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PERRY: What I want to do today – since we've been working with Chris Friday up at Western, one of the professors up there – he asked me to give you a talk and walk through the plant and see how it used to operate. It's a little harder to tell now when it's not operating, but there's still quite a bit of equipment left out there. Maybe I should start by introducing myself. I'm Richard Perry; I'm a native of Bellingham. Grew up here, parents and grandparents lived here. I've got kids and grandkids now living in the county, so we have over a hundred years in our family that has been in this county. So we've seen the whole development of the whole industries and coming and going of forest products and various industries. I've worked here at Georgia-Pacific for thirty-seven years. My background is [that I] went to Bellingham High School, went to University of Washington [and received a] chemical engineering degree, went to Iowa State and got a masters in chemical engineering, then came back here and went to work at this mill in 1968. A few years later was kind of the peak of the operation here. They did a lot of building in the ‘60s, as we'll see, in the ‘60s and ‘70s.

CROSS: What position did you start at in the plant?

PERRY: I was started as a process engineer. There was a group of chemical engineers that helped change the process and modify the process as things were continuously changing and developing. A lot of the designing and the process side of it was done by the chemical engineers. Then they had mechanical engineers and electrical [engineers] that would actually design the equipment, install it, design the electrical parts of it. We’ll see some of that.

There was a paper mill on this site in 1925, the very first paper operation. The first pulp mill started in 1926 here. The major building of the mill started in 1937 where they built all the red brick buildings around here. Those were built between '37 and about '45 to '50.

So what I wanted to do is try to explain the process. I've got some books here; you can each have one of those. I'm going go through and show you the photographs that these were made off of. Some of the headings on the photographs didn't copy so well, so as we're going through here you might want to make some additions or notes on some of the photographs. But I thought I'd take the originals here, so maybe you can see them a little bit better. This is a book that was probably put together in the mid ‘40s, ‘45 to ‘50, showing the whole process of developing from the woods, logging out here – and I've put a tab on each one where there's a picture in your book. The first one is showing out

in the woods up locally: the big spire pole that they would set up, and as they would log an area, [they would] use that to pull logs up to the landing. There are some great pictures in here of various types of the logging in those days. This is a shot of the landing where they pull the logs up into it. Some of the photos are of the old logging trucks; you can see the logging trucks of that era in the ‘40s and early ‘50s.

CROSS: Do you know how long it would take them to fell a tree and then get it to the plant?

PERRY: Depends on how big the tree was. But there are some pictures in here of trees that are five to six feet across and some of the early chainsaws that they used. If you did it by hand, of course it would take hours and hours to cut through a four- or five-foot tree. If you did it with a chainsaw, it was probably a matter of twenty minutes or thirty minutes, depending on the size of it. So you've got the concept of how the wood…and a lot of the wood that was used in the pulp mill was not the greatest quality wood. It could have rot in it or splits or damage. Those were called pulp logs. Or [if they were] too small to make lumber out of.

Most operations – there's a big lumber mill – two or three of them on this waterfront back in the ‘20s, ‘30s, ‘40s, down at the far and of Cornwall. There's a big chunk of land down there now which had the big McMillan-Bloedel lumber mill from about 1917 till about 1945. On this site – there are some pictures in one of the books I've got – it was the Morrison Mill that was on this site and up at Blaine and Anacortes. They were big lumber mills back in the early part of the century. When we built the addition to the pulp mill in 1938, we bought some of this property from the Morrison Mill, and there are still foundations out on the comer of the property by the water where their big boiler plant sat. They're marked on our drawings because every time they tried to build something on that spot, they hit about a ten-foot chunk of concrete that they'd have to drill through. They carefully mark those on the drawings: don't try to drive any piling in this area because there are big foundations of a steam plant that used to be there. Same thing will happen now when you try to redevelop this site; there'll be big chunks of area where you've got massive foundations where different things used to sit. This is a picture of the mill back before they built the bleach plant; this is probably about 1945.

The logs that actually came into the plant – various sizes over the years – of course they were big when they started and they got smaller as time went by. We built a unique barking system that was designed here called the Bellingham Barker in about 1947. Some of the wood was salvaged wood that came in the operation back in those years. The bigger logs would come into the main barking plant, and they'd be cut into 20-foot lengths with a cut-off saw and those then were the feed for the barking and chipping operation. The first thing that would happen is that it would come up to the section where the hydraulic barker was. This was a pretty impressive operation because the fellow operated this control, and he'd run this head back and forth as the log rolled in a series of rollers, and the head would peel the bark right off the tree with high pressure water – 1300 pounds of pressure. There were big old-style pumps that pumped this fresh water through those nozzles.

CROSS: And this was developed here?

PERRY: Yeah, it was developed here by the people that were running the plant and the engineers here back in the mid ‘40s after the war. It was written up in the big magazines at that time. It was actually used in other mills. There were several different companies that were trying to develop that and had different versions of it, but this one ended up pretty successfully. The wood would come out of there, and it would go into a…the raw logs would come out. You don't have this picture in your book, but it's a picture of the logs coming out with the bark peeled off of them. That was the feed into the next stage of it, which was the chipper.

That was probably the most impressive thing we had on the site here was this large chipper. We'll walk by that unit out in the plant. These 20-foot logs would come through, and they're probably two to three feet across. There's a fellow standing up here, and it would drop down into the throat of this thing. All you saw and felt was this – it was a big massive wheel that was spinning fairly slowly with blades on it, and it would cut a whole log like that into chips in about 10 seconds. And this low-frequency vibration would come out and jiggle right in the middle of your stomach. Everybody that saw that – I led tours through there when I was a young engineer – everybody would watch the whole process as I've just shown you, and you'd walk up to that point and look over and, "That's kind of nice.” You'd see the log coming, and all of a sudden it would drop down there, and that thing would just chew it up instantly. Everybody would grab their hardhat and step back: "Whoa, that's pretty amazing!" This was the chipper that made that happen. A massive wheel that was driven by a 1500-horse electric motor, at fairly slow speed: it was only running at about 240 rpm. When they shut it down – I mean the wheel was that thick and probably 15-18 feet across – it would take a half hour to stop just the momentum of that mass turning. That was all to get the chips.

You want a chip that's a certain size. I've got some samples of the chips. See, the ends are cut at a certain angle. You want a nice, fairly uniform size chip because the next stage is cooking that chip. You know how, when you cook vegetables, you want them all about the same size. If you have a big one and a small one, the small ones overcook and the big ones don't get cooked enough. The same thing happens then when you're trying to cook woodchips. And so the whole process started with trying to get a uniform size chip. Of course when you dump a log into that kind of a device, you're going get a bunch of uniform size chips, but then you're going to get some splinters and various things, so the next step was to screen those out. You can see on these screens there are holes on these screens so the proper size chips would go through there, and then the oversized stuff would go off and be re-chipped or turned into fuel for the steam plant. You don't have this shot, but it just shows the conveyers carrying chips up to the digester building. There were several stages in the screening: take the oversize off, take the fine sawdust type. That was taken off and sent to the steam plant. So you've got just the uniform size chips you wanted in a certain range. Then those would go up into the digester building. There are large pressure cookers that we'll see out here. The chips were in the big hopper above it. There would be twenty-two tons in each digester; those chips would fill the

digester up to a certain point. So that was ready for the next stage. These are big riveted vessels, brick-lined to withstand 100 pounds of pressure, because the cooking took about 5 or 6 hours. It had to be under pressure for that long, under controlled pressure and continuously heated. Now the other component you need when you're going to cook the woodchips is some kind of cooking acid. We were a sulfite mill. We used three different components: we used sulfur and limestone and water. Sulfur came from the local refineries, limestone came from the quarries around up in the mountains by Maple Falls or out in the islands, San Juan Island or Texada Island up by Vancouver Island. Of course the water came from the lake.

CROSS: So it was all a very localized operation? There wasn't anything imported?

PERRY: I'm not sure where they got the original sulfur; it probably came in on ships and barges, so it came from – I'm not sure where.

KOLESNIKOV: Are there other types of plants that used some other methods?

