

UTAH WATER AND POWER BOARD

MEMORANDUM

From: E. L. Bay

Date: August 13, 1961

To: Jay R. Bingham

SUBJECT: Inspection report on construction of Little Deer Creek Dam for the period August 7 through August 11.

The superintendent on the job for Weyher Construction Company is Les Staples. He reports that 60% of the work will be carried out by Berquist Construction Company, a subcontractor. The foreman for the subcontractor is John Mills.

Some equipment was moved on to the site, Saturday, August 6, and some clearing, principally in the borrow areas was started on Saturday. Main items of work accomplished during the work week are outlined as follows:

Monday, August 7

The contractor spent the day setting up camp, improving roads, and cutting timber. A high water line was staked for clearing purposes.

Tuesday, August 8

Cutting of timber on the south abutment was completed and stripping of the abutment was started.

Mr. Bellows of Weyher Construction Company visited the site and discussed with me the plan of operation on the job. We also discussed the payment for the rock talus in the bottom of the embankment area. It was agreed that approximately 40% of the total 1200 yds. could fairly be considered larger than 1 cu.yd. and be paid for as rock.

The outlet centerline was staked today. The location looks good.

Mr. Lambert of the Irrigation Company was trying to locate us a shack for job headquarters.

Inspection report on Little Deer Creek Dam - Continued

Wednesday, August 9

Stripping of the south abutment was continued along with clearing operations. In the course of stripping a seep area was uncovered near the contact line of the south abutment and the embankment upstream.

New toe stakes were replaced for the convenience of the contractor.

Thursday, August 10

Mr. Lambert delivered a portable shack to be used as an office.

Word was received today that all tree stumps had to be removed in accordance with conditions of the forest service use permit. The subcontractor's man, Mr. Mills, said that he would file a protest immediately.

Stripping operations were continued and large talus boulders were drilled prior to blasting.

Friday, August 11

Stripping of the south abutment was completed today and cross sections were taken. The outlet was staked by putting in 25' offset stakes. Grades were run on the stakes and cuts were shown.

Mr. Bingham, Mr. Lawrence and Dr. Marsoll visited the site. The seep area on the south was discussed and it was decided that a drainage system should be installed.

Saturday, August 12

The contractor began excavating for the outlet works today. The upper end is badly saturated and does not appear to be suitable for support of the pipe or gate structure.

Monday through Friday an inspection crew of Waddoups, Goslin, Peart & Bay was on the job. On Saturday Waddoups and Bay returned. We previously made arrangements for board and room at Mirror Lake Lodge and have been staying there.

E. L. Bay/cb

UTAH WATER AND POWER BOARD

MEMORANDUM

From: Elvon L. Bay, Engineer

Date: August 23, 1961

To: Jay R. Bingham, Executive Director

SUBJECT: Inspection Report on Construction of Little Deer Creek Dam for the period August 13 through August 19, 1961

Sunday, August 13

A letter was prepared authorizing the contractor to install a perforated concrete pipe and gravel drain to intercept the seep on the south abutment.

Monday, August 14

In excavating for the outlet, a ridge of bedrock was encountered on the south abutment which apparently was not detected in the test drilling operation. An estimated 300 yards of rock excavation will be involved in cutting for the outlet.

New outlet line and grade stakes were put in where they had been disturbed during excavation.

Mr. Bingham and I attended a meeting of the Washington-South Kamas Irrigation Company, where a status report on the job was given.

Word was received today that the U. S. Forest Service had disapproved our proposed C. M. pipe in the outlet. This will have to be replaced with two more sections of concrete pipe. A concrete headwall is also required at the toe of the fill.

Tuesday, August 15

Excavation for the outlet was continued today. A concrete mixer, a crane and bucket and cement were brought in today and preparations made for pouring concrete in the outlet.

Wednesday, August 16

Excavation for the outlet was completed today.

Installation of the drain on the south abutment was started today. A total of 60' of perforated pipe and gravel were placed.

