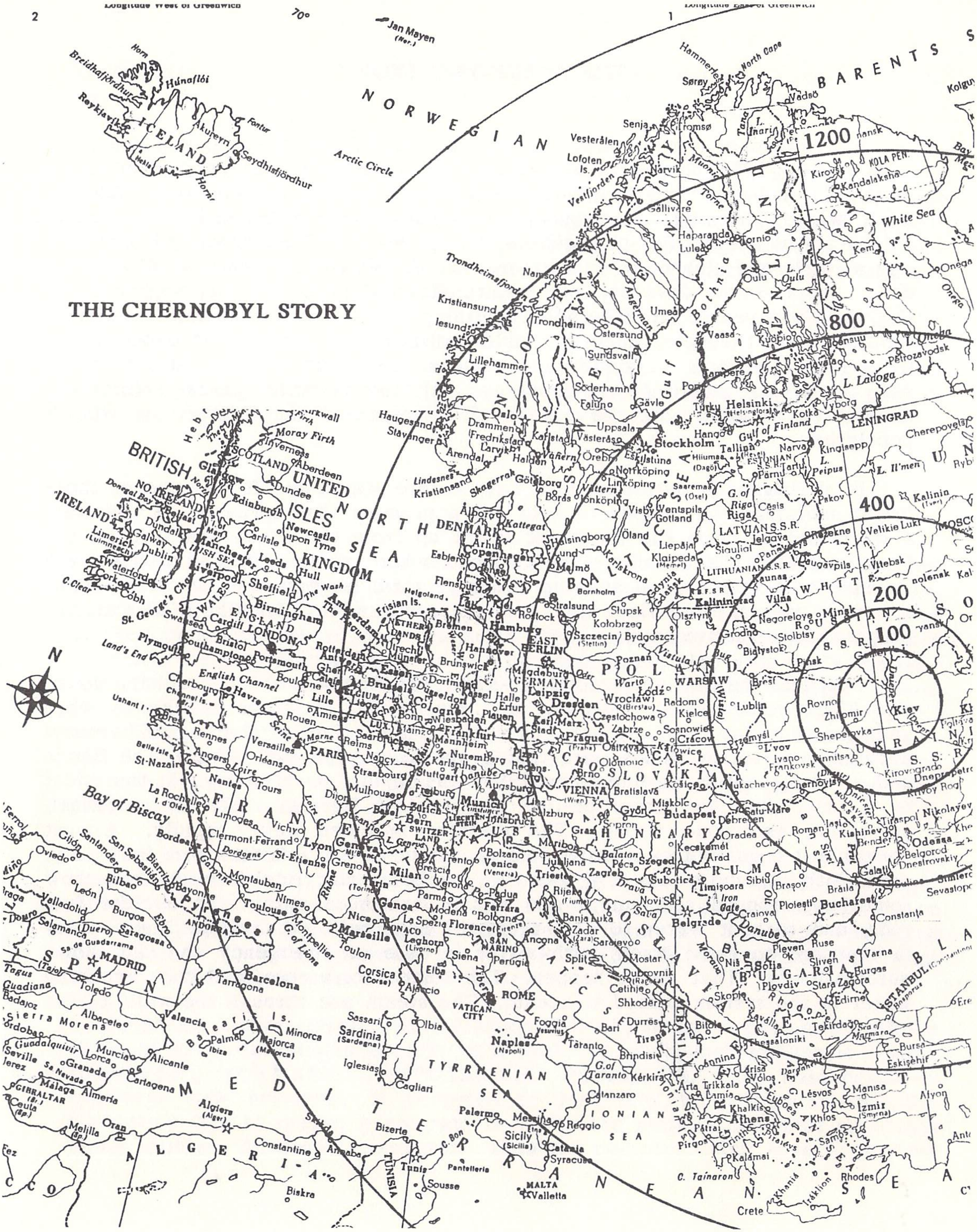
THE CHERNOBYL STORY



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It's been over a year now, but in the latter days of April, and the early days of May, 1986, the world held its breath. A terrible accident had occurred at the Chernobyl nuclear power reactor inside Russia, and it was as bewildering as it was frightening. A thousand megawatt power plant suddenly became a fountain of death. For physicists and engineers the breakdown and explosion was a riddle and nightmare come true. The Soviet Government did all it could do to suppress the answers, but despite Moscow's best efforts, sophisticated U.S. satellites peered into Chernobyl's burning hulk and scientists and technicians scouring over the data made available realized that their worst expectations were indeed reality. A significant nuclear event had occured at Chernobyl and the world might be in jeopardy. A massive intelligence effort was undertaken to determine the extent of damage and the risk to the world's population.