PERRY: Yeah, there are different processes of making pulp. This is a sulfite process; the current one now mostly is Kraft process, and this is an acid cook. The Kraft process uses caustic soda; it's on the other side of PH scale. If you're familiar with pH, 7 is neutral. We cooked around 3-4 pH. The Kraft cook is up in the high end of above 7. I'm not sure exactly how high: 8, 9. I've never worked in a Kraft mill. A pH of 8 or 9 or 10.

CROSS: Did Bellingham ever attempt to use caustic soda at all?

PERRY: It's a whole different process. It takes different equipment, different specifications, and different recovery systems, so it's virtually impossible to switch a mill from a sulfite mill to a Kraft mill, economically. You've got to design it from the start that way. Most of the mills that were built after the '60s or so were the Kraft-type mills. Our wood supply mostly was hemlock and spruce, which were the less resinous type woods. The Kraft process could use things that had high pitch, like Douglas Fir and a lot of the pines have a lot of pitch in them. The caustic process apparently handles that pitch and dissolves it better. In the process of making the cooking acid, you'll see there are some big white towers out there, and they'd fill those towers with chunks of lime rock about that size – not this small but larger stuff, large boulders. And then the sulfur in later years was melted – sulfur, when you heat it up, will melt. Then they'd spray that into a burner. That would burn the sulfur and make $S0_2$, $S0_3$. The rock was added to the tower; the sulfur was burned and the sulfur fumes were put in the bottom of this tower; water was put in the top of the tower, and in the process it would dissolve the calcium out of the lime; and the sulfur would combine with the calcium and the water to make a calcium bisulfite cooking acid. So that was the other component that you needed, besides heat and the equipment, to dissolve and turn a woodchip into fibers. So that's the product of the digester and – going back to the photographs here – these are the digesters which are a big domed vessel on top, cylindrical, and you'll see the bottom then is…this is actually the cook's floor up here where the controls for each digester…there was a head cook which ran the whole digester operation. He got the proper amount of chips in there, got

the cooking acid in, [would] bring it up to temperature. A lot of steam was used to heat that whole batch up to temperature. In the bottom of the vessel, it was coned like that. There was a big valve at the bottom and piping; at a certain point, the pressure was reduced in the digester; then that bottom valve was opened, and the whole mass of pulp – hopefully it was pulp instead of chips by now…Once in a while, it wouldn't get quite cooked enough, and you'd blow it out there, and there'd be partial chips and all kinds of stuff, and that'd be a mess, so they tried not to do that.

KOLESNIKOV: What happened then? What would you do then?

PERRY: Depends on what time period you're talking about. In the early days, I understand it just went out into the bay like all the sewers from this mill discharged – the water discharger originally just went off the dock there. If you had a problem with something, that went there too. Just like the city used to dump their garbage around the bay; over there by where our warehouse is, there was a big garbage dump where the sawmill used to be, there was a big city garbage dump from the '40s and '50s. It wasn't unusual in those days to just – if you didn't need it, it just went out in the bay. In later years, all that went into clarifiers and was pulled out and trucked out of the site or [they] tried to reprocess [it].

KOLESNIKOV: When you say later years…?

PERRY: From about mid '60s on. Once the cook was done, it would be blown out into – this is a picture of the sulfur burners. They're not quite exactly in the sequence, but…we don't have a picture of the blow pits in this book, but…The pulp comes out in the blow pits; that was a device that separated the cooking solution. Now, in the whole cooking process, in the original chip, the fibers that end up in the paper made up half of the dry weight of the wood. The other half was the binder that held that together, which was called lignin, and that was the big components…One of our former engineers is now living over in Spokane. He used to use these quite often in talks; he was our technical director for a while. The weight of the woodchip is half fibers, half lignin. The lignin was a binder that held those fibers together, and that became a big operation here over the years. It was the use of the other half of the woodchip, [which] was the lignin. There's a series of products I'll show you later. That's where I spent most of my career, was in the byproducts side of it: managing and supervising and developing products, working with the research guys. We'll talk about that one later…The cooking acid and the lignin were washed away from the pulp. In the old time, it was the blow pits, [in] later years it became in a big washer that's still here. That was developed here in the late '70s. This shows an early washing stage. Actually this whole book was really put together, I think, before the bleach plant was in operation, or when it was first in operation. At one point, this was the end product: instead of a white sheet like that, it would've been a brown sheet, more like the Kraft paper bags that you see in the grocery stores. That's a mostly unbleached fiber, and that's what the natural wood looks like. That's what all your paper would look like if you didn't do any bleaching.

CROSS: Was there any quality difference between bleached and unbleached?

PERRY: Of course the brightness and the color, and in the old unbleached you'd see a lot more specks. They didn't have to be as careful of getting all the fiber bundles that were not completely separated, or the little dirt and bark specks. If you look at a Kraft bag and some of the early papers, you'll see a lot of specks and things in them. In later years, like for making photographic paper like this, we shipped a lot of our pulp to Eastman Kodak in the '80s to make photographic paper. They couldn't have any specks in there: you don't want a speck in the middle of your photographs. In later years, there was plastic that got into a lot of the operations. That was really bad for photographic paper because that became a little speck or maybe even a clear window in there. So we had a big - you'll see still signs around here that say, "No plastics allowed in this area," because if you take a hardhat or something and drop it into one of these tanks, it all gets chewed up that comes into a million little pieces of plastic and goes through the whole system. There was a big plastic purge at one point to get plastic out of the whole system.

Getting back to this, this book really stops at processing the fiber at this stage. From 1950 on, bleaching was a big part of the operation. There are multiple stages in the bleaching and various bleaching chemicals - caustic, chlorine, chlorine dioxide, oxygen, hydrogen peroxide - were all chemicals that were used to beach the fibers. So a lot of the chemical engineers that worked here in those days, in later years were to try to improve the bleaching process. There's a screening after the pulp is taken out and the liquor washed out of it. In early days, and later years also, sand and grit was removed from it because there was still sand and grit from the forest, and your cooking liquor would have some sand it. So there was a lot of removal of that, removal of unprocessed bundles. Then there was a further screening where the fibers would go through slots in baskets in later years, and the fibers would go through the right size of a slot, and the oversized stuff would stay behind and get reprocessed. Later years, we used centra cleaners and those were little spinning devices that would concentrate the dirt specks and sand particles and separate those from the good pulp. So there was a lot of work done on the fibers to get them clean.

Once the fibers are cleaned up, then they're concentrated because there's a lot of water involved in this process. You take some of that toilet paper and you wad it up – you know how light it is when it's dry, and if you soak it full of water under a faucet it just gets quite heavy. As tight as you can squeeze it you've still got about eighty percent water in there. In order to pump it around, you can imagine how diluted you have to get it. Mostly it's less than one percent: you've got one percent fiber in ninety-nine percent water to pump it around and process it. These devices changed it from a half percent up to four percent, which was still a lot of water in it but it was getting more slushy. We've got some big towers back there that would squeeze it just as tight as you could get it, and it would be put in the tower to store it between steps in the process.

The last stage was drying it into a sheet, and that's a piece of a modern pulp that we use as the starting point in our process now in the tissue mill. It's kind of wet – you can feel that and pass it around. That was not a completely dried piece of pulp. We would make a sheet that was like that but hard, thick and hard and dry. That's what this is showing here:

the machine that would take that mass of fiber and squeeze the water out of it and pull it out by passing it over rollers and over felts to pull the water out. Then finally you can see that pattern that gets on there is because its being carried on a heavy felt and that's the pattern of the felt.

Then in the final step, it would go into steam-heated dryers, and they'd go back and forth. This is the early drying line that was here when I first started working here, and then later in the '70s they replaced it with a large dryer (that we just finished removing). The sheet would go back and forth in there and be heated with steam, and eventually the moisture would be driven out of the sheet. Then when it came out of the device, it would be cut into sheets that are 40 inches square so, and then baled. That was the end product…and these are inspectors that are…you'd pull a sheet and you'd weigh it and you'd check it for different brightness, look for specks, look for various things on the sheet that was the quality control at the pulp. The final stage in the pulping process was making it into about a four- or five-hundred pound bale. That's what these guys are doing here: They're putting it into a bale, wrapping a pulp sheet around it, putting wires around it. That was the finished product of a pulp mill.