Considerable water is seeping and leaking into the outlet excavation, saturating the soil and making it unsuitable in spots for support of the outlet. I informed Mr. Staples that the present dewatering set up was unsatisfactory.

Mr. Colton, the Forest Ranger, was at the site, and talked with Max Waddoups. Max listed the following items which Mr. Colton discussed in answer to some of our questions:

- 1 - The present locations of stacks of timber to be burned are suitable.
2. - Staking at the borrow area is not required.
- 3 - Road maintenance will be minimal, consisting only of re-opening drainage washes where they were previously located.
- 4 - Unburned stumps may be carried to designated disposal areas.
- 5 - The borrow area should be re-seeded with 15 lbs. of seed per acre after preliminary grading to lessen the slope. The Forest Service will provide the seed.

Thursday, August 17

Work on the French drain was completed today. Record was kept by us on the materials used and the time spent. Installation of the outlet was started. As grade was achieved, the pipe was laid on concrete blocks. The cutoff collars will be formed around the pipe and excavations made under the pipe.

The water problem is getting exceedingly worse due to seepage and leakage of cofferdams. The contractor was again told that more positive means of dewatering would be needed.

Friday, August 18

The water control problem was worse today. An attempt was made near the upper end of the outlet to excavate saturated materials and replace them with dry firm soil. The dry material, however, became saturated soon after placement. Mr. Staples was told that he would have to get rid of the water even if it meant using well points.

Mr. Bellows of Weyher Construction was on the job and asked about the Parshall flume location. I showed him the tentative location about 100' below the stilling basin.

Gilbert Searle of the State S.C.S. organization visited the site to make an inspection for the A.S.C. He found the following items wrong with our design.

- 1 - No cutoff wall - recommends a concrete cutoff wall 2' into rock and extending 2' into fill.
- 2 - Should have 30" minimum diameter outlet (minor item)
- 3 - Expects seepage and piping through the right abutment.
- 4 - Outlet pipe not structurally sound for this height of fill.

Saturday, August 19

Six cut off collars were formed and poured today, using 5.0 cu.yds. of concrete. Prior to pouring, the concrete pipe inside the forms was greased to prevent bond.

Concrete was mixed in two bag batches each totalling approximately 1/3 cu.yd. The following proportions were used:

Cement - 2 bags
Water - 10.7 gallons
Gravel - 701 lbs.
Sand - 416 lbs.
Air Entraining Agent - 1 ounce

All slumps were estimated to be less than 3".

Concrete was placed, using a crane and concrete bucket. A vibrator was used in the forms.

Elvon L. Bay

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UTAH WATER AND POWER BOARD

MEMORANDUM

From: Elvon L. Bay, Engineer

Date: September 11, 1961

To: Jay R. Bingham, Executive Director

SUBJECT: Inspection Report on Little Deer Creek Dam for the period August 20th through September 2, 1961

Sunday, August 20th

It rained heavily most of the day. Water running down the south abutment loosened rocks, letting them fall onto the outlet pipe. Two joints of pipe were damaged before the pipe was covered with sand bags.

Mr. Enke's report on the strength of the outlet pipe was received today. The report was discussed with Mr. George Lawrence of the S.C.S.

Monday, August 21st

Cleanup of storm debris was carried out after which 7 more cutoff collars were formed. All forms used for previous pours were stripped and the concrete was sprayed with curing compound.

The 7 cutoff collars were poured, using 5.8 cu.yds. of concrete. The mix was the same as that used previously. The average estimated slump was 3".

Cutting and stripping of the stream bottom material was continued. Waste material was also being removed.

Ray Zanger, after discussions with George Lawrence, Gilbert Searle and Glen Enke, recommended that a concrete cap be placed over the pipe. I called Mr. Bingham in Washington, D. C. and discussed it with him. He concurred that the cap should be poured.

Tuesday, August 22nd, 1

The last three cutoff collars were formed and poured, using 2.5 cubic yards of concrete.

