

Pentagon Attack

Interview with Donald Kuney and Brian Maguire
October 26, 2001

Putney: This is an oral history interview with Mr. Donald Kuney, the chief engineer of the heating and refrigeration plant for the Pentagon, and Mr. Brian Maguire, the operations manager for the plant. It is October 26, 2001, and we are in the plant near the River Entrance of the Pentagon.

We'll start with a general question. Donald, what is your job here and briefly describe your key responsibilities. Then, Brian, the same for you.

Kuney: My title is Pentagon Heating & Refrigeration Plant Manager; our mission is to provide safe, reliable, utility services in support of the Pentagon reservation. That includes distributing high-voltage electricity to the Pentagon, which is 13,800 volts, chilled water for cooling to the Pentagon and Federal Building 2, and to provide steam at 125 pounds PSIG to the Pentagon, FOB 2, and Henderson Hall. In addition, we operate two sewage lift stations for the Pentagon.

Putney: What's the importance of the chilled water?

Kuney: Chilled water is used in the summer for cooling the spaces inside the Pentagon and Federal Building 2, and year round it is used to cool the mission critical computer rooms, telephone closets, and things like that. This utility is actually one of the most critical, the chilled water. If the electronic gear is allowed to heat up, the computers start tripping off. Our mission is to provide a certain chilled water temperature and what we call a delta-P, a pressure differential, between the supply and return lines. Normally we try to provide 42° F chilled water with an 18 delta-P inside the Pentagon. In addition

we are responsible for establishing the contracts and certifying and paying all of the Pentagon Reservation's utilities bills.

Maguire: Don and I support each other. The operations and maintenance people work for me. The Pentagon renovation is our bailiwick. We heat and cool and supply them with electricity. We have a very large steam distribution system, some of it is in tunnels, and several hundred thousand feet are buried.

Maguire: We have two 16-inch main steam distribution systems. Then I've got two chilled water distribution system, that goes, again, all underground the reservation, or through tunnels. It's a large system that we have to operate, maintain, and stay up to date on. We do a lot of accommodation. When the people in the Pentagon are doing renovations or need work done, we will go in there and isolate systems. It's a good thing we do that often enough, because when an attack of this type happens, we have a very good idea of what valves to go to, what is closed, what to open, and how to do it. It's the same system that Don described. My people operate and maintain it and keep it up and running.

Putney: Even before September 11 had terrorism in some form been a concern? Had you thought about it and had you been involved with efforts to take certain steps to prevent or minimize it, with reference to Khobar Towers and Oklahoma City?

Kuney: Yes, Are you familiar with the RDF, the remote delivery facility, and some of the backup facilities that are being installed over there?

Putney: Not those, but I've been through the RDF.

Kuney: The RDF (Remote Delivery Facility) concept was designed to eliminate the tragedy of Oklahoma City from happening at the Pentagon. First by moving all delivery

vehicles away from the Pentagon; second by screening all packages prior to delivering them into the Pentagon. Inside the Pentagon there are a number of backup systems, some installed by the agencies themselves. In the early 90's I was involved inside the building with our technical staff under the Federal Facilities Division. During Desert Storm when General Powell's office was too hot and too cold, and his operation center and his computer center were running 24-7, we were asked to help relieve some of the hot complaints, we became very familiar with the whole building and how critical it is to keep the services operation centers up. We have always had this as our top priority. There are a couple of these operation centers that have what we call DDC, direct digital controls, computerized controls that monitor the utilities that we supply to them. We put our pressure differential transmitters on the chilled water system, right next to one of our biggest customers. If you want to satisfy your customers and eliminate complaints, you keep your biggest complainer, that three-star over there, happy. It's one of our operation strategies to know who the critical clients are, and we try to work with them and the Pentagon engineers to satisfy their requirements before they complain.

Within FFD we are responsible for getting all of the major utilities over to the Pentagon. The other building managers are responsible for distributing them inside the buildings, Pentagon, FOB 2, and Henderson Hall compounds. So we provide the major utilities, and how they are distributed inside the building is the responsibility of the various building managers. In our plant, we have numerous redundancies built in the design and the equipment itself. The original concept of the H&RP was to have all of redundancy for the chillers, electrical, and boilers backed-up over here at the H&RP. We didn't think this was necessarily the best concept, because the short runway at

National Airport puts us in the direct flight path. We have thought about one of these aircrafts falling short and landing on top of us. We can hear them flying over us all the time. We told the renovation program manager this. We actually took pictures of airplanes coming in right over the top of our exhaust stacks. We claimed "All your eggs are in one basket." When Mr. Evey became the Pentagon renovation program manager he saw these pictures, and thus the decision was to move some of the redundancy out to the RDF. In the H&RP, we have in reality two chilling plants over here, so we have a lot of redundancy.

When you talk about terrorist attacks, working with the Defense Protective Service and our safety office, we have participated some terrorist scenarios. Also, Brian is on the Pentagon emergency response team; he was trained as a Virginia firefighter, for exactly this type of event. He keeps his license up, he is fully trained and has full air respirators and fire suits in his office. We had participated in some mockup scenarios of terrorists, usually a small bomb placed near our transformers or fuel tanks, so we have had some training which provided us an understanding how other divisions and us where suppose to respond, but no one had conceptualize an attack of this magnitude. The understand of various roles each division was responsible was crucial in responding effectively in this incident, because despite the training, things don't always go as planned. Brian and I knew where the DPS, FBI, and Fire Departments command centers would be placed in case of a terrorist attack, and that's a key point. So yes, we've had some training, but more on a macro-level, Brian and I and a couple of foremen went through theses training scenarios, but not everybody over here. Responding to breakdowns and normal operation emergencies, and training our

operators to respond to normal breakdowns, placed us in the position to respond quickly and effectively to this unanticipated 911 event. Brian, please go over some typical upsets that you have on a regular recurring basis.

Maguire: I hate to say it's "regular." During construction by Arlington Cemetery, they were digging and broke one of my 24" chilled water mains. We were losing chilled water pressure fast, but we isolated it and started to fill within minutes. We were only down about four to six hours. A few years later, construction activity hit CW lines again, near the same place. Recently when they were coming across in front of the Pentagon, constructing the south terrace, they drove some piles right through my line again.

