Glenn Charles Matthew Bjork
had to have both grandfathers
1/14/25 @ Gwinn Hospital in Austin location
went home in a cutter and a horse
Parents; dad everett eugene bjork 1891; born grandfather carl eric bjork
emma johns 1887 one of 17 chidren
nationality of parents Everette born national mine
at that time called winthrop
grandfatherborn in dolarna sweden
mothers parents came fromcornwall england supposes they were tin miners
grandfather:
carl eric bjork from sweden in 1879 small iron ore mining town silverhaden
1880 his fiance came and they were married at Bethany Lutheran, old church behind high school
1879 in Nelson Mine on U.S. 41, house with pipe in the front yard; verious jobsincluding shift bossing, then at incline mine; not a vertical mine but on an incline, connected to Cliffs Shaft mine where Brownstone shops are in Ishpeming (Could this be the Sherwood which later became an escape route for th Cliffs shaft?)

Worked there few years and was transferred to Cliffs Shaft, which at that time was called the Morrow mine. Grandpa lived in Ishpeming short time & moved to Winthrop (now nationa mine) on Mitchell Hill. He and his three brothers'-in-law in fact built homes in area of Mitehellhill. South of there is Klondike Pit where grandpa also worked, loading horse-drawn wagons - open pit Approx early 1890s

From there, he was laid off about 10 years total during tenure with CCI. When you were laid off you lost your prior time, it didn't accumulate. In the 1890s mines shut down so he went to Alaska to mine gold. Gone a year to Nome. Family, brothers & sisters stayed behind to do the farm work. Rehired at Morrow Mine doing diamond drilling/exploration department, underground and surface. While on the steam-operated diamond drills, hedrilled where Ishpeming hospital now stands to see what the ground was like tobuild a hospital.

He also also drilled at North Lake to see where would be thebest place to put down the LLoyd mine shaft. Always aheadof the game . Neguanee Mine underground and ad Maas Mine.

The Gwinn District, called the Swanzy Range started to open up so grandpa sent down to Gwinn to drill, lived in tents in 1906, and wanted to build a townsite away from the mining, so they drilled to see where there wasn't an ore body to put the town. So CCI hired William H. Manning, architectural engineer to drawupthe plans for a model town, Gwinn MI.

Grandpa worked at Austin, Princeton, Stevenson, Gwinn Mine-as a pump man at Gwinn Mine for a few years. Retiredin 1927 with 36 working years. Would have had 46 if he had gotten credit for the additional 10.

Morrow mine: brother Adolph came over here in about 1890to get work, got job at Morrow, 1890. 1891 his wife came over with 5 little boys. She died from influenza/ some lung disease in 1904. That left Adolph with five little boys. He did the best he could, but there was no help available. Killed in cliffsshaft in1908. The five boys were taken in by Glenn's grandfather and wife. They tried to raise them, got too hard for them, couldn't make enough money to keep the boys, so they were sent to an orphanage in Joliet Illinois.

Boys: all went into the army in 1918 except one. The four went to France and came back after the war, were discharged, and scattered all over the country. One discharged out of Fort Snelling in Minnesota and never heard from again. Glenn's Dad received letter from gov't inquiring about where he went, but Glenn's dad didn't know.

Met one of the boys, carl, livedin syracuse. One, Gunnard came home after 20 years in the Marine Corps. No contact with them. Knows whereone went. The son of one of the boys, Harold has visited Negaunee a few times and they have one son. Had a family reunion one year.

After the boys left, grandpa was still working in mine, an they moved to Gwinn working diamond drills about 1904-5-6. Townsite of Gwinn built 1908. Retired1927 from Gwinn Mine. He and grandma worked as caretakers at town hall in Gwinn for two years after retirement. Went back to Sweden with sister Olga Lund to see his three sisters. 1930 after grandma died. Never saw his mother ad father again. 51 years before he went back.

When grandpa was pumpman and they would have free time, grandpa would carve things out of pump rubber. He carved a whole set of farm animals out of pump rubber. Only piece Glenn has is a little rocking horse. In Sweden, province of Dolarnaa, it's (roedhost? red horse). They did a lot of carving, and people were interested in farming.

Glenn's own mother died 1929-65 years ago. Emma Johns. Grandpa had a Pontiac car and he'd go to Ishpeming and national mine to visit old swede friends and talk swede. Roy and I in the back seat, bouncing along from Gwinn to ish; we'd behorsing around and he'd stop the car and go cut a switch off a tree and give us a rap"behave"...we'dbe good for a few miles, you know.

Then he always had a habit...he had wood spokes we'd stop by Green Creek and put water on the spokes, he figured they must be drying out, you know, keep them wet.

