Voices from the Past

GRAVITY FLOW SPRINKLER IRRIGATION IN TETON VALLEY

By Melvin W. Burgner

April 24, 1982

Tape # 25A

Oral interview conducted by Harold Forbush

Transcribed by Louis Clements

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INTRODUCTION

The Library of the Upper Snake River Historical Society in the Teton Flood Museum contains over 600 video, cassette, and reel to reel tapes. These oral interviews have been gathered to over the past years from individuals throughout the Snake River Valley. I had the opportunity to catalogue this collection over the past couple of years and was amazed at the information containing therein.

I decided that it was unfair to the public to have all of this historical information on a tape and only available to a few who had the time to come to the library and listen to them. The library does provide a service in which copies of the tapes can be made, and during the past few years many have come in and obtained a copy of a particular tape. The collection has a lot of family stories, some pioneer experiences, a few individual reminiscences of particular parts of history, and some recorded individuals have a personal knowledge of a historical event.

I spent a lot of time trying to come up with a name for this series of stories that would describe the overall text of the message contained herein. Since they are transcribed from the actual voices of those who experienced the history the name Voices From The Past seemed appropriate. The oral history in this volume of Voices From The Past has been taken from the interviewer with it being recorded on tape. Since Idaho's history is so young in year, the oral history becomes greater in importance. Eyewitness accounts rank high in reliability of the truth of events, although the reliability suffers as they interviewee ages or the time between the event and the interview grows. As the age of some of the cassette is progressing into the time period of deterioration of tapes, all are currently (2002) being copied onto audio discs (CD's) for preservation.

I have selected this event as one that occurred in Eastern Idaho which was experienced by the person or persons being interviewed. There was such a vast amount of information available in the library; I had to reserve many of the tapes for inclusion in future volumes. The tapes are being transcribed in order of importance according to my thinking.

Transcribing from a tape to written word is a new experience for me. I have done this on a very small scale before but to attempt to put the contents of a conversation down on a paper requires a great amount of concentration. I have taken the liberty of editing out the many "a's" that occur in an interview as well as other conversational comments. Then comes the problem of the book a challenge from the point of view of making a correct transcription and yet an interesting story. I have made a few editorial changes in view of this problem.

I would like thank the many people who have taken the time to arrange for the oral recording of an individuals story. The information obtained in this manner is, in many cases, not available from any other source. One of the pioneers of oral history in Eastern Idaho is Harold Forbush. Despite the handicap of being blind, he travels around the whole Snake River Valley visiting with people and taping their responses. He began his career of taping while living Teton Valley and serving as the prosecuting attorney there.

His lifetime interest in history got him started and since then he has been a major contributor to the collection of stories in the library. He continued his oral history recording after moving to Rexburg. After retiring from being Madison Counties' magistrate, he moved to Idaho Falls for a time and now has returned to Rexburg to continue as occasional taping session. He is to be congratulated for his lifetime commitment to the preservation of Idaho's history.

There are many others who have done some taping including several Madison High School students. Most of the student tapes are not of the same sound quality as the professional oral history collector, but the stories they have gathered over the years have provided a special look at the Depression, war experiences, farming experience, and many other subjects which can't be found anywhere else. Many thanks to them.

There are some tapes in which the interviewer did not identify themselves. These unknown records have provided several stories which have helped make up the overall history of the Snake River Valley and I thank them even if I cannot acknowledge them personally.

I hope that as you read the following stories you will be inspired to keep a record of your own either in written or tape form so that your opinion of what has happened in the world or in your life can be preserved. Many think their life has been insignificant and others would not want the years and find each other to have its own contribution to my knowledge of what has happened. Idaho is an exciting place to live and is full of stories which are unique to our area. Share them with others.

Louis J. Clements.

Gravity Flow Sprinkler Irrigation in Teton Valley

Interview with engineer technician **Melvin W. Burgner** on April 24, 1982, by **Harold Forbush** on the evolution of irrigation between 1950 and 1980 in Teton Valley.

Harold Forbush: Mr. Burgnener, I would like to direct my questions to you first in this interview in the absence of Mr. Keith Blackburn who has not arrived. I ask you when and where were you born and what is your present address?

Melvin W. Burgner: I was born January 1930, at Driggs and lived most of my life there until 1961 when I moved to Rexburg. I reside now at 225 South 4th East in Rexburg.

HF: How do you spell your last name and what derivation is it, what ethnic group?

MB: It's spelled B U R G N E R and the name Burgner came from Switzerland as early pioneers.