Then that material then was used as a feed material for people that tried to make photographic paper, writing paper, tissue products, paper towels, whatever. You'd buy pulp in these bales, or whatever form it was made in, by various companies and you'd mix it together, so what we're making here is really the raw material for the whole paper industry.

CROSS: From start to finish, how long did that take?

PERRY: When you'd start the mill up after a major shut down, it would probably take twenty-four hours to get that. From the time you got the wood chip going through the digester building, it's like a six-hour cook. Then it had to wind its way through the bleach plant, through the chest, into the pulp dryer. If you would try to follow a single chip, probably twenty-four to thirty-six hours.

CROSS: How much could a plant like this one produce within a certain amount of time – a day, or a month, or a year?

PERRY: When we shut down in '99 or 2000, we were making about 600 tons a day. When they first started the mill here, they were probably making 120 tons a day, or something like that. This shows the bale pulp being handled in the warehouse by some of the early lift trucks. We loaded it into rail cars. So it was shipped out of here by train, or by ship, some of the early ships. That's why you see, out on the dock, there are a lot of warehouses. The ships would come in, and they would load their ships with bale pulp and then that went out to the various markets.

The final shots here are some of the pulp testing laboratory…this is the analytical laboratory, which was on the ground floor of the lab building. This fellow that's in the middle here that you can see the vest…his name's Carl Adolphson. He was one of the

pioneer researchers in the lignin products, which I haven't talked about yet. He was here when I first started working here and holds a lot of the patents on the lignin research. A really interesting fellow. One of his sons is a college professor back east, a very smart mathematician, so he must have passed on some of his intelligence to his kids. This shows some of the mechanical engineers that were working in here back in the mid '40s to design some of the changes that were happening. This was the office building before… the part we're sitting in wasn't built at that time. We walked through the front office and that was the headquarters of the Puget Sound Pulp and Timber Company.

The alcohol plant was built during the war, and it was first step in taking the lignin that was, from about '37 till about' 45, just taken out and thrown away. It was not recovered for any uses. During the war, they needed ethanol to make synthetic rubbers. When you digest wood this way, I think there are some sugars created chemically, 5- or 6-carbon sugars, in the cooking process, and the harder you cook the pulp the more sugars you make. So there was a small amount of sugar that came out in the lignin that was recognized. There was a whole plant built here during the war to make ethanol for the war effort. By the time they got the plant built, the war was over. They built it pretty quickly, but it still took enough time so that they didn't really…and also there were some competing chemical processes, so the one using ethanol to make synthetic rubber was not ultimately the one that succeeded or actually won out. So the pulp mill here bought the alcohol plant from the government in 1945 or 1946 and started operating it and ran it. That was the beginning of using some of the byproducts.

Once they pulled the sugar out of the lignin, they had a more refined product. Then that was used to develop a whole string of…this is the lignin as it came out of the plant. It's a bit dried up now but it looks like a dark brown molasses. That was chemically changed. One of the first products made was a product for helping drill oil wells; it was turned into a spray-dried powder…it's probably all stuck together…these have been sitting down there for about five years and haven't been…There were a number of lignin products that were developed. The first one patented, or one of the early ones, was a thinner for drilling oil wells. It was added to the drilling mud so that it would stay fluid under high-pressure and temperature conditions, under contamination. That continued to be one of our big products. Micronutrients: we added various metals and trace minerals – potassium, boron, nitrogen – various things to lignin products to use it in fertilizers. A big use was for binding animal feed; these are feed pellets that were bound together with lignin. It was used in dust control. Monsanto had a plant in Seattle where they would buy a portion of our lignin and they would extract a fraction out of it; after doing some chemical reactions, [they would] make imitation vanilla out of it. They ran that plant for a number of years. We had a large research group here that was operating basically from the mid '40s up until the time we closed. It was probably one of the premier lignin research operations in the world. We had probably up to twenty-five or so chemists and engineers working here, developing uses. There are about a hundred different products developed. In that small brochure that I gave you, in the back, it talks about the co-products area, and there are two or three pages explaining what some of the co-products were. Mostly concrete additives, binders, glues used in gypsum board, used all over the world in cement, road dust control, and a long list of other products. I think there are

some on the front page there, a list of what it was used in. Yeah, this is a combination list of what the fibers were used for and the lignin products. Any questions of any of this so far?

CROSS: Did the lignin products just give you a larger market base than you had? I mean because, other than doing the pulp mill, you had a specific market, but did this kind of expand it for you?

PERRY: Yes, because when we made 600 tons a day of pulp, we had 600 tons a day of lignin that if you could sell that for another twenty dollars a ton profit, or fifty dollars a ton or one hundred dollars a ton, that gave you quite another source of income to support an operation because you're always trying to either make more money or do things more cost effectively. Just like today in the computer industry: if you kept the same computer and kept the same price, you'd be out of business shortly. It's the whole competitive thing: to try and keep making a better product for less money. It happens in every business. Some years we made more money on our lignin products than we made on the pulp. That's what kept this operation going for as long as it did because the…If you had multiple products…Pulp was a cyclical product: some years you made a bunch of money, and other years you lost money on it. Well, you can't lose money too many years in a row, and people ask you, "Why are you still making that when you're losing 5 million dollars a year?" Some years we'd lose five or ten or twenty million dollars on pulp, but we'd make maybe that much or a little more on the lignin product. So it balanced out. We had a number of different operations here on the site that, when you combined it all together, you continued to make some kind of…The goal was to make money every year so you can keep paying all the wages and keep giving some money back to your shareholders, and that's the way you stay in business.

KOLESNIKOV: Could you talk a little bit about what were the underlying causes of losing money, of not being profitable?

PERRY: Well, when you're in a commodity business like we were with pulp, if there's an excess and the whole economy starts going down, then there's an excess. There are too many mills in the world then, not enough markets. Like there is today: if you've got too many car manufacturers, then some make money, some lose money. If things are good, everybody's making some money because there's more demand out there so the prices are up, and you've got full capacity. Some mills – the most modern mills, the most efficient mills – there's always a new one being built. There's about only one new pulp mill built in the world every year now, where there used to be several. So whoever has got the latest technology, the biggest – we were a 600-tons-a-day mill, but there are mills now that are 2000 and 3000 tons a day – a much more massive scale, four or five times bigger. So you can imagine all the complexity that goes into making a mill. If you can have one train that replaces five mills, you don't have to have as much…You have one sales person or one accountant, whether you've got a small mill or a big mill; you've got the same number of people on some of these jobs. So the efficiency is the big mills, but then that makes it harder for the mills that are already here, like this mill, [which] was started in '26. You can imagine there were a lot of mills built between 1926 and today.