Ole swede called Beckmans, lived in Gwinn. Down on the silverlead creed, he helped to sink a shaft for a silver and lead mine. where the base is now, at beginning of silverleadcreek.

Beckmanalways said that this is going to be a big silver and lead mine, with all brick buildings, and it's going to be all swedes working there. The mine never went any further. 100 feet and then filledwith water. Pickeda lot of berries with grandpa..bluberries. "Look under the yackpines, that's where you find the blueberry". Growing up you had to go and pick berries whether you liked to or not. Come home with bushels, hot, dry. Fun though, looking back. Grandpa had a cow in Gwinn to get milk and butter.

Glenn's dad, everett E. Bjork. Born 1891 at national mine (winthrop then) Went to national mine school and sunday school, which was taught in swedish then, they all had to learn swedish. Heard it at home too. Dadfluent in swedish even thoughborn in U.S. Wentto school unitl 16 years old, about 1907. Wanted to quit school, so grandpa said ifyou quitschool you'regoingto go to business college. Ishpeming at that time had what was called Ishpeming Business College. so heenrolledthere,about a year and they got a job at the main office for CCI. then, things wereopening up in Gwinn district and he was sent there, they moved to Gwinn in 1908-Austin location.

Dad worked out of the main office in princeton. Workedundergroung with surveyors, and mostly officw work all his life. Worked at all the mine offices. When the mines shutdown in Gwinn about 1938, when Mackinac Mine shut down, and he tookcare of the officeat the Mackinac Mine until it closed. From 1938 hewasback at mainoffice in Princeton, took care of all the Cliff Power and Light accounts. Gwinn, Chatham, Eben, Seney. Bigjob. 1941 they pumped out and reopened the PrincetonMine to reopen it after 20 years for the war effort WWII. Hadbigger staff-miningclerks, supply clerks, etc. Then closed after strike of 1946. He was kept on at same office til about 1956 on Cliff Power & LightAccounts, andthey shut the Princeton Mine oficedown then, he was going to retire, but CCI officials wantedhimto go up to the Mather Cottage in Ishpeming whereall the higherups stayed when they came from Cleveland, so ma did the cooking and pa was the butler, so they enjoyedit up there, met a lotof nice people. Were thereuntil 1962, andhe retired after 54 1/2 years.

1975 he passedaway. 13 years of retirement.

Dad remarried in 1933, mom had died in 1929. Wife's famiy was from Rock. Piking brries, canning, flower garden, hardworker. dad avit trout fisherman and hunter. glenn learned from his dad.

Glenn andsister. Brotherlived a year and 14 days and died. Lost several children. Mother hadparkinson's and died. Glenn remembersherlyingin a hospital bedinhome in Gwinn. only recollection he has of his mother. He was four when she died.

Childhood with dad and stepmom. had grandparents close by and they looked after the kids also. Picked berries and help around home, cut wood every year, crosscutsaw and pile woodin the barn. Now and then, go in the car and fish, make a lunch out there, ma forgot the frying pan and they washed a shovel off and fried the fish on the shovel. Lot of good times. Not like nowadays when everybody's gottabe buzzin somewhere...going. simpler I Guess, more simple but enjoyable.

Glenn graduatedfrom GwinnHigh 1943 during the war years. Went right from high school into the military. Startedfor the company in March of 43, part time until out of school. Three months. Worked steady at the Princeton Mine until August of 43 then into navy. You could choose. On aircarft carrier Hornet.

(end of side one)

Tape 1 Side 2

Work on family tree

Made family tree for four kids. Took 5 years. On Swedish side, goes to Swedish school in Ishpeming during winter. Teacher went to Silverhaden, looked up Glenn's second cousin's parents. Got information dating back to the 1700s in the church records. 21 first cousins. Glenn has been writing to some cousins, mostly in Swedish. Startsin October to have letter ready by December.

Uncle Johnny Johns went to Cornwall threet times and never found anything on their family. Some of the names hadchanged. Someone on Negaunee said that Johns was originally Jones. Grandfather Bjork. Name was Carl Eric Johnson. When got to Ishpemig there were so many Johnsons that he decided to change the name Bjork. He and brother chose Bjork.....doesn't know why, but notes that there are a lot of Bjork (birch) trees in the area. Bjork means birch in Swedish. Guesses it was the trees.

Post worle war II. Dischrgedfrom the navy in 1946 and there was a big strike on. Cliff Power and Light picked up several guys to go and cut power lines around big shag lake. When strike over, went to Mather A. 1946. Worked as rock drifter putting in a main heading over to where the Mather B shaft would be...driving a drift. Definition of main heading is main level drift, triedto keep in rock rather than ore.. Crosscut is a drift ahead into the ore body, laid track to haul out the ore.