Kuney: In the last eight years it's been about four times that construction activity has damaged our chilled water distribution system. Each time we learn to respond and recover a little quicker. So we've had some pretty good practice.

Maguire: We've had some hits; we've had people break steam lines, chilled water lines. We also routinely run through these past scenarios with our operating people.

"Somebody is going to take down the south chilled water distribution system, what are we going to do?" We know which valves to isolate, which valves to open up to refill, how to get it back as quickly as possible. In the summer months we routinely have lightning strikes, which frequently trip our entire chiller plant of line. We have synchronous motors, they are 4160 volts. They follow the sign curve. If the motor is following the sign curves dead-on, and we have a lightning strike or switching situation, it will pull that sign curve, and as soon as the power gets back on that motor will try to speed up or reverse to get back into synchronization. Our chillers have safety relays built into their motors, which prevents this from happening. I've seen a 5,000

horsepower motor shaft snap because the trip gears weren't set tight enough. So if we have a spike, we will lose our chilled water plant [snaps fingers] like that.

Kuney: Virginia Power in their Pentagon substation has installed a specialty electrical meter that records every electrical event that is 10 percent voltage dip or greater, the 10% magnitude is usually when we trip. The last couple of years we have averaged around of these 30 occurrences per year. So on a frequent but unannounced schedule, the grid has dipped when someone hits a transformer or there is a lightning bolt, which then results in tripping some of our equipment off line. Whenever you see the lights blip at your house, or in the Pentagon, we usually trip a chiller over here. Our operators respond to these events and get our equipment back on line before anyone ever knows that we experienced a problem. Through our high voltage switchgear, we can configure our system to isolate these electrical blips, which would make our job easier, but our normal electrical operation configuration is set up for the utmost reliable for the Pentagon, which has a network electrical distribution system. Basically, we have multiple high voltage busses tied together that are set to ensure reliability for the Pentagon. If just a flicker or loss of power, is experienced on any of the upstream or down stream distribution systems, since we are tied together our plant experiences it and our chillers trip. On the other hand, due to the network configuration, the Pentagon avoids an electrical outages and just sees a small flicker in their lights, we experience an under voltage and we trip off. It makes our job harder but it also keeps us in practice to provide the Pentagon the most reliable system. This happens all the time, a couple of times a month. These occurrences and our recovery from them are an important factor on why we responded the way we did on 911, because we have to bring our

systems back on line before our customers noticed. We don't get many complaints. Most people in the Pentagon never even know we are running over here. Who thinks about the power company until the lights go off?

Putney: That's true, I've had important documents on the computer and didn't want to lose them, and I never did. The power has never gone out on the weekends or odd hours or regular workdays.

Kuney: We set it up our operation philosophy to give the clients the utmost reliable system. The chilled water is used for what I would call, from the engineering standpoint, cooling the external solar loads of the building (including outside air for ventilation) and cooling the internal load, the people, computers, lights, printers, copiers, coffee pots, etc. what we call the plug load. When we calculate what size of air handlers to install we add the loads together then we select the size air handlers, then the last thing we do is size the chillers. We have 10 chillers here with essentially two separate plants. This gives us great flexibility and reliability. We have ten condenser pumps that are 400 horsepower each and 10,200 GPM each. The chillers are 3750 tons of cooling capacity each--a typical house is two or three tons. These chillers are 1,000 to almost 2,000 times bigger than your typical house AC unit.

Maguire: We can heat and cool a good size town or a small city.

Kuney: We use river water for condensing over here. We have what we call bar rakes at the river, about an inch of bar spacing that picks up the sticks, tennis balls, beer bottles, and driftwood out of the river. We have traveling screens, where we pick up quarter-inch debris. We have pumps and backwash drainers that clean the river water all the way down to 42 thousandths of an inch. This last step gets the smaller debris

such snails and such out of it. Then we use the cleaned river water to reject the heat of compression and the heat of absorption from the Pentagon and FOB 2.

We developed and trained all of our operators on plant specific systems operating manuals. They learned all about the various systems and sub systems and our piping and valve configurations, the backbone. We have very skilled wage board employees here; we have half dozen or so who earned their chief stationary engineers; we have over a dozen and their half first-class stationary engineers. 100% of our operators are licensed. In our position descriptions (PDs) we require every operator to be licensed.

We built a very professional organization. There were already some very skilled craftsmen here before I came. We just had to convince them that after being out of school for 20-30 years, which they had to go back and get their license. We are now under A-76, competitive out-sourcing. The outside contractors have to have the same licenses. In order for us to compete with outside industry, we made this requirement years ago; with the philosophy that privatization or outsourcing was a reality and we had to prepare for.

Putney: When did the new plant go into operation?

Maguire: In October 1996 the chilled water plant came on line, and then in March 1997 the boiler plant came on line, or was accepted. They had been operating and testing it for a while.

Kuney: The plant was designed to be fully automated by our distributed controls system (DCS) with the philosophy was that it would never go down and that the computer would never trip off! In the real world this isn't true, so we had to add a number of bypasses and gauges so that we could operate this plant manually. When we were building the

plant we realized that we need special training above your typical manufactures O&M training, so issued a contract modification to develop H&RP system operating manuals. We also spent money on a compact simulator, which actually emulates the control systems and H&RP equipment. We went through various malfunctions scenarios on our simulator. This helped us understand and predict our system response.

Putney: On September 11, when you came in, where were you and how did you become aware of the attack?

Kuney: We under an A76 process, competitive out-sourcing study. The operator's jobs are up for competition with outside industry. On the morning of September 11, 2001 I was briefing the competition and the government's most efficient organization team (MEO) on our performance work statement (PWS). We were actually in the RDF, the remote delivery facility. We had a limited staff over at the plant. When the crash happened I was briefing the MEO team and the offerers on the solicitation and what the requirements are. We were going over the specifications when the incident occurred. We had eight persons plus myself over there. They made us leave out the North side of the RDF and locked us in the yard. They locked the compound for security. The first thing we did was to call up our guys into a huddle and look for signs of distress. Some people coming out of the building were showing signs of distress, and I was worried about shock. There were some people getting really upset, and we told our people to sit them down, and as soon as the gates opened to get them home or to the hospital. I was thinking it was not a good spot to be in, locked in, and we were not helping our mission. We had a very capable staff at the plant, but all the key individuals, the senior guys, where assigned to the MEO with me. I went to see if the RDF gates could be

opened, or if we could climb the retaining wall, looking for a way out. Brian and I probably could have made it over the retaining wall but if someone else may have gotten hurt. Brian and I personally spoke to everyone to keep him or her calm. We paired all of our employees up and instructed them to watch after each other. I went to Brian and stated that I was going to try to get back to the plant. He wondered how I was going to do it. I asked are you in? He said yes. I said to follow me. I had remembered from the RDF concept design drawings that the RDF had some emergency exits. I went over to a contractor employee to verify that they installed the emergency exits and that they installed security-locking devices, electric mag-lock security system. I knew there was a way to breach security.

