

Molly Graham: This begins an oral history interview with Cliff Newell for the NOAA Heritage Oral History Project. The interview is taking place on Sunday, September 22, 2024, in Phippsburg, Maine, and the interviewer is Molly Graham. I'm a little unsure where to start, but in one of the documents you just copied, there's a note about Project FLARE. Can you say what that was?

Cliff Newell: That was the Florida Aquanaut Research Endeavor. That utilized the EDALHAB [Engineering Design and Analysis Laboratory Habitat] habitat, which was built by the engineering students at the University of New Hampshire. I'm not sure if FLARE only had the one mission that I was on. I think it had several, but the mission that I was on, that was my first saturation dive, was a Pacific reef, which is off just a little south of Miami, I believe – automobile tires that have been bound together so that they wouldn't just float off or whatever, dumped into a big pile. We were studying the reef fish to see if they would move into that artificial tire reef, which they did. The problem is, after the tires were there for a while, they started leaching out chemicals, so all the tires had to be removed. I think that was about a five-day saturation in that habitat. It was real shallow. At the end of the saturation, you breathe oxygen in the habitat for a while, then swam to the surface and climbed into a small chamber. There was Roger Clifford, Wes Pratt – you know that name?

MG: No.

CN: He used to be at the Narragansett Marine Fisheries lab – and me who ran that.

MG: You were underwater for five days.

CN: Yeah.

MG: Can you talk about what that experience is like, the living quarters, and how you manage your daily routine?

CN: Well, the habitat itself was rather spartan. It started its life as an oil tank. It had been adapted with – there were two bunks, a lower bunk and an upper bunk. The third guy had to sleep on the deck on an air mattress. On the other side was a kitchen counter. Your meals and whatever were all prepared on the surface ship and sent down to you in a transfer, pot that was stuff put in there, pressurized, and lower it down to you to eat. You ate pretty much what the guys on the surface were eating. Bathroom facilities – we had none. If you had to go, you went outside. That's usually the first question that everybody asks you about a habitat: what are the bathroom facilities like? Well, in that one, there were none. It really didn't matter because the Lulu, which was the mothership for the Alvin, was what carried that habitat and lowered it to the bottom. It sat up there, up above us, and it had no sanitary system. It was just an open dump system. Everything that they dumped was scattered all around the habitat anyway. You'd go out and do your survey. I don't remember exactly how that was set up, whether it was a timed thing. Each person had several different species of fish that they were responsible for seeing if they had moved, any of them been moved into the tires. It was amazing. I mean, it was like *boom*, the tires were there, and there's the fish. I can remember there was a big – what do they call the one with the teeth? Moray. In Florida. I mean the fish – I used to – on my way back to the habitat,

I'd hand him the pencil, this big fish, and he'd chew the pencil up. All I can think of is Lamprey, and they're not Lamprey. They are the moray eel. They're kind of docile. The trick with them is you don't corner them because they got a lot of teeth.

MG: Better they chew the pencil than you.

CN: Yeah. Then, back inside, you sleep more underwater than you do up here because the air that you're breathing inside the habitat is thicker than the air inside this room, so it's more work for your body to just breathe. So, you're more tired. You sleep more. In that Helgoland habitat, which was 120 feet, the air in that habitat was – if the surface is one [inaudible], thirty-three feet is two, sixty-six, ninety-nine is three, 132 is four. So, the air is almost four times thicker than it is on the surface. It's easy to sleep ten hours in that habitat. If there wasn't noise waking you up or something clanking or banging or people coming down from the surface, you could easily take a nap. I can remember when I went into – I think it was Helgoland. I was in that sixteen days on the bottom. I took a tape deck – of course, that was the vintage of cassettes – and a bunch of Willie Nelson stuff and things like that. I don't think Jimmy Buffet tunes were around in those days or I'd had some of them, but I took a bunch of them with me so that at least there was some semblance to being on the surface. You could listen to that. Rather than going to Helgoland and mix the two of them up, that's what FLARE was.

MG: Was this a relatively new technology? Was there press coverage for the habitats?

CN: I'm sure there was some press coverage, but I don't remember a lot of it. Of course, the oil industry was probably doing some saturation diving before we got into it. I don't know what they're saturating at now, probably six hundred feet anyway. Then, they work a bell from a deck chamber.

MG: Is the bell like an elevator from –?

CN: Yeah, it's a perfect example.

MG: It would be a way to get from the habitat to the mothership.

CN: Yeah, with a closed bell, you could do that. In fact, on Helgoland, we evacuated one team from the habitat because there was a hurricane coming in, and we did that with a recovery bell, brought them up onto a Coast Guard ship, brought them ashore. We attached that little Dräger Duocom, that little chamber that I showed you, because that had a scrubber system built into it. See, carbon dioxide is what you worry about more than anything else in a closed system, more so than oxygen depletion.

MG: How long did FLARE last? I know you were there for five days of saturation, but was it a longer or bigger project?

CN: They actually picked the habitat at the end of our mission to leave the area because the habitat was supported by the Lulu. They picked it up and took it back. It was after the saturation run that they removed the tires. They didn't have the habitat. That was only about maybe fifty

feet at the most. So, that's why you could do your decompression on the surface, swim to the surface, get in the chamber, and then blow back down, repressurize.

MG: That's in the recompression chamber.

CN: Recompression chamber. I don't remember what the decompression schedule was. It might have been six or eight hours. Helgoland was forty-eight hours and ten minutes. You decompressed on the bottom.

MG: What do you do for those forty-eight hours?

CN: Sleep, read, listen to Willie Nelson. [laughter]

MG: [laughter] I also have in my notes that in that same year, 1972, you were doing deep diver submarine ops.

CN: Those are the pictures that I showed you.

MG: Right.

CN: With the tunnel between the chamber and the submarine.

MG: Say a little bit more about where that was being done and for what purpose.

CN: That was off Boothbay. We were studying lobsters. It was set up as a saturation operation with the deck decompression chamber, and the submarine Deep Diver was the transportation vehicle from the ship on the surface to the bottom. The saturation was a hundred and fifty feet, and then the lockouts were down to three hundred or maybe a little bit more than three hundred. That was off Boothbay.

MG: Can you say what a lockout is? What does that mean?

CN: Lockout?

MG: Yeah.

CN: The submarine makes the dive, gets to the bottom, and you equalize the pressure inside of the submarine diver's compartment with the ambient pressure. There's two hatches on the submarine. There's an inner and outer hatch. If the pressure in the submarine is greater than the water around it, that's holding the inner hatch down. When you get to the bottom and you want to get out, you equalize that space in between. Now, if you're deeper than what that pressure was, the water's holding the bottom hatch up. This hatch here comes up out of the way; you equalize the pressure in the compartment the divers are in, and when it's equalized, that hatch drops away so you can get out, and that's a lockout. It probably sounds better if you lock back in because you are locking. You get in, and you close the hatches as you work your way back inside, following the dive, you bring that lower hatch up and dog it in place.

MG: Because of the pressure differential, is the water not rushing right back into the vessel?

CN: Correct. If you had more pressure in that compartment, the diver's compartment, then if the pressure of that air in there exceeded the pressure of the water, it would bubble out. Once the hatch is open, you always maintain equilibrium you always want to maintain equal pressure inside the diver compartment, so that it keeps the water out of there, from coming up above the hatch.

MG: Were the use of submarines a regular part of your work while doing the lobster studies in Boothbay?