It all began on Saturday, five days before May Day. It was one of those bright mornings that seems to hold out a promise that spring is on the way, a warm breeze from the southeast swept up from the Black Sea through the breadbasket of the Ukraine. The two and a half million citizens of Kiev, the Republic's ancient capital and the country's third largest city, had their minds on other events. Red flags and party placards were everywhere as the city prepared for a festive holiday.

But, less than 80 miles north of Kiev normalcy was already melting down. The 25,000 citizens of Chernobyl and the 10,000 residents of Pripyat were unaware that anything unusual was taking place. But at the huge Chernobyl nuclear power plant things were taking place...very unusual things. The fourth and newest reactor, on-line since 1983, was rapidly overheating. In the midst of a test being performed on-line by qualified Russian technical personnel, something had gone wrong. The disaster unfolded quite rapidly. Almost certainly it began with a massive loss of coolant in the reactor's core on Friday, April 25th. Maybe a loss of pressure -- maybe an electrical failure -- somehow something stopped the pumps and fission continued within the nuclear fuel rods, and without water to cool them off heat built up rapidly. The reactor is supposed to flood itself with water in case of emergency and shut down automatically. That didn't happen. The temperature rose, and the remaining water in the system turned to steam. The steam ate through the walls of the

pressure tubes that carry water through the core. The steam reacted with the graphite blocks of the old fashioned Russian reactor. Highly explosive gases were formed around the pressure tubes and on Saturday these gases exploded, shattering the building. The graphite was ignited and blew open the reactor core. As the graphite was exposed to the air, the fire intensified. The uranium fuel, continuing to fission, heated and melted. Radioactive particles in the form of gas and a cloud of smoke rose into the sky.

A fire in a graphite reactor has not occurred since 1957, when Britain's Windscale plant suffered a similar crises. In 1986, the Russians were still using this outmoded technology, and on top of that had built the reactor without a containment building surrounding it. When graphite burns it burns with a vengeance. It reaches temperatures of more than five thousand degrees celsius. It creates a terribly dirty fire that spreads fall-out constantly. Without a containment structure, a huge reinforced concrete dome designed to prevent radioactive materials from escaping during an accident, the clouds of deadly radioactive isotopes spewed out, sucked upwards by the convection of the raising fire, and into a cloud of deadly radiation. Since the operators were too late in flooding the reactor, the superheated steam which formed had reacted with the graphite, with the fuel and with the zirconium shielding producing flammable hydrogen, methane and carbon monoxide. The gases had built up for hours and when they combined with the oxygen, released by the rupture of the pressure tubes, a violent explosion occurred. The reactor was destroyed, and so was a portion of the reactor building.

However, the explosion and cloud represented only Stage 1 of the disaster. Now the shattered graphite bricks began to burn like a giant pile of coal. Melted fuel fissions out of control and water will not quench the fire. In fact, water would only react with the graphite to produce a flamable form of carbon monoxide which would only fuel the flames.

Russian authorities moved as quickly as possible to contain the disaster. A cordoned off circle was formed around the Chernobyl plant approximately 18 miles in diameter. Helicopters and planes were used to allow specialists to survey the scene. Medical workers were called to the aid of the injured. The movie "China Syndrome" represented only a fraction of the disaster they faced. In other nuclear melt-down scenarios, most of the radioactive materials remained buried, perhaps deeply in the ground. Unfortunately, at Chernobyl, the graphite fire had sucked in oxygen, and as it burned, had spewed the radioactive isotopes into the air, contaminating rivers and reservoirs.

American intelligence sources were able to redeploy one of their KH-11 Military Reconnaissance Satellites that it currently had in orbit around the earth. Powerful lenses peered into the Chernobyl reactor. The scene was astounding. The roof of the reactor was blown off and the walls were pushed out

Inside what was left of the building, analysts could see an incandescent mass of graphite. Smoke-blackened surrounding buildings indicated that at some point the fire had been much more active. The glowing mass of graphite now resembled a back yard barbeque fire. Deadly gases that once represented a hundred tons of uranium were still being vented through the open roof into the atmosphere and surrounding the countryside.

