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Chapter 13b Control Data – Idaho Falls 1971

In late August Chris Christopherson who worked out of the Renton office, and the salesman responsible for Idaho, approached me. He had a prospect which was EG&G, Idaho. The AEC had an IBM 360 Model 75 in Idaho Falls, Idaho. They were a prospect for a CDC 7600 class computer in a couple of years. He also was working with a consulting company, Energy Incorporated (EI), that was interested in using the CDC Data Center in Palo Alto.

This was a scenario like I had worked in Richland, and he would like to have me in Idaho Falls. EG&G, Idaho was the prime contractor at the INEL and would be responsible for the computer procurement. They were the same company I worked for in Las Vegas. That would be a plus, as well as being from Idaho. My role in Richland was essentially complete. I did not want to hang around fighting with CSC as a support analyst. I said I would be interested if he could work it out.

In late September Chris got back to me. I was to go to Idaho Falls with him to meet people and assess the situation.

It looked like a huge challenge in Idaho Falls. CDC lost to IBM a few years earlier, even though CDC was the preferred vendor, and had the best computer. The procurement was tailored for CDC, but the analyst messed up the benchmark. IBM won and now EG&G management and the users had a grudge against CDC. I thought it was something I could turn around. I loved the pre-sales environment. I was ready for a new challenge.

A few days later LaRue and I were told to fly to Idaho Falls and look for housing. Before we left we listed the house for $39,500. The realtor was skeptical as that model had never sold that
high. We farmed the kids out with the neighbors, flew to Idaho Falls, and stayed at the Westbank Hotel. LaRue looked at houses while I met with EG&G and EI people.

We had no idea how long we would be in Idaho Falls and we didn't want the work of another new house. LaRue liked the older established house at 245 Ronglyn Avenue and I liked it also. It was all brick with a family room, living room, dining

room, kitchen, pantry, 1 1/2 baths, and two bedrooms upstairs and a finished basement with two bedrooms, a bathroom, huge fruit room, huge recreation room, a craft room, a laundry room and a furnace room. It was built in 1955 by the owners of a furniture store and the carpets and drapes were all high quality. The wife had passed away and he moved to Island Park with a new wife. He would only entertain a full offer of $40,000, so we submitted our offer at his asking price. After the realtor tracked him down he accepted.

Our flight home was on Hughes Air West (the yellow airplanes called the flying bananas) via Boise, lewiston, then to Pasco. We had an hour to kill in Lewiston, and we went to the bar to watch the Oakland A's in the final game of the World Series. It came time to board. It was the last of the ninth inning with the A's in the lead. We were being paged over and over but we had to see the ending. The A's won and we dashed across the tarmac while frantically being waved aboard. The pilot asked who won.

When we got home I made a long banner and hung it across the front of our house with "Oakland A's" in yellow and green. We sat on the front porch that evening with our drinks, our A's caps, and the green A's bats of the kids.

In the next day or so we received an offer on our Richland house at our full asking price of $39,500 much to our and our realtor's surprise. Maybe we should have asked for more, but we were happy to have it done so we could close on the Idaho Falls house.

I had some work to do to turn over the account to my old friend, Don Cooper, who was moving from the Portland office. I decided I would leave the Mazda at the Pasco airport and fly back and forth until the turnover was complete around Thanksgiving. We hated to leave the Richland house and all the work we had done. The movers packed and loaded us up and we departed for Idaho Falls on October 24, 1973 pulling our Golden Falcon travel trailer with the new Oldsmobile.

It was windy and raining hard. The gas gauge on the Oldsmobile was on empty when we got to Boise that evening. I pulled into the first gas station we came to and coasted the last fifty feet to the gas pump out of gas. We stayed at the Holiday Inn across from the airport and went on to Idaho Falls on the 25th. I parked the trailer at the house, and we checked into the Westbank hotel. It was Julie's seventh

birthday. We had a birthday dinner in the Bonneville Hotel dining room. We moved into the house a few days later after we closed, and a house cleaner had gone through it.

My Work in Idaho Falls

I finished up my work in Richland the day before Thanksgiving. I put snow tires on the Mazda and departed after work. I hit a snow storm through the Blue Mountains and the rest of the way. I got to Burley around 1am and the freeway was closed. The Mazda had good road clearance for the deep snow, and the snow tires were effective. I drove around the barrier and kept going. I was the only vehicle on the road from Burley to Pocatello. I got to Idaho Falls at 5am Thanksgiving morning. The folks had come down from Salmon and they had a tough trip also.

The winter of 1973-1974 was bitterly cold with a lot of snow and temperatures down to 20 and 30 degrees below zero. We never really wanted to live in Idaho Falls because of the cold winters but now we were here. I wondered if we could adapt and like living in Idaho Falls.

Chris was a wheeler dealer and made an agreement with Energy Incorporated (EI) to provide us an office in their building downtown. In exchange, I would help them convert their programs to run on our Palo Alto Data Center 6600. He convinced CDC to install a user terminal at no cost to EI since it would produce revenue. Chris went so far as having EI sign a letter of intent for a computer system within a couple of years to sort of validate things and bait CDC management. Chris would continue to live in Seattle and fly back and forth almost weekly. He obtained budget for a nice monthly expense account for entertaining prospects. Chris used it liberally.

My main effort would be with EG&G to meet key users and build trust. They operated the IBM 360/75 computer for the INEL that was selected after CDC botched the procurement a few years earlier. It was woefully inadequate when it came to the reactor safety research program called RELAP that was developed at the INEL and used worldwide. A typical reactor simulation on the IBM 360/75

could take several hours. A justification was being built for the acquisition of a new modern supercomputer.

In one of my first meetings at EG&G I met with Dick Wagner who was now the head developer of RELAP. The original two developers of RELAP had left EG&G and were now in ownership positions in EI. That would help me greatly in the future. Dick asked me how much faster the CDC 7600 would be versus the IBM 360/75. I told him I would expect around ten times faster. That got his attention, and challenged me to prove it. I accepted the challenge with all the confidence that I could muster.