Very first day @ Princeton Mine. Enjoyed it. Part time while in high school. (Laughed) "When you go down the mine it's like you're in a new world. You got your light on your hat and a few light bulbs along the main drift that are all muddy and dirty, and wet places, and..." Didn't play any jokes on him as a high school student. Doesn't remember many jokes playedon people. "Interesting place to go down....get in the cage and go down...."

Characteristics of Princeton.Soft ore body. Raise to go up to another level. Had tamarack cribbing to keep the raise from caving in. "There was places in the Princeton mine where you never had to drill and blast, it was so soft. We put a spade on a "moiling" machineand just spade the ore out, and they'dput more rounds of cribbing and keep going up. It was soft, soft ground."

How many levels: fifth and sixth in Princeton. In fact we had to walk about 1000 feet to go down to the sixth. During the war they sunk the main shaft down to the sixth level. So it was connected up then.

Mather A after the war, after Cliff Power and Light. Rock drifting. The main line was heading toward Negaunee to eventually hook up with the Mather B shaft when it was sunk. Bjork worked in that drift until 19

"1947 January or February, the mining broke into the old Nelson Mine, and water...that was kinda spooky. We all thought another Barnes Hecker. And we had to work in that for several days...we haddaroll our boots as high as they'd go, and the motors splashing through water. Had to roll boots almost up to your knees in the main drift."

We didn't think too much of it, you went there every day, and done your job, and splashed through the water, wondering when it was going to quit coming. Anyway, they sent everyone home then. They were a little concerned that it would be another Barnes Hecker. So they had a skeleton crew put in some dams so the water wouldn't come out and flood the main shaft. That gave us an opportunity to take in the ski tournaments, when the mine was down. So we got to go up almost every day from Gwinn to see the ski tournaments. Anyway, the water petered out.

Worked there until 1947, when we started to sink the shaft for the Mather B. So we went over there the fall of 47. First of all we blasted up on the hill for an engine house. We hadda blast rock out and make a flat spot for the engine house. Then we started to sink shaft. We had a wooden head frame: that's what you see on surface, the steel shaft house over the shaft. While sinking shaft for the B, it was a wooden structure. Somewhat closed in. About February, March, April we started sinking. Sank it down to 3100 feet and then went back and started to blast ahead where the levels would be, at the sixth level and the seventh. There were 225 feet between levels. Some of the older mines had maybe 50-60-70 feet between levels. It was hard ore, they could go less.

What was an interesting thing, when we opened up sixth level, we drilled and blasted the rock for the platte - that's the wide spot out by the shaft wherethere was two set of tracks that unloadedtimber trucks and alla that that came off the cage. And then went around on the other sideof the pillar (left a pillar in there, and then we openedup that side for the trenches, that's where the orecars dumped ore, and then they had a scaper scrape the ore into a measuring pocket. The measuring pocket held exactly a skip load maybe 10-ton 15-ton skips.

When we had that done, Mather A drifted coming towards Negaunee, "this was kindofa highlight, I thought, in my time is my partner and I, Sam Carrilli, were advancing that drift from the Mather B side, we

had about 400 feet to go, so Sam and I had the honor of busting it through to the Mather A. yeah. When the smoke cleared, there was the Mather A bunch over there and we went over and talked to them. So we I suppose we shook hands and chewed the rag.

Sinking shaft for the B. Process. When putting in the engine house, when we blasted, we had to put big mats down with trees over cause there was houses just below there. We never broke a window ever, though, and then a bulldozer on surface, he'd push the rock out.

Sinking shaft. Drill about 65 holes. Ten men on a shift. Each hole from 8-10 feet. You'd drill and blast and then you'dgo down about 28 feet below the last set of steel. There were steel sets, not timber. Then you'd rig up a staging, they had a staging that was anchored on four corners. They had a chain block (and tacke) you'd lift up and then take a hook off of a set above, and you'd lower that down; that would lower down 7 feet, 8 feet, and then we'd put 3" fir planks across all of the staging and then they'd start layingdown the steel....side plates and then legs and dividers and ladder road. We'd do all of that beforewe'd go down again to muck that pile out. You'd muck the pile out and then you'd keep about 28 feet ahead of the last set so you wouldn't hurt that set when you'd blast. If you broughtthe sets too close, the blast might upset that set, buckle it.

Steel set is I beams or H beams about 10" by 10" or 8X 10, and they'd run about 20 feet long and 14 feet wide on the end sets. They were hung there with a big corner studdle? we called them Big piece of angle iron that was machined already with the holes, and you'd put that there and hang it from the last set above, but a drifter? in there and a bolt. And then on the four corner pieces, you'd put in your wall plates, and they'd reston them and your end plates, and two dividing sets in the middle, across the center of the shaft; this is the cage road in other words, and another divider, and then another divider with that same steel and you'd put a platform on that one every 7-8 feet, and that was your ladder road, in case you had to climb the ladder in case you had a power failure or something and you had to climb up.