HF: Your father is the first to come into the Teton Valley area?

MB: His father, my grandfather was the first of the Burgner's to come into the Teton Valley.

HF: His full name?

MB: John Jacob Burgner.

HF: There are Burgner's who are not related to your particular family?

MB: Not that live in Teton Valley.

HF: Nor in the Upper Snake River Valley?

MB: There are Burgner's in Idaho Falls area that I am not certain are relatives or not. They do spell their name the same way. We're not that well acquainted to know if they are family or not.

HF: Before we start the interview concerning the primary subject here let's definer some terms. What do we mean by gravity flow pressure?

MB: Gravity flow pressure is making use of the elevation of the water above a field to create pressure to sprinkle with as differentiate with a pump system which produces the pressure for a sprinkling system. So the water at some higher elevation creates pressure and does operate the sprinkler system.

HF: The pressure must be great enough to turn the sprinkler heads?

MB: To turn the sprinkler heads and to put the water out at a prescribed flow from the sprinkler head.

HF: Ok, in other words, the prescribed flow would be the maximum efficiency?

MB: Sprinkler heads sprinkler nozzles come in various sizes and each of them, under a certain pressure, will put out so much water. Now for instance, it would take a nozzle of 11/64ths inch diameter, which is a common one, with a pressure of about 50 pounds per square inch, it will put out approximately six gallons per minute. There are various sizes all the way form about 1/8 inch on up to 7/16 or some such. They vary in size and are designed for different crops, of course.

HF: Now in this sprinkler system they use laterals. Are these three to four inches diameter?

MB: Yes, a lateral is usually aluminum so it's light to carry and approximately 40 feet long. Then a series of these connected to the main line lined out through the filed comprise a lateral. A lateral may be a hand moved line, which means that a person has to pick it up and put all the joints back together and lay it out in approximately a quarter mile length. There are what we call side rolled, wheel lines that re on wheels and are powered by a motor. After the water has sat at the prescribed time at that setting it is turned off and the lines are allowed to drain. A little gasoline motor is started up and the line is rolled to the next setting.

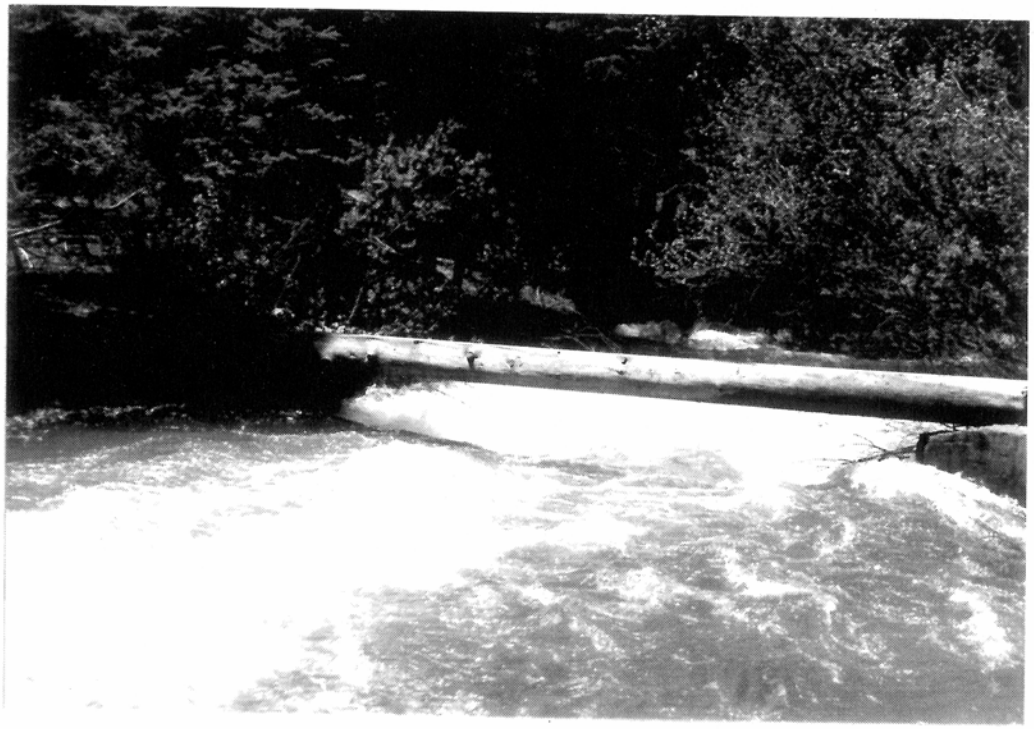
HF: The prescribed water time usually is a 12 hour period, isn't it?