Converting RELAP would be a major undertaking since it was programmed around the IBM 360/75 and its scientific computing limitations. IBM with its 32 bit word lacked the numerical accuracy of 10-12 decimal places. It required double precision floating point notation. Single precision is the normal mode of operation with CDC computers and its 60-bit word. So, the programmers devised a scheme using double precision 64 bits on the IBM system. I knew that the way IBM does normalization within 64 bits it still provides less accuracy than CDC with 60 bits. I planned to exploit it.

EG&G programmers programmed the reference to the first variable in an array as A(1,1) in IBM notation. It would have to be changed to A(1) for CDC notation and a massive task. RELAP had many thousand lines of code that would have to be changed to run on a CDC computer in single precision.

CDC computers could run RELAP in double precision with no changes. However, it would take twice as long per calculation and was not necessary. Luckily the people at EI had accomplished some of the conversion and I could follow what they did. However, it would still be a big effort. Knowing this I loaded up and flew to Minneapolis where I would have access to a 7600. I worked day and night with little sleep for a week and finally got it to run.

I flew back with the results on a computer printout about a foot high. I met with EG&G management and Dick Wagner. I held my breath while Dick flipped through page after page of the results. After quite a while he said the results were good and we were 10.8 times faster than the IBM 360/75! The EG&G and DOE people were impressed. With this speedup they would be able to run a complete reactor simulation in an hour or two versus twenty-four hours on the IBM 360/75. .

Chris and I began pushing for a quick sole source procurement for a CDC 7600, and EG&G management picked up on it. The normal computer procurement cycle in the AEC, now known as the Department of Energy (DOE) was around three to four years. It required a feasibility study and justification to be submitted. If it was approved a funding request had to be submitted for congressional action in the next budget cycle two years out. A sole source procurement could be accomplished in six months, but is only approved in urgent circumstances.

RELAP was the only computer program in existence that could simulate reactor failures and predict the outcome. If a major accident occurred (such as happened few years later at Three Mile Island) EG&G and DOE would not have the computer power in place to address the accident. EG&G submitted this as the justification for a sole source procurement for a CDC 7600. It had a good chance but was rejected at the final hearing in Washington. It was not all bad as EG&G could proceed with an expedited competitive computer procurement. We would have to fight it out with the competition.

I have no doubt that high level IBM management used their Washington DC clout to shut down the sole source request. We knew we were getting under IBM's skin as they were complaining to EG&G and the AEC about my activity in Idaho Falls. They started bringing in IBM sales and technical people with Idaho backgrounds to make sales calls. It was amusing. They even replaced the regular salesman based in Boise with the hotshot salesman based in Houston. He was the salesman for the last procurement in Idaho Falls, which IBM won. However, he remained in Houston and only came to Idaho Falls infrequently. Chris and I would run into him in the Stardust bar and had some good discussions. I told him one night I didn't want to see the IBM jet flying in with IBM executives to go fishing with key INEL people as was the case in the last procurement. We learned later that IBM issued a directive that IBM people were not to frequent the Stardust.

Chris and I were deflated about not pulling off the sole source procurement, but we had made a lot of progress in the first six months in Idaho Falls. The Seattle District’s annual sales meeting was at a resort on the Oregon Coast that spring and Chris and I went over. It was a short time after the sole source procurement had been rejected in Washington and we were dejected. At the award’s presentation we were both given a length of rope "to hang in there". We didn't see the humor in it,

I learned a lot when I converted RELAP and made the timing run in Minneapolis. It took many hours looking through the program listing over a foot high to find the changes that had to be made, and then keypunch the corrections to 100's of cards. Being under extreme pressure and dog tired it was easy to make keypunch errors that took time and effort to correct. I found there was a consistent methodology used by the EG&G programmers to get around the short commings of the IBM 360/75. I decided I would write a program that would scan for a match with what I was looking for. The program would initiate the change without me having to look through the listing and keypunch the changes.

My goal was that I would not have to go through a listing and keypunch a card to make a change. Once my program found a match it would create a change directive according to my input data. This was then written to a file for the CDC UPDATE utility to make the changes.

I worked on the program in my spare time over the next year or so. It was difficult programming. I had to scan every column of the 80 column punched cards looking for a match with the data I provided as input. Fortran and CDC computers were designed for fast computations using 60-bit words and not manipulating bits and bytes at the character or single digit level. I learned how to do this on the program I wrote while at the Lawrence Livermore Lab, so I knew what I had to do. I was fortunate as I could use the Palo Alto Data Center 6600 via the user terminal at EI to debug my program as I went. I kept adding functionality until I could convert the many thousands of cards of RELAP without me touching any part of it.

It was amazing that the computer did the conversion in less than a couple of minutes and was error free. I could now convert any program by simply changing the input data that was appropriate for that program.

I named my program "EDIT" and used it extensively. The program is 217 FORTRAN statements. That is about three inches of keypunched cards. I still have it stored in the top drawer of the desk in my shop. I also reproduced it in a WORD document. I have included it at the end of this chapter as an Addendum.

I was in a lull waiting for the Idaho Falls computer procurement to get underway when I got a call that I was needed in Minneapolis to work on a benchmark for Lockheed Corporation. I got there, and the three analysts assigned were in trouble.

The benchmark demonstration was in less than two weeks and they didn't have anything converted and running.

Lockheed had given them the toughest programs they had that were running on a Univac 1108. They made heavy use of unique Univac extensions to FORTRAN. The analysts were working on a couple of programs each. That was about all they would get done. They had decided three other programs were too difficult. They would only get to them if they finished what they were working on. They had decided a fourth program, which was Lockheed's structural analysis program named REXBAT, was too large and complex. Therefore, there would be no attempt to convert it.