The other divider, on the other side was a skip road so there were two skip compartments. That's to haul theoreup to surface. Two skips they had there. So you had a cage road, a ladder road and two skip roads. As I remember, about 14 X 21, the shaft was.

We didn't do a lot with the walls where it was bad was below the sets we would bring a lot of plank down and put it in behind the set and block it from behind so the plank would hold up the wall from anything caving down on us. We trimmed the walls down pretty good, of course when were drilling down there, they'd keep the cage low on the cage road side, and I did a lof of that drilling myself. And of courseon the skip road side we'd cover that with sheet iron so nothing would fall, so you were kind of protected that way when the drill'sgoing you can't hear anything

Mucking is shoveling...we hand shoveled down about 800-1000 feet. then they got hydromucker, a hydraulic clamshell like you see on a construction site (Rodell mucker) devised by Houghton. There was a motor that ran the hydraulic pump ; one man running the pump, cleaning the floors up; bucket.

They had what they called a tray down the bottom with a bale on it; we'd loadthe tray and ring the cage down to the bottom; it was a "sinking cage" open cage basically. The tray had two hooks on it, and we had a tugger that we could bring down when we needed it an air tugger, that's a thing that you pull with run by air. The air tugger would lift this tray. It was centered so it would automatically go toward the cage and as you lifted that tray there were two hooks that would catch on bars on the cage and as you kept lifting on the tugger, the tray would automatically dump the tray into a car the cage.

Pretty good recovery we had. With 65 holes we generally had 65 cars so each hole was working about a car.

Number of guys on crew sinking shaft. 10 men on a crew, three shifts, five days a week.

Feet per day. they set a noth american record. A half is two weeks= a pay period every two weeks. For two consecutive halfs we hit a hundred feet; two hundred feet in a month, so that was a record for that type and size of shaft.

Incentive program. Contract mining basis. Footage rate. Doesn't remember exactly - got 15-16 dollars a day at that time, which was far different from later days when the footage bonus might be 50-60 dollars a day. But that was big money for then. They paid big money for shaft sinking. It was abovecontract pay at the other mines, there was an incentive.

Selection process for sinking shaft. What mining experience you had, willingness to work, steadiness, they didn't want people losing time. Worked 46 to fall of 47 at the Mather A. Fall of 47 to Mther B.

Mather B shut down in 1970

Levels were opened up 6th level, then down t 7th, all done before the rock drifting went ahead.

Dimensions of a plat. Cage road side of the plat probably 14-16 foot caps, which would give you a 20-footwidth at the floor. Set = two legs and a cap. Ten feet high at the shaft, 9 feet high farther away from the shaft. Needed to be 10 feet high to accommodate the sections of steel and 30 foot rails that had to come off of the cage, so you had to have enough height. You had a switch there and you had two sets of tracks, one that came off the cage. Trench side where they dumped was about 150-200 feet, about the same width as the cage side.

The tracks went alongside the trench. Blasted out a trench. Trench side was maybe 100 feet long and on two sides of the shaft and down about 10 feet and that was all cement...concreted.

That was inside of the shaft so when the cars came out with the ore, they had what was called a camelback outfit there. The ore cars had a fifth wheel so when the motors pulled ahead there, they could move that camelback wherever, on the rock side or the ore side but if they had ore, they'd keep pulling this train through it, and with each train the fifth wheel would catch the camelback and it would dump into the trench.

Camelback made out of steel too and you could move it where you wanted it by the trench, and there were pins in there through the rails to hold it from tipping, just hold it there. There was an angle iron on the bottom. The ore cars had a plate and when it came to this camelback it would go under a plate on the camelback so when the orecar fifth wheel hit the camelback, if the plate on the car wouldn't go under the plate on the camelback, it tip the whole car into the trench. The orecar wheels stayed on the track, it was only the body of the car that dumped.

The camelback was on the opposite side of the car from the trench, and so was the plate that held the base of the car down.

(end of tape 1 side 2)

Tape 2 side 1

June 23, 1994

Clarification of camelback construction (Car only tips 45-50 degrees)

Camelback setup worked good for many years. The motorman stayed right on the motor and pulled the cars through.

Unfortunately, one day a guy got his leg caught between the camelback. A motorman. I think he had it amputated. They started pulling it over with an electic tugger. Tuggers pulled ore and rock when you're mining. Used a tugger when you blasted to pull the ore. Then they hooked a chain... they had an endless cable down between the tracks. They'd hook a ring on the front of the motor and then they'd push the handle and nobody on the motor, pull the car over the camelback. So nobody could get hurt.