MB: Yes, or approximately 11 hours set is usually what is called a set. Then the water is turned off and it's allowed to set for a little while so that the ground firms back up. Then the lines can be moved more easily and it is set for another eleven hour period.

HF: Each lateral pipe, you say, would be 30 to 40 feet and in the center of that would be the sprinkler head?

MB: Yes, there is a riser on it that is about 18 to 24 inches in length coming up off of the aluminum line. On top of it then mists the sprinkler head which is spread mounted. It turns easy. On it then is this nozzle that I mentioned before, that is of a certain diameter allowing the water to come out of it. As the water sprays out then a little spring mounted flapper hits the water. It moves the sprinkler head a matter of a few inches and it just keeps doing that as it rotates around.

HF: Does that go clockwise or counter-clockwise?



Darby Creek - Source of Gravity Flow Water

Diversion Dam, Darby Creek

MB: That's a good question, Harold. I think they do go a certain direction but that's something I've never even thought about. I think they go clockwise but I'm not a positive.

HF: With 50 pounds of pressure, that water can be thrown out in a circle approximately 20 feet to 40 feet in diameter?

MB: No, its diameter would be about 90 feet. Anywhere from 80 to 100 feet depending on the size of the nozzle. In other words, the smaller nozzles do not cast water as far as one of the bigger nozzles. An 11/16ths nozzle will cast water around 96 feet in diameter.

HF: Actually the risers are, what, about 40 feet apart?

MB: They're 40 feet apart along the lateral line but spaced along the main line they are about 50 to 60, and that also varies depending on the design were using.

HF: But the theory is to make sure that spray area form one riser overlaps another riser?

MB: That's right, so you get complete coverage.

HF: Now when we talk about the term "SCS", what does that mean?

MB: The Soil Conservation Service is an agency of the Department of Agriculture. It is usually referred to as the technical arm of the Department of Agriculture. It is working directly with farmer on their land assisting them in irrigation projects, dry land farming, watershed work, and quite a number of problems.

HF: And then the term "cost-benefit ration"?

MB: Ok, whenever a project, especially a group project, is being started there's a lot of things to look at even before you get in to the design of the system. You look at the cost of what the system is going to cost to put on the land, to operate and the maintenance on it. You weigh that against the benefits you are going to receive form it. For instance, the crops are calculated, how much increased crop yield you are going to have. Through that then you determine whether or not the benefits will outweigh the costs. You strive to get a benefit that is greater than what you cost is going be.

HF: Spread over a period?

MB: Over a given period of time.

HF: That must be a proper ratio or the government, of course, would not extend any type of a grant or the project would not go through.

MB: That's correct, it has to have a good cost-benefit ration in order for the government to participate.

HF: Well now, as an engineer technician, Bill, when did you get your training? Did this require formal education in addition to practical experience?

MB: Well, as a technician, normally a good share of the training come on the job, which mine did. Of course, the service does conduct a lot of training sessions, and I have attended at least eight or ten of those where we have gone and been instructed at some location either by our own personnel or by others in some of he various work that we do. For instance, I was at Portland for a course in structural planning to help me learn to design engineering structures for irrigation. We've had some for better irrigation methods. Just a wife variety of subjects. So a lot of it's on the job, and a lot is classroom study that has been developed by the service. I, of course, have had some courses at Ricks College that I took that have helped me.

HF: How long have you been with the SCS?

MB: I started in 1951. so I have been with them approximately 31 years.

HF: That's remarkable. What is your GS rating?

MB: Seven.

HF: And that is the highest you can go?

HF: We do have some of our technicians that are GS nines. They usually are assigned to an area. For instance, ours is at Pocatello. That individual has responsibility for some of the engineering work load throughout Southeastern Idaho. So we do have some that are nines.

HF: Now to your understanding, what was the real purpose of the gravity flow sprinkler irrigation in Teton Valley? When did it start to your recollection and what did they expect to promote in starting a program like that in that highest valley?

MB: To my knowledge it began between 1956 and 1958. The firs attempts at this were made in the Alta area of Wyoming. It did overlap a little on the Idaho side because out of Teton Creek the farmers do irrigate in both states. The purpose of it was, or course, in the Valley they depend entirely on stream flow. There were no storage dams, on reservoirs to keep back the high water. Once it's gone, why, it's gone. So about the end for July the streams get so low there was no water to divert for second crop. Usually if they got one crop of hay, that was just about it. They'd mature their grain out pretty good. On potatoes, they were limited on that because they'd get so low they couldn't grow hardly any acreage. So their idea was to make this water that was available go father and also to reduce the erosion that was being made on the farm land.