I told my coworkers to concentrate on the programs they were working on and I would work on the three difficult ones they had set aside. With my EDIT program I had all three running correctly in two days. I then decided to tackle REXBAT, the one declared impossible. It was a massive program and indeed looked impossible. However, within a week I had it converted and correctly running two of the three sets of data. The third set ran correctly for a long period then would suddenly exit.. You knew it ended as the last page of the printout was a full-page picture of Snoopy sitting on top of his dog house.

It came time to run the benchmark for the evaluation team. Two of the three data sets for REXBAT was a fantastic accomplishment according to the Lockheed people.

The purpose of the benchmark was to qualify vendors if Lockheed should decide to replace the Univac 1108's in the future. We ran our demonstration, and the evaluation team was surprised at what we accomplished.

However, Lockheed eventually decided not to go ahead with a competitive procurement. They had a sweetheart arrangement with Univac. It is my belief they were afraid they might end up with a CDC computer.

Shortly after I returned to Idaho Falls Lockheed paid CDC a consulting fee and expenses for me to meet with the lockheed REXBAT team to discuss the how and why of what I did. I flew to Sunnyvale, California and spent a day with them.

I am not sure but what the results of the third data case that I produced on our computer was correct, and the Univac solution was wrong due to less accuracy.. That may have been what the meeting was all about.

Our Life in Idaho Falls

We settled in and joined the Newcomers Club and was quite active with socials and potlucks. We met a lot of professional people that were also new arrivals for jobs at the INEL Two couples that we met and socialized with were Kay and Layman Lott who moved from Boulder, Colorado, and Neil and Pat Cox who moved from Tucson, Arizona. Layman was a Phd engineer with EG&G and Neil was a Phd chemist with EG&G ,and formerly a college professor. They were not quite sure about what I was doing in Idaho Falls since I had no official connection with the INEL

Our house was just three houses from where the IBM salesman lived that beat CDC and sold the 360/75 to the INEL a few years earlier. He was no longer with IBM as he had started his own data processing business downtown. We never did get together to discuss things., I am sure he was watching what was going on.

The kids soon got into skiing by going to Kelly Canyon with friends, and LaRue went with lady friends she met in Newcomers. They started by renting skis, and then with stuff from the ski swap. I wasn't about to take up skiing but finally relented to go once. I rented stuff and we went to Kelly Canyon on a nice spring day. I signed up for a morning ski lesson. The instructor started me on the rope tow and beginners hill snowplowing and making turns. Then gradually into skiing parallel. I was doing good, so we got on the lift to the top and I made it down skiing parallel with the instructor. The lesson was over, and I was full of confidence. I took the lift to the top on my own. My confidence and what I had learned gave way to panic at the top. All I could do is traverse across and stop until I got brave enough to turn around and go across the other way and stop. I finally got to the bottom after about an hour, and was soaking wet from sweating so much. I was done with skiing and found a place to sit and wait in the lodge.

After a couple of hours, I decided skiing was not going to defeat me. There was a rope tow on a gradual slope behind the lodge. I got my stuff and went out again. I got myself together and started having fun. The hook was set.

The next weekend we went to Targhee and after that to Salmon. We bought new boots and skis from our friend Grant Haveman who had a ski shop in his Ace hardware store. I got Kneisle skis, LaRue got K2's, and we both got a pair of Scott ski boots, which were the hot new boots on the market. LaRue's were orange on the bottom and yellow on the upper. Mine were lime green. Julie got a new pair of yellow Hummer skis and new boots. Kathleen and Brian already had their stuff. The next day we went skiing with our new gear on Lost Trail Pass with Carol and Grant. After that we went to Big Sky, Montana. It became one of our favorite places to ski. My fourth time on skis we jumped in over our heads. We rode the gondola to the top then spotted a chair lift going on up into a bowl on Lone Mountain, and headed for it. We got to the top of the bowl and it looked too steep and frightening to head straight down. The guy in front of us was traversing across the top of the bowl so we followed him across until he stopped. We asked him where the easiest way down was, and he said it was his first time here, and he didn't know. It was straight down in deep snow and moguls, but we made it with a couple of falls.

That fall we bought a family ski pass for Kelly Canyon and joined the Idaho Falls Ski Club. We had a lot of good parties and ski trips with the ski club.

I decided we should do some backpacking as a family. We began acquiring the gear. We bought Jansport backpacks, lightweight sleeping bags, cooking gear, ponchos, rain fly's, and hiking boots from REI in Seattle and local sporting good stores. Even Julie who was around seven had her own small backpack.

Our first backpack trip was in Yellowstone. We took an overnight trip to an isolated lake. I was in the lead and Brian was bringing up the rear when I heard him yell "moose, moose, moose!" I looked back and we had walked by a huge bull moose laying just off the trail. We hurried on up the trail to put distance between us.

We sat up camp by the lake by strunging two rain fly's to keep the rain off us. We forsook a tent as they are too heavy to pack. We caught trou,t cooked them in foil for supper, and then it was time to bear proof the camp per park ranger's instructions. The first instruction was to hang all food from a tree limb away from camp and out of a bear's reach. The second instruction was to not sleep with the cook which was not feasible.

It rained all night and the thought of grizzly bears made for a long night. At one point during the night I pushed up on the rain fly's to drain the puddle. They separated and dumped the puddle of water on Julie. The next morning, we were hiking across a large meadow. We came to a backpacker crouched down and pointing to moose off to our left that were really agitated. All we could do is crouch low and move on down the trail.

Yellowstone was probably not the best place to take a family backpacking. The next day we departed on a two day trip to another remote lake. I rained most of the way which was about seven miles. When we got to the lake and evaluated the weather we decided to head back out.

Brian and I took a backpack trip to the White Clouds and the Little Boulder Chain Lakes. I stuck my six pack of beer in Brian's pack before we left the car without him knowing it. We set up camp next to a small creek. I put the beer in the water and it was cold after a short while.

There were fish in the lakes, but they weren't biting. We had canned stew that night. We hiked up high on Castle Peak and looking down on the string of lakes they resembled a chain. Thus the name.