Maguire: We went through the remote delivery facility, about 150 feet in.

Kuney: We re-entered the RDF against the wishes of the security guards. Before the security guards stopped us, there were a number of them, I had planned to look for a familiar face and found an officer that I recognized. I was hoping he recognized us. We had regular DoD badges, and I told the officer that we needed go back to the plant to support the mission critical operations. He said we couldn't go through the Pentagon, so I asked if we could go through the emergency exit. He said it would set off an alarm. We told him the whole facility was in alarm and pushed forwarded. He eventually let us proceed. He asked us to assure him that we would secure the exit afterward. We did.

Maguire: So we went down the side and up through the construction area by Route 110, up along the side of the building, through the parking lot, and down to the plant. At the H&RP gate we talked to the guard, and he said he had seen the plane come down. He and one of our operators both saw it.

Putney: Did you know it had been a plane?

Kuney: No not a first, when we were in RDF I thought a box or something had dropped in the office next door. Brian thought a semi-truck had hit the building dock, because we were at the loading facility. Twenty seconds or so later an admin person came from the dockmaster and said that a bomb had blown up the Pentagon and everyone had to evacuate. As I exited the RDF I turned around and saw the cloud of smoke, and it was three times the size of the Pentagon. I knew it was not a typical bomb, I thought it must have been a semi or tanker truck with a bomb that went into the building. We were outside about one minute after it happened. We needed to get back to the H&RP to support the critical operation inside the Pentagon.

Putney: This process of trying to get out and get back to the plant didn't take that long?

Kuney: It didn't take long considering the circumstances. It was actually luck that the RDF security guard recognized us and allowed us to get back. As we were coming from the RDF by 110 into the Mall and River area, that's an executive parking area, again the security guards wouldn't let us go in. We again had to BS our way through and just kept going. They weren't going for their guns, so we just kept going. We came up to the River entrance and saw people going down the hill and that some smoke covered the plant. I made a comment to Brian, the firefighter, about the possibility of chemical or biological agents. We discussed the likelihood that the fire would most likely destroyed any agent. I then asked if he saw any signs of poisonous fumes.

Maguire: In the course on firefighting one thing you learn is that when you get on the site, you look for smoke and people who are down or disoriented. If people are down, it is because they have been overcome at the site by smoke--or by poison gas or

something like that, if it was a-bomb, terrorist attack, or fuel truck. We would look to see if the people were standing upright and healthy. If they weren't, it would be an indication of some kind of noxious toxin.

Kuney: We were going into where the smoke was. We came into the plant and saw a security guard, who told us it had been a plane. He was listening to the DPS radio and heard that it had hit at the heliport. We have a major utility vault at the heliport. One of our electricians, John Terry, was on a break at the loading dock and he saw the plane come in.

Putney: Where was he?

Kuney: He was in front of the H&RP loading dock facing North West taking a break. We entered the plant control room at 9:55.

Maguire: We made good time. From the time it hit it had been within 15 minutes.

Kuney: Try to do that now, it will probably take 20-25 minutes to walk from the RDF. So we found some of our guys. When we first came out of the RDF and saw the black cloud, I called our supervisor on my two-way radio and told him to secure our facility, and not to let anybody in. When we came into the plant, we saw some repair guys and electricians, we paired them up, we looked for signs of stress, and assigned them to do a perimeter check and check the fences, electrical substation and our fuel tanks. We have two 300,000-gallon fuel tanks of diesel fuel, number two oil. They were to check our substations and look for anything unusual, check our transformers, and report back to us. Brian and I went into the control room and asked how the operation was going. The plant was running normally, delivering 125 pounds of steam and 42 degrees of chilled water with the proper delta. We instantly asked if the any alarm had gone off to

show a problem with the water pressure. They said no. We then asked what our chilled water ballast tank pressure and our city water pressure were. The Ballast tank was 38 psig, when normally it is 80 psig and the city water pressure was 18 psig, when normally it is 85-90 psig. It is equivalent to asking what is your blood pressure if you cut off an arm. The plane broke pipes when it crashed into the building. This scenario is equivalent as if someone cut off one of your arms, we knew we had to put a tourniquet on the damaged area and put an IV in ASAP. We knew what to look for and how to respond, because of the lessons learned from our previous "partners" or construction workers hitting our lines. We isolated the problem within minutes. There is a mechanical requirement of what we call net positive suction for our large CW distribution pumps, a minimum head pressure, otherwise the pump will cavitate--it's like throwing gravel into it and damage the pump. Cavitation sounds like gravel running through the pump, it will tear up your pump real quick. In the old plant, we had two two-inch make-ups that use to take 4-6 hours to fill the CW system. In the new H&RP we installed a six-inch emergency makeup, plus our normal of two-inches makeup. One feed comes from the 14th Street Bridge, and runs around the Pentagon right in front of the heliport. Guess where the fire trucks are hooking up? Normally the pressure is 85-90 psig, but it was 18 psig. We have a redundant city water line, which crosses Chain Bridge. It's a different system. Since the city water pressure was low, Brian was asked to switch to our alternate feed and put in the emergency six-inch makeup, put the big IV in. I tried calling the Pentagon and asked for the building operator in the BOCC, Building Operations Command Center. I finally tried the private number and finally got Steve Carter. I told Mr. Carter I needed someone to get down to the damaged side of

the building and isolate all chilled water valves and all city water valves in the utility tunnels in the center courtyard and the A ring.

Putney: Isolate means what?