Electric tugger is a machine that pulls the ore or rock, whatever you're mining. You drill and blast, and then you've got a means of getting that rock out. You put a head block, that's a big block where the cable goes through, we call it the breast, that's where you blasted, we'd drill eye-pin holes or put a wooden pole, we used to call it a jimpole. Make a little hitch in the ore, one on each side, we'd put a jimpole, wedge it in tight, in fact we'd pick a litte hole in the breast, and then get a measurement back to the last set of timber or steel and cut it on a bevel so you'd drive that in tight and spike it. Then you'd throw a chain over the jimpole with a choker ring around it so the tighter you pull it, it would stay tight, and your block was hung from that. Large pulley. That's how you got your dirt out of the drift was by using this tugger...it was a pull-back cable and a pull-in cable. One handle you push on the tugger pulled the scraper in, and of course you release that one and pull the other one and that would haul that scraper in with the load. You either, depending on where you were mining, it would dump down into a raise or dump down into a car on the level.

Lot of changes in tuggers too. About a 15 horse tugger when I started, and they got up to about 60 horse...more powerful tuggers.

All electric with gears, transmission in between gears and then two drums, one wound up your pull rope and one for your pull back rope, so you pushed the handle for pull back and put your scraper into the works, and you let that go and push the other handle to pull the load back in. Ropes (we called them ropes) were steel cables.

The plat had concrete floor. Other places where there was concrete underground?

Where they put a dam to seal off the main line in case they had water coming in somewhere. They'd drill into the sides of the drift to make good anchor, and the same thing on the back (that's above). Drill eye-pin holes down on the bottom end, nd then drill a lot of eye bolts in there to help to hold it along with that cutout.They'd blast in like 2-3 feet and they they'd pour cement there both sides and over the top and across the bottom, and in that set-up they had big square timbers that were set up on top on the upper side of the dam, so that if they had they could just drop each timber down into place. There was a kind of a channel there on both sides where the timbers were set up, so if you had to, boonk, you could just drop them down on top of each other. Timbers were there if you ever needed them, could drop them down in case of a flood. The whole dam wasn't concrete, you had to haul motors through there, so you had to keep it open, but if you had to block it off those timbers were there to block it off.

Concrete was on the skip side, the plat and the cage plat were all poured concrete. Floor and on the post in the middle, it was poured partway up the piller to keep it from wearing down. The pillar by the plat was really more like a wall, but anything that supports something you called it a pillar. Wide by the cage, and as you go in it got narrower and narrower down to nothing. The tracks coming out from the cage met up with the switch with tracks going inside. Switch at the end of the pillar, so when a load of ore came, they had the right of way, it was always coming to the shaft to dump. To come into the cage side, you had to throw a switch, but the main line, the switch was always set for the main line.

Ultimately, the switches were never thrown without the go-ahead from the dispatcher, but when Bjork first started there, each level had its own dispatcher. "But it all handled from surface then after. He didn't have to go underground even, he had a big board with prints of all the levels and the crosscuts, and all done by one man, I guess it was a nuthouse from what I heard. You could go coocoo from listening to all those motors." "I dipatched on sixth level for a while, but I got out of it, I couldn't sit."

Communication underground. Princeton, Mather A and Mather B. Princeton mine you had a telephone on the plat. If you needed to get somewhere you took a motor or had somebody bring you in, and hurry up and go get 'em. Telephone was a big iron box, all sealed so it wouldn't get wet, and they you had to ring it with a little crank for the shops or the engine house. To direct a call to a specific place, you had a different amount of rings. But anyway, Mather A there was no dispatcher when I was in Mather A, that came in at Mather B, of course Mather A must have had it too in time, but I was gone by then.

They had radios on all the motors and they could contact the motor anywhere where you were or if you needed help, or to dispatch 'em to another area. Until 1947 when Bjork left the Mather A, there were no types of communication that would go up into the contracts. Only a system of lights into the contracts. There were signal lights, so in other words if you wanted to send timber up off a timber truck, one guy would lash on the timber and you'd give two bells "hoist up" two *lights* would show up on top, lights, "hoist up" and you'd hoist up on top. Three bells send er down. The raises were so high it was hard to holler, so you had to have some kind of communication, so we had signal lights.