Another trip we left the kids with the folks in Salmon as they didn't want to go backpacking. LaRue and I backpacked up a creek off highway 28 south of Salmon with the goal to reach 4th of July Lake. It was seven or eight miles all up hill.

We started late in the afternoon and were chugging up the trail. LaRue wondered if there were rattlesnakes to worry about. My reply was, "it is too high altitude for rattlesnakes". A short time later I saw what looked like a big rope in the trail. When we got closer it was a big rattlesnake with an attitude. I had my 22-pistol in my backpack, so I had LaRue get it out. I remember Dad telling me how he would shoot the head off rattlesnakes and that was my intention. However, I was shaking so much I couldn't come close. We detoured around and got out of there as he was highly annoyed.

We kept climbing higher and higher in the hot sun and we ran out of gas about a mile short of the lake. We made camp on a grassy spot beside the creek and caught some Cutthroat trout for dinner.

We got some big rocks out of the creek, made a fire ring, and got a good fire going. I brought four mini bottles of gin for evening martinis. I poured one each into our tin cups and we sat on a log by the fire to enjoy. We just got seated with our tin cups in hand when a rock in the fire ring exploded. We both tipped over backwards and the tin cups went flying. We had two mini bottles left. We moved the rocks away from the fire and started over.

We planned to sleep under the stars. We spread out a large black plastic sheet and rolled out our mats and sleeping bags. I had my pistol and flashlight by my head. During the night I heard something walking on the plastic at the foot of our bed. I grabbed my flashlight and pistol ready for the worst. I flipped on the flashlight and it was a tiny cottontail rabbit. It was hard to sleep after that excitement. We went back to Salmon the next day.

1975

The Idaho Falls Computer Procurement

The DOE finally approved EG&G after delays and jumping through bureaucratic hoops to issue an RFP for a large-scale computer to replace the IBM 360/75.

It would be a fully competitive procurement with a huge benchmark and lengthy evaluation period. The RFP was released early 1976. I picked up the benchmark on magnetic tapes and headed to Minneapolis.

I found that the benchmark consisted of the RELAP reactor safety program and about seven other large programs. Each program had several sets of data. I was familiar with all the programs due to my involvement with EG&G for nearly two years.

In all there were 44 jobs and the run time was expected to be between four to six hours. It was intentionally designed to be over four hours. The published mean time between failure for the CYBER 76 that we would be bidding was four hours. That could be a problem.

The CYBER 76 was the old 7600 with a new name and new packaging. We referred to it as the same old dolly in a new dress. It was a number cruncher and had to have a frontend computer to interface with the users. We would bid a small CYBER 173 as the front end.

IBM and Univac knew what they had to beat. IBM had recently announced a new model called the IBM 370/168 as their new giant killer. There was not much known about its performance. We suspected they would have to bid two processors to meet the performance specs. We also knew IBM would submit a bid with a competitive price. You never knew what UNIVAC (now Sperry Rand) would do. I knew we were in for a dogfight.

We were allowed six weeks to prepare for a live demonstration with the evaluation team in attendance. I went right to work with my EDIT program on an old 7600 in the Arden Hills, Minnesota benchmark lab. I had all but one job running correctly in a few days. The third set of data for RELAP ran correctly for about 25 minutes then would go into a never-ending loop. My conversion looked good, but something was going wrong. I needed to talk to Dick Wagner at EG&G in Idaho falls. That was prohibited by the rules of the RFP.

I knew that Dick moonlighted at EI with his former coworkers on RELAP. My office was with EI, so I made a quick trip to Idaho Falls. I got with Dick in the evening to discuss the problem.
He quickly found it was due to the superior accuracy of the CDC computer. It was not accounted for in the program that was developed on their IBM computer. He generated a fix and I was in business.

I had the programs converted and running correctly and needed blocks of at least six consecutive hours for timing runs. I knew from experience that I could not live with an hour here and hour there in the benchmark lab. I needed to make many timing runs and decide what to do to speed things up. This would be impossible to do on a computer used by many people.

I liked to visit the manufacturing floor to see what was being built, and for what customer. I discovered that a new CYBER 76 was in final checkout, and there was no customer name on it. It was the model we would be bidding for Idaho Falls. I told my management that I needed that system, so I could work around the

clock with no interruptions. I also wanted it in the “fish bowl” on the second floor, so that the customer would be impressed.

My request went up the chain. Then Chris and I were called to present my request to the man himself, Bill Norris. He was the founder, President, and CEO of CDC. We timidly walked into his big office on the top floor of the new glass tower, This was CDC Headquarters near the airport in Bloomington. Minnesota. He listened for a while and asked many questions. He would authorize it if we ”guaranteed the order”. Wow, the pressure was on big time.

Within a few days the new CYBER 76 was moved from the checkout floor to the “fish bowl” on the second floor as I had requested. The “fish bowl” was called that because it was behind a glass enclosed wall above the grand stair case of the lobby in the Arden Hills facility.

I knew it would wow the evaluation team. My friends in the benchmark lab were impressed that I pulled it off. The manager, Bob Korsch, assigned my old friend, Evans Harrigan, to generate and tune the operating system the way I wanted it.

I was pleased getting Evans. We had worked together in the Chippewa Falls Lab during my Livermore days. I knew he was the best available on operating systems.

I could handle all the programs that had to be converted, and the timing demonstration. I also needed a topnotch analyst to do the interactive demonstrations on the second day of the evaluation team visit. I knew of Bill Gray who worked in software development in the
Sunnyvale, California facility. I requested Bill, and eventually got him. I had a good team for a change. People by now were listening to me and I got what I wanted.

It took a couple of weeks to get the CYBER 76 moved and checked out. Also, the necessary peripheral equipment that we would be bidding all checked out and working together. It was a monumental task, and the clock was ticking. It was the old game of a team of hardware engineers and software people often in conflict.

It finally came together. It was time to make full timing runs. The initial run took four hours and 15 minutes. It was in the ballpark of 10 to 12 times faster for each job than the Idaho Falls IBM system.