Kuney: It means shutting the valves off, putting the tourniquet on, while Brian was trying to put the IV in. I reminded Steve "Do not shut the fire valves, the red ones." Brian went down to switch the city water system, then and I ran down to isolate our South 36" CW distribution system, because it runs directly under the crash site. I made the decision to shut off FOB 2. FOB 2, the ballistic missile command, we knew we had major breaks in our lines. Based on how fast we lost pressure.

Maguire: You did this down in the basement.

Kuney: I personally shut two 36" CW valves down in the H&RP basement.

Maguire: That line goes underground, crosses here, and comes around in front of the Pentagon into the heliport and up the hill.

Putney: It goes right in front of the helipad side.

Kuney: Correct. While shutting the valves, I forgot about a redundant set of lines we had put in that we were testing that tap off the south distribution system and run into the A&E drive. We couldn't shut them off easily, because we are over here. I called the BOCC again. Mr. S. Carter and Mr. D. Smith had gone to personally shut those valves in the smoke filled basement of the Pentagon. It was heroic, actually. I got a hold of the BOCC, Mr. Dan Murphy, an electrical engineer, and asked him to go down into basement of corridor 1 and 2 and shut the two 36-inch chilled water valves. I told him what they looked like--big 36-inch green insulated valves, about 50 inches in diameter. He personally went down and shut down those two valves. Those two actions allowed

us to put on the tourniquet and isolate those areas. I ran back upstairs; it was almost 10:00. Brian was coming up and I asked what the Arlington pressure was. DC city water pressure is normally 85 psig, and Arlington is normally around 80 psig, about a five-pound difference. Both city water systems had dropped to 18 psig. This should be since these are two separate distribution systems! That's why we were switching to Arlington. Brian told me Arlington was also 18 psig. That wasn't good, because if the pressure is lower than our pressure we can't make up into our system. I asked our operator what the ballast tank pressure on our chilled water system was. It had been 38 psig when Brian and I ran downstairs, but now was in the mid-20s psig and dropping. I instructed my personnel to shut the plant down at 10:00, as 30 psig was our critical cut-off point. We shut off the chillers and distribution pumps, and by the time we actually had shut everything off, Steve Carter at the BOCC noticed that 10:02 was when they totally lost their CW pressure. I remembered 10:00. Everybody was a little frantic. We told them to calm down, and that there was nothing we could do until the Pentagon shut their valves over there and the system pressure was aloud to build back up. I stated when the system is ready we needed to be ready. We paired up different groups to start up different sub-systems--the condenser pumps, the backwash drainers, the traveling screens, the distribution pumps, the chillers--and a few people were frantic. I didn't want them to affect the others, so I gave them some money to go buy cokes.

Putney: Each in his own way helps.

Kuney: Brian and I were totally calm which set the example for the others. We stressed to our operators that when the system pressures built back up, we needed to go! At 10:20 the city water pressure came back and filled our CW system to a point where we

could safely turn it back on. I gave the command to start the CW plant at 10:20. By 10:30 we were fully up to normal. There is a three or four-minute warm-up cycle for these the big chillers, starting the entire plant in only ten minutes was quite an accomplishment. Looking back, it went like clock work, a well-greased machine. Everyone did his or her part to recover this quickly. By 10:30 the Pentagon was receiving normal cooling parameters. FOB 2 was still off. The chilled water was being delivered to the critical operation centers of the Pentagon. We made that our priority. FOB 2 was my second priority--my decision.

Around 1002 I received a call from an electrician in the Pentagon that a major electrical vault in the Pentagon was on fire, it was damaged when the plane came in, and they had to shut it down. It feeds one of our sewage lift stations. They wanted permission to shut it down; they confirmed that it was damaged, on fire, and water was entering it, I gave them permission to shut it down. We sent some of our guys to our sewage lift stations to ensure that our emergency generators were running. So we were up and running fully normally by 10:30 except for running on a generator at the sewage lift station. Around 11:00 the city water and chilled water pressures were building up. We were stabilizing. At first we have to fill our systems slowly and watch it so it doesn't trip off. Brian and our guys are pretty good at this, because we have done it many times, not only because of the unscheduled outages, but also the scheduled ones.

Putney: Even Arlington Cemetery workers digging contributed.

Maguire: They don't call them the "Core" for nothing.

Kuney: By 11:00 Brian and I thought we could try to bring FOB 2 back up, and Brian started filling that system. We cracked the valve, the pressure started growing, drawing

down, and he did it real slow, that's the way you fill these big systems up. We have huge 36-inch valves with butterfly valves. The butterfly valve is an isolation valve, it's not good at modulating, meaning it's not good for flow control. When you barely move it open, it gives you almost 50 percent of flow.

Maguire: It's a disc, and as soon as it starts to open you have major flow.

Kuney: The water pressures of both the Arlington and DC sides were down because of all the pump trucks and everything. We filled until about 11:15.

Maguire: I cracked open the return side, and the pressure immediately started to drop, and we almost lost the Pentagon again. We had to secure it then, and later that afternoon we had to go through a very slow, slow fill up. By 4 or 5 o'clock we were able to reestablish the flow at FOB 2.

Kuney: We had to go and shut a couple of valves in the vault and go inside and verify that it wasn't damaged. The problem was getting over near the Heliport. Part of the plane damaged the heliport vault, damaged the concrete abutment walls around it, damaged the top of the structure itself, ripped off the equipment access panels and the big hydraulic door, and damaged the stairs going down. In addition, the Fairfax County fire department had a number of tripods set up to monitor the structure on the two sides of the blast area for movement. That was right in this area. Brian tried to get in over there, and no one would let him in. An hour or so later I was able to get over there. We couldn't get down the normal way, but we had an emergency exit a ways down there and we opened that and we went down. We had the firefighting going on above, and it looked like a movie set--fire, smoke, and water. There was almost two feet of water down there. We looked and made sure everything was working. We had pressure on

the system so we told our guys to start filling the FB-2 CW distribution system again, slowly.