HF: And some of the crop land, the topography, was very uneven.

MB: That was a major factor too, especially in the Alta area where it was rolling ground. You tried to lead water around with ditches and irrigate it, and to come out with some kind of decent irrigation was almost impossible.

HF: In the Upper Valley there, what methodologies had the farmers here-to-for used in getting water out on the land?

MB: Most of it was just surfaced irrigation. After the crop was planted, they could plow their ditches and they would go straight down the slope of the land. Then you would turned the water down that ditch and go along there with dams and drop it and divert the water out to the side. I spent many hours in the field for my own day irrigating. It wouldn't go very far so you would take you dam a little farther down the ditch and turn it out again. It was just long and hard process to irrigate. In doing that, in an attempt to make it a little better, they would corrugate. The corrugations were light depression bout 18 inches apart that went down the length of the field in the same direction you were irrigating. This would help to lead the water down through the field a little better. This was usually done on grain ground and hay ground. Course the problem with corrugation was that the field was left very rough so when you were mowing or ding any of your operations it was a rough ride to stay on a piece of machinery. Then or course, the potatoes and peas, when they were growing tin the valley, they used furrows. They would plant potatoes and peas in rows with a furrow between each row. Then the water was delivered down through the furrow to irrigate. So that was the general method.

HF: It was believed that with the sprinkler irrigation, they would not have to go all this work of making the contours and making ditches and etc. The sprinkler pipe so forth could be held laid out over the ground, and then the sprinkler could be done.

MB: Another thing about that too, Harold, is if you stopped to calculate the number of ditches in a field, the acres lost to crop production was tremendous. SO by going to sprinkler system, every farmer picked up several acres of valuable ground that he had never farmed before because he had it in a ditch and there was no crop being produced along that ditch. Maybe it was too, three, four or five feet wide taking up ground and just didn't produce crop. Once he put it into sprinkling system he was able to farm almost every inch of his farm.

HF: Now could we get an idea just what a saving a sprinkler would be, maybe 30 percent, 40 percent of the water itself?

MB: Oh yes, I'd say at least 50 to 60 percent saving in water. You'd stretch it that much father. For instance, I was thinking about when they were irrigating potatoes, I can remember that our water would be so low that you could maybe get 8 to 12 rows of potatoes that you could turn your irrigation, your whole stream would be taken in those few rows. That same about of water put into one literal line would cover a strip about 80 or 90 feet wide and a quarter of a mile along. It was doing the same job that the other little stream was that was surface water. So it was covering I'd say at least five times the area with the same amount of water.

HF: Bill, had gravity flow or pump pressure sprinkler irrigation been tried in other places prior to when it was done in Teton Valley.

MB: Pumping, or course, had been done. I have some old pictures in an old book that was put out by Armco. I am not sure of the age of the book, but I would say that pump systems were back into the ‘30s anyway. They were crude but they were using them at that time. But to my knowledge gravity pressure had not been used on any big scale at all, that I had ever heard of, prior to this time.

HF: Prior to its development in Teton Valley?

MB: Yes.

HF: Now here on the Rexburg Bench farmers had drilled deep wells and were bringing the water to the surface and pumping to prior to ’56 or ’58, hadn’t they.

MB: Very little if there was any of the Rexburg bench. In fact I think the Rexburg Bench was after 1960, as far as I know.

HF: You didn’t know of any other area then prior to 1956 or ’58 where gravity flow had actually been developed and experimented with?

MB: I know of none.

HF: So this is something new. Who can you say got this program moving towards this direction?

MB: I’m sure the farmers that we mentioned in the Alta area, John Mark Wilson, Irvin Christensen and I’m sure there are some others there I could name. They in conjunction with Maurice Roberts, who is an employee of Roger Brothers Irrigation, got together and kind of developed that method of irrigation at that time.

HF: In other words, this Maurice Roberts was imaginative in his thinking. His company was a new corporation out of Idaho Falls, I think. They were trying to promote the sale of aluminum laterals and these systems. Referring to this particular first there with Mark Wilson and Irvin Christensen, who was the technician who developed that? Yourself?

MB: No, we at that time, the Alta area of Wyoming, was serviced out of the Jackson Hole office. The district conservationist and technicians from that area and engineer were the ones who worked with those farmers in developing that.