The contractor was told to use 3" expansion strips at the top and at the bottom of the pipe envelope at every pipe joint and also break the steel at each joint.

Excavation of the bottom was also continued today.

Wednesday August 23, 1961

Forming was completed and concrete poured in 80 feet of bedding and 60 feet of pipe cap. 3 inch wide composition expansion joint strips were placed vertically at both the top and at the bottom of the pipe envelope at each and every pipe joint. The Longitudinal steel was also broken at each joint.

Stripping of the stream bottom, including embankment area, toe trench and stilling basin was completed and cross-sections were taken.

The stream channel from the dam to the parshall flume was cut to natural material. The intended location of the flume was staked 200 feet below the toe of the dam.

Thursday August 24, 1961

25 Cu. Yds. of concrete was poured today, completing the outlet pipe envelope.

Shaping of the streambed below the dam was completed and the Parshall flume was set in place with a crane.

The pile of rock talus was being pushed down for use in the toe drain.

Friday August 25, 1961

Ten Cubic Yards of concrete were poured in pipe bedding and Parshall flume wing walls. Slumps of 7 batches of concrete were measured. They ranged from 2 inches to 3 inches with no slump being greater than 3 inches.

Hand backfill and tamping behind the outlet pipe was started.

Saturday August 26, 1961

Nine Cubic Yards of concrete was poured in the stilling basin cutoff wall and pipe bedding.

Some cleanup was required because of rain in the night. It was too wet to accomplish such hand backfill.

Wednesday, August 23rd

Four sections (between cutoff collars) of pipe bedding and three cover sections were poured today. Approximately 15 cu. yds. of concrete were used. Expansion joint material was placed vertically at the top and the bottom near each pipe joint and the longitudinal steel was broken.

Stripping of the stream bottom was completed, including embankment area, toe trench, and stilling basin. New cross-sections were measured.

The streambed from the dam to the Parshall flume was cut to natural material and the flume location was staked 200 feet below the toe of the dam.

Thursday, August 24th

Twenty-five cubic yards of concrete were poured today, completing the envelope around the pipe.

Shaping of the streambed below the dam was completed and the Parshall flume was set in place with the cranes.

The rock talus on the north abutment was being pushed down prior to placement in the toe drain.

Friday, August 25th

Ten cubic yards were poured today. Slumps ran from 2" to 3", with no slump over 3".

The Parshall flume was formed and checked for level. After levelling, the wing walls were poured on the flume.

Hand backfill and tamping around the outlet was started.

Saturday, August 26th

It rained most of the night, Friday night. Some soil washed down the slope and water was standing behind the pipe.

Backfill behind the pipe was started but it was too wet to continue for long.

Approximately 9 cubic yards of concrete were poured as pipe bedding and the outlet wing wall.

Monday, August 28th

Backfill and tamping behind the outlet was continued.

Rock was pushed down from the talus area to be used in the toe drain and stilling basin."

A C.M.F. culvert was installed through the cofferdam to carry water away from the French drain.

Tuesday, August 29th

It rained all day long, making the ground wet and sloppy.

Rock was moved into the toe drain and stilling basin.

Forms for the outlet gate structure were started.

We received word from the concrete testing laborator that our test cylinder No. 1 broke after 9 days of curing at 3661 p.s.i.

Wednesday, August 30th

It rained hard until 3:00 p.m.

The outlet gate structure was poured. An area was blocked out around the pipe where the thimble will be placed later.

Bedding under the last section of pipe in the stilling basin was also poured.

Considerable mud and earth was pushed on top of the rock toe drain during the morning. The sub-contractor was told to push most of this off and spread the rest into a narrow layer.

Thursday, August 31st

The cutoff trench was staked and excavation was started. At 5½ feet the north end in the stream bottom area was in gravel.

The spillway shoulder stakes were placed using our presently proposed alignment. It appears that this alignment and grade is not suitable on the downhill side and should be shifter north.

Friday, September 1st

Mr. Bingham, Dr. Marsell, and Mr. Busby came up and looked over the job today.