Highest raise, Jimmy Baldini and I brought up a raise at the Mather B from the 9th to the 8th level, that's 225 feet. With a modern new device called a Alamac or K raise machine. That was devised and built by Swede engineers. And they were using them in Sweden. you got on this rig here and you didn't have to climb. The old conventional way of raising you went up ladders and you built a stage, that's two poles and then you have stage plank and then you drilled off of that, your holes going up. And then after you're all drilled, you go down and you get your dynamite and your caps and you go up and load your holes, and then hook up and come back down. And if you're using electric(charges) you'd go to the switch box and throw a switch, and the caps would get enegry (and go off). But if you weren't too high, and years ago, before they had electricity, they had lighting by fuse. And they had 8 foot fuses, and some 12 foot fuses, and you had to light those and then climb down out of that. And then after the blast, you were hoping no ladders got knocked out so you could climb back up there. That was one of the dangerous jobs you had there, raising. And I know times when I went up after a blast and the doggone covering was...we used to cover up one side...the ladder road side with cribbing before we went down after we were all charged up we'd take 3-4 cribbing and place it over the ladder road, so that any dirt that might be falling wouldn't be coming down when you were climbing up after the blast. This one particular time I remember we were going up a rock raise and I didn't think it looked to good, it looked like some studs of cribbing in the rock. I climbed up there and came up on top of the last round of cribbing and got a toe hold on the side, and I gave the back a tap and a big slab came down. Luck, lady luck with ya. I just had a toe hold, and it fell maybe a

foot from me. The blast had come down but there was a lot of loose stuff ahead of that too. You always gotta trim down good after you blast. Bar down loose ore androck. Bar down is steel bar like a pinch bar, different lengths and do a little pinch, wherever you see a crack, get in there and pry it down. Definition of the back. Always above you ,wither steel or timber. two legs and a cap is a set of timber. And then you put tamarack poles and cedar lagging over that to protect any loose on the back from coming down through. That's theback like a ceiling.

cribbing,maybe about four feet, and they came down joggled from surface, they'd cut out a little piece, and then four of them would make a round. Your could call it lincoln logs, the lining of the raise, the walls of the raise, all cribbed up so nothing could squeeze in or fall down.

Differences in detonation methods. Earlier it was by dry fuse. Used to carry a fuse down in a fuse box, fuse can we called it slung over your shoulder. Lined with some kind of stuf. Round, about a foot across, and it had a leather strap that held it shut with a buckle on it. Rope on that that you slung around over our shoulders to climb up raises, or going anywhere into a place where we were mining. And then that was your dry fuse. They'd make that up in the fuse room on surface. We put a cap on the end of a fuse, ready. Just for dry fuse. you'd carry them in, and they as you're going in you'd stop to see if your partner had left a bag of powder at the powder house. Each contract had their number on them. The fuse can also had your number on, you'd pick that up on surface, and if your bag was out there, your powder bag, you'd fill that up with a box of powder that would fit in the bag, like a packsack. You'd carry your explosives in there. After you'd drill your cut, you'd call it drilling a cut, that's drilling a row of holes for that particular size drift, then you'd put your primer. That's called a primer. The first one is a stick of powder an inch by eight or inch by six, something like that, of dynamite. You'd put a hole through it. You had to use a brass or wood skewer, they didn't want you using anything metal cause it could spark. You'd punch a hole with a powder punch, a piece of brass or copper with a ring on it. (like a pencil) You poked a hole through the dynamite and then we'd take it through to the bottom end and fold it back and make a hole in this end and poke it in there, in case you had to pull back a little bit on there sometime. (The cap was put into the end of the end of the stick farthest away from the miner.) Hole through the side of thestick of dynamite, put the fuse through that, and then you brought your cap around to the front end and shoved it up into the end of the dynamite. Or sometimes you'd take that (fuse) and run it through and then you'd put a slot on the side instead of coming to the end so they run it through there and up into the dynamite. the cap was on the end of the stick away from the miner. The primer was put in first, "bottom of the hole" they called it. Then you'd put your other dynamite behind that. Then with the dry fuses, you learn that as you work with the oldtimers, but you learn the proper way of blasting.

You've got cut-holes that open up the breast so the other dirt has a place to go. Timing the blast: I learned from an old guy that some people used to cut so much fuse off for each hole. I never agreed with that. This old timer didn't go along with that, either. He left em all 12 feet. And he'd just cut a little slit in the side, and then we had these lighters, you light em with a match, and they're like these kids play with on the fourth of July...a lighter....it looked similar to that. (like a sparkler). The way he taught me is he just made a cut in on every fuse in the breast, in every hole, and then I learned to time by lighting, in other words you went in with you lighter sssssssht! it caught, sssssssht! it caught, nextone, nextone, next one, next one.

You always judged the order of lighting fuses depending upon the desired results for a better blast. That was something learned by experience.