CN: They weren't so much in Boothbay as they were in the canyon areas. The canyons are more south of the Gulf of Maine. They were not lockout submarines. They were just dry submarines, for lack of a better term. They were an observation tool, not only for lobsters but fish of all kinds. Whatever there was there to see. Believe it or not, even at six or eight hundred feet, if you settle out and turn the lights off on the submarine, you can have some visibility. There's some light there. But, of course, the submarines has a number of different high-lumen lights attached to it. With those turned on, you've got all the visibility unless you stir it up. The trick is to head into the current so that any silt you stir up washes off out behind you. We'd make dives in those for three or four hours. There's more room in that bathroom than there is in those small submarines.

MG: Yeah, I keep thinking you have to be a certain kind of person to be able to manage these small, solitary spaces, the claustrophobia, and close quarters.

CN: You think we're maybe a little bit kooky?

MG: That's what I'm trying to suggest. [laughter] No, just a certain kind of person that doesn't mind being in those environments.

CN: Could I do it tomorrow afternoon? I don't know. It's like everything else. I had been diving for quite a while before I went off on the first saturation. I made quite a few dives. I used to take the day off from my regular job and dive under the ships at Bath Iron Works for extra money. With three kids, you needed all the shoes you could buy.

CN: You saw how much I made in my first job. Of course, that was at Woods Hole.

MG: I didn't see your salary.

CN: I was a GS-3 at \$3700 a year or something like that. I wasn't diving then. I was the lab technician, I guess is what they call me. We ate a lot of fish in those days.

MG: Tell me a little bit more about the Helgoland work. That seemed like a bigger chapter in your career.

CN: Helgoland is the name of the island in the North Sea that – the habitat actually was home-ported on Helgoland Island, and then deployed just offshore of Helgoland Island. We went there to look at the habitat before it was brought over to this country. The program here was herring and herring spawning. Pigeon Hill, which is an area of Jeffreys Ledge, was a historical spawning area for herring. That's why we set the habitat on that location. That's about a hundred twenty feet deep on a normal tide, it's about a hundred and twenty feet to the top of Pigeon Hill, and then it slopes down to probably three hundred feet on either side of it or around it. It's the first saturation study done in cold water, scientific saturation, anyway, and probably the worst time of year that you could ever be trying to work offshore the coast of New England. We started just after Labor Day 1975. The habitat came into Boston on a Polish freighter and was offloaded there and towed to Pigeon Hill, which is off of Rockport, Massachusetts, and deployed. Shortly after that, it was maybe on the bottom two or three days, and the first team entered to do a checkout of all the systems. They were down about five days when that was completed, and the checkout team was leaving with one individual staying down, and then the first scientific crew would enter the habitat. However, when the checkout team was surfacing, Joachim Wendler, a German aquanaut, embolized on his way to the surface and died. So, that kind of threw a wrench in the works. We stopped for analysis. We were dead in the water for the next three or four days, but pretty much decided to go on. The decision was made by the people that were going to be saturating and whatever that we wanted to go ahead with the operation, rather than just back out and go home. I think the feeling was that just quitting was like criticizing poor old Wendler, who lost his life checking the system out. We went through a board of inquiry, a rather intense board of inquiry. I actually recovered Wendler from the buoy when he came to the surface. I had put my suit on, and Bill High handed me a pair of flippers. I bailed over the bow of the boat. We were waiting for the guys to swim back, and Wendler never left the buoy. We gave him mouth-to-mouth and CPR all the way back to the beach, put him in a chamber, pressed him down. We had a German physician as well as an American physician on scene. Because he was a German commercial diver, that's what had to be used for tables, which were fine. Anyway, he never revived.

MG: I imagine the operations going forward must have just been that much more nerve-wracking. What was the feeling among the crew?

CN: Well, for me, it was about a twelve-hour day minimum. I would start getting stuff ready at five o'clock in the morning, rounding up the crew that was going to go offshore, and running from where we were staying in a hotel in Rockport, running down to the boat. In the early part of it, our support boat was running out of Rockport harbor. Eventually, we were running out of Gloucester because you could get a bigger boat in there. You'd be out all day long, either diving or running the dive [operation], keeping track of everybody's bottom times and surface interval times. The last thing you want to do is bend somebody in an operation like that, especially since I didn't have a chamber offshore. After Wendler's fatality, we ended up with a larger support vessel and that Dräger Duocom, that L-shaped chamber that I told you about. A normal day was you're back on the beach [at] five or six o'clock. I spent a lot of time sleeping on the run back in. I'd catch a quick five-minute nap or whatever. And then, every evening, when I would get back in, there was a staff meeting. "What'd you get done out there today? What broke, and what is still working?" The weather really did a number on us. Many a day, we would go back out, and the surface buoy would be hanging by three chains rather than four. So, first thing you'd have to

do was reconnect that. We ended up taking all of the fuel oil out of the support buoy. The support buoy was on the surface and the habitat was at a hundred and twenty feet. The buoy on the surface supplies compressed air, powerful lights, electric heaters, and whatever. You had to keep that generator going to keep the habitat operating. There was plenty to do.

MG: This was for Project FISSH [First International Saturation Study of Herring and Hydroacoustics]. What did that stand for? What was its purpose?

CN: First International Saturation Study of Herring and Hydroacoustics. The hydroacoustics was going to be putting fish into a cage and then changing the way the fish was presented to the transducer on the bottom of the ship above to see if the position of the fish changed the picture on the fathometer.

MG: To see if vessel traffic impacts hearing behavior?

CN: It may have. Herring spawned about a mile from where the habitat was. The crew that was there to investigate the herring spawning – you wouldn't go that far from the habitat. Besides, it would be a lot deeper than what the habitat was. Without some kind of a transport system, it'd have been nice to have a submarine you could lock into and do that. But we didn't have a submarine. To answer your question, it may have been with all of the activity on top of Pigeon Hill, that's why the herring didn't come there and spawn.

MG: I see. Herring is such an important fish in New England fisheries. Was there a lot of pressure or interest in this project from NMFS?

CN: There was a lot of interest. Herring are a food fish for other fish. The biggest use of herring – adult herring in this country – are probably lobster bait. In fact, there used to be – and don't quote me, but there used to be twenty-some-odd sardine factories in the state of Maine. They were canning the juveniles. The ones that would be spawning would be the adults. They would be, say, twelve inches long. Now, there are no sardine factories in Maine. Sad but true. If you want a good sardine, you have to buy Norwegian sardines. So, as far as pressure, I suppose there was some pressure around the edges to learn something. You can imagine the expenditure of that habitat, bringing it over from Germany, setting it up on Pigeon Hill. There must have been fifty guys running around doing something connected to it on a day-to-day basis. There were no women divers. I'm sure there was some somewhere. Sylvia Earle, I think, came along when they invented scuba.

MG: Yeah, tell me about Sylvia Earle. Did you get to interact with her very much?

CN: The only time I interacted, really – I mean, I knew her. If I saw her, we would pass the time of day. She wanted to dive from a NOAA ship. This is when she was the Chief Scientist. She wanted to dive from a NOAA ship on Flower Garden Reef, which is in the Gulf of Mexico. She hadn't been diving for a long time, and she hadn't had a physical in quite a while. Anyway, the information came across my desk in Seattle that she was going to be diving, and I said, at minimum, she needs a physical. I wasn't worried that she didn't remember how to dive. I mean, the bubbles always go up. Well, Nobody wanted to tell Sylvia that she needed a physical to go

diving from a NOAA ship. So I said, “No, it's no big deal. She puts her pants on one leg at a time, too.” I just called her up, told her what the deal was. I said, “I can make arrangements. You tell me where you're going to be on such and such a day, and I'll bet you I could line up a doctor that'll do your physical.” She said, “Newell, if you can do that, we'll do it your way.” And that's what I did. It's the same old thing. Everybody thinks the big shot – well, just let them go do what they want to do. The big shot wants to go along with the rules and regulations just as much as the next person does.