You have to keep re-looking at things to keep yourself efficient. But like I was going to say, when the markets go down, when the economy goes down, you have recessions, world-wide recessions, so people aren't using as much paper, aren't using as much of a lot of things. Then the pressure is on all the mills to…The price of your product starts going down; it starts dropping and dropping. Pretty soon it drops below the price of the least efficient mill, and then it drops below the price of the medium-efficiency mills, and sometimes it gets down to the price of the most efficient mills. So everybody's losing money. Then the least efficient mills in that kind of economy hang on as long as they can and then they start shutting down. So if you're one of the least efficient mills, eventually there's going to be a dip that's going to take you down, either temporarily or permanently. Sometimes, as these markets fluctuated over the years, we would end up stacking pulp in the parking lots. If you were here, say, in the early '80s or so, you'd have seen pulp stacked in the parking lot out here because you had to keep making it, because the whole efficiency was either that you had to run at a certain speed or you had to stop. You couldn't just slow down things. So you had to keep running, stacking inventory until you found a sale, try to keep moving your product. Or else you'd get to a point where you had too much inventory, it was costing you too much to carry it on your books, so then you'd take some down time. You'd shut down, do some maintenance, try to take advantage of that time, and that happened in probably all phases of our business. Sometimes you'd have too much lignin product; we'd have lignin stacked in the parking lot, covered with tarps, because we couldn't sell all of that we were making. But you had to keep making it because the pulp mill was running. Usually in those times the pulp mill would be selling their products great. They would want to keep running. But then for every 600 tons of pulp they made, which they had markets for, they had 600 tons of lignin that came out. You had to use it, you had to make something out of it. So there was a lot of pressure on the lignin sales force to keep selling product at a certain pace because it came out as a co-product with the pulp. It was always a balancing act. We've got 8-million-gallon tanks down there, and sometimes we'd fill those tanks right up, brim full, because various ships would come in and pull it out. Well, you can't just stack liquid lignin on the ground someplace like you can stack pulp. You've got to have it in a tank and you've only got so many tanks. You'd be waiting for that next ship to come, and then you get a note from your sales guy, "Oh, it's delayed a day." And you say, "Oh, my gosh, I'm almost full now. Can we make it another day?" So you go out and measure all the tanks. Can you squeeze a little more till you're brimfull? And then finally the ship arrives, and you can load the ship and make some more room. Running an operation of this size and this complex is a very big juggling act. Everything would be running fine, and then one piece of equipment would break down in one key part of the mill, and that would affect the whole thing. Like our evaporators were a key. If we couldn't keep the evaporators running, we couldn't evaporate the water out of the lignin and concentrate it enough to get it in the tanks, and you couldn't keep the pulp mill running. So if one of your big evaporators quit it would affect the whole complex. Everybody would focus on that, trying to get it back in operation.

CROSS: Did machines break down a lot? Or did they mostly work?

PERRY: That was the job of the managers and the engineers and all the people and the mechanics who worked here was to see that that did not happen. And you tried your best to…Just like your car: you don't want your car to break down on the way to Seattle to see a concert or something. You try to avoid that, but once in a while it would happen. Once in a while you'd have a power failure outside of our control that would instantaneously shut all the power off to this whole mill. And that was real exciting because you had processes here under pressure, things that were…You had to design a mill to withstand that kind of event. All the controls were set up to fail in a safe position. You don't want to have your pressure cooker cooking away, and then you lose all control of it. We had distillation columns with high pressure…That was a big emergency situation when you lose power in a plant like this. All the operators in every area would do their…what they could do to try to keep their plant under control. Sometimes you'd lose power but you'd still have air, you'd still have steam coming because the steam pipe would keep running. Or you'd lose water if you had a problem with your water supply. So you'd have steam and heat and everything, but the water would start to drop off, and then you'd lose your cooling ability. All of those things had to be designed; when you design a plant like this, you had to take all those things into account and try to design your controls so that you'd have a stable operation under adverse conditions. It wasn't a simple thing. I'll show you one thing. Just one piece of the equipment was quite expensive. This is a spray head off of one spray dryer that made the spray-dried lignin product. This is quite heavy, stainless steel made in…I think that was made in Denmark. Just this piece would cost about probably $30,000. This spun [at] high speed and the liquid lignin would go down in here. It would come spraying out this nozzle into a big chamber, and the hot air would mix…It would turn this into that in one step. It'd go from a hot, molasses-like liquid to a dry powder. It had to dry before it hit the wall any place; it had to dry in this air stream, so it was called a spray dryer.

LEWIS: I read that a lot of your heavy machinery relied on Europe in terms of importing stuff like that. Is that true, and if so, did that affect the efficiency of the plant, having to import from so far away?

PERRY: The pulp business probably started in Europe before there was an America. Northern Europeans, like Norway, Sweden, and Finland, had a lot of equipment because that was the heavily forested area of Europe. A lot of the pulp-type equipment and the pulp mills were built in those areas. So a lot of the equipment related to pulping was from Northern Europe. A lot of it was built there. A lot of it was built in the U.S. also in later years in Beloit, Wisconsin. When you get into the history of pulp in America, it started in Maine and in New England, then moved to the Midwest in the late 1800s and early 1900s, then moved out to the Northwest in the early part of the last century. And then it started into the southern states in, say, the mid part of the 1900s. The equipment manufacturing kind of followed that path too. There is a lot of equipment still built in Europe today...Sweden and Finland. Our pulp dryer came from Finland; it was designed in Finland. Some of our spray dryers were built in the U.S., some were built in or designed in Sweden and Denmark. But these are worldwide companies. Even if you buy something designed, say, in…like the spray dryer may have been designed in Denmark, and some of the key components like the spray machine and the heart of it came from

there, but the chambers and all the support equipment came from the U.S. Most all of this equipment we've bought, maybe certain key components were built in some other country, but the things that were economic to build here were built in the U.S.

CROSS: And how did technology changes in the last thirty years affect the plant? Or did they affect it at all?

PERRY: Like I said, yeah, we had to keep changing, we kept changing. A lot of the equipment that you see in this book was not here in the '70s and '80s because every area, from chipping to screening to…the digesters were basically the same vessels, but the control of them changed. The electronics changed, the drive mechanisms, the motors and pumps, those kept changing, updating. You'll see the old pumps in here; a lot of them got replaced multiple times. Just like taking a car: basically, if you took a 1938 car and kept adding – if new brake technology [came out], you would add new brakes to it. [If a] new transmission came out, you would put a new transmission in. If you kept updating and updating…That's what happened in this mill. The basic frame of the car stays the same, but all the components that went into it kept changing and updating. We went from these big dials that you saw at one point there up in the digester building, these controls on the wall, a whole panel of…these big round dial indicators, those were the control charts of the '40s and early '50s. Those got replaced in the '60s and '70s with pneumatic controllers, the small ones. Then those got replaced in the '80s by electronic controllers, and then that got replaced by computers in the late '80s and '90s. So the basic digester stayed there, but how that got controlled from this in the '40s to that building right up there between these two buildings – the digester building is over here, the bleach plant there – that became the control center for this. And there were computers in there that went out and took all the pieces of information and put it onto a screen, and you could see exact temperatures and flows and everything. So the operator, using a mouse, controlled this whole thing whereas the operator in those days controlled it with a dial and a valve. The whole process continued to evolve. Probably every business does that. You go into any store here in town now; they don't have the cash registers of the 1940s and 1950s. The basic building's there, but all the workings of it have changed.

KOLESNIKOV: I'm curious about the shutdowns. How often was that necessary?

PERRY: In the years from 1968 to the present time, generally they would have two shutdowns a year. In the '60s and '70s and '80s, they had one every six months from – one was the fourth of July. They picked them around holidays because…so that…I'm not sure why they picked them around holidays. Some people would get the time off, the operators would get the time off, and the mechanics would have to work extra, so it didn't always make sense. The 4th of July and Christmas would be two shutdowns, and then they gradually changed that to shut[ting] down in the spring and in the fall. Sometimes they'd try to go – it's expensive to shut down because you lose production, and you've spent a lot of money fixing things. So the people trying to keep the thing running financially didn't like shutdowns. The mechanics and the people that tried to keep it running mechanically liked to have shutdowns because then [they] got a chance to fix things that were broken. So generally in this mill we'd shut down twice a year, and we'd

shut down for anywhere from three to five days. But it'd take a while to shut the whole…You'd start shutting it down where the chippers were, and then you'd phase that through, and they'd flush all the pulp out. So in about a day or day and a half later, the far end would be shut down. We'd be working all the way through here, so there would be a period of time, probably about two or three days, where everything was down. You could work on major things that would affect the whole operation – maybe the air system. If you shut down all the air, everything was down because the air compressors drove controls, instruments – controlled everything. Water: if you had to work on your water supply. Or your power: if you had to work on something major in the power system, you had to shut off all the power in the mill, and you didn't want to do that except on very rare occasions, so not [during] every shutdown did you work on something that major, but [during] every shutdown you'd work on some minor things, and fairly major. You know, in the middle of a shutdown, you'd have stuff torn out. You'd have 300 people working in there, stuff torn out in every area. They'd do major realigns of equipment, take big sections out, tear it all apart. You look at the mill in that shutdown and say, "Okay, in three days we've got to be running again." Everything's torn apart. You'd say, "It's not possible to do it," but somehow 300 or 400 people working can get all this stuff back together. Then it would start up, and it would start up the same way it was shut down: the wood prep would start feeding chips to the digester, the digester started cooking, the bleach plant would get pulp, and finally the pulp dryer would be the last thing to get the pulp. If you're working in the pulp dryer you had an extra day and half to get ready.