Before that, when Brian tried to get over to the heliport vault to help the firefighters, I was working with some contractors lining up redundant chillers and DX units, to support FOB 2. I had a number of rental groups waiting ready to go and a number of contractors ready to fix the potential problems at the heliport. My boss, Mr. Irby, called me and asked what I was going to do: "Will you get rentals or are you going to fix it?" I said I needed someone to get over there to evaluate the damage. Brian was the only one who finally got over to the crash site; security turned all the others away. Brian had firefighting equipment. A Pentagon person in a cart picked Brian up and took him over. I went over, and they even turned me around. I didn't give up. I went around Army-Navy Drive the back way. I knew where the location of the off-site command center was suppose to be, and I found a small gate at the back of the parking lot that was left open. I walked up to the command center and got hold of a DPS Officer and requested that they give me an escort to the crash site. I explained to DPS and the FBI officers that we had to get FOB 2 back up, they didn't realize that this incident also affected the utilities running to FOB 2.

Putney: Would you restate the importance of FOB 2, Federal Office Building 2, coming back up?

Kuney: One of FOB 2's biggest occupant is the ballistic missile command--and some other op centers that were moving up there because of the damaged area in the Pentagon, so we had to reestablish their utility systems. FOB 2's management and I were working together. In the past, when we had some extended outages in support of

building the plant, we put some tie-ins for temporary utility services up at FOB 2. They were still there, and I was verifying that they had kept all the electrical circuits and piping. We had kept it on the inside of the building and bricked it over, because they didn't want a hole in the building. We were setting up emergency rental contracts ready to go. I told my Director that I needed someone to evaluate the heliport damage and report back. Luckily the damage to the Heliport infrastructure turned out to be minor, it wasn't as bad as we thought. We were able to bring FOB 2 back up. THE plant was totally back to normal by 5:30 or 6:00 p.m.

Putney: We do forget, sometimes, about critical support.

Kuney: We were able to get down to the vault, evaluate it, and get our guys to start filling the system back up. When I went into the vault, all the power on that side of the building was shut off. We have sump pumps for the utility vault structure there and a tunnel going into the center courtyard. A lot of that fire fighting water went down into our vault structure, and the water level was rising. I looked at it and did a quick calculation, because also inside the Heliport vault was live steam that was not affected going up to the FOB 2 and Henderson Hall. The steam line is 125 pounds of pressure at 350 degrees F. Water, steam, and hot pipes do not mix. If the water level came in contact with the steam pipes it could explode or turn it into "Old Faithful," a huge steam plume. We did not want that. That was a critical thing.

To go back for a minute, Brian and I made it over here quickly from the RDF. Every operator, who are emergency essential employees, were still at the plant, even though the guard was telling them that there were incoming planes. In addition, when the guys in the RDF were locked down until the DPS opened the gates, everyone, even

those not assigned to shifts, came back to support the plant. Everyone stayed and did their mission, even though we had reports of more incoming planes. After we got the plant and FOB 2 back up, the acting general foreman, James Graves, and myself stayed around and talked to some of the emergency personnel people. The fire department was talking about putting a huge crane on top of our vault structure, and I told them they might damage it. We showed them where it was, and we found out that they had no drawings of the area so I called my counterparts in the Pentagon. We talked to the Wedge #1 construction site superintendent, and got drawings out of his construction trailer. The Pentagon renovation started helping, and Brian started helping with natural gas, where to isolate it, and other utilities. The building had a hole in it and was on fire, and we had to shut down the gas lines. We supported the emergency response crews by our knowledge of the utility systems, also by giving them points of contact from the outside as to which electrical vaults were shut off. We were coordinating with our Pentagon counterparts, the building manager's office, Steve Carter and his people.

From about 4:30 to 9:00 it was a blur, working with FEMA, their structural guys, sitting them up with POC, helping with the coordination, working with AMEC getting guys up in New York calculating loads of the under ground vault structure, working with the FEMA structural engineer, the Fairfax County structural engineer. I was writing key POC names and numbers down. I was able to give people information such as who's in charge of PenRen. PenRen played a big role. We gave them points of contact of the command center that was off-site, so they got involved in what later on became the JOC, joint operation command.

Wednesday morning I called my counterparts and my boss and asked what was the procedure to get equipment into the crash site, and there was none established. I called DPS, the ops center, a dozen people, and it just went in a circle. It was 6:00 a.m., and we had to get pumps over there to the Heliport to pump out the vaults before the water level contacted our steam lines. Basically, the man on site said to do what we had to do. Brian, our general foreman, a crew, and myself started pulling all the gear that we needed to support us and tried to get in while we walked around from the River to the Mall sides of the Pentagon to the Heliport side. Again, no one would let us get close, and we had to talk our way in with someone from security that knew us. Once we got in we found the right folks to let our truck in with generators, pumps, air compressors to power the pumps to take out the thousands of gallons of water out of our vault structure. We had problems getting our support vehicles and fuel in. We had to do what we had to do. We still didn't know if there were any hazardous chemical or biological elements in the water. One of our biggest concerns was that if there was something hazardous in the water we could possibly contact it from coming in contact with the water. So we had our guys go through the decontamination procedures that the Army setup. They had decontamination tents where they sprayed you down with a slightly chlorinated mixture of water.

Maguire: They had their own decon setup right there at the heliport.

Kuney: They sprayed our boots, gloves, and stuff. We had to go into the water to put our pumps in there. There were parts of the plane and stuff hanging down into the Heliport vault. The FBI hadn't swept it yet.

What I am most proud of is that 100 percent of our guys stayed at their duty station during this entire event. When reports of additional planes were coming in security said to clear the building, everything was running on automatic. We had only about 4 minutes before another plane came in--according to security reports. So we cleared the structure. Brian Maguire stayed in the plant. I went outside but figured the terrorists weren't smart enough to hit us again, so I came back in. I went down, bought a couple of Cokes, and said, "Here, Brian, have a Coke. Do you think they'll come back?" He said, "Nah." We were sitting there, drinking the Cokes and watching the plant running on automatic.

Maguire: While I was in the building by myself heard a jet go screaming over the plant. One of my guys called from outside on my cell phone and said, "Don't worry, chief, it's one of ours."

Putney: It was one of the fighters.

Maguire: Yes. Right after that, when they had control of the skies, everybody came back in. We didn't have to tell them to, they just came.