MG: What's different about scuba? What's different about the kind of diving that Sylvia Earle was doing?

CN: She was basically a scuba diver. She actually dove in the JIM suit. They had the JIM suit hooked onto the front end of a submarine, and she climbed inside the JIM suit. I doubt that she could walk; the JIM suit weighs eleven hundred pounds with an occupant in it. The resistance and whatever, making it move, to walk it, or whatever – you know you've been somewhere. There's different length spacers in the legs that you can put in it for a tall person or a short person. I had the smallest. You wear lead weights on the front and the back. I'm trying to remember what I had for weights, but I don't. I'd be guessing if I gave you a number. I don't think Sylvia could have maneuvered the JIM suit. She's a pretty small woman. But I'm sure she could do surface. Surface-supplied diving. You got all the air in the world or gas that somebody wants to send down a hose to you. So, yeah, it's more difficult to move than in scuba gear. Scuba gear, you pretty much neutralize your buoyancy. You want to go over there; you just kick over. Well, if you're diving hose, usually you stay a little bit heavier because you're walking and dragging hose. I'm sure she's done that somewhere in her career.

MG: When was her involvement in the habitats? Was it during her time as chief scientist?

CN: No, before. She was never part of any of the habitat program that I was in. I think Hydrolab was the habitat at the time when she was real [active], and that was down off of St. Croix.

MG: You were involved in the Hydrolab. I have that in my notes.

CN: Yes, I was involved. I was part of the setup team and checkout crew in St. Croix for Hydrolab, but I never saturated in it. Hydrolab was another one that was shallow. You could actually breathe some oxygen. In fact, while I was there one trip, we evacuated the team from being in there. I'm trying to think of the TV guy that was in the habitat. Actually, he was swimming down to the habitat, and there was a photographer inside the habitat already. I guess the TV guy was in there. This is back in Dick Frank's day – was coming down to the habitat, and they wanted to film him. That habitat had a window about that big around? Four feet diameter. The photographer set his movie light next to the window to get extra light outside, and it actually bubbled that synthetic window. I'm not sure whether it was Lexan or whatever. So, now the window's got a bubble in it. Now you got to shut the hatch and depress the habitat, meaning get more pressure on the outside, especially an area that big. The decision was made to bring them in from the habitat. It was maybe a ten-minute trip at most, one by one, in a speedboat, get them on the beach, put them in the chamber, press them down deeper than the habitat was. That way,

if any bubbles that started while they were making the run into shore, you put them back in solution, hopefully. Once they were all inside, decompress them all inside the chamber on the beach. I used to go back and forth to St. Croix like the wind. About the time I'd get home, the phone would ring. Dick Frank was a sport scuba diver. [Lowell] Weicker, the Senator from Connecticut, was a big proponent of NOAA, and he was a sport scuba diver. When he wanted to dive in St. Croix – “Newell, what are you doing this week?” I'd go down and babysit those sport divers. Because I'll tell you, all you need is a photographer and a politician, and you got bends jumping right out of the water. That politician will stay underwater well beyond his normal bottom time as long as the guy's clicking the camera. I stay off to the side, keep track of the time, how much air they had in the tank. When I wanted them out of there, I'd go over and tap them on the shoulder, and either they'd come up with me, or I'd grab them by the tank and take them to the surface.

MG: Was Weicker using the Hydrolab?

CN: Weicker did not saturate in the habitat but he made many dives around it.

MG: Was the Hydrolab NOAA's first or the US's first undersea habitat?

CN: I don't think Hydrolab was there when FLARE – the EDELHAB habitat was deployed

MG: That's right. That was the New Hampshire –

CN: University of New Hampshire. The Hydrolab in St. Croix was originally operated by Fairleigh Dickinson University. Bob Dill was the director of the Marine Lab in St. Croix, and originally worked at the NOAA dive office, so there was that connection there. I'm almost positive that EDELHAB was deployed there before Hydrolab.

MG: That sounds right. Was the Hydrolab also used to look at coral reef activity?

CN: Well, it was set up on a coral reef outside Salt River Canyon, just outside of that in St. Croix.

MG: I read it had a moon pool. I didn't know what that was.

CN: That had an open trunk inside of it, so that it was always open to the ocean. You could swim up into that moon pool, climb up through that trunk, which was probably only three feet tall. To keep water from splashing into the habitat, it was probably – I don't know, maybe thirty-two inches, three feet in diameter. When you look down in there, there was always water in the bottom of it. Any fluctuation of waves or whatever outside, the water would come up and down inside that moon pool or the moon pool would move.

MG: NOAA is about to use the original Hydrolab in an exhibit. So, I was curious about what else we should know about the Hydrolab. What are some interesting facts?

CN: I think Morgan Wells spent more time in Hydrolab than any other individual. In fact, one of the mannequins they've got in there reminds you of Wells.

MG: Yes, we think it's Wells. I mentioned last time I was here that some people think the third mannequin is you. Here's a picture.

CN: It could be. I don't know.

MG: The one in the middle.

CN: Yeah. It looks kind of tall for me. But I was in it. That's the trunk that I was telling you about. The moon pool would really be down – if that hatch was level with the floor of the habitat; every time a wave went over, water would splash in, which is what frequently happened in EDELHAB. EDELHAB, the hatch was too close to the floor. Many a morning, Wes Pratt woke up soaking wet. I don't know if that's – I was in and out of St. Croix. I installed the chamber outside, hooked it up, and checked it out, and all of that.

MG: Was this all before you were officially with the dive program?

CN: This is when I was with Fisheries in Woods Hole. Your reputation travels fast, good, bad, or indifferent. [Dick] Rutkowski and I worked on putting a chamber in there. That was after '75 that the Hydrolab went in St. Croix.

MG: Yeah. I think the Hydrolab was in operation from '70 to '85.

CN: From '72 to '85?

MG: That's what my notes say. But my notes might be wrong.

CN: I called the dive office a couple of weeks ago and asked them how many dive manuals they had published since I left. Anyway, the next thing you know, those two arrived in the mail.

MG: We can always add it to the transcript. Was the MUST [Manned Undersea Science and Technology] office the predecessor to the diving program?

CN: The MUST office was like a financial office. It had some people that had underwater experience. Bob Dill was one of them. Jim Miller. Morgan actually went to work for them before. He's the one that split the dive program from the MUST office. There was all kinds of money there, but you couldn't get any money. The money was all going to the fancy projects. They were almost like a favoritism-type project to the people in the MUST office. Wells fought them, and the dive office became separate from the MUST office. The MUST office was fully functional when Helgoland was operational in the US, but it was probably two or three years later that the dive office took some of the money and broke off on their own. But it's going the other way. When I was running the dive office, there was a given amount of money that was set aside for the dive program. The funds were actually monitored out of the Rockville office, but I had a known budget shortly after I left. It would

have been when Dave Dinsmore went in there. Their budget was part of the Pacific Marine Center [PMC] with Pacific Marine Center deciding where they were going to spend their money. I don't even know if this one's got Hydrolab in it. You notice they went back to a hardcover book or a fixed-cover book. They didn't like my idea for a loose leaf manual. This was my idea.

MG: To have a three-hole punch?

CN: Three-hole punch. If you find an error on page forty-eight, you print a new page forty-eight [and] throw the old one away. Yeah.

MG: That makes sense to me.

CN: Hydrolab, underwater habitat. [Pages] nine, thirty-two, and forty-one.

MG: So we're looking at one of the NOAA Diving Program Manuals?

CN: This?

MG: Yes.

CN: Yeah.

MG: Who wrote this? How was this put together?

CN: All the NOAA dive manuals that I know anything about are – different parts written by different people. Although the last manual a fellow named Bozanic, Jeff Bozanic – it says in there that he was the person that organized that one as an individual. The other one was Best [Publishing Company] book. Even this one. I'm looking for a number. That's from Baker.