HF: Were there several farmer or just those two men?

MB: There were several, there was a number of others. There was quite a number of others.

HF: And who did they divert from?

MB: Marc Wilson and Irvin Christensen diverted out of Mill Creek, M I L L. Some of the others farmers got started out of their systems and diverted out of, I think they call it, the High Line Canal. I'm not positive. It comes out of Teton Creek up in the canyon and makes its way passed the Pratt Cemetery, a little above the cemetery to the north. Then it runs along the east and north and on around the hill going straight north.

Pipe For Gravity Flow

Pipe Further Along for Gravity Flow

HF: SO there were several diversion would have been taken from all along that High Line Canal?

MB: Yes, that is correct.

HF: Then pipes were brought down. Can you give me an idea how much fall you have to have in order to get the appropriate pressure?

MB: Ok, 100 feet of all, 100 feet of elevation, is equivalent to about 45 pounds. If you didn't have any friction loss in the pipe then you could say in 100 feet you would have 45 pounds of pressure.

HF: Ok, form the upper end down to the lower end it would be 100 feet in the length of the pipe or the fall would be 100 feet?

MB: The fall.

HF: The fall itself would be 100 feet. The length of his pipe might very well be several hundred feet?

MB: Yes, It would be several hundred feet up to maybe a mile in order to get that elevation. In addition to that elevation water flowing through pipe creates friction. The more water you try to force through a pipe the greater that friction is going to be. So we tried to pick pipes sizes that would reduce the friction.

HF: The larger the pipe the les friction you'd have?

MB: Yes, for a given flow. If you tried to increase that flow then your friction increased or if you reduced it your friction reduced, or course. So we would have to have normally 120 to 130 feet of fall to overcome the friction that would be caused in the pipe and still wind up with about 50 pounds of pressure.

HF: What size of pipe in diameter seemed to prove to be most feasible?

MB: Well, that had to be related directly to the number of acres being irrigated and the number of gallons per minute that had to flow through it. They varied in size. We have pipe anywhere from a ten inch diameter on a small system that would serve maybe 160 acres. On the Victor pipe line or the Trail Creek watershed, I believe there is pipe there that is 42 inches in diameter. That is serving a big acreage maybe six thousand acres. The pipe size varies according to the size of the system.

HF: What material seemed to be the most feasible?

MB: Welded steel pipe has always seemed to be the best material Teton Valley. You get underneath the ground where a good share of it is gravely soil and the steel pipe would

stand up better under there than some of others. What we call PVC pipe, which is a plastic pipe, works good if a little care is taken in bedding it so there are no large rocks coming in contact with it. It has worked great and has lot's better friction factor than steel pipes. Then another pipe that is used is called asbestos cement pipe, excellent flow characteristics, but it's a pipe that had to be handled very, very carefully. It had to be bedded well, but once it was, it's excellent pipe.

HF: Now your steel pipe is generally what was used up there?

MB: Yes.

HF: What length would that usually come in?

MB: Steel pipe usually came in 40 foot lengths.

HF: Then after it was laid they would weld it, you had to have it individually welded?

MB: That's right. Each joint was welded end to end. They slipped together with just a slight bell on one end so they would slip together.

HF: The depth would vary depending on the soil texture?

MB: We specified in our specification that it be 24 inches of cover over top of the pipe. Some pipe like PVC or the plastic needed 30 inches of cover over top of it.

HF: Now this would permit tillage above?

MB: That's right.

HF: And it would also be deep enough so freezing would not be a problem?

MB: There could still be problems with frost. That's an item that was part of the maintenance of this system. It had to be drained in the wintertime so that all the water was out of the pipe. Either the water was pumped out of low places or drains were provided so it could flow out.

HF: Specifically on the High Line Canal up there in Wyoming, that seemed to be the area that started first. It provided example, provided illustration to the farmers up there, kind of a show piece, I suppose. To your knowledge, did a lot of farmer in Teton Valley go up there and take a look and get inspiration to do something about their own.

MB: yes, I know they did. I know that's where those who followed after got their ideas from and did move on their own systems.

HF: Do you think these systems up there in the Alta, Wyoming, and area were the first and maybe about 1956?

MB: That's right.

HF: What other projects followed, Bill?

MB: To my knowledge, one of the earliest ones after was Arthur Bowles who farmed at the mouth of Darby Canyon. He saw the problems with water not going far enough and with erosion that was occurring on his place. SO he put in one of the first ones after that. That was followed by several systems in the Darby area. These became groups, large groups. As I remember the Middle Darby system was about a 1500 acre project. The North Darby system was maybe 1200 acres. So we began to get some large groups going in and putting in these systems.