"Mining is something else too. People think if you go in the mine, and I think that sometimes this next generation have the idea they know all about it. But they claimed at that time five years for an experienced man to learn it. But then getting back into blasting, then later they went into electric blasting, and that was electric caps. They were different lengths. And they had milliseconds, and then it went up to number 1, 2, 3, 4 all the way up to 12, they were different length electric caps. Some burn longer, they go off later. The shorter ones would go off sooner. That's where I worked with electricity. But you had to place those caps in the right places too to do the best break.

Put in two sets of cut holes. (he's drawing on a sheet of paper.) Two cut holes would converge until they met as they got deeper into the rock, and that was called a "V cut." If there was really hard ground, they would place a third charge in the middle of the V called a "buster". Just a short one so it would detonate sooner and enable the two main charges "to work better" (to be more effective.) You would decide which pairs of Vs would go first, the top pair or the bottom pair. Drilling holes did not go straight in from the breast.

Steel sets would lean out at the bottom. That's called "rake." "It had to lean out for support. Wood sets, you always had to check the rake. Steel sets you didn't have to check the rake, because they were welded at the top with a plate where you bolt the cap on. But wood timber, those days, I liked working with wood timber, too."

When you drill your holes, you gotta figure this hole going in here, by the time that reaches 8 feet is going to be out here, to make room for the next setof timber. If you went in with a 90 (degree cut), you wouldn't have room for the next set. That's the same with a cap, you gotta put them holes in at a little angle upwards so when then that (blast) comes to 8 feet ahead, there's room for the top to go, and not take too much ground either, you gotta take the right amount.

When you're following a set of timber, you to to start you hole, but you gotta figure where it's gonna come out 6 feet ahead, and it's the same for the cap. And as you come down the side, you gotta come down with the "rake." And also for the bottom. When you're out drifting on the main line, they put in rails and ties, and you gotta gauge that to drill down to make room for the ties. If you drill flat you have no room for the ties.

Top one went in at an angle out away from you, and you would compensate with the angles of the other holes. You always opened up with a V cut, you could open with either the bottom or the top, let them go first...they always went together, or as close as you could light em with fuse; electric blasting you'd put same number fuse so they both went together.

Looking down at the V cut, (end of side 1)

Several kinds of blasting patterns. A lot has to do with the type of ground that you have. If you have real soft ground with an 8 foot drift, you could probably get away with 10-12 holes, even with an 8-foot drift. Then again, if it was hard you might have to use 25 holes. More holes to pull that dirt out. It all depends on the ground.

Time from ignition to blast. Electric, you threw the switch, she was going right now. With dry fuse, I don't remember the rate of burn on that, but you had plenty of time to get out of your workings. Providing you didn't cut (the fuses) too short. There were some people who got hurt and blasted by cutting too short. You were going to save time so your blast would go off quick. And you got trapped. But you leave that full length, 12 feet, seems to me because you're usually drilling an 8-foot cut, so it had to be 12, you had plenty of time to get out, climb down the raise or whatever, before the holes started going.

(Question re: did the guys cut their fuses too short so they could make more footage) Money hungry. Wanted to make money, so they figured they were saving time, I know guys that did it and I know they ain't here no more too. They cut too short.

At detonation, sounds, smells?

Powder smell had a smell of its own. Smells like a firecracker, maybe. There were different types of powder you'd use too. Herkomite, Gelamite, Gelatin different strengths. That gelatin was the most touchy, that was 80% glycerin. That was powerful stuff. Thinking about back when we were sinking shaft how we used to open those boxes when they came down, 80-90% gelatin. They used gelatin by the way in wet conditions where there was a lot of water. Herkomite was more of a dryer....like sawdust, kind of like. The gelatin, we used to pound them... open the boxes with our boots. We used to knock em open.

Numbered fuse boxes, etc. numbered according to the contract number? Yes, for the contrac numbers, whatevercontract you were working. You all had powder bags and fuse cans, and all your tools, everything was numbered for that contract, whatevercontract you were working.

How closely were materials for blasting controlled? Did people have to sign for?

There was a powder monkey there who used to mark up how much powder you got. He marked that up, and that was 1000 feet from any workings.

Powder monkey he went in right away and opened up, unlocked the doors and get ready for the miners to come in and get their powder. And load up their bags, and he'd mark up what powder you took and what contract, but all the tools and everything had a contract number on them. Even your brass c heck, in those days you had brass checks and now they've done away with that. Everybody had a number on a brass check, and if quitting time your number didn't show up on the board, they'd begin to wonder where that guy was, and they'd go look for him.

If brass check missing, what would happen then?