MG: One of NOAA's administrators.

CN: Yeah. This is just a thank you. "Thank you very much for your assistance and guidance on the fourth edition of the NOAA Diving Manual." So that's what this one is. Huh, it's interesting.

MG: What's that?

CN: This letter is from Jim Joiner, who was the owner of Best Publishing. It says, "Dear Cliff, once again, thanks to each of you for your personal contribution to the fifth edition of the NOAA Diving Manual." How come he thinks it's the fifth, and Baker thinks it's the fourth? There's no date on either one of these letters.

MG: I don't want to take you off track. We were trying to find out the year the Hydrolab was established.

CN: See, this one here is one that I edited after when it was all – see, I've got "leave out." Contributors and reviewers.

MG: Oh, wow. It's a long list.

CN: There is four pages.

MG: I see lots of PhDs and MDs. Did you ever consider going on in your education?

CN: Did I?

MG: Yeah.

CN: I did at one time. It was actually, actually, after I'd moved to Seattle and took over the dive office. I never did it. I was so busy running that place that I didn't know when I could go. The marine technology classes that I took, in a lot of ways, were helpful in running the dive office. However, I always felt that I was at a lower level because most of the time, I was working with PhDs or MDs. You'd be amazed at how many MDs that I know always call me "Dr. Newell." At the time this was [published], I was already in Seattle. Before I was the director of the program, I was the Chief of Diving Operations. That was my title.

MG: Did you work right under Dr. Wells then?

CN: Yeah. See if it says anything in here. I don't even see anything about – the only thing I see is the word Hydrolab. And it's funny, it says, "In the FLARE and Hydrolab undersea programs, divers were able to observe fish near stationary traps." I was thinking there was a whole section on habitats.

MG: There might be. It's a big book.

CN: History of, one-seven. It says, "The most famous and widely used habitat was NOAA's Hydrolab, which was based in the Bahamas and the Caribbean from '72 to '85 and provided a base for more than six hundred researchers from nine countries. In 1985, the Hydrolab was retired from service and now resides permanently in the Smithsonian Institute, National Museum of Natural History."

MG: I wanted to ask you about the Aquarius next.

CN: Okay. "The Aquarius, a more flexible and technologically advanced habitat, has replaced the Hydrolab as NOAA's principal C4 research laboratory. See section seventeen for more detailed discussion of habitat-based in situ research programs." The Aquarius was originally intended to go to St. Croix, and it was originally to be named the George Bond. George Bond was the father of saturation diving. He was a Navy captain physician. I think it was Weicker that didn't like the idea of naming it after George Bond, for whatever reason, so it ended up being called the Aquarius. Those of us that had worked with Bond were livid. During Helgoland, George Bond would come on the radio in the middle of the night and quote poetry to us, put us asleep. Great guy. Judy was having some medical difficulty when I was in saturation – that's a two-day decompression to get out of there – and George Bond would call the local doctor in

Falmouth, Massachusetts, talk to them about what was going on with Judy, then he'd give me the information over the radio at night in the habitat.

MG: So, you're not completely cut off from communication?

CN: No. You could talk. You could make phone calls from the habitat. They hold the phone on the surface. You hold the telephone, a regular landline telephone next to this speaker on the two-way radio. The message would go out that way, then the other way around. You just flip the thing over, and the person talking on the telephone would talk to the habitat. You'd hold the button on the microphone for the radio.

MG: What made the determination that Aquarius would go elsewhere?

CN: I think it was the fact that Fairleigh Dickinson wanted to get out of the business. But I'm not positively sure.

MG: I know it now resides in the Florida Keys National Marine Sanctuary.

CN: It was on Conch Reef, which is right off Key Largo, and the support base was in Key Largo, but now it's run by Florida International, and their support base is further down the Keys. I don't know just where the habitat is because they took it over after I was no longer a cog in the game. That's the only habitat.

MG: I see the Aquarius there.

CN: There's the Aquarius. The Aquarius is big, from about here back. The first eight feet of it was wet lab, where you'd come in and out. There was a room to hang up equipment and wetsuits and all that kind of stuff. That Jules Lodge is the one that is the hotel in Key Largo, underwater hotel.

MG: The Jules' [Undersea Lodge] hotel.

CN: Yeah.

MG: These are some great pictures in the manual. There's the Hydrolab. There's EDELHAB.

CN: You see the Lulu set up right above it.

MG: If I reached out to the dive office, would they be able to share a copy of the manual with me?

CN: I would think so. I don't even know who the director is there anymore. They've really gone through a lot of changes since I left there, rightfully so. The one thing that aggravated me or bothered me more than anything else was they did away with the Standardized Equipment Program.

MG: How large of a program did it become?

CN: The standardized equipment?

MG: The whole diving program.

CN: Say that again?

MG: How large did the diving become?

CN: Oh, how large did they get? Well, when I left, there were 325 or 30 divers. All but about ten people were employed by other agencies. When I was in Seattle, there were six of us that ran the dive office. Okay, right now, the last I knew, there were thirteen. They did away with one of the biggest parts of the whole deal, which was the Standardized Equipment Program. I had two people that were responsible for overhauling and checking equipment before it went out to the divers in the field. So, I mean, a lot of work. But people are funny. Nobody liked overhauling scuba regulators. The reason for starting Standardized Equipment Program was when Rutkowski and I were traveling around teaching divers, some poor sap would show up with equipment that had Joe's Snorkel Shop tags on it. The hose would be ruptured, maybe, or the regulator didn't work. Luckily, we put them in the pool the first time they used them. But some the stuff that – the unit that was sending this new diver gave them whatever junk they had laying around. So, the only way to solve that was if you started this Standardized Equipment Program, number one, every diver within the unit would have the same equipment. So, if something went wrong with my equipment on the bottom, you would know how to fix it, especially if it was something that I couldn't see because of the location behind my back or whatever. But if it's exactly the same as your gear – sounds simple to me. But they got rid of that shortly after I left. Now, guess who does their overhauls on regulators? There's a girl there that is in charge of that program, but they no longer do the repairs. She and I are quite friendly. In fact, she's been here. She came with Laurie Barber, my ex-administrative assistant. Her name is Lisa Glover. Write her name down. If you can't get a dive manual anywhere else, I'll give you her number. When we go upstairs, I'll give you her phone number. There's at least a contact.

MG: I have in my notes that, in 1976, the *Patricia Marie* sank, and you were involved in trying to recover the bodies from the sunken fishing vessel.

CN: That was off of Provincetown, Massachusetts.

MG: What happened?