Mr. Bingham went over some of the job details and answered some questions I had on the rock toe drain, the depth in the cutoff trench, location of the reservoir gage and stripping of the talus area.

By the end of the day the cutoff trench excavation was completed to bedrock at a maximum depth of 8 feet.

Saturday, September 2nd

There was from 4" to 6" of snow on the ground in the morning, and flurries continudd all day.

The contractor and all of his men, except one operator, left the job in the morning.

One 'dozer was used to excavate the spillway.

A new spillway alignment was staked 7' north of the planned line.

UTAH WATER AND POWER BOARD

MEMORANDUM

From: E. L. Bay

Date: September 8, 1961

To: Jay R. Bingham

SUBJECT: Report on construction of Little Deer Creek Dam for the period Sept. 2 thru September 8, 1961.

Saturday, September 2, 1961

It snowed in the night last night and there was still 4 to 6 inches of snow on the ground this morning, making everything extremely wet and hard to work. Snow flurries continued all day.

The contractor and his men all left except one dozer operator who stayed to work on the spillway.

Max spent the day computing a workable line and grade for the spillway. We staked a new alignment 7' north of the proposed center-line.

Sunday, September 3, 1961

The cutoff trench was pumped dry and backfill was started at 2:00 p.m. The earth was moved in with two scrapers and compacted with a sheep's foot roller.

Monday, September 4, 1961

Placing of fill and compacting with the sheep's foot roller was continued until it appeared that the borrow was too wet. By 11:00 a.m. the fill began to get spongy so fill operations were stopped. Les Staples and I scouted the area for drier material but none was found.

Tuesday, September 5, 1961

The fill material was very carefully selected today in order to keep it as dry as possible. By working the top of the borrow over the whole area of the hill, it was possible to obtain drier material. The fill placed was considerably more firm today.

Bob Weyher and Howard Bellows came on the job today and were quite unhappy with the way the fill was being placed. Mr. Weyher said he was going to dismiss the sub-contractor and finish the job himself.

The parshall flume was backfilled today, except for riprap and final

shaping of the stream.

Wednesday, September 6, 1961

Very little fill was placed today due to the change in the work force. Berquist Construction moved out completely and Weyher Construction began moving their own equipment in.

The survey crew used one of Weyher's men and took new cross-section measurements so as to determine quantities as of the Berquist departure.

By my records there was 20 working days expended as of today.

Thursday, September 7, 1961

Weyher Construction now have their own equipment on the job and are now moving earth. It is their intention to push the material on to the dam with bulldozers rather than using scrapers.

Two dozers began moving the earth down the hill and two more spreading it on the embankment. A sheep's foot roller was used for compaction. I suggest that they try the vibrating roller tomorrow.

Hand backfill and compaction behind the outlet pipe was continued today.

The fill appeared to be quite firm today.

Friday, September 8, 1961

Placement of the embankment material was continued today, using the vibrating roller for compaction. By 11:00 a.m. the entire fill was soft and spongy. It appears that the moisture content of the borrow has gone up from an average of 7% to approximately 9%.

By 10:00 a.m., Max Waddoupe stopped the embankment fill because of sponginess. Hand backfill was continued, however.

At 3:00 p.m., I met with Bob Weyher, Les Staples and Max to discuss the problem. I told them that I would try to get Mr. Bingham and Dr. Marsell up in the morning to look at the fill.

Lights for night work were installed today.

A small projecting ledge rock on the main roadway was drilled and blasted.

UTAH WATER AND POWER BOARD

MEMORANDUM

From: Elvon L. Bay, Engineer Inspector

Date: September, 1961


To: Jay R. Bingham, Executive Director

SUBJECT: Inspection Report on Construction of Little Bear Creek Dam for the period September 9 through September 17, 1961

Saturday, September 9, 1961

The new man, Toshiyuki Kano, reported to work today.