KOLESNIKOV: Did that affect the people who weren't working on the shutdown?

PERRY: In later years a lot of the operators would work along with the mechanics, and so they would…the whole operating crew would turn into maintenance people, and so they would do cleaning, clean out tanks and work with the mechanics to help them get the equipment fixed; they'd be like an assistant. So really everybody would have some kind of job, except for some of the office people maybe. But even the engineers, supervisors, everybody was out there trying to…The engineers would have projects, and they would be supervising crews to accomplish some major change or rebuild, so there was a lot of preparation work done. They'd have big charts covering a whole wall, all the projects, and you'd have daily meetings during the shutdown to see how the progress was happening in all these areas. If there was one area that was behind schedule that could affect the whole mill, then there'd be extra resources put on that, or there'd be changes made to that project to try to get it back on schedule. It'd probably take months to plan it, and then three or four, five, six days to execute it, and then several months to finish up all the details. You had to make sure you had all the spare parts here that you needed. If you tore something apart, and there was missing one key spare part, you couldn't get it back together, [and] then you couldn't start the whole mill up. The planning people, the maintenance people, the purchasing people all had key roles in getting all these parts here figured out, organized at the right time. And sometimes you'd dive into a project, take something apart, and you'd find, "Oh, there's something else damaged that I hadn't planned on." Now I've got to try to figure out how to fix it. If I've got a part in some other part of the country, fly it here. We even had to go to other mills sometimes and say, "I don't have a certain key shaft or a bearing or something that I need. Do you have one in

your store room?" There was cooperation among the mills, even competing mills: Weyerhaeuser, St. Regis, Crown-Zellerbach, whatever the companies were in those days. Even though you were competitors, you knew each other from business meetings and various councils and things. Maybe the mill maintenance guy or the mill manager from this plant would call someone else and say, "We really need this bearing. Do you have one and can we get it from you, put it in our mill, and then we'll buy another one and give it back to you?" Things like that happened.

CROSS: At the plant's peak, how many people were employed here?

PERRY: Our personnel person told me one time the peak was around 1977 or '78: about 1200 people.

CROSS: What was the relationship like between the plant and the community of Bellingham?

PERRY: I think it changed over time because originally, when the plant was built here, it was a time when they were trying to develop the area. You couldn't live in this area unless you had a job, and the jobs were based on fishing, timber, logging, sawmills, agriculture, farming, and pulping later. So if you talk about what was the relationship in the '20s, '30s, '40s, I think in the '30s especially…I found in the file, the building permit for this mill in 1937, City of Bellingham, one page: "Want to build a pulp mill for $630,000 and auxiliary buildings." – signed off by the city, a $355 building permit. Think you could do that today with a one-page permit to build? But in 1937, late in the Depression, finding something that would employ people I think was pretty important to the community. I know my grandfather, living on the other side of town here, couldn't make his house payments in 1937 for $7 a month, and he lost his house. So I think he would have liked to have had one of these jobs down here building this mill if he [could keep] his house. When I went to high school here in the '60s, I worked at a drugstore right uptown. The $S0_2$ would come uptown, and you could smell it. We'd even close the door of the drugstore at certain times because the fumes were quite strong, but that was an accepted thing. If you were living in a community that had a pulp mill, you put up with those kinds of things. Now when I started working here in the '70s, then there was a conflict between Western and the mill, and there were articles in the newspaper, and the Environmental Protection Agency started. You probably asked me the most sensitive question that I could have here because it was something that combined a lot of things that were very quite dear to me. Like I said, my family… [was] raised here, grew up here; my grandfather was born up on Sehome Hill. I've talked to him, and he said the forest used to come down to Broadway. He climbed Mt. Baker back in 1918 or 1919, or something, twice, and I've climbed it. I grew up here, and I consider myself an environmentalist. Hiking: I've climbed the Shuksan, and I've climbed the hills and really enjoy, tremendously enjoy the environment. And in later years, as I started working here and saw the…You see the need for paper products – people use it everyday – and you see the need for lumber, and you start to see the conflicts between cutting trees and the environmental movement, and the whole EPA started after I started working here. That whole environmental consciousness continued to expand and increase. Then I saw in

later years all these conflicts between people saying, "Okay, you're a dirty pulp mill," or something, and people not understanding the breadth of the question, and where it has come from, and how much change has actually happened in the mill – in this specific mill – from what it was and what I knew it to be in the '50s and '60s and what I worked my career as an engineer to make it better. What people were complaining about in the '80s and '90s, many times I thought and said, "You should have been here in the '60s to see what…If you don't like this, try that, and see how you like that." The thing that really got to me, though, was when…we started going through in '99 and 2000, we had a series of permits, and we had a few local activists that would stand up in front of people in meetings. We went to these meetings over and over again, and I got so I couldn't go to the meetings anymore because it made me so mad, I'd go home and I'd have this big pit in my stomach and I couldn't relax. I just stopped going to them because I would hear people saying the same things that would have a kernel of truth and a whole bunch of stuff that wasn't true. And for whatever reason, whatever motivated them, it was a continual set of attacks until ultimately there were things that happened in 2000 that shut the mill down. And then those people, a lot of them kind of disappeared, and left the people in the community and the people that work here and the people that live here with the results of that. I think it's unfortunate, I think it's really to the detriment of a large number of people, a number of people that worked here and raised their families here and sent their kids through college from these kinds of jobs. And now you see in the paper that people are trying to figure out how to get family-wage jobs into the community. Jobs for you guys: when you get out of school, where are you going to work, and what kind of families are you going to be able to raise, and what kind of job stability are you going to have. Things that I think weren't considered, or weren't considered enough, when some of these decisions were pushed, and the people that stood up and said certain things.

CROSS: Do you think it was more difficult because this is a college town, that you get more people who are trying to explore new ideas and attaching themselves to certain programs?

PERRY: I think it made it more challenging, but you've got a fairly educated group of people in here. What I see happen[ing] is a lot of people come here, go to college here…I read stories about them: they went to college here in the '70s and '80s and then liked it so much they settled here. The college brought people from a lot of different places here, attracted people here, and they liked the area, and so then they settled here. But the people that came in the '70s, '80s, or '90s had different experiences, didn't have the whole history of the place, so what I saw happen is the people that had the history here were kind of competing against later-arriving people. People who had been here two or three or four years and then…I felt – probably not justified – but I felt a lot of resentment of somebody coming here, living here two or three years, and telling me how the place should be when my family's been here for a hundred years. I felt in some ways I should have more say than that person had, even though they just drove up the highway, rented a place, and now they're down telling me what they don't like about the place. That was hard for me to take. It's still hard for me to take.

KOLESNIKOV: Could you talk about the kind of thing that the people who showed up at these meetings talked about? You said they had the same agenda over and over again. Maybe an example?

PERRY: Well, it's a complex thing, but I think there was a certain developer that I won't name that had designs on and had bought property in this area here. His property would be more valuable if the mill wasn't here. So he had an agenda, I think, yeah. There were other people that had various other…probably a lot of them were well-meaning, that were concerned about health effects, were concerned about environmental effects, and I can't fault them for that. But I think it's all a balance. Every person on this earth has some impact on the environment. We've got 6 billion people here now. We all have an impact on the environment, some more than others. Every time we make a decision, we buy something, we drive our car, we come down here. Did you drive down here? Every time we do that we have an effect: we're buying oil from somebody, we're burning it in our engines. We all have an effect on this environment. Making paper, making lumber has an effect on the environment. We can't live in any way…I mean even the poorest people in Africa have some effect on their environment there. And so it's keeping that in perspective and trying to figure out how can we do the things we want to do and have the least impact? There are some people that have figured that out and some people that just want to use that as a club to beat somebody up, and other people jump on the bandwagon and don't know why they're doing it, but it sounds good so, "I'm going to follow through." It's tough when you know some of the facts, and when you see the whole broader picture, to listen to somebody that only has part of the picture and tries to make strong demands out if it. After that period of time in '99 and 2000, I basically said, "If that's what an environmentalist is like, I'm not an environmentalist." I love the trees and the woods and everything, but I'm not an environmentalist with that kind of definition. Then I went down to a place on the Oregon coast and met a guy down there that was basically an environmentalist the way I could…I mean he was living the way that…he put his money where his mouth was. Lived a very simple life, drove a Toyota Prius, and when he drove it he only drove it a certain distance, so he used the minimum amount of gas. I could understand a guy like that, but I can't understand a guy that's living like I do, like we do up here but spouting off things [about] what we should be doing here.