Closer analysis however, indicated that something even more unusual was taking place. The pictures of the destroyed reactor building also showed barges filled with peaceful people sailing down the Pripyat River as though nothing had happened. And less than a mile from the burned-out reactor, men could be seen playing soccer. It was clear that the community had not been evacuated.

Hurriedly, analysts began to look back through information which had been collected by other forms of surveillance. Tapes recorded the previous Saturday had shown infrared images of a sudden flash in the vicinity of Kiev. Now they believed that this represented the explosion that had shattered the reactor. Communications analysis revealed that the day before, Friday, April 25th, emergency action was being taken even then at the Chernobyl plant. Apparently the Kremlin must have known about the accident a full three days before it made its first grudging announcement. Even now they were not informing their own people. Secrecy was reaching the level of inhumanity.

Finally, the outside world was notified, but not until trouble was being detected elsewhere. Without any announcement from Moscow, residents were quietly evacuated from the Chernobyl region. Close to 50,000 people were moved. Convoys of Kiev's city buses were seen leaving the city heading towards Chernobyl.

Early Monday morning, a worker at Sweden's Forsmark nuclear power plant walked past a radiation detector and the alarm went off. Radiation was discovered on the blue covers he wore over his shoes. Officials quickly determined that there was nothing wrong at the plant because monitoring stations elsewhere in the country were also reporting sudden jumps in radiation to levels as high as a hundred times normal. Upon notification from the Swedes, the Americans erroneously concluded that a Soviet underground nuclear test had somehow vented into the atmosphere.

By mid afternoon Monday, Swedish scientists had identified isotopes of Krypton, Xenon, Iodine, Cesium, and Cobalt in the fallout. This radioactive stew had to have come from an accident in a reactor. A meltdown had taken place somewhere. Through an analysis of wind direction and time of detection the Swedes backtracked from Eastern Sweden and determined that the accident must have occurred on a line that led over Latvia, down over the Soviet city

of Minsk to Kiev. But surely if the Soviets had experienced a dramatic nuclear explosion venting radioactive isotopes into the atmosphere from an inland location, dramatic action would surely be underway. Therefore, they incorrectly assumed that the broken down plant must have been close to the sea coast.

That didn't seem to square with the facts. Analysis of the wind and a composition of the radioactive cloud indicated the fallout was moving in a coherent plume at an altitude of about 5,000 feet. Since the cloud they detected had scattered widely it must have traveled a great distance, meaning that the accident had occurred further south, deep in the Ukraine. Even though it seemed incredible, the analysts knew that this meant Chernobyl.

Events began to catch up with the Russians. Finally , at 9:02 p.m., on a television news program called "Vremya", the Soviets made their first announcement.

> "An accident has occurred at the Chernobyl Nuclear Power Plant as one of the reactors was damaged. Measures are being taken to eliminate the consequences of the accident. Aid is being given to those affected. A government commission has been set up."

That was all. No mention of casualties. No technical information on the dimensions of the disaster or how it was being dealt with. Foreign diplomats and embassies requested additional information to protect their citizens. The Russian reply was that there was no other information to give. The Russians were stonewalling the world on a potentially disastrous event. Meanwhile, the fires continued to smolder.

By Tuesday the Soviets released a little more information -- four short paragraphs revealing that two people had been killed during the accident. The main concern then became -- how many people had been killed by the effects of the disaster, and how many people were likely to die later? The announcement added that the "radiation situation has now been stabilized." And they said that four "settlements" near the reactor had been evacuated.

By Wednesday the Soviets released more of the frightening story. They insisted that "no chain reaction fission of nuclear fuel is taking place. The reactor is now in a smothered state." A government agency indicated that 197 people had been hospitalized, but that 49 of them had been quickly discharged. Further, they indicated that the radiation situation was improving and that the state of the air basin over the remaining territory of the Kiev region and the city of Kiev was causing no concern. The quality of the drinking water, as well as the water in the rivers and water reservoirs, was in line with standards. A commentator on Soviet television showed a black and white photograph of the damaged reactor building. "As you can see yourself there is no gigantic destruction or fire," he said. American Intelligence experts

agreed that the photo was accurate, however one major exception had occurred. The Soviets had air brushed out a plume of smoke and the heat haze that rose from the reactor.

The infrared satellite photos showed continuing hot spots caused by lingering heat long after the fire had been brought under control. Additional data suggested that the graphite was still burning. The Soviets appeared to be dumping dirt and sand on the fire from helicopters. One helicopter was hovering dangerously close to the plume of radioactivity. Sending Soviet pilots on such a mission seemed suicidal indeed.