Kuney: Right after I came back a few minutes later, everyone else came in, even though the security in DPS was saying to stay out. We were able to get a TV and saw that the plane had hit our utility structure, and that's when we started to evaluate sending some people in there. We knew we would be here a long time, all night. I pulled out all the money I had, about 50 bucks, and I sent an operator for food. He got stuck in the traffic. A couple of hours later, he was stuck and couldn't get near a grocery store. We called a deli on 15th and Army-Navy Drive, and Brian and I ordered

sandwiches and sodas for everyone. We went and picked them up and brought them back and distributed them. I think that was a good morale booster.

Maguire: Especially the cookies.

Kuney: We talked later with our government credit card folks and said due to the crisis they would pay. Either way, we didn't care. We needed to do it. We answered phone calls from wives, relatives, and people stuck somewhere else. We were able to reassure everyone about the welfare of our people.

Maguire: Even my daughter called from Florida. She told them to send me home.

Putney: I hope nobody told her that you were trying to turn off a natural gas line. Would you describe that?

Maguire: Outside of the heliport vault there is another pit, with a metal grate over it. That's where the natural gas comes into the Pentagon. It was right under where the plane hit. I had my firefighter gear on and was able to get some access. I pulled the cover off and went down and secured the line. It is not a very big line going into the Pentagon, but it was potentially dangerous. You don't want natural gas in a fire situation.

Putney: If that had not been secured, what could have happened?

Maguire: It could have added fuel to the fire. Also, if they had enough water on the fire and the heat was down, gas could accumulate, and then when they thought the fire was extinguished it could have re-ignited with a tremendous explosion.

Putney: Can you describe it, did you feel the heat?

Maguire: I could feel the heat. The gas valve is 50 to 60 feet from the face of the Pentagon, and I could feel the heat. It was hot. Water was getting to be about 8 to 10 inches deep.

Putney: Did you have light?

Maguire: I had a flashlight in my pocket.

Putney: Were you by yourself?

Maguire: Yes. I went through the firefighting academy last year, and I knew one of the cadets from one of the fire department trucks, and he said he would watch out for me. He was up in the front.

Putney: Was there a ladder or steps you walked down?

Maguire: Yes, I walked in, and he kept his eye on me. I shut the valve down, came back out and put the cover back on. It was tough to get close to the vault, because the cover was blown off and torn out. I peeked into our heliport vault but didn't see any real damage inside the vault, or gushing steam and water.

Kuney: I went over there about the time Brian was leaving.

Putney: About what time was that?

Kuney: About 4:30. I saw all the firemen standing around the gas grate. I asked them if anyone had ever shut off the valve. Some of them didn't know, and they asked how they could tell. So I actually went down there to check it. I saw that it had been shut.

Putney: How big is that area down there?

Maguire: The gas vault is about as big as this room. The heliport vault is bigger, about 40 by 40, and top to bottom about 20 feet.

Putney: They both had water inside and were filling up even more?

Maguire: Yes, especially in the big heliport vault. There was some water in the gas vault, but not much.

Putney: And you need flashlights down there?

Maguire: Not for the gas vault, the ceiling is a grate, open to the atmosphere. In the other vault a flashlight was needed because all the power was out. There was a lot of smoke above.

Putney: So you went to the vault twice, first to make the assessment, and the next day to pump it out.

Kuney: Yes

Putney: It's an extraordinary story. I want to get details for a good visual image.

Kuney: At 11:00 we tried to bring FOB 2 back up. Brian, downstairs in the plant, started filling them slowly. As he was cracking the valve, I was telling him what the pressure was. When you start filling, the pressure in our system will drop. As it dropped, I told Brian to bring it back slightly. There was at first about 60 pounds of pressure, and it dropped down to about 54. Brian was maintaining 54-56 pounds, part to the Pentagon and part of FOB 2. We did that for about 20 minutes. When it was stabilized we tried to open the other valve, we thought we had filled the system up. When Brian cracked that other valve, the pressure went from 58.7 to 38. I told Brian to "Shut the valve! Shut the valve!" It went so fast I thought the line that went into the Heliport was busted, totally damaged. I assumed that the 36-inch return line in the heliport had a major leak. I called up contractors from mechanical and the specialty cement encased pipe contractor people down in Richmond, to ask them to stand by. I thought we also might need heavy equipment to dig a trench 12 or 15 feet. The

explosion might have blown the cement pipe loose. We didn't if the damage was inside or outside the vault. We shut both of the valves and went over to the vault. He got over there but they wouldn't let him around it. The stairs into it were damaged, and a couple-ton lid was hanging. If we went down there it could fall on us. There was debris all over, the other equipment access panel was hanging from the structure, and the firefighters' tripods were there. They didn't even want us walking by them because if you move them, you mess up their measurements. I went over to the vault and tried to look in, and they said, "Sir, you can't go there." The pipes themselves didn't look that bad.

Maguire: If we'd had a big leak, we would see the eddy currents and the water level rising.

Kuney: We saw water dripping in there. There was water coming in, when I was there. Back to the vault--I couldn't go in the normal way, but we had an emergency exit back on the grass. I got a key and we opened it up and let it air out. Then I went in to look. I said to Jim Graves, "If I don't come out, get one of the firemen with an air pack to come get me." I could see there was water pressure on one of the lines. There was a small steam leak in one pipe, which we isolated. I looked at all the gauges--there are two gauges, one on each end, north and south. I wanted to verify that the gauge weren't busted. If I had pressure on the system and no leaks, that meant we could start back up. I found two sets of gauges that said the same thing. I confirmed that it was intact, and I came back up and told Jim to call the Plant and bring the South side back up slowly.

Putney: What time was this?

Kuney: Probably about 5:15 or 5:30.

Putney: So you went into the emergency exit, now your entrance; did you have any firefighting gear on? Did you have flashlights?

Kuney: We had flashlights, nothing else. There was almost two feet of water, with debris floating on it. There was a guy on top. I asked him to watch out for me. It really was a dumb thing to do, but we needed to get FB-2 back up.

Putney: You were able to confirm that it was OK to bring the power back up.