MCALLISTER: On that same note, I guess, on the other hand, how was the supply for [the trees], and how did that change? Did you get these off Crown Pacific lands or did you subcontract, and how did you balance that supply?

PERRY: Well in the early days…We've got a wealth of historical information down here in our vault area in files, and over the last couple of years that I've been working on this job, I've been looking through that…A lot of it was local lumber that the mill…At the time when it was formed, they bought pieces of property around. They had [some] down in Clearlake and various places. They had logging companies, they even had a company up in Vancouver – VanWest Logging. We have a lot of the old books from the '40s and '50s down here. So apparently they had contracts with various…in the local area. There was a lot of timber and wood around here in those days, and so they built the mills. These mills were located around here because of the sources of lumber, local lumber, and

so it was all local sources. As demand increased and the population grew in these areas and more mills were built, then the rate of using that lumber and that timber expanded, and eventually we used and traded…We had a whole group that worked on timber procurement, not only for this mill but for our other mills in the Northwest, and the sawmills. We had sawmills, and we had various types of plants. Everybody else had these, and so you'd trade chips back and forth. In the '80s, we had chips coming all the way from Alaska down here, we had chips coming up from California and various places. Where our specific chips would come from varied from day to day and week to week. In the '90s, we were bringing chips from Chile, all the way from South America. We had ships of woodchips coming up from Chile and radiata pine that were growing on tree farms down there. We did that for a period of years. So it changed and evolved, just like the mill was changing: the sources of wood and how other people were using what kind of quality of wood. Lower and lower quality was used for lumber. They didn't just need the straight-grain clear stuff; they would use whatever they could get. That squeezed the pulping wood down to a smaller fraction of the wood that was available. Once they learned how to make chipboard and particle board, they'd take flat slices of wood, kind of like these chips, and press them together and make a plywood-like product out of it. As each of those things would change, that would change the cost. We used hard wood. We used alder trees in the mill. We used various types of wood in later years that we wouldn't have used starting out. We had some small operations that would make some pulp out of those. I think we should take a walk out into the mill and see what…

KOLESNIKOV: What is it like for you to be working here during this time when everything is ...?

PERRY: Everything's being torn down? Well, I've talked to many people about that and it's…Some parts of it, I get used to it. You get used to tearing down stuff that I and other people have built over the last thirty-five years or forty years or fifty years. But some parts of it still impact me, like when we tore down the lignin operation, which I started working on in the first summer when I was working here. I had thought I was pretty hardened to it because I've been watching this for the last four or five years as we dismantle things, but seeing some of that part go away still had an impact, I think. I just think that that part of the history of the mill and the site is gone forever. It probably impacted me as much [because] I worked with a lot of the research guys in the lignin building over here, and when I walked through there three or four years ago after we closed, I saw all those files, and some of them were just dumped in big piles. Valuable research that guys spent years and years working on became basically worthless to most people. You look at that, and you think, "These were very smart people working on this, and now it's worthless trash." What does that say about the stuff I'm working on today? You know? All the stuff that we worry about, that we spend so much effort on: is it ultimately going to become worthless trash at some point? Probably most of it will, but you don't think about that. So can you maintain some kind of focus and drive and purpose, knowing that a lot of what you're doing is not going to be ultimately .. .It's going to have a time when it's useful and very important, and then it's going to phase out. But if you get into philosophy, that's just the way life is, I guess. You've got to accept it and keep going.

We'll follow the same path I showed you in the books there. This was our vault area, it has all the - all the historian stuff there.

CROSS: Are you going to be moving that soon?

PERRY: Yeah, in this building, we're starting to assess all the stuff stacked around. We've been sorting out the stuff we don't want anymore and trying to move the files to other parts of the mill that are going to remain. Some of them are shipping to headquarters, some of the legal documents. We'll walk out into where the chips and logs started, and then we'll walk through the mill and follow the path, like I showed you in the book. You'll probably recognize some of the pieces and the areas from those photographs.

CROSS: What buildings in this area have already been torn down?

PERRY: Well, we had the shed here. Mostly what was torn down so far was the whole chip-handling area. There were big towers out here and conveyers: see where that one conveyer stops in midair? That continued across at that elevation out to a big tower out here, and that had a big arm that spread chips. This whole area was a big chip pile. Earlier, it was a log handling area. We'll have to be a little careful; we'll skirt around because they're doing demolition out here… [Construction sounds]

CROSS: How would you like to see this area redeveloped? Any preferences?

PERRY: I guess I think the way it's heading is…we'll walk around this water here…it's going to be a mixed use of maybe some even light industrial and some business, some living areas. I think it's going to be interesting to see how it does develop. It's a nice piece of property. I've had architects walk through here, and they see all kinds of re-use potential. This area here was our gas turbine that, when we had a power problem in 2000 (which actually shut the mill down), we had a gas turbine that we bought. It sat here. Ten megawatts. We sold that to a company in Scotland that has an office in Dubai. A Scottish fellow came from Dubai and helped take it out, load it on trucks to be shipped back to the United Arab Emirates. That's where that went. Some of the oil money coming back, I guess. We'll skirt around here, but I wanted you to see. The whole area out here was our log sorting yard, and then also in later years there was a gigantic chip pile. If you were at Western back in the '90s, you'd look down here and see a big pile that looked like sawdust, but it was those little chips with a big bulldozer pushing it around. There'd be 40,000 tons of chips sitting out here at any one time. Sometimes it would get so big it would creep right into this… There would be just a little narrow roadway between those tanks and the [pile]. While we're out here I'll show you a few other things...I'm trying to get the lay of the land here. That's the barking and chipping area over here, the chip screen room. This building here was our board mill. We used recycled paper, waste paper, and made a heavy cardboard out of it. We ran that plant from about the '40s until the '80s. We would have newspaper and recycling drives, and we bought a lot of scrap paper, and that was the feed stock for that. The alcohol plant

there, built in 1944, was the first part of the byproducts. Behind that, which is gone now, was the original pulp mill and [that] later became the lignin plant. Those eight large brown tanks here, each one of those is a million gallons. Those were the tanks I referred to when we made the lignin and would hold it till the ship came in. There's an underground pipe – you see it just disappearing into the ground there, [running] underneath this area out to the end of the dock. We would pump from those tanks out to the ship, and then that ship would take the lignin around to various places: over to Japan, around the perimeter of the United States to tanks there. We'd supply our businesses and our customers out of those tanks. We had a terminal system down in San Francisco; Los Angeles; Houston; Jacksonville, Florida; and Philadelphia. We would supply lignin to those terminals, and then we had salespeople that sold to the customers out of those terminals.

McCALLISTER: How many gallons do the tanks hold?

PERRY: Each one of those is one million gallons: it's 48 feet high, 62 feet in diameter. We've got some people that are looking to try to move those tanks – in one piece. You try to imagine how you do that. There are guys that say, "Well, we can just jack it up and put these big wheels under it, and we just run it across the yard here and onto a barge and haul them away." We say, "Well, good. If you want to do that, we'll make a deal and you can have them." We're supposed to tear those down too.

CROSS: Is there anything around here that's not going to be torn down?

PERRY: All the red brick buildings are staying. Most of what you see – except for the office building we just came out of – that tan building behind it, those white towers that are just peeking up behind there, those are all coming down. And this thing here is leaving. And any of these extraneous chunks of concrete laying around here are going to be knocked over and taken out. And those big tanks are supposed to leave.