CN: It was a scallop boat. The best that we could tell was that they were headed in at the end of the day, probably with a deck load of scallops. Scallop boats have a drag on each side. They only use one at a time, but they have two drags, and the drags were not lashed down, and they were headed in, in heavy weather. There were two boats coming in, one ahead of the other, and the guy in the back boat – the story was he turned around to do something behind him, and when he turned back and looked forward, the front boat was gone. It sunk that quick. What it looked like to me was that they probably take a heavy roll, and that drag, which was not tied to the rail

on one side or the other, slid over. The weight of the drag affected them so that the rail went underwater, and it took on enough water that it sunk that quick. Gerry Studds was the Congressman from Massachusetts at the time. I guess he had lived at least part-time in Provincetown. Anyway, he called the Woods Hole Fisheries Lab office and wanted to know if the divers from the lab could go looking for that boat. Everybody's thinking maybe the fishermen inside the boat are still alive. They're not going to live. Anyhow, Dick Cooper called me up [and] said, "Can you put a rig together to go looking for this fishing boat?" I said, "What am I going to use for a boat?" The Coast Guard supplied one of those big black buoy tenders. They supplied that for a support boat because they were all dancing to Studds's drum. He called somebody in the in the Coast Guard. Anyway, I moved a chamber and a surface-supplied diving system onto that boat that afternoon, and we got underway the next morning and went to P-town. We went out there to the area. You could see bubbles coming up, bubbles of oil from where that boat was on the bottom, and we dragged – I don't know if you've ever been on a scallop boat, but there's a rope going or a wire going every direction you can imagine. In a Zodiac, I dragged a grapple for half, three-quarters of an hour, I don't remember anymore, around and around that bubble, trying to catch that boat on the bottom, and I couldn't. Finally, I said, "The hell with this. I'm putting some gear on. I'll follow the bubble train down." I did, and I landed on an oxyacetylene burning torch if you know what that is. It's an oxygen hose and an acetylene hose. Go to this metal torch – anyway, that's where I landed was on that, and I knew that it was part of the rigging on the boat, so I'd follow that over, and there's the boat sitting right there. It looked just like somebody had set it upright. I was in scuba gear. I wasn't going to go in the boat on scuba gear. You don't make penetrations like that. So, we just came back to the surface. We had a good mark on where the boat was, went back up the next morning, and put the Coast Guard boat into a moor over the top of it so that it can't shift too much side to side or fore and aft. Anyway, I went down on it with hose gear all through the boat, looking for bodies. There were none. Anyway, there was an American flag folded up in the wheelhouse. I grabbed that and brought that up with me. We gave that to the wife of the captain of the boat. I don't remember just how soon after or long after – I can remember going back to Provincetown to go to the funeral for the guys who were lost. But apparently, they all washed overboard.

MG: And the bodies were never recovered?

CN: No, there were all kinds of stories about those bodies in it. There's this, there's that. Well, I can tell you, I went all through – I was down in the engine room, crawling around on the end of a hose. Again, you get all the air from up above that you need.

MG: A couple of years later, the NOAA dive program was more formalized. Dr. Wells was appointed director of the diving program. I'm curious about the dynamic between you and Dr. Morgan Wells and Dick Rutkowski, and the conversations you had and how you determined roles and responsibilities, what kind of strategic planning you did around the dive program.

CN: Morgan was a very unique guy. Smart as a whip – diving physiology and physics and mathematics. He was always more than happy to teach somebody that wanted to learn what he knew. Rutkowski and I looked up to Wells. In a lot of ways, we carried Wells. Morgan wasn't really a fieldman. He'd done a lot of fieldwork. He'd been in habitats more than any individual. But he didn't want anything to do with the training. Rutkowski was running that. I don't think

Morgan ever told me, “I want you to do this or do that.” It was always, “Can you? Will you?” We were friends as well as working cohorts. Real, real, close friends. And was Rutkowski as well. I mean, if you go in Rutkowski’s facility that he has now in Key Largo – have you been there?

MG: Yes.

CN: He has a memorial to Morgan Wells set up there. It was a close relationship, but an open relationship as well. So, I mean, it was – if you didn't know something, you'd just ask him; he'd tell you. If it was hardware related, it usually came to my bailiwick – compressors and hardware and piping and plumbing and this, that, and the next thing. I don't think either Dick or Morgan gave a second thought about we're going to do this or that with a hardware-related situation; they would just pick up the phone and say, “Can you be somewhere next week?” It's like the chamber in St. Croix. Every year, when the physician's class would roll around, I would go to Miami and go all over the systems to make sure they were up to snuff.

MG: When did you start bringing physicians in? Can you tell me about the connection between the medical benefits of the hyperbaric chambers and why physicians would need this kind of training?

CN: I wasn't there when the physicians' program was first put together. Of course, Morgan's office was just down the road in Rockville from UHMS [Undersea and Hyperbaric Medical Society], which was in Bethesda. There was a lot of back and forth between those two offices. Charles Shilling was the director years ago of UHMS. It's just the fact that there weren't a lot of physicians scattered around the coastal areas that knew anything about hyperbarics. NOAA Diving program had a medical review board, and I'm sure they must have been involved in getting the physician's training program off the ground. It was run in conjunction with UHMS. Even when I was in Seattle, NOAA Dive Program gave UHMS a lump of money, like twenty grand or something like that, on an annual basis. UHMS did all of the legwork with the physicians and whatever until we got it to Seattle. Of course, Rutkowski had the chamber in Florida. The chamber in Florida came before the physicians' training program. I'm quite certain. I'm sure that Rutkowski was instrumental, as well as Morgan, in getting that first physician's class off the ground with UHMS.

MG: Was it to teach physicians how to deal with patients who had the bends or other diving-related injuries?

CN: I think initially, they came from hospitals that had a hyperbaric facility. They had a physician or two, but they wanted one or two more people that were trained. To my knowledge, there is no training in hyperbaric medicine that goes on in standard medical training. Hyperbaric medicine was kind of looked down upon in the '50s. There were a bunch of hucksters going through the countryside with chambers on trailers, and they were peddling the hyperbaric therapy for everything from dementia to impotence, to you name it. Well, gradually, they were proven to be peddling a bunch of falsehoods. So, the insurance companies didn't want to handle it [or] have anything to do with it. So, UHMS originally was UMS, Undersea Medical Society, and then it branched off with Undersea and Hyperbaric Medical Society because hyperbaric oxygen

therapy is used for a lot of first aid treatment. Gas gangrene is one thing [that] comes to mind right off the bat. Diabetic feet. Anyway, UHMS was there already. I guess Wells and Rutkowski beat their door down to get that program going. Now, what benefit was it to NOAA? NOAA was scattered all over the countryside, with divers in lakes as well as on the coast and doing all kinds of crazy things. So, if you had no physicians or facilities to take care of them and you have an accident, the rest is history. I mean, it's like when Wendler had his accident; I had no chamber offshore. Well, a dive supervisor without a chamber in the case of an accident is like a plumber without a wrench. You can imagine, you got divers in Juneau, Alaska, or Kodiak Alaska, that are diving all over the place. We ended up – we put a chamber in Juneau. It was a chamber that I originally had in Woods Hole. I tried to give the chamber that I had in Woods Hole to the local hospital. Jeff Davis was probably the foremost hyperbaric physician in the world before the poor guy died of a brain tumor – late fifties or early sixties. He could sit here and explain hyperbaric medicine to you as well as me. That's the kind of guy he was. I think I used to say he could teach hyperbaric medicine to the third grade. Nicest man I ever met. I lost my train of thought here. He was tied in because he was military. The hyperbaric unit at Brooks Air Force Base in San Antonio is named the Jefferson C. Davis Hyperbaric Unit. That's where they ship all the burn victims. There's a plane crash and umpteen people have burned and whatever. Oh, I know what I was going to say. Jeff Davis came to Falmouth and gave a talk about hyperbarics. There were probably fifty physicians in the room. He talked for an hour, maybe two. When his lecture ended, all but one get up and walked out. They had no questions. They had no interest. There was a guy that I used to play hockey with who was an orthopedic surgeon. I asked him about hyperbarics one time, and he said, “Oh, it’s witchcraft.”

MG: What's your feeling? What's your opinion?

CN: Hyperbarics? It's wonderful if it's an oxygen-deficient wound. That's the best thing in town. But I tried to give the chamber to the hospital. You give me a room to put it in. We'll install it. We'll maintain it. You train a physician, and you got it for medical use, and it's sitting there as an emergency tool if I have a diver with a problem six months from now. They had no interest whatsoever. The reason I mentioned Jeff Davis – if Jeff Davis couldn't sell somebody on hyperbarics in that hospital, Cliff Newell sure as hell couldn't. So, I gave up after that show of non-interest.