Kuney: Yes we confirm that the pipes were OK. They were back up about 5:30-5:45. We took them up slowly, trying to verify that we did not have any breaks. By this time in the afternoon the city water pressure was close to normal. The systems were equalized. The more city water pressure the greater pressure difference is, the greater amount of flow for making up. When we tried bring FB-2 up at 1100, there wasn't that much pressure differential. So even though we were filling at maximum, there was no difference in pressure and not that much actual filling in the system, because of all the firefighting and the other pipes being shut off. The Pentagon itself was absorbing that. Going back, lessons learned, I think just too many things were going on at 11:00 in the morning, when we were trying to bring it up. It fooled us. When we cracked that valve, we almost lost the Pentagon again, and I didn't want to do that. We were able to see on TV around that the plane had actually hit and damaged the vault. By seeing all of the damage and seeing how fast the system pressure dropped, we concluded that the South CW distribution system was severely damaged. It turned out that it wasn't true, but it was an assumption I made. Luckily, it wasn't as damaged as I thought. I wish we could have brought up FOB 2 more quickly.

Maguire: If we had had better access, we would have been able to get in there much sooner.

Kuney: Considering the circumstances

Maguire: We did good to get them on at all.

Kuney: Agree, but we can always improve.

Putney: A lesson learned is to use some kind of emergency badge that could identify you as critical workers?

Maguire: They are trying to work that out right now, to see if we can get a different badge, so that essential people that support the facility can get in and out.

Kuney: Another thing that helped us respond were having these Nextel phone systems with two-way communication. This communication was invaluable, not only for us to communicate back and forth but other branches borrowed some of our spare phones to support the recovery efforts. On 911 there was so much phone traffic you would get cut off every 30 seconds, but the two-way radios did not get cut off. Following 911 our counterparts on the tech staff were repairing the roof, doing cleaning, air monitoring, and environmental testing, and we loaned them some of our phones and purchased additional phones for them to keep in touch with us and with each other. So better communications that works inside and outside the Pentagon would be a benefit. We talked over the years about having one set of communications that DPS and the operators of the facility could use. It could be grouped for just the plant people, or the FOB and Pentagon folks, or maybe a group of key individuals or global with different grouping. When we came across the River entrance a man said the Twin Towers were hit, and we knew there was a second attack. We started to put two and two together. I

asked Brian the question about chemical-biological attack versus just a plane landing short. That could happen, too.

Maguire: That, to me, was more likely to happen. The planes fly right over the Pentagon and the plant, day after day. It's not a matter of whether it will happen, but when. Whether a terrorist attack, or an accident, we are right on the flight line. It turned out it came from Dulles, but because of the air traffic around here all the time, no one would know what it was until too late.

Putney: From Wednesday, for the next few days, were there any crucial decisions you had to make, or was it just working with the contractors to start repairing?

Kuney: Tuesday evening, we were fully normal, except for the dewatering of the vault. We wanted to keep the water level low because of the other insulated pipes in tunnels and vaults. We didn't want any further damage of our pipes from water. We have close cell insulation on some pipes that can handle water, and others that are fiberglass. If fiberglass gets wet, you have to tear it off and redo it. That's a lot of money and work. We wanted to minimize the adverse impact, so we worked with the Pentagon renovation group to get power reestablished in the center courtyard, the utility tunnels, the heliport, and steam room 3 and 4, that supply utilities to the Pentagon. The next day I walked all tunnels to see how high the water was and start putting the pressure on getting more pumps. We worked with PBMO's Dan Murphy and his group and electrical shops to start hooking up some power back into some of the damaged areas so we could start to de-water them. We had to at least try to minimize the damage. We walked through the tunnel from the heliport to the CCY, and certain dips had several feet of water. We saw some damage, and tried to assist our counterparts from the Pentagon. We helped at

the JOC. We helped get escorts for the contractor that was cleaning the roof, and helped set up some military groups to help with this. Over the weekend they needed escorts, so we set up some military units to help support this requirement. It was a mundane job, but it is important and at least they felt they were contributing. There were some of our guys that came in and escorted over the weekend, also. We supported as much as we could. We tried to go back to normal business as much as possible. We went out and helped the renovation. We pumped the Heliport site out every day for the first week.

Maguire: We had to; the water was coming in at the fire scene. I had to go back in and get caulk, because where our vault meets the tunnel underground the water was pouring in and I had to isolate it.

Kuney: Why was that?

Maguire: The firefighting water saturated the ground. When I was at the heliport vault on Tuesday afternoon, the water in and around the heliport was about a foot deep on the surface. Inside the Pentagon, water on the first floor was eight to ten inches deep. The tunnels had even more water. They put a lot of water on that fire.

Kuney: A lot of folks don't realize that. I think all that fire-fighting water raised the water table in this area for a few days. We sent a lot of men over there, we tried to rotate and have everyone contribute. We tried to help out as much as we could with the renovation and our tech staff. We were operating fully normal from 6:00 p.m. on 911. We would check and answer e-mails, and go back out again. We made sure we could get fueling to support our equipment, get pumps and trucks in. Some days it was easy,

and some days it was like starting all over again. It was a hassle, but it was something we had to deal with. Everybody was trying to do his or her job.

Maguire: We have learned a lot from this, and we are in the process of trying to get everybody--us, security, the building manager, and everyone else--more able to deal with it better if it happens again. Like the old expression, "That which doesn't kill you makes you stronger." We will be stronger because of this.

Kuney: We appreciate the guys that helped us to do our job--Steve Carter and Dan Murphy, who isolated the valves in the Pentagon, for instance. I received e-mails from some of the mission critical operation center in the Pentagon, stating that the pressure dropped so quickly that it adversely affected their backups. We actually coordinated with some of the op centers to make their systems more robust and responsive. By us getting the Plant backup as quickly as we did, we helped op centers. Some guys gave me some notes saying, "If your management is anything like ours, the most you ever get is a personal thank you for saving us." And to me, that is the best compliment we could ever get. When Brian was in the Merchant Marines things happened out in the ocean. You have to deal with it; it's your life. Brian was telling me a story this morning about being shot at.

Maguire: We had a lot of government cargoes, and I went to Vietnam about eight times with cargo. One time I was in the engine room and heard a couple of thunks. I looked up on the sidewall and saw sunlight. I looked on the other side of the ship and saw sunlight. I looked again and saw a few more holes coming through and realized we were being shot at. I opened up the throttles to give it full speed, and went down below the water level into the shaft alley, and called the captain. I said, "We are under fire."