I knew of some things I could do to bring the elapsed time down. I would put in my changes, and the first thing of the day was to run another timing run. However, I was only gaining a minute or so. I expected a lot more. I made timing runs over the ensuing days. There was little or no improvement. I believed the elapsed time was good, but I thought we should do better.

Bill and I worked sixteen-hour days seven days a week. With about two weeks to go I was tired and planned to spend a weekend at home. However, the Western Regional Sales Manager walked in about midweek and wanted me to show him where we were. I am sure it was a special trip for him as he probably didn't believe the reports he was getting.

The first thing he asked was if I needed additional resources. and I said no. I ran a demonstration from beginning to end and he was impressed. However, I told him I needed to squeeze some more minutes off the elapsed time, but really wanted to go home for the weekend. He said to stay and keep working. CDC would pay for LaRue to fly out for the weekend, which she did.

I had been having meetings with Evans to discuss issues and kept telling him, "I feel like there is a governor in the system holding me back. No matter what I do the elapsed time barely improves."

We tried different versions of the operating system to no avail. It was down to the last day and late afternoon before the scheduled demonstration.

Evans walked in and said he thought he had identified the problem. When the operating system was generated a debugging feature was turned on. He explained that it would cause an interrupt every time input or output was initiated. It was to log a trace for fixing problems. He said it could cause an eighteen percent degradation in throughput if there was a lot of input/output going on. Just as I thought all along. There was something stifling me.

Chris was to meet the evaluation team of about ten people at the airport and we were all scheduled to go to dinner at a fancy place. It was around 5pm and I needed to make one more timing run to see what the improvement would be.

I told Chris that he and his management were on their own with the evaluation team. Bill and I had things to do. I didn't tell him anything else. I made the timing run and saw a huge improvement. The elapsed time went from four hours ten minutes to three hours and ten or so minutes. I was ecstatic.

The next morning, we all met early at the hotel and went to the Arden Hills Facility. We entered the lobby. There was a wide spiral staircase to the second floor “fish bowl” that had drapes that were normally closed. I had them pulled open that morning for our guests. I told them, “look upstairs and you will see the system we are demonstrating. It is the exact system we will bid in our proposal”. It made a nice impression.

Demonstrations are usually conducted in crowded noisy computer centers with computers all over the place. The CYBER 76 in the “fish bowl” was impressive. I was proud of the effect it had on the evaluation team.

I had a nice conference room set up with a detailed briefing binder for each person. It contained all the changes to the programs and timings of all 44 jobs we would be running. I led off telling them how easy the conversion was. “I did not touch a single card “. I held up my handful of punched cards that was my EDIT program. “This did all the work and every change it made is documented in your binder. To prove it I will hang the IBM magnetic tape you released with the RFP and run this program. In less than two minutes it will have made the complete conversion, and we will start the benchmark”.

Then I said, "you can expect an elapsed time of around three hours and ten minutes". Chris's head popped up from his hangover state with, "you mean four hours". I came back with, "we'll see". Chris kept muttering, "four hours". Now it was show time.

We moved into the “fish bowl”. I hung the IBM magnetic tape and ran my conversion
“program. It did its work in about a minute. It was time to start the timing run. I told them, “when I start the benchmark I will back away from the operator's console and not touch anything per instructions in the RFP”. The RFP stated,"the operator will not assist in scheduling jobs or interfere with the order of the jobs for execution. The operating system must do it all automatically." However, I had

some tricks up to my sleeve to automatically control the order the jobs were processed.

I also told them they could sit at the console which was two big cathode ray tubes. They could watch the progress of jobs being processed. They could also watch the contents of memory change on anything that was running in the computer. They were free to look at anything. They loved it. I circulated around explaining things, answering questions, and exuded complete confidence.

The timing run ran in three hours and ten minutes. Chris was flabbergasted, and the evaluation team was smiling. I knew we aced it, but we still had a long list of mandatory demonstrations to perform the rest of the day and the next morning.

It was lunch time and Chris and the sales managers from the Seattle Branch Office and San Jose Regional Office took the evaluation team to the conference room for a catered box lunch. Bill and I had to get ready for the mandatory demonstrations that would take up the afternoon and the next day. We grabbed a sandwich out of a machine. I also wanted to double check our timing run to ensure we processed every job correctly, which we did.

We finished the day around 6pm and the CDC Vice President of Sales, Bobby Robertson, had a chartered bus outside. It was for transportation to a famous Swiss restaurant in Stillwater, Minnesota.

Bill and I began setting up the next morning demonstrations as we had not been invited to go to dinner. We thought they were gone when Bobby Robertson came busting in the room saying, "you guys are coming with us." We scrambled aboard to cheers. Robertson handed us a large glass of extremely good red wine. He had a couple of cases in reserve. Everyone was in a good mood and really wound up during the hour bus ride to Stillwater.

The Swiss restaurant was fabulous. Everyone was singing after dinner and having a great time.

We had the bus driver drop Bill and I off at the Arden Hills facility around midnight as we had to get ready for the next day. We got about four hours sleep.

The next day went well and the evaluation team departed in the afternoon for IBM in Kingston, New York. I felt very good vibes coming from them. I don't believe we could have done any better. We had pulled off an astounding benchmark demonstration.

(I recently visited with a former DOE representative who was on the evaluations team. He did not remember much of the IBM demonstration except they had a lot of trouble performing the benchmark timing run. It was midnight before they left the facility and there was no place to get something to eat His impression of IBM was not good.)

We had a lot of work to do finalizing our proposal as we had to answer a long list of mandatory questions. We got it done and submitted about two weeks later which was the proposal deadline. We waited until the last minute to turn the proposal in so that our price of $8.4 million could not be leaked to the competitors. Then it was a long wait. A lot of rumors flew around Idaho Falls. Then we finally got the call that CDC was awarded the contract.