MG: When I met Dick Rutkowski, he really talked about how he swears by its therapeutic and anti-aging properties.

CN: Yeah, I don't know about that. Although, look at Rutkowski; he's ninety-four years old. He's still going. I talked to him last week.

MG: Oh, yeah. How's he doing?

CN: Fine. He was getting ready to go out to dinner with one of his buddies. He's a character.

MG: Yes, he is. I still have some more questions, but we've been talking for a little while. Do you want to take a break?

CN: It's up to you. I'm doing fine.

MG: Okay, then I'll keep going. Before we were recording, you talked about the facility at White Oak. Can you say a little bit more about what was being done there?

CN: The facility at White Oak?

MG: Yes.

CN: That was a Navy facility, and part of the overall facility was the hundred-foot-deep tank that they had there. The facility, I believe, was called the Naval Surface Weapons Center. Other than that tower, I don't know much of what went on there. I think a lot of what went on there, they wouldn't tell you what was going on. I think it was probably a lot of secret stuff going on there.

MG: Well, some of the training had to do with replicating blow-ups. Could you tell me what a blow-up is?

CN: A blow-up would be an uncontrolled ascent to the surface. The problem with a dry suit [is] the air inlet is on one side of your chest, the exhaust is on the other. The only way you can get air out of that suit is if you're head up/feet down because that's where the exhaust button is. The first time I ever wore a unisuit, I was moving cement clumps of – I don't remember what they weighed – around on the bottom, getting ready for a submarine safari. May have been the deep diver thing. I thought, "Wow, this is great." You leave a little air inside the suit; it works like a lift bag. Well, I picked up that weight and gave it a toss from a shelf, an underwater shelf on the ledge. When it went, my hand was caught in the loop of rope on the top of it, and I went right along behind it head down. Air went into the feet of the suit, and there I was, bound for the surface, carrying the block because the rope was caught on my wrist and unable to exhaust any air out of the suit. Anyway, that's a blow-up from ninety-five feet.

MG: Is your suit literally blown up? I'm picturing you like Michelin Man.

CN: The suit is blown up like a balloon. There's probably a picture in there [NOAA Diving Manual] somewhere of a blown-up diver in a blown-up suit. It's the most hazardous thing going. The only way you survive it is you exhale all the way to the surface. You don't inhale at all. Now, do I remember that? It was just ingrained, I guess.

MG: If you had dropped the brick on your way up, would it have propelled you up too fast?

CN: Even faster. I mean, I was already going too fast. The normal rate of ascent used to be sixty feet per minute. Now, they recommend going even a little bit slower than that. As a training method, you'd tell the divers [to] just go at the same rate as your smallest bubbles. That's about sixty feet per minute. If I had dropped the weight, who knows how fast I'd have gone? But I couldn't get rid of it until I got to the surface. I think somebody came over and helped me get rid of it. I put the glove back on, went down, and finished the job. It may have saved my life going back under pressure. I don't know.

MG: When the dive program moved out of MUST, did it become part of OMAO?

CN: Office of Marine and Aircraft Operations, I think it is. I don't think so. I don't think it went directly into – it ended up there, though. That's where it is now. I almost think it went in – what is OAR?

MG: Office of Oceanic and Atmospheric Research.

CN: Yeah, it may have gone into that. I'm not sure.

MG: But is it with NOAA Corps now?

CN: Yeah.

MG: Did you join the NOAA Diving Office before or when you moved to Seattle?

CN: As an employee?

MG: Yes.

CN: When I went to Seattle. Fisheries agreed to give up my position, my ceiling, or whatever. When I went out there, then I became an employee of – must have been OMO, Office of Marine Operations.

MG: Were you still working under Morgan Wells for a time out there?

CN: Yeah. I went out there in 1987. TDY.

MG: Temporary duty.

CN: Yeah.

MG: That was the six-month probation, or when you became –?

CN: No, that was when I was building the dive center. You've never been there, you said. What do I mean by building? The building was there with a big open space. We had contractors come in and turn it into a lower and upper level with the classroom and office space on the upper-level chamber, down below a workshop on one end of it, and then an open corridor. Then, once that was done, I added high and low-pressure air systems for the chambers and for whatever throughout the lower part of the facility and took the chamber out of Miami, the eighty-four-inch chamber, brought that to Seattle, and installed that out there in the dive center. So up until then – see, the Miami facility was Rutkowski's. The director of AOML, Atlantic Oceanic, and something laboratory –

MG: Meteorological Laboratory.

CN: – Meteorological Laboratory is who Dick worked for. There were a lot of divers that were coming into Miami. The normal routine was somebody would make a dive somewhere in the Caribbean. In the morning, they'd get on an airplane and fly to Miami that afternoon. About halfway to Miami, they'd bubble up and be looking for treatment, and there was no hyperbaric facility in Miami. The director of that lab, I don't know what his interest was as far as chambers and whatever. Rutkowski was already diving at the time for them, and Dick had been through some kind of commercial diving school. The director of that lab asked Dick if there was any way that they could get a hyperbaric chamber in there. The guy's name who was the director of that lab was H.S.

MG: Harris Stewart.

CN: Harris Stewart, thank you. God, I should be able to – Harris is all you hear now on the television. We're going to have a woman president.

MG: I hope so.

CN: So do I, if for no other reason, the other turkey is not good for the country. AOML was across the street from the Fisheries laboratory. The chamber ended up at the Fisheries laboratory. Dick gradually built a facility. They build a lot of buildings in Florida that are up on stilts. The chamber was underneath that. He got a bunch of local laborers, and they put cement blocks and made a room to start for the chamber, and then expanded into the next room and the next room. I went there to get the chamber. “How are you going to get this chamber out of here?” So, I just disconnected all of the piping. It was all going to be new when I got to Seattle. I just took a Sawzall, chopped it off here and there. When I finished, I got the maintenance crew in there, and I said, “We need to take this wall down so this thing can be dragged out of here.” They couldn't believe it. It was four days from start to finish. It was on the truck and headed to Seattle. I met it in Seattle. I was out there when the truck showed up and unloaded it. By that time, I think I was probably employed by OMO.

MG: Well, tell me a little bit more about your tenure as the director of the Diving Program and the things that stand out to you.

CN: Well, number one, we still had some of the people with knowledge of the program back in Rockville when I took it over, which helped considerably with budgeting and keeping that end of it straight. I ended the year one year within twenty-five cents of my allotted budget. They couldn't believe that anybody could maintain a budget that closely. I said, “Well, there you go.” There was a guy in Seattle who was the West Coast representative. That was Ed Clark. He was a NOAA Corps officer. I think his primary function was probably to collect dive logs and get the information back to Rockville because all the divers were tracked for their physical being up to date. To stay qualified, you had to make at least one dive every month. That was tracked in the Rockville dive office. So, this fellow was tracking the dive logs for the West Coast divers, or at least PMC, anyway. When I first hit there, I was just running the facility, and Morgan was back in Rockville. Actually, he might have been at Fort Eustis by then. But then Morgan left, and I got a letter from the admiral – I think it was [Sigmund R.] Petersen at the time – appointing me

as the director. I'd been out there doing the NDC [NOAA Diving Center] stuff, running that side of it, the training program, and pretty much the day-to-day of the operations. It was no big challenge, like suddenly, the weight fell from the sky, and here it is. We already had the Standard Equipment Program going, which gave us great contact with the divers in the field. It was funny. The Northeast Fisheries Center was fighting the funding part of the (SEP?). We used to – I think the first year, we billed every laboratory and branch of NOAA that had divers five hundred dollars – it was either five hundred or six hundred per diver to fund that program. Woods Hole thought that was the end of the world. Mary Laird. Did you ever know Mary? She was the budget person there. Just about the time the thing got going, somebody broke into – I think it was the Beaufort, North Carolina – there's two. There's Beaufort and Beaufort. Anyway, broke into the dive locker at the laboratory and stole all of the equipment. Well, first thing they did was call my office and say, "All of our dive equipment is gone. Now, what do we do?" I said, "Well, we have all your sizes for suits. We know how many divers you have for regulators. Keep an eye out for the UPS truck." We shipped them whatever they needed. That was part of (SEP?). Okay, well, Mary Laird was one of my biggest fans the next day. For five hundred dollars a year, you were getting a three-thousand-dollar bag of dive gear. So, keeping that going, there were a lot of arguments with staff over German [inaudible]. "I know you don't like doing it. That's our bread and butter."