Pretty much of a buddy system, too. I remember one man at Mather A on night shift got killed. He didn't come out to shaft. We always congregated at the shaft waiting for the cage. But you know him, and you

always worked next to him, and "where's so-and-so?" He should be there, and they'd send someone in right away. Original meaning for that was to see if you made it out of the mine. Timekeeping system, later on had to punch a clock, but had the brass check system for a while at Tilden when I went over there, and then they changed to a punch clock, and I first went to Empire before Tilden, and they had a brass check system yet then. I don't know what they have now.

Contract number was on all your tools and powder bags, and everything, and I remember when Cleveland Cliffs took over at the Cambria, it was called the Hartford Mine when Republic Steel had it, there was a superintendent went over there, called Trosvig, when Cliffs took it over, and he said we want tools, saws, axes, chains, picks, shovels, enough for every contract cause I know some is going home. He knew it, but he had to have enough for the men to work with.

What happen if a guy caught taking things home?

"Working for Cleveland Cliffs as long as I have, they went a long way with a man. They gave him a lot of chances, before they'd pull the noose on him. They were good about that. Even drinking. I knew a lot of guys that had drinking problems, they gave him chance after chance after chance. More than any other outfit I'm sure would have, but they bent their back that way.

Wages. 79cents an hour when I started at the Princeton Mine. I remember miners were making $9-10 contract mining, that was big pay. A day. I was making $6 a day at that rate.

Benefits. We paid so much a month to CCI for a doctor. CCI had a doctor in Gwinn. 50cents they'd take off your paycheck, you'd get all the pills and medicine and everything else you want. For you, (not for the family.) And they'd come to your house to see you, too, the doctor would.

Company doctorwas was Dr. Serbst.Spelling unsure. He had a tough time in World War II, in prison camps and was down to nothing. Dr. Joe Witters, he came from Nahma, he worked for Nahma lumber company, and then, come to the war years, he came to work for CCI at Gwinn.

How smoky when blasting? Biggest thing was now and then getting a "powder headache" from handling it,....dynamite. Handling it with that glycerine, it would give you an awful headache sometime. The old cousin jacks used to say, you gotta eat a stick of powder first and then you'd be all right from then on.

I knew pretty much what it tasted like, wiping it off my brow, that glycerine. Wewould be charging up back holes and that stuff would be running out of the holes, and down your neck, and oh, you got some awful headaches sometime.

Temperature. Cliffs shaft was a very cold mine. Not very deep and lots of air down there, in Cliff's Shaft. Then you got Mather B and sixth level was cooler, and as you got deeper it got warmer, andof course, your ventilation was not quite as good as it was on the upper level. Princeton Mine was cold, that was only about 500 feet deep. So it depends on the depth you are.

Didn't work at Cliffs shaft, just grandfather and brother

Dog drift, dog raises. A dog drift is a little small hole, just enough room to get through, just about enough to stand up. Just a little hole, enough to get from one place to another, and if you have kind of bad ground, you'd put up little cribbing sets, just little round poles with a cap and a few pieces of lagging. Most of the time you could go in and you could make a drift, but just a small hole. Naked drift is one with no timber, no reinforcement. Naked raises too, you could go up a naked raise if the ground permitted, and if you had bad ground, you had to use cribbing.

Color underground. Black. lot of pretty colors, pretty ore too, reds, dark reds, light yellow, yellow ochre, specular hematite shines, glistens. Specular hematite is a hard ore that's real shiny, and it glistens. We had some of that at the Mather B. Then we had what they call ....lot of diferent coors.

Lighting. Outshaft is well lit, and in the main drift there's lot of lighting, maybe every 50 feet. they got light bulbs all along. Crosscuts are pretty well lit until you get up into the sublevels, you 've got a light or two, but you'd depend mostly on your headlamp for light.

Headlamp. Carried the battery pack on your belt, wet cell storage battery, 8inches high, 6 inches wideby inch and a half thick, and you had clips on there that you'd on you big belt that you wore. You had another small belt running through those clips, hung on your side, and then you had an electric wire that went up to your headlamp. Weighed only a few pounds, you knew you had iton, but not that cumbersome. Would last 8 hour shift. Sometimes you'd have to send for another light. Each man had his own light assigned to him, same as your brass check number, your lamp number was on that too. Company provided the lamps and batteries for the men.

In an area with no other lightingsource, the lamp wouldlight up 13, 14, 20 feet, and then you had a bright and a dimmer, I suppose the dimmer would go ahead a hundred feet or that, beacon on the bright.

Steady light for the whole 8 hours. If you had a good charge, then the light was good.

At completion of shift, they had a long table up in the dry, as you're coming into the dry with the slots there for each battery, and you'd just drop it into one of those slots, and then the dry man or lamp man, he'd they had a magnet to open it, and then the top would open, and then they'd shove it in on the charging rack. You put it into any slot. The table was about 4 feet high.

Describe the dry.