He said, "We know. You've got plenty of steam, we'll be here, and if you need us, we'll do more. Take care of business and then pull back." You have to do what you have to do. It's your life and the lives of others. Our mission is to support in any way that we can. The people in the plant did what they had to do, with no question. They stayed and did their job. Then they went on to the next thing.

Putney: The whole world was watching, too. People were supposed to come back the next day, and they were able to do that, do their jobs and function as the military command center of the nation. You made that possible, with what you had done, but you are invisible.

Kuney: Typically, our job at the plant is to be sort of invisible, so no one ever knows we are here. When you notice a problem, then we aren't doing our job. Walt Freeman, who used to be the director of Real Estate and Facilities, told me that in his Navy (World War II), when a ship went off to sea and lost its boilers, the first thing the Navy would do was relieve that captain of his command. This statement was made when I first came here, and the Pentagon Boilers are my responsibility. I asked why sir? He said because the captain had not properly trained, disciplined, promoted or performed the preventive maintenance. It was his fault, get rid of him. I took that as our attitude here. I came back into the plant, and met with Brian Maguire and our General Foreman and told them this story. I told them, "If I go, you go." That is our attitude. If we go down, we will potentially lose our jobs. Our other attitude has been, from day one, safety first, mission second, efficiency third. It is our job to safely operate the plant, to meet the mission of the Pentagon. Then, do it as efficiently as possible. I would make the decision to shut off the Pentagon rather than have to go to someone's wife to tell her someone got killed.

To safely operate and meet the mission as efficiently as possible is our mission statement. It's fairly simple, and if we go down, it's potentially our jobs, everybody knows it, and we don't want to do that.

Maguire: In more than fifty years we have never dropped a chilled water plant through operator error. In fifty years we have never lost and gone cold iron on a boiler plant through operator error.

Kuney: It's about sixty years, now.

Maguire: We've had disruptions in service due to a broken pipe outside our control. We are able to shut it off, isolate, and refill. We've had power failures, but we get it back on line. We've had many things happen.

Kuney: We have had logjams in the river; tarps floating in and damaging our bar rakes at the beginning of the cooling season, when we had to come up with makeshift ideas to get us through the summer. And customers in the Pentagon never knew. In facility operations we have to do whatever it takes. Sometimes that's going by the book, sometimes it's adlibbing, and sometimes it's just winging it. We've always done whatever it takes to keep the plant running. We've had machine shop guys making parts that are no longer available, in house, overnight. When they hit the pipe at FOB 2 in 1994, we had a company in Texas make some custom rubber couplings and had them airlifted them here by 6:00 the next morning. We had to convince the company to retool and remake them, and then get them here. A lot of addition support we contribute to the weigh of our name (the Pentagon). Outside industry has always been willing to support us. Sometimes it's done on the phone; sometimes it's contract with my

boss and contracting, or legal, or budget as a group, to safely meet the mission as efficiently as possible.

Putney: This is wonderful material. Did you have anything else to include in this interview?

Maguire: Just that our people did their best; to do what had to be done, no questions asked.

Kuney: Under very trying circumstances. When two planes were supposedly still be in route, they could have easily taken off and ran away. I know enough about chemical and biologic threats; we have had training on that. We were wondering where the wind was going, and if it was smart to stick around. We have the attitude that if it's your time, it's your time, and that was part of it, too.

Maguire: I've missed my time six times, been pronounced dead twice.

Kuney: He has some amazing stories.

Putney: Stick with this guy, do whatever he does.

Kuney: His brother called up and said he dodged another one.

Putney: Nine lives.

Kuney: At least seven now. I was really proud that everyone stayed on site. We had our key management and supervisors on temporary assignment over in RDF competing for their jobs in the A76 process. But everyone came back and helped. For some it took two hours getting back, they weren't allowed even close to the River mall or Boundary Channel, and they had to walk around the marina. Some on their way back like Ben Monroe, our union steward, a reservist, started caring for victims and took his own POV to deliver victims to local hospitals. He came back later and told me what he

was doing and asked if I needed his help here. I told him to keep on helping the injured. That doesn't get in the papers. I heard stories about government workers, wage board people, plumbers, electricians, skilled craftsmen, who pulled people out of the fire; tore their shirts off and dipped them in water for makeshift respirators and others patched wet rags over burned skin. There were some real heroes over there. All we did was our job. We weren't able, actually luckily, to do some of the heroism over in that part of the building. After we briefly shut the refrigeration plant down at 10:02. Our guys were asking what to do? Brian and I replied by telling them to just sit down and relax, we briefly assigned when various systems that will be needed to started to recover the refrigeration plant and to wait until it is our turn. At 1020 the city water pressure had filled our CW system back enough that I gave the command to go. By 1030, the H&RP chiller plant was delivering full CW service to the Pentagon. I think we were up to bat with bases loaded, when we swung, I think we hit a home run. We couldn't have done it any better.

One thing Brian and I did setting up our organization was requiring licensing and cross training of every operator. For our boiler and chiller operators, what we call utility system and repair operators (USRO), they are AC mechanics, refrigeration mechanics, and AC refrigeration operators. In addition to that, we require them to be multi-skilled and multi-crafted on the boiler side, the boiler operators and boiler mechanics. Our requirement before signing a request for personnel action to promote somebody to the USRO WG-11, is that Brian tells me that the individual can bring the chiller plant up by himself, with maybe some help, that they can lead a group to bring the chiller side up-- from an occurrence like this, and the boiler side. Routinely we have our supervisors

running scenarios through our operators to keep them sharp. "If this trips, that trips, tell us what steps you will take to recover?" Our operators are required to possess license, and then get the plant specific knowledge to recover from emergencies on both the heating and refrigeration plants. On every shift we have three men who have met these requirements. When something like this happens, we have full confidence in our men knowing what to do to bring our mission back up.

Maguire: When we have a mishap and I go out on the floor, I don't have to look for a particular person, I just ask whomever I come across to do this or that, and take care of this or that, and they have the competence and capability to do it.

Kuney: Brian and I used to get calls at home once in a while, but we don't get them anymore. I haven't had an operator call be at home in years. This is an important fact as why our guys responded as efficiently as they did to this event. Our operators are licensed, trained, and prepared for almost any emergency scenario.

Putney: You're in the business of keeping the place running, no matter what.