MG: Doing what? Gear maintenance?

CN: Overhauling the equipment. See, equipment that needed overhaul or maintenance would come back to the office on a yearly basis or when needed. It would be done by factory-trained individuals in the office, so that gave you some quality control that you didn't have with Joe's Snorkel Shop. But it's routine, over and over. And if you overhaul one regulator, the big thing is the scuba regulator – most of the diving in NOAA is scuba. It was then. There were a few of us that had done some surface supply. They didn't like it, and I was never able to convince them when you ship depth gages out to Joe's Diver, put the sheet, the check-off sheet, where you ran that depth gauge, which is an instrument of about that big around up against a pressure gauge, a calibrated pressure gauge, that's that big around. Send them a piece of paper along with it. They can see it. They'll know what we're doing. "Well, I have to go upstairs and get that from the Xerox machine." I said, "I'll put a Xerox machine in the shop. I don't care if you're too lazy to walk up the stairs."

MG: Did you have a number two person, a deputy, someone who worked closely with you?

CN: I had a NOAA Corps officer who was executive officer of the dive office. In some instances, he could run the telephones. He could answer the phone, but I didn't want him to. They had minimal dive experience, so I didn't want them answering the hard questions to the people in the field. There was some help there in the training program. The training program was a big part of the dive office. We were running three classes a year, averaging twenty students a class. I figured that in the time that I was there, I trained something like twelve hundred divers. The deputy was good with the logistics for the training, especially if we were moving into Key Largo for a winter training class, getting the gear there, because everything you're going to use has to be shipped. We had big crates, as big as those big Conex boxes that you see going on airplanes at the airport. We had one of them, two of them, I guess, that

belonged to us, that we could load everything into, take it to the airport. The airport would deliver it to Key Largo, and we'd run the class. The reason we settled in Key Largo was the Sanctuary program was there. They had a compressor, so we could fill tanks there. There was a couple of places I could put divers. It wasn't pretty, but it was water, and most of what went on in the classroom, I taught myself.

MG: After Dick left, who helped you with the curriculum?

CN: Most of it, I did myself. I showed you that book, right?

MG: Yes, your big binder.

CN: Yeah, that binder that was falling apart.

MG: That was the first two weeks program. It's like teaching the second grade. Once you write the curriculum, it's the same thing year after year after year. Steve Urick, who worked for me, used to teach the cylinder inspection part of it. Other than that, I pretty much taught it all myself. If we were back in Seattle – I've taught first aid classes to the administrative people in Seattle. First aid is first aid. Doesn't matter who the people are. They were scared to death of an earthquake out there. There was an earthquake at one time in Seattle years and years ago. The fear was the NOAA facility was probably about – if it was five feet above, it's a lot – above the level of Lake Washington. You know what happens in an earthquake; the next thing you get is a tidal wave. The whole side of the building was nothing but glass.

MG: I wanted to ask you about tsunamis and if you have ever coordinated with the Office of Response and Restoration. They would work on oil spills. When the 2004 Indian Ocean tsunami happened, a lot of debris washed up on shore on the West Coast.

CN: To answer your question, no, I never worked with them. NOAA divers wanted to go to Alaska right after –

MG: *Exxon Valdez*.

CN: The *Exxon Valdez* thing. They were all wound right up to go there. I said, "Well, come into the office, and let's sit down. Let's look at some of the realities about putting divers in there." Number one, you're not going in – the standard school regulator – the reason I'm turning is I used to have one hanging off that cabinet, but it's not there. Anyway, the second stage is what makes it – when you breathe in, there's a diaphragm inside with a mouthpiece on one side and the water on the other. The exhaust valve is in the bottom of that. It's not always dry. There's always droplets jumping across. To put somebody in an oil spill, or – they wanted to go and look. They were more interested in going in the areas that had been treated with the dispersal agent. And I said, "Well, I think we ought to find out what the effect of that is on your lungs before we just throw you in there." I don't know if they ever went. If they had, I probably put them in AGA masks, which is a full-face positive pressure mask. Tell you another story similar to – when the bridge from Bellevue to Seattle stuck open. It's not a drawbridge. It's all the same level. For it to open, one part slides in past the other. One day, it didn't close properly, and there was rumors

that cars had fallen off the bridge and sunk there. There were a bunch of people at PMC [who] wanted to go there and assist in the recovery of any people that were still alive in the cars, or recover the cars, or this, that, and next thing. We all brought them in and had a little discussion about that. I opened it up by telling them that there's three hundred feet of water there. That kind of killed their idea of diving on scuba gear to recover cars. It turned out that no vehicles plunged off the bridge. But emergency diving operations, it's like – one of the things we used to do in training older divers went for dive masters. These are people that are going to run the diving operation, is you pull stunts with the dive students. One of them, we used to give people one of those little ketchup things, or the plastic bag. They'd come to the surface and turn their back and squirt the ketchup all over their face and turn around screaming and yelling. It was up to the dive master to do something to get that person recovered out of the water and initiate first aid. You'd be amazed at how many people I had in February that jumped overboard fully clothed to go get that person who was faking. Yeah, they weren't too happy, Lake Washington's cold in the wintertime.

MG: I bet.

CN: Yeah.

MG: What was it that brought you out to places like Palau?

CN: Oh, that was somebody else [who] went to the dive office. I don't know who the chief scientist was on – whether it was somebody from Florida State University, FSU, who had the grant, or if it was somebody from University of New Hampshire that had the grant. I think it originated with Florida, and they were going to go there. They were interested in getting a sample of the mud from the bottom of Jellyfish Lake and wanted to know if the dive office could provide any support or information relative to diving in polluted water because we'd done the studies with EPA [Environmental Protection Agency] developing the equipment. I don't know who the initial contact person was. Anyway, was another one of those deals. Somebody called Wells. Wells called Newell. “Can you go to Palau? I said, “How the hell am I going to go to Palau?” I didn't even know where the hell it is. The theory was that those islands in the South Pacific are the ones that – they're either phosphate or phosphite. I can never remember which is which. One of them is fertilizer. I think it's phosphate. Where did that come from? Originally, it was thought that it was bird guano. That used to be a big industry is trucking bird droppings by vessel and making it into fertilizer. So, where does this come from? They were interested in maybe places like Jellyfish Lake. Did I tell you why it's called that? There's a population of jellyfish in there that have no tentacles. Through evolution, they have no enemies, so they don't need tentacles. They've dropped off, and the lake is shaped like a cone, and it's open on the bottom to the ocean, somehow or another. All the trees and vegetation around the edges of this cone that fall in the water eventually sink. The lake is stratified because the temperature remains constant year-round, so it doesn't turn over. Because of that stratification, the vegetation decays in an anoxic environment. That's what creates hydrogen sulfide. Is that what creates phosphate? Anyway, I think [John] Blackwell must have been working for the dive office at the time. He was going to be the diver. There was a guy named Greg Stanton from Florida State University that was heading up the dive side of it, had not been part of the NOAA diving program polluted water escapade. I knew Blackwell. I had him in the Bering Sea prior to that on a different