KOLESNIKOV: You said the brick buildings are staying?

PERRY: They're staying, yeah. The red brick buildings will be here. When you look around here, you'll see the red brick buildings and those big silos. The architects want to make something, offices or condos or something, out of those silos. Everybody looks at that and says, "Oh yeah, that'd be great!"

CROSS: Modern architecture?

PERRY: Yeah. Let's walk around, and we'll see the chipping plant.

McCALLISTER: In Nebraska, they turned them into lofts.

PERRY: Yeah, that's what they said back in Minneapolis, one of the big grain silos, they turned – those are first things that redeveloped, they said.

PERRY: That excavator thing there…that can do an amazing amount of demolition. It has a big jaw that will cut right through high beams. He's a pretty skilled operator.

LEWIS: Is he going to do anything like that right now?

PERRY: Well, no, he's not going to do that…They're working on it right now, but he's been pulling metal out of things and taking buildings down. He took this whole building down that was right here with that one piece of equipment.

KOLESNIKOV: Do you have any idea of the cost of the demolition?

PERRY: Well, for the whole site it was estimated to be about 4 million dollars.

KOLESNIKOV: And who is bearing that cost?

PERRY: Well, it's part of the agreement with the Port of Bellingham. Georgia-Pacific said they would demolish certain things. So it's part of their agreement. Our demolishing: that's what I'm managing now. The demolition, the sale of the assets. This stage right here is probably about a million dollars of it. You'll want to watch your step around here because there could be some extraneous pieces of trash or metal around here.

CROSS: Have you had any problems with people sneaking on to the site and causing trouble?

PERRY: There have been a few people. You'll see a little graffiti sprayed on various places, and security guys have chased guys out of here before. On Wednesday we had a couple joggers – or I guess Tuesday, maybe it was – a couple of joggers just came running right along the railroad tracks or on the road there as I was walking around with my manager. "Who are those people?" (laughs) So we called security, and they talked to them. There are a lot of transient people that live along underneath the viaducts and various places. We haven't had a lot of trouble with them, but over the years we've had a little bit. Those big towers are going to come down. Those are the rock towers that I talked about. You recognize that from the photo? This is the building…We can't go up in there unfortunately because they've cut off the stairways, and it's not safe, but…This is the building where that hydraulic barker was – is. It's located up in there. The logs come up the back side of this building. The log pond used to come right up to the back door there; now it's not quite as close any more. The logs would come up there, into this building, the bark would be taken off, then they'd come around here, the big chunks would drop into this, and this is the chipper wheel that it would take a half hour to stop. That picture was taken looking down in that throat: when you saw the log going into there, and the guy was operating it. That's the chipper. This is for the really big logs. There's a band saw up there that the blade is – you know what a band saw looks like? Normally [has] a little blade? The band saw up there is this wide – a big one. It was for taking the giant logs and cutting them into sections so you get them small enough to put in this chipper. Some logs would come out of the hills, and it would be one log per log truck.

LEWIS: What are you guys going to do with this equipment?

PERRY: Well, it's going to stay here and probably become whatever the Port can make. This might become an exhibit or something once the thing is redeveloped. Let's try to get back in the sunlight here. In later years when we stopped using this, we switched over to bringing chips in already chipped. This device here was built – we bought it in 1999 – to unload our chips. There was a picture of a bunch of logs stacked in a big crane above it in that book. That was out in this area. There has been a crane on this site since the early days of the mill. This is about the third generation crane that's been here.

McCALLISTER: Isn't this the old Bellingham Municipal Dock?

PERRY: You'll be able to see it. It was down further. This bucket can pick up a fairly good size chunk of…I think it's a 25-ton crane, so you can take a big scoop of chips and unload the barge. We're going to move this over to our mill down in Owanna on the Columbia down in Oregon. Let's walk on the dock here for a second. That dock you referred to: I think it used to sit right down in this area. The Port want to redevelop this whole dock area to have a floating dock the full length of 1200 feet for pleasure boats. That's our treatment lagoon over there. When we first built the mill, the discharge was right into the waterway here. Then in the mid '70s we built that treatment lagoon. So now there are pumps right underneath here, and they go underneath the water and come up where that warning sign is. We pumped all the effluent of the mill into that treatment lagoon, about a 35-acre lagoon. There are aerators in there that went around the pulp mill. We had a bunch of aerators, big compressors in the building over there.

CROSS: What are the plans for the lagoon now?

PERRY: Well, the Port now has bought the whole site including the lagoon, and they want to make that into a boat harbor. So they would knock a hole in this and dredge it out and put floats in there, and if you make enough money, you can buy a boat and stick it over there. (laughs)

PERRY: So we are following the flow of the…We've made the wood chips now, and they stored them in those silos. This is the screen room. There were pictures in the book of the chips being screened to take the large chips away and get the right-sized one. That happened in this building. Then there were conveyers that went over and up into the top of the digester building. We'll walk over towards the digester building and take a look at that. These are parts of the spray dryers that made the lignin products, that we took down. Be careful here, you don't want to get caught on the sharp metal. The whole digesting process happened in these tall buildings. The white towers that you see here are where… the limestone rock was put in those towers. Sulfur was burned in a burner system, that's gone now, and went into the bottom of those towers, with the lime rock inside, and then water went into the top of them. And those towers are where the cooking acid was made. All these warehouses on the dock are where the pulp was stored originally. This is our machine shop and storeroom area. This area right here was where the bark that came out

of the barking plant – all that was used to make steam in the steam plant. In between, in this area, there was a bunch of equipment to grind up the bark and any waste wood. There were big hoppers here – it was originally a wooden building, and then in later years it became these metal silos – and that's where the bark was kept before went to the steam plant to be made into steam. We had four boilers that took…it's called hog fuel, which is just waste wood. That's ground up and fed into the boilers and then generates steam to drive the mill.

CROSS: Was steam your chief source of power, or was it a lot of generators?

PERRY: The steam was of course the thing that heated up the digesters, heated the water in the bleaching. Then we had our substation here, which was electrical power that drove all the pumps and those kinds of things. Our big compressors that evaporated the water out of the lignin were driven by electric motors. We've got the biggest electric motors there: 4500-horse[power] electric motors. This is the steam plant over here. You can see the tall stacks that were part of the original building. Well, they've just buried my route to get in there, so we'll have to go around to the other end of it. Let's take a peek in here first. This was where the pulp dryers – be careful! You want to stay back because there are lift trucks running in here, and they don't work very well when they run into you... There are some pictures in the book that show the pulp dryers. The original pulp dryers were in this building. There were three of them. When [the pulp] came out of the digester building, it went into these three machines, and [it was] dried and made into bales, much like you see sitting in here now. Those were taken out in the '70s, and a single pulp dryer was put in the building next door, which has now been taken out again. All we have left of that era is the building it used to sit in. You can see the trusses. The original building was just that second set of supports there. That was the first building, and then they've added on to it. [Let's] take a look around the other end of the digester building if we can get into it around the rubble pile. These first three digesters were the original ones built in '38, and three more were added in about '41 or '42. Then we added two more in 1978, and then a final one, a ninth one, in 1989. We won't walk all the way down there…This is the digester. You can see up inside of here, if there's enough light, and you can get an idea how large they are. You can see the upper fill hole is in the top, there's a large chamber, and there's a big valve here that came out, and there's a big valve that blew the product out of this area. These are made out of steel that is one inch thick, and then it's got a brick lining inside of that. It's a mild steel, so the brick protects the mild steel from being corroded. So it was very important that they kept those linings in good shape. In later years, when they had ultrasonic testing, they could do an inspection of the entire vessel periodically to see if there was any spot where the brick lining had failed and it was starting to corrode in the vessel, because if you've got a major corrosion then it's a spot where a leak could happen, or [in] a worst case, a rupture.

LEWIS: How much does that weigh?