It was quite an accomplishment for me with back to back wins in Richland and Idaho Falls against UNIVAC and IBM.

After the Idaho Falls Computer Installation

My next assignment was to install the system and get it through the 30-day acceptance test which went smoothly. It was a big day when Chris and I and a CDC courier picked up the check for $8.4 million at the DOE building on April 26, 1976. We went to the Bon Villa Club and had bloody marys. Chris presented the check to the bartender to see if he could cash it! It blew his mind.

We initialed the check before we put the courier on the plane that evening. I still have a photocopy of the check in my drawer somewhere.

It was agreed that I would work under contract to EG&G converting programs and then move into sales. I requested Bill Gray to replace me. He accepted and moved to Idaho Falls. Both of us would end up working for EG&G in 1980.

Our Airplane

Bill Gray was a private pilot and glider instructor, and was looking for an airplane to buy. I wanted to learn to fly. Chris expressed interest, so we decided on a three-way partnership. Bill found a great deal on a 1971 Piper Cherokee 140 (N591FL) in Ohio for $7,500, and we decided to go for it. Bill and I flew to Toledo, Ohio to acquire the plane if it passed his inspection. It was a beautiful four passenger (two adults and two smaller people, or three adults), 150hp, low hours, and painted white with red trim. We were impressed when we saw it and inspected it.

Bill took a check ride with the seller. Then we handed him the check and departed. Bill is a cautious type, so we flew about an hour and landed at Valparaiso, Indiana to go over the airplane and plot our next leg.

The plane checked out and we continued and flew south of Chicago observing the skyline. We landed in Moline, Illinois for fuel and were advised of a weather front blocking our route due west. Our plan then was to turn North and follow I-35 to Minneapolis where we could bunk up with fellow CDC people that we knew were in town. However, it began raining hard, so we landed in Mason City, Iowa and parked the plane. The Holiday Inn sent a car and we spent the night there.

The next morning, we headed North again. We got to Albert Lee, Minnesota and Bill landed to go over the plane again. I think the real reason was that Bill lived in Albert Lee when he was young, and learned to fly out of that airport.

The weather cleared to the west, so we turned and headed west across South Dakota. I was the navigator. I had great vision and Bill's vision was not too good. He insisted that I have a map in my lap and call out landmarks every few minutes. In the flat midwest we flew IFR (I follow roads) and sometimes railroad tracks. Bill would circle low over a town, and I would read the town's name on the water tower to make sure we were where we thought we were. It worked as we kept on course. We refueled in Mitchell, South Dakota and headed west over the badlands following I-90 to Billings, Montana.

I relieved Bill at the controls every now and then and that was fun. After five hours I was watching the two fuel gauges approaching the empty mark, and we had another half hour to go before reaching Billings. Bill would tap the fuel gauges,

and didn't seem too concerned. We were following the interstate and had a place to land if we had to. I wasn't aware at the time that we had a five-gallon reserve in each tank after they showed empty.

We made Billings and ready for a rest stop after five and half hours. The Billings tower called us, "One Foxy Lady", the phonetic annunciation for the last three digits of our airplane number N591FL. He should have referred to us as “one foxtrot lima”. We liked “one foxy lady” and it stuck.

The weather briefing said our weather going west was getting worse. We decided to have a look and took off with the idea we could return to Billings. We skimmed through to Butte and were flying through a rain squall when a bolt of lightning knocked out our electrical power. We had no electronics. Bill started down to make a landing on the freeway if necessary. He told me to check and reset the circuit breakers which were between my knees. I got it done and we were ok, so we turned south for Dillon, Montana.

We decided to land in Dillon to top off the tanks. Bill wanted reserve to get over Monida pass, or detour around, if the weather got worse.

We were filling up in Dillon and a guy out for a flying lesson came over and offered to buy our plane. It made us feel good, but we declined his offer.

We were now only about an hour from home, so we called ahead to expect us. It was getting dark when we landed in Idaho Falls. LaRue, and Bill's wife Nancy, were there to meet us with champagne and snacks. We set it on the wing and rehashed our journey.

My Flying Lessons

An engineer at EG&G was a Certified Flight Instructor (CFI) and I linked up with him to take flying lessons after work. One evening he told me to fly to Rexburg and do a touch and go. Then to Rigby and do a touch and go. Then land in Idaho falls and stop in front of the Red Baron office and hangar. I was surprised when he signed my student license. He got out and said, "do five touch and go's, taxi back here, and park in your usual spot". Wow, I was soloing after seven hours of dual instruction! I did have the benefit of flying with Bill on the trip from Toledo and

trips to Boise and Salmon. I had been having trouble with my landings up until that evening and was wondering if I would ever get it right. That evening all eight landings were perfect. I walked two feet off the ground when I got out of the plane. Bill and Chris knew I was flying and had come out to watch. We went to the airport bar and celebrated me soloing. Chris wanted to be a part of it all but never took a lesson.

The Teton Dam Break

On a nice Saturday morning on June 5, 1976 Bill and I planned to wash and wax the plane. He would also give Brian a ride. On the way to the airport I heard on the radio that the Teton Dam might break. I never heard of a dam breaking, so never thought much of it.

Bill said they would fly towards Rexburg and the Teton Dam and see what was happening. I stayed at the airport as we didn't have the backseat in the plane. National Guard helicopters swooped in and our congressman, big George Hanson, stepped out declaring an impeding disaster, and was interviewed by the press.

Warnings were now coming over the radio. Idaho Falls and the airport would be under five feet of water.

Bill and Brian returned and were excited. They saw the flood hitting Rexburg and saw houses, dead cows, and trees floating in the flood water. Bill said he would fly the plane to Driggs to save it. He asked me to get his wife Nancy and son David and take them to our place as we were on higher ground away from the river. It is strange he left his Volvo station wagon that was worth more than the plane at the airport. Bill took off and I went to get his family.