operation. There's no way in hell I was going to let him go diving in hydrogen sulfide with somebody that I didn't know. So, well, pack your bags. We had twenty-eight pieces of luggage when we got on the plane in Dulles. From Dulles to San Francisco, San Francisco to Guam, Guam to Palau. The one package that didn't show up was the one that had the hydrogen sulfide monitors in it. I was going to have them on somebody or somewhere on the surface in case we generated hydrogen sulfide to the surface. Hydrogen sulfide and oxygen cannot exist in the same environment. But if you remember back about that time, and I don't remember what year that was [1987], it's when they'd had that disaster somewhere in South America where all of the cattle died, and they thought that was hydrogen sulfide from a lake right-handy to the pasture where the cattle were. I don't know if any people were killed in that or not. Anyway, we had that in the back of our mind. As it turned out, it was later on identified as carbon dioxide, and I don't know what caused it. Anyway, the first thing that I did was take – we had a small barge in the middle of a lake, and the first thing that I did was take the helmet on the end of the hose and lower it to the bottom, bubbling up all the time to see, number one, is it going to heat up the helmet that John's going to wear. The one thing about hydrogen sulfide is initially, you can smell it. It's like rotten eggs. However, it also – I can't think of the word to use, but it disguises your sense of smell. So, first, you smell it, and then you don't. Anyway, we did that for, I don't know, twenty minutes or whatever. Then we took the suit that he was going to wear, the outer suit, and did the same thing with that, rolled it all up on a ball and sunk that to the bottom. Everything that was shiny on the helmet was about the color of your tape recorder when it came back out. That was brass. It didn't damage it at all, but it sure changed the color of it. It turned out the level of hydrogen sulfide on the bottom of that lake was hundred and ten parts per million dissolved. And fifty parts per million in an enclosed space is run for your life. But we got the core tube full of mud, got Blackwell back on the surface, and on the way up the hill to get out of there, I said, "I think we're out of here, John. We got one. Don't push your luck."

MG: Sounds like you have to be pretty brave to do this work.

CN: Well, John was the one that had to be brave. He was the one going in the water. Of course, I think – I don't know if he still would, but back in those days if I told John to jump for the moon, he'd probably be that high off the ground.

MG: After Dr. Wells retires, would you stay in touch with him about the dive program and reach out to him if you have questions or need guidance?

CN: Maybe. He still came out. The physician's program was still being run by UHMS. Morgan was the director of it. Rutkowski was the second in command. They were using the facility in Seattle, so I would see him when he came for that. But other than that, I didn't see much or hear much from him. Morgan was a little bitter when he left. So, not really. By then, I'd had – I don't remember when he retired. I think it was '91. '96, I retired. I went there in '87. Must have been about '91 that he retired. Between you and me, Morgan did not get along with the admiral, who was the head of NOAA Corps at the time.

MG: I wanted to ask what went into your decision to retire and what life after NOAA was like for you.

CN: Well, I had been planning, I guess you could [say], of retiring when I hit fifty-five. My brother worked in the shipyard. He was a secretary for the vice president of the shipyard. The reason there was a male secretary [was] they had to go to the foreman's meetings – I don't know – whenever they were held, probably [on] a weekly basis, and the foreman of each part of the shipyard – the pipe fitters and the welders and this, that, and next. The story was that those meetings are unfit for females. My brother had that job, and he came home from work one day, and he said, “You're not going to believe this.” Bud Guild. “Cleaned out his desk today and said he's retired.” This guy was married to the sister of the President of the Bath Iron Works. They had a cottage right over there. Anyway, I said, “How old was he?” “Fifty-five.” I said, “Sounds like a deal to me.” From that day on, I figured on retiring at fifty-five. When I had as much as two years to go, I could tell you how many days I had to go before I could retire. The reason I retired was – I had the best job in NOAA. I was out there in [Seattle]. Of course, it may not be so good as it was because now they answer to PMC, where I answered to – Bill Moran was the first Admiral. That's the one you should have interviewed. He was a character. He was a hanging Admiral. If he didn't like you today, you'll be gone tomorrow. He's the guy that shook my hand and said, “Six months. If it's not working, you just back up and go.” He and I were like that when it was over.

MG: Real close.

CN: Yeah. Anyway, we had planned on building a year-round house here. Judy's grandfather built that log cabin about a hundred years ago now. She came from the hospital to that cabin when her mother brought her home from the hospital. We'd always figured that somewhere along the line, we'd like to live here year-round. So, fifty-five and thirty years' service, you can retire from the feds. I had thirty years, and I was fifty-five. I had just about thirty-five years. I said, “I'll see you later.” I was running a staff meeting for people from all over the country. At about noon time, I said, “If you've got any more questions, you better speak up, because I'm leaving.” Judy was flying out to Seattle for the roast. They said, “Oh, you're not retiring.” It was a Thursday, which fooled them. Everybody figured, well, you retire at the end of the week. If you retire from the government, you have to go by the fourth of the month, or your pension doesn't start until the following month. Anyway, I started going and picking up the papers in front of me. They said, “Maybe he is.” I said, “I'll see you later.” I got up and went to the airport and picked up Judy. We sold the house we had there. It may have been sold at that time because October 4th was my last day of work. We moved back here. We rented a place for the first year we were back. Kip and I started cutting the road in. The following July, July 21st, we pounded the first nail. It was a real wet spring. We had to wait for the cement trucks to get in here.

MG: Well, how did you spend the time? I know you have lots of grandchildren. What have your retirement years been like for you?

CN: Well, up until three or four years ago, they were pretty good, but then my health went to pieces, and I can't do anything anymore. I mean, I say I retired. I fished lobster traps. I used to have a couple hundred lobster traps. I had a little construction business going, small jobs, nothing major, doing that. If I had a trap hung down somewhere, I'd put the gear on and get on and get it. I was still pretty active. Just before I turned sixty-five – it was the year of my 65th

birthday. Just about every month, I had a new ailment. It started out with polymyalgia rheumatica, which, if you know – it's like multi-muscle rheumatism; every joint in your body starts – I went from that to atrial fibrillation, to prostate cancer, to – there's a couple others that I'm missing. Anyway, things were still pretty good. The polymyalgia was a tough one. But in 2021, I had colectomy surgery, which is due to chronic diverticulitis, and they took a foot of my colon off. I've never been the same since then. Oh, I know what one of the other ones was. I have multiple sclerosis. That was just about the time – just after I turned sixty-five. That really does a job on you.

MG: I bet. Is any of this in your family history? What do you think accounts for the ailments?

CN: I don't know. My dad had prostate cancer. The average male is lucky if they get by sixty-five years old without prostate cancer. It's easily cured, so it's no big deal. My mother had cancer. She had throat cancer. The other stuff [is] just bad luck, I guess.

MG: Well, you've been able to withstand several hours with me and telling you all these stories. You live in maybe the most beautiful place and house.

CN: Yeah, we like it here.

MG: Well, I've gotten to the end of my questions. Is there anything else you wanted to tell me about or something I forgot to ask you about?

CN: No. We've covered from one end of the country to the other, almost one end of the world, from Germany to Palau. They're kind of at the opposite ends of the spectrum.

MG: That's right. Well, I'm not very far away, and I love this drive here, so I'm happy to come back if you think of other things you want to put on the record.

CN: I don't know. You'll probably think of some before I do. What do you want to take with you as far as these pictures go?

MG: Let me turn this off, and we'll figure that out.

-----END OF INTERVIEW-----

Reviewed by Molly A. Graham 11/10/2024

Reviewed by Cliff Newell 11/26/2024

Reviewed by Molly A. Graham 12/10/2024