Mr. Bingham and Dr. Marsell came up to the job today to discuss the wet condition of the borrow and the sponginess of the fill. Mr. Bingham had previously discussed the problem with Dr. Peterson. He suggested the following criteria be used:

- 1 - Do not use the vibrating roller
 - 2 - Leave rocks in the fill'
 - 3 - Do not over-compact
 - 4 - Place in layers or lifts 1-1/2 ft. thick
 - 5 - compact to only 95% of the density shown on the curve at 9% moisture, rather than optimum
- 

It was decided to continue fill operations, using the above criteria. This word was given to Mr. Weyher, Mr. Bellows and Mr. Staples and Mr. Pratt.

No embankment was placed today, but backfill behind the outlet was continued.

Sunday, September 10, 1961

No work was carried out today. Mr. Bingham and Mr. Skogerboe came up and went over the work today.

Monday, September 11, 1961

Twenty-two working days have elapsed today under the terms of the contract. Two - 10-hr. shifts were started today. Work was resumed on embankment placement, using the criteria set up on Saturday.

The toe drain was completed by filling remaining large voids with rock spalls. One complete lift over the entire area was completed to a depth of about 3 feet.

Stripping cross sections were brought up to date and computations of quantities were started.

Tuesday, September 12, 1961 - 23rd working day

Placing of embankment was continued today. The entire area was extremely spongy. The moisture content of the fill material averaged about 10.5% with one in-place-density running only 88% of maximum.

Mr. Bingham said that Dr. Peterson was not able to come up today, but would come on Thursday.

Computation of quantities for Weyher Construction was continued.

Wednesday, September 13, 1961 - 24th working day

More embankment was placed today. The foreman was again instructed about keeping the edges of the fill compacted.

New toe stakes were set upstream and levels were set on the reservoir gage.

Thursday, September 14, 1961 - 25th working day

Mr. Bingham, Mr. Lawrence, Dr. Marsell, and Dr. Peterson visited the site. Dr. Peterson examined the fill and the borrow areas. He made the following recommendations:

- 1 - work the borrow so as to always use the driest material
- 2 - keep the borrow in a condition so it will not collect rain or groundwater
- 3 - keep a slope on the fill so it will shed rain or seepage water
- 4 - compact to as high a density as possible without getting too spongy. (try for about 92% of maximum)
- 5 - blend and compact the sides of the embankment at the contact with the foundation to prevent leaks, particularly in the cutoff area.

Friday, September 15, 1961 - 26th working day

More embankment was placed today. The fill is now about 10' above the outlet. Rocks were raked out to the upstream and downstream faces to be used as riprap.

A man from the Forest Service was at the site today and gave permission to begin burning any time.

Saturday, September 16, 1961 - Non-working day (bad weather)

The contractor placed fill until about noon when the rain made it too wet, and we stopped the fill operations. The embankment was smoothed up and low places were filled to prevent ponding.

At 9:00 a.m. the cofferdam was broken and a trench was made to drain the pond through the outlet. The trash rack was first installed.

In the afternoon it was found that about 2 or 3 g.p.m. of water was running out of the south side hill below the dam at a point about 1 foot above the streambed elevation. The water was muddy and the same color as the fill, but its source could not be determined. Several pictures were taken.

The contractor was told that he could stockpile borrow material on the edge of the fill during the night shift.

Sunday, September 17, 1971 - Non-working day

No work today because of rain.

UTAH WATER AND POWER BOARD

MEMORANDUM

From: Elvon L. Bay

Date: September 23, 1961

To: Jay R. Bingham

SUBJECT: Inspection Report on the construction of Little Deer Creek Dam for the period September 17 through September 23, 1961.

Sunday, September 17, 1961

No work accomplished today because of inclement weather.

Monday, September 18, 1961

Heavy rains in the night washed silt into the stilling basin, filling the voids in the rock. Silt was also washed from the south abutment onto the fill, but with no apparent damage.

The Contractor's foreman and a few of his men were on the scene but no work was accomplished. There was rain and snow all day long.

Water was still flowing from the side hill below the dam with the source still unknown.