Experts estimated that the accident's "kill radius" extended for at least 18 miles around the site. This would be an area of more than 1,000 square miles in which unprotected humans could die.

Foreign governments took no chances. France quickly withdrew 12 of its nationals from Kiev while the Finns sent in a special plane to help evacuate 100 students and technicians from the area. England evacuated 86 students and teachers from Kiev and 30 more from Minsk, which lay under the initial path of the cloud from Chernobyl. In Poland, the neighboring country nearest Chernobyl, the fear of the accident was in the air. Radiation levels soared, and the government distributed an iodine solution to children under 16. Even as far away as Tokyo, heightened readings prompted recommendations that citizens should not drink rain water.

Despite the catastrophe, and despite the calamity which might occur, on May Day marchers thronged into Moscow's Red Square and with balloons and banners proclaiming, "Denounce Nuclear Madness in the United States." In fact, the television broadcasts pointedly featured the colorful parade in Kiev, amongst small scattered reports from the city that electricity and water services had been interrupted in some neighborhoods during the week. And, Tass, the Soviet News Agency, published a letter to six world leaders criticizing the United States for its continued nuclear testing.

Today the road from Kiev to Chernobyl is filled with the reminders of the disaster. Incoming motorists still have to slow down while automatic docimeters scan their cars. Along the wooded 90 mile route drivers returning from the plant must stop every five minutes at a Soviet monitoring station.

In all, 135,000 people were evacuated from 179 populated centers around Chernobyl. The first two reactors at the plant are back on line, and the third one, the one which was immediately adjacent to the demolished fourth, is to become operative later this year. The City of Pripyat, nearby the blackened stack of reactor Number 4, is a ghost town. It is still decorated with posters for May Day 1986. Weeds are pushing up through sand boxes at yellowed

kindergarten buildings. Where some 50,000 people went about their business, on the warm Saturday morning of April 26, 1986, today lingers nothing but abandoned memories.

The former Plant Engineer, Chief Engineer, and his Deputy are charged with criminal negligence for permitting the accident. Apparently they were in the process of a controlled testing procedure when the situation got out of hand. The danger was underestimated and corrective remedies were not taken soon enough. Circumstances were allowed to go out of control and the resulting disaster became inevitable.

Today the Soviets are building a new town, Slavutich, which will house 30,000 Chernobyl workers, family members and support staffers. The miscalculation that may be felt for generations has now become a part of history. Hopefully, it is a part of history that will not be repeated.

PAUL NORMAN, the designer and programmer of CHERNOBYL, has had an impressive career producing computer software at COSMI. His first effort, FORBIDDEN FOREST, came on the market shortly after the introduction of the Commodore 64 personal computer. The eerie music (which Paul composed himself), the outstanding graphics and intricate game play soon made the title a top seller and won it the Software Publishing Associations Silver Award. But, Paul didn't rest on his laurels. His BEYOND THE FORBIDDEN FOREST introduced Omnidimension 4D, an exciting technique in which the player is able to move realistically in and out of the monitor screen, creating the illusion of authentic spatial geometrics. Combined with the visual passage of time the program was truly four dimensional.

Paul immediately invested his talents in furthering the art of authentic simulation when he developed SUPER HUEY, the first helicopter flight simulator. The program proved to be a roaring success, zooming to #1 on all the charts and receiving a Gold Medal from the Software Publishing Association. Quickly followed by SUPER HUEY II, the series soon went Platinum, the highest award in the industry.

Following a short respite, during which COSMI convinced Norman to release some of his programming secrets in a desk top publishing and music editing title, PAUL NORMAN'S COMPUTERIZED PUBLISHING CO., Paul began to challenge new horizons. It occurred to him that the ultimate authentic simulation was to create a program in which the player's computer simulated being another "different" computer. Then the operator didn't have to pretend

that his computer was an airplane or a submarine, but only that it was a different computer. The computer/computer simulation genre was born and COSMI was rewarded with Paul's current smash hit DEFCON 5, in which the player is put in charge of the computer controlling America's S.D.I. "Star Wars" defense system.

Now, in his latest computer/computer simulation, Paul Norman has reached new heights. CHERNOBYL will put you at the master control console of a nuclear power plant. The reactor and the lives of millions of people will be at your fingertips. The excitement and challenge will build as you learn the intricacies and dangers of atomic fission. The genius of Paul Norman awaits you. Enjoy!

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