HF: When you had groups involved, how would they pool their water rights or enough to reach the total amount?

MB: As I remember, the way they worked, when they would organize one of these groups that was interested, the group would consign their water to the total group.

HF: Ten shares or 20 shares or whatever?

MB: Yes. Usually it was inches of water. When the system was designed, one lateral for 40 acres was a kind of an average way of placing laterals. We have found out since, one lateral can't hardly take care of 40 acres of ground. They were allowed a lateral for so many acres. The nozzle size was designed, and that would be the number of laterals they would have for their farm.

HF: I know as the attorney for several of those water corporations, for example the Middle Darby, the fellow got together and hired counsel to incorporate under the laws of Idaho. The statues were set up and designed specifically for these sprinkler irrigation systems. We would have each user give so many inches water, and all of this could be combined and diverted into the system. Now let's take for example, the Middle Darby, was there any particular problem that had to be faced, a challenge that had to be met in that system?

MB: I think one of the main ones, as I remember Harold, was our heading. We had some problems with it, and I believe they still do at times. Because of seepage around the headwork, where the water flows into the pipe, they've had some trouble there.

HF: They had to build special reservoir retainer or something, didn't they?

MB: A special box, concrete structure, that allowed so much water to go into their line and so much to be by-passed to go on over to the North Darby System. They both used the same canal. So there were some problems there. I think maybe, as I mentioned, bedding along the line for the pipe so that it was protected somewhat because there was some gravelly soils to go through.

HF: Now in your role as a technician, were you involved in showing them how to construct the heading in that particular job?

MB: Yes, I worked with Keith Blackburn on this. We did come up with the design for that structure, and I drew it up for the group. How it would and should be built. Another problem along the line was too much pressure. You could take some of that out by sizing the pipe down just a little smaller as you went down the line. As you go down the line you decrease the size of the pipe because you are taking off lines that go to some farmer. So you are reducing the flow so you reduce also the next section of main line. Sometimes there was still too much pressure to safely operate the line. So pressure reducing stations would have to be built into the system so that you could dissipate some of the pressure safely without any damage to the line.

HF: Now is it your recollection that in the Middle Darby, the North Darby that you did have some problems like that, of reducing to keep the pressure from getting so great?

MB: It seems to me like there were some pressure reducers.

HF: Too much pressure, or course, would blow out the what, what would happen?

MB: The steel main line, or course, is designed for some pretty high pressures. It can stand some awfully high pressures. There could be surges develop in the line and these surges can be real devastating to a line. So these pressures releases were designed to overcome things like that to safeguard the line.

HF: When there is too much pressure out in the laterals, what take place?

MB: The spray coming out of the nozzles will be broken up so fine at times that nay wind at all just carries the spray off. It isn't effective on the ground at all.

HF: And that's a sign of too much pressure?

MB: That's a sign of too much pressure.

HF: Can you govern that; can you change that by getting a large nozzle?

MB: The best thing is the one I mentioned, the reducing the pressure, keeping it as near the design pressure as you can keep it.

HF: 40, 45, to 50 pounds?

MB: About 50 to 60 pounds, somewhere in that range.

HF: Going on to some of other projects in the valley, what could you enumerate?

MB: I've got a list here in front of me, and I will try to remember some of those others. A little later we went over into the west side of the valley for one of the first systems over there. If I'm not mistaken that was the one we called the Buckstan-Foster sprinkler group. I have both listed here, Buckstan sprinkler group and the Buckstan-Foster.

HF: There's a Mahogany, the Mahogany Creek sprinkler group.

MB: they didn't actually call it that at the time, Harold. W called it the Buckstan or Buckstan-Foster, but it did come out of Mahogany Creek.

HF: That would be J. Dell Buckstan and George Foster.

MB: Yes, or J. Dell's dad. I guess he was the promoter at that time. Of course, he was till operating his own ground that time. They were concerned with water loss and erosion on their lands because it was a rolling ground. In the potatoes, when they surface irrigated they had terrific erosion losses on their ground. They were about the first on the west side of the valley.

(Editors Note: The rest of this tape can be listened to at the library of the Upper Snake River Valley Historical Society in the Teton Flood Museum. There is approximately ½ hour more of tape and it includes comments by engineer Keith Blackburn as well as more by Mr. Burgner.)