The flood was projected to hit Idaho Falls late Saturday afternoon. We were fortunate that the initial direction of the flood water was out over flat land away from the Snake River. It would take hours before it would flow back into the river. This provided time to muster volunteers and place sandbags along the river bank through downtown Idaho Falls.

Crews worked all night and stacked sandbags over five feet high on the east bank and about eight feet high on the lower elevation west bank of the Snake River

through Idaho Falls. By Sunday morning the flood water was at the top of the sandbags, but they were holding. It was solid water and the falls were no longer visible.

The CDC office was in a basement about 50 yards from the east bank of the river and would be flooded if the sandbags failed or the water came over the top.

My brother Garry and I went to the office Sunday afternoon to get important documents. He stood at the top of the stairs to warn me while I went into the basement office to gather things. I got what needed to be preserved and we got out of there. Water was beginning to flow over the top of the sandbags when we departed. I took pictures of trees, carcasses, house tops, etc. floating down the river. It was a scary scene.

By Monday the water began receding and we were no longer in danger. The Broadway Bridge was a mess and would take a long time to get it back into service. The hotels and downtown area were saved by the sandbagging effort. It was quite an accomplishment.

My New Job

I was finished with my job as an analyst in Idaho Falls and was selling computer time and structural analysis applications for the CDC Data Center in Palo Alto.

I was working with Morrisson Knudsen (MK) in Boise. They had major construction jobs all over the world and the designer and builder of the Teton Dam that just broke. I had made major strides in getting them to use the Palo Alto Data Center for doing structural analysis.

I was scheduled Monday morning after the dam broke to give a presentation in Boise. I called my contact at MK Sunday evening to see if I was still on for Monday morning. I was advised it would not be a good idea given the circumstances. So much for that.