PERRY: It's probably 200 tons, something like that, with just the steel part of it. Probably another couple hundred tons of brick, so probably maybe 300 or 400 tons. See, when they put the foundations in, there's just a forest of piling driven underneath these to

be able to support that weight because this whole side on fill. So every building and every structure they built down here has to be supported by piling. They drive them down to the original soil underneath the bay. Early photographs show just a forest underneath this building, or the original part of the building. There is piling about every two feet, just solid. Then they put the forearms, put the concrete down. The digesters are supported separately from the building itself. So if you're going to dismantle this, you've got to take the whole thing in reverse. The building was built first, and then the digesters were put inside on the original one. You've got to really imagine what's involved in trying to take these nine digesters and all the brick out of here and leave the building behind. It's estimated just to do that is a 1- or 2-million dollar project. And then you've got a building [where] parts of it are fairly old and not built to today's earthquake standards, so whether they'll be able to save this building or not is a big question.

McCALLISTER: What did this area get filled with mostly? I understand most of the old structures were actually on pilings in this area.

PERRY: They got filled before they built the structure. I'm not sure where the fill came from, but you can see the early pictures of it. It was a marshy area, and the original beach was around the perimeter of the property. I've got drawings that show that the first comer was filled in about 1913 and then later parts in the '20s and '30s. Because by the '30s, it was filled all the way out to where the sawmill was running. There are pictures in Boss Tweed: if you go up there to that restaurant and look down at this site from that angle, where the railroad track now runs around the side you can see it's running across the water. This whole area in that picture is all covered with water.

McCALLISTER: Where was the Standard Oil...?

PERRY: Right across the waterway – there were a series of tanks over there. So this was the digester building. We'll go up in the bleach plant and see the last part up there. This whole building here was the screen room. There was a series of tanks here with a big stack on it. At the end of the cook, after six hours of cooking, the chips would be turned into a mass of pulp, then that'd blown out into these wooden tanks with a grating, with a metal plate with holes in it at the bottom. They would blow the whole digester into one tank, then they'd flood water on top of it. They would flush the water down through the holes and have a big monitor – a power hose-type thing – wash the pulp and the liquor separated from the pulp. Then the pulp would go into the screen room, and the liquor would actually – it originally just went into the sewer, but in later years it was collected in tanks, and then it was pumped into the whole alcohol and lignin operation. The bleach plant was added in about 1952. Now, the fellow you'll be talking to, Norval Magnusson, was here in 1948, so he was involved in helping to design and build the bleach plant. He's got a lot of information on what the place was like. Let's go in the building here out of the wind. These big chests in here…the pulp was put in here, and these chests fed the screening system. There were pumps down in these pits. There are only a few pumps left. There were some large pumps down here that would pump the pulp and water mixtures out of these tanks, upstairs, and then it would be processed in the screens upstairs. We'll walk up the stairway and take a look at some of the cleaning equipment. This was the

original screen room in here. Most all of the equipment's gone out of here now, but this is where the pulp was washed when they first processed it. This was added on later. There were some screens in here that took the sand out of here and separated the good fibers from the uncooked fibers. But this place changed quite a bit over time: they got rid of the flat screens and put in pressurized screens. This is actually a washer. It was designed here. It was designed on the principle of the forgeneer washer, which was a plastic screen that ran in a continuous belt around there. Once we developed the lignin operation, it was important to try to as efficiently as possible separate the pulp and the lignin without getting too much water added to it. This was the pulp washer that was actually designed here, and this was the very first one out of about 100 that we built around the world. They patented it here. This wire came around here. Those are suction boxes. The wire ran that way, the pulp and the lignin were put on this end, and at that end the fresh water was put on. It was pulled through by vacuums, through the pulp, then that slightly dirty water was put back on the next. It was a countercurrent: the water and liquid were moving this way, and the pulp was moving that way and getting progressively cleaner and cleaner. So you've got concentrated lignin coming off this end and fairly clean pulp coming off that end. So it was a countercurrent-washing type of a device.

CROSS: How many pieces of machinery were patented here at this plant?

PERRY: Oh, there were hundreds of patents that they…as far as machinery.

CROSS: Well, machinery and in terms of patents, how many came out over the years?

PERRY: Oh, there were probably 200 or 300 patents that came out over the years. A lot of them were lignin patents on various chemicals. There weren't as many machinery types. The barking operation was one of them. This was a major one. There were some other, smaller types of machines, but those were the two main mechanical devices that were unique and patented. We sold this patent to the [Black Klausson?], and they continued to make those. I think there are about a hundred of them built around the world. In fact we looked at relocating this one down to our mill in Florida. We had the [Black Klausson] people out here, and they reviewed the whole thing to see what changes…of course this is an older version. The newer ones have a lot of different features on them. They decided not to move it, to build a new one. After the pulp is washed, it goes through the cleaning system. In here you can see some of the centra cleaners that were used. See all these spiral cone-like devices; there are whole banks of them here in various stages. Under pressure, they would pump the pulp and the dirt in a spiral, and the dirt and heavy stuff would concentrate to the bottom, and the good stuff would go out the top. There were multiple stages of those that would clean the pulp in this whole area. There are screens over there; a lot of them are gone. Screening and cleaning of the pulp would happen in this area. Then it would go back into the other room, and the pulp would be bleached. Underneath the floor in the next room, there is a bunch of big chests and towers. Various bleaching chemicals would be added to the pulp, and then they would be washed off in the washers that are on the top deck. By the time the pulp left this area, it was all clean and bleached, and it was ready to go to the

pulp dryer. We dried it into a sheet. The architects say, "Well, that room next door with the high ceiling: that would make a nice gymnasium, or something like that, with a track around it."

CROSS: Swimming pool off to the side…

PERRY: Yeah.

KOLESNIKOV: Do you have any sense of what happened to the people who worked here?

PERRY: Some of them went to other mills, some of them retired, a lot of them went back to the tech school or various places for retraining in various other jobs and have gotten some jobs in whole different businesses. A lot of the older ones, I think, worked for a few more years and then have retired. Some of them took early retirement. There are still 250 people working in the tissue mill, so some of them actually got jobs, like myself. I continued to work in the tissue mill, and then I have come back and [have] worked in the demolition area for the last two and a half years. A lot of the mechanics have gone over to the tissue mill, and they continue to work, and some have retired out there now. Some of the pulp mill workers were hired back into the tissue mill and started learning new jobs over there. But a smaller fraction continues to work here. It'd be interesting to find out. Once in a while you see an article in the paper about some of them. I know one of the fellows that worked in the alcohol plant started a restaurant out in Ferndale. He and his wife worked there for about three years. Now I see the restaurant is closed, so I'm not sure what he's doing now. The last area that we haven't talked about is the byproducts and the alcohol plant, which I've already gone over some. There's not a whole lot to see there anymore. So we'll head back to the office and wrap up.

CROSS: The Bellingham Herald wrote a lot about Georgia-Pacific a lot of the time – this plant specifically.

PERRY: Yeah.

CROSS: How did you feel about being…were there a lot of hard feelings towards the Bellingham Herald a lot of the time?

PERRY: Well, I think there was a time there when they weren't doing us any favors. We were trying to survive in a tough environment. A lot of the time it didn't seem like they were helping us any. I think it's changed. They've been down here, had a lot of reporters and photographers come around. They've tried to be pretty fair with us, I think, in the last two years. Unfortunately, a lot of people have kind of changed their attitude a little bit too late. I sense – and I've talked to a lot of the former employees – there are still quite a few hard feelings among the former employees. Some of the city officials, some of the people were really going out of their way to try and make it hard for the plant to survive. There are still a lot of hard feelings out there. But it's only natural, I guess.

I don't know what else to show you. That's about the size of it. You can have those books. Have you got any other questions I can try to answer? I was going to show you some of the tissue. This one roll of tissue is an old…it's one of the early ones…I don't know what time period, but ‘40s or ‘50s. That was probably the ‘70s or ‘80s, that one…then the later one, the current one they're making now. So you've got phone numbers to contact? I've talked to each one of them. I haven't talked to Homer Irwin.

McCALLISTER: I'm doing Homer Irwin.

PERRY: Okay, so he'd be one to...