ADDENDUM -My Computer Program

The computer program I wrote in my spare time to convert programs follows:

```
          PROGRAM   EDIT (TAPE1, TAPE2, TAPE3, INPUT, OUTPUT,
TAPE5=INPUT,          1TAPE6=OUTPUT)
         DIMENSION LS1(50), LS2(50), ICODE(50)
         INTEGER S1(50,80), S2(50,80)
         INTEGER TAB1(80), TAB2(80)
         DIMENSION LSTART(80), INDEX(80)
         INTEGER EXPAND(80)
         EQUIVALENCE (IN(73), EXPAND(1))
         DIMENSION IN(92), ISAVE(92)
         DIMENSION IGNORE(80)
         INTEGER DELETE(14), PERIOD, BLANK
         DIMENSION IDECK(7)
         ISAVE(91) = 10H
//ORIGIN     ISAVE(92) =
10HAL LINE         PERIOD =
1R.
         BLANK = 1R
         REWIND
C*          READ IN THE DIRECTIVES AND CHARACTER STRINGS TO
LOOK FOR
9000   FORMAT (4I5,4X,R1,4X,R1)
         DO 100 I=1, 50
         READ(5,9000) LS1(I), LS2(I), TAB1(I), TAB2(I), ICODE(I), IGNORE(I)
         IF(EOF(5)) 150,90
90   CONTINUE
         NS =  I
         READ(5,9100) (S1(I,J), J=1,80)
         IF (ICODE(I) .EQ. 1RD) 100,91
91   IF (ICODE(I) .EQ. 1RP) 100,92
92   CONTINUE
         READ(5,9100) (S2(I,J), J=1,80)
 9100  FORMAT(80R1)
  100  CONTINUE
       WRITE(6,9101)
```

```
 9101  FORMAT (1H1,*  //FIRST   50   STRINGS ONLY WERE PROCESSED
//*)
   150
       CONTIN
       UE
       WRITE
       (6,9150)
       NS
 9150  FORMAT (1H1,*  //*, I2,* STRINGS PROCESSED AS FOLLOWS //*)
       DO 175 I=1,NS
        WRITE (6,9175 LS1(I), LS2(I), TAB1(I), TAB2(I), ICODE(I), IGNORE(I)
 9175 FORMAT (1X,RI5,4X,R1,4X,R1)
       WRITE (6,9176) (S1(I,J), J=1,80)
       IF (ICODE(I) .EQ. 1RD) 175,171
171  IF (ICODE(I) ,EQ, 1RP) 175, 172
172  CONTINUE
       WRITE ( 6,9176) (S2(I,J), J=1,80)
 9176  FORMAT (1X,80R1)
  175  CONTINUE
       WRITE (6,9177)
 9177  FORMAT (1H1,*  //MATCHING STRINGS WERE FOUND AS
FOLLOWS  //*,//)
C*                READ IN A NEW LINE FOR EDITING
   180  READ (1,9180) (IN(I), I=1,90)
 9180  FORMAT (90R1)
       IF (EOF(1)) 999,200
   200  CONTINUE
       DO 190 I=1,90
       ISAVE(I) = IN(I)
   190  CONTINUE
       INEDIT = 0
       NOV = 0
       DO 250 I=1,NS
        ISTART = TAB1(I)
       ISTOP = TAB2(I)
       IC = ICODE(I)
       NCS1 = LS1(I)
       NCS2 = LS2(I)
```

```
        J = 1
        L = ISTART
        NODEL = 0
  202  CONTINUE
        IF (S1(I,J) .EQ. ISAVE(L))  205,225
  205  IF (NCS1 .EQ, 1) 215,207
207  DO 210 JJ=2,NCS1
        JJJ = L + JJ – 1
        IF (JJJ .GT. ISTOP) 250,208
208  IF (S1(I,JJ) .EQ. ISAVE(JJJ)) 210,225
  210  CONTINUE
215  IF (IC .EQ. 1RR) 220,216
216  IF (IC .EQ. 1RD) 260,217
217  IF (IC. EQ. 1RP) 248,218
218  IF (IC .EQ. 1RI) 240,219
219  IF (IC .EQ. 1RB) 230,214
  214  IF (IC .EQ. 1RU) 400,220
400  DO 401 JJ=1,7
401  IDECK(JJ) = 1R
        JJJ = 0
        JJ  = 0
  420  JJJ = JJJ + 1
  430  JJ = JJ + 1
        IF (ISAVE(L+JJ+NCS1-1) .EQ. 1R(   ) 410,402
  402  IF (ISAVE(L+JJ+NCS1-1) .EQ. 1R    ) 404,405
404  IF (JJJ .GT. 1) 410,430
405  IDECK(JJJ) = ISAVE(L+JJ+NCS1-1)
        IF (JJJ .GE. 7) 410,420
  410  WRITE (3,9410) (IDECK(JJ),JJ=1,7)
9410   FORMAT(*/DECK *,7R1)
        WRITE (6,9411) (IDECK(JJ),JJ=1,7)
9411   FORMAT(* /DECK *,7R1)
        GO TO 250
  220  CONTINUE
C*       SPECIAL CASE TO HANDLE A SUBSTITUTION STRING THAT IS
LARGER
THAN THE ORIGINAL STRING
        NC =  NCS2 - NCS1
```

```
        IF (NC .EQ. 0) 221,223
   223 NOV = NOV NOV + 1
        LSTART(NOV) = 1
        INDEX(NOV) = 1
        GO TO 224
221  CONTINUE
        DO 222 JJ=1,NCS1
        IN(L+JJ-1) = S2(I,JJ)
222  CONTINUE
224  INEDIT = 1
        L = L + NCS1 – 1
        IF (L .GT. ISTOP) 250,225
225  CONTINUE
        L = L + 1
        IF (L .GT. ISTOP) 250,202
   230 DELETE(I) = 10H/BEFORE,
        GO TO 242
   240 DELETE(I) = 10H/INSERT,
   242 DO 245 J=1,72
   245 IN(J) = S2(I,J)
        GO TO 261
        WRITE (6,9280) (ISAVE(K),K=1,92)
   250 CONTINUE
        NODEL = 1
C*          IF LINE IS EDITED DISPOSE OF ACCORDING TO ICODE
        IF (INEDIT .EQ. 0) 8250,260
  8250 WRITE (3,9300) (ISAVE(I), I=1,80)
        GO TO 180
   260 CONTINUE
C*           *DELETE CARD LOGIC HERE
        DELETE(1) = 10H/DELETE,
        IF (NOV .LE. 0) 261,300
   300 JC = 74
        LBIAS = 0
        LAST = 0
        DO 310 I=1,80
   310 EXPAND(J) = BLANK
320L = LSTART(NOV)
```

```
          IF (L .LT. LAST) 323,321
321 L = L – LBIAS
   323 I = INDEX(NOV)
          NCS1 = LS1(I)
          NCS2 = LS2(I)
          NC = NCS2 – NCS1
          IF (NC .LT. 0) 330,322
   322 JC = JC + NC
          JJ = JC
          JJJ = JC - NC
   325 IF (JJJ .LT. (L+NCS1)) 330,328
   328 IN(JJ) = IN(JJJ)
          JJ = JJ – 1
          JJJ = JJJ – 1
          GO TO 325
   330  CONTINUE
          DO 335 JJ=1,NCS2
335 IN(L+JJ-1) = S2(I,JJ)
C*              SHRINK UP THE LINE
          IF (NC .LT. 0) 336,337
336 NC = IABS(NC)
          JJ = L+NCS2 – 1
          DO 339 I=1,JC
   339 IN(JJ+I) = IN(JJ+NC+I)
          JC = JC – NC
          LBIAS = LBIAS + NC
          LAST = L
   337 NOV = NOV – 1
          IF (NOV .LE. 0) 340,320
   340 NOV = 1
   261 CONTINUE
          DO 255 I=1,13
          II = I + 1
          If (ISAVE(73+I) .NE. BLANK) 251,256
   251 DELETE(II) = ISAVE(73+I)
255 CONTINUE
256 DELETE(II) = PERIOD
          NDIGIT = 14
```

```
        III = I + 1
        DO 259 I=II,13
        If (ISAVE(73+I) .NE. BLANK) 257,258
257DELETE(III) = ISAVE(73+I)
        III = III + 1
        GO TO 259
258NDIGIT = NDIGIT + 1
259CONTINUE
        WRITE(6,9259
(DELETE(I),I=1,NDIGIT(I)   9259
FORMAT(1X,A8,13R1
        WRITE(2,9258)(DELETE(I), I=1,NDIGIT)
 9258 FORMAT(A8,13R1)
        IF (NODEL. EQ.  1) 270,264
  264 IF (IRC .EQ. 1RD) 290,270
  270 WRITE(2,9260) (IN(I),I=1,72)
 9260 FORMAT (72R1)
        WRITE(6,9262)(IN(I),I=1,72)
  9262 FORMAT(1X,72R1,18X,*  //REPLACEMENT LINE  *)

WRITE(3,9300)(IN(I),I
=1,80)                  9300
FORMAT(80R1)       IF
(NOV .LE. 0) 275,271
  271 DO 273, J=1,80)
        IF (EXPAND(J) .EQ. BLANK) 273,272
  273 CONTINUE
        GO TO 275
  272 WRITE(6,9272)(EXPAND(I),I=1,80)
9272FORMAT(6X,1H*,80R1,4X,*  //CONTINUATION LINE  *)
        WRITE(2,9273) (EXPAND(I),I=1,80)
9273FORMAT(5X,1H*,80R1)
  9261 FORMAT(1X,90R1,3A10)
  275 WRITE(6,9261)(ISAVE(I),I=1,92)
C*          GO BACK TO PROCESS  THE NEXT CARD IN THE PROGRAM
        GO TO 180
 9280 FORMAT(/1X,90R1,2A10,*--PRINTED ONLY*)
  290 WRITE(6,9290)(ISAVE(I),I=1,92)
```

```
 9290 FORMAT(1X,90R1,2A10,*--DELETED*)
      GO TO 180
  999  ENDFILE 2
      REWIND 2
      CALL EXIT
      END
```

End chapter