We were informed by the State Road Testing Lab of all concrete breaks to date. Twenty-eight day strengths were in all cases over 3600 lbs. per square inch.

Tuesday, September 19, 1961

No fill was placed today because water was still running across the fill and the borrow.

Some excavation was done on the spillway and the lower 20 feet of gage was poured.

It snowed intermittently all day.

Wednesday, September 20, 1961

The only work done today was excavation of lower spillway channel, including drilling and blasting some rock sections.

Intermittent snow kept things extremely wet as it has all week.

Thursday, September 21, 1961

There were only 4 men on the job today. They spent the time working on the spillway. A dragline was used to excavate the channel in the earth area. Rock was drilled and blasted.

Snow continued today.

Friday, September 22, 1961

Work on the spillway continued.

It continued to snow today and the fill was still extremely wet.

Saturday, September 23, 1961

The fill was somewhat drier today, so we decided to resume fill operations. Instructions were given to the Contractor to proceed as outlined below:

1. Make some drainage ditches on the south abutment to keep water off the fill.
2. Shape up riprap on the lower slope.
3. Rake all rocks off the fill.
4. Scarify and rework surface of fill.
5. Start placing fill on downstream area to make more level.

Work was started at 3:00 p.m. and continued until 1:30 a.m. The fill was extremely spongy.

This is the 27th working day.

October 7, 1961

From: Elvon L. Bay
To: Jay R. Bingham

Subject: Inspection report on the construction of Little Deer Creek Dam
for the period September 26, through October 7, 1961

Sunday, Sept. 24, 1961

Non-working Day

Placing of embankment material was continued today. The stockpile of fill material previously pushed down near the dam was completely used up and material was again being pushed directly from the borrow area. The embankment was still extremely spongy.

Melting snow was running on the fill so we had a diversion trench dug above the fill.

Monday, Sept. 25, 1961

28th working day

It was clear today but very cold (35° - 40°). Routine fill operations were continued. The embankment was still spongy.

Tuesday, Sept. 26, 1961

29th working day

Mr. Bingham visited the site and went over the work today. We discussed the following items:

1. Embankment - He suggested that we continue placing fill in spite of spongy conditions, but we should watch it closely. I told him about the one area on the north abutment where we left an overhanging rock, and he was finally persuaded that it could be left.
2. Riprap - Mr. Bingham thinks that there is sufficient rock on the downstream slope without having to import any. It should be better shaped however.
3. Spillway - The general plan for the spillway as we now have it cut is okay.
4. We were told of the October 15th completion deadline imposed by the A.S.C.
5. Seepage below the dam - It was concluded that the seep area below the dam was coming from the side hill and not from the dam.
6. Stilling Basin - The channel below the end of the outlet pipe will have to be excavated to an elevation lower than the outlet flow line.

More embankment material was placed today and some shaping of the riprap was done with a dragline. The flow line was again restaked.

Wednesday, Sept. 27, 1961

30th working day

More fill was placed today. The embankment was extremely spongy. In-place density test results are not at all consistent. It appears that the sides of the test hole flows in after the hole is dug and before the volume is measured. A new area was located near the top of the borrow area where the material was a little more dry. (10%)

Some of the north abutment was improperly stripped prior to placing fill. We had this area dug out and refilled.

Thursday, Sept. 28, 1961

31st working day

Work was continued on the fill using material from the dry area at the top of the hill. This works a little better, but is still spongy.

An attempt was made to shape up the slopes of the dam, but they are still quite ragged.

We put a row of 9 stakes up the downstream slope and checked alignment and elevation to watch for possible slope movement.

Work was stopped about 8:30 p.m. because of rain and snow.

Friday, Sept. 29, 1961

None working day

We arrived at the job at 7:30 a.m. and found that the contractor's men were placing fill on wet, sloppy soil. They were stopped immediately. Intermittant snow and rain came down from then until about noon. At 10:00 a.m., Mr. Staples informed me that he was going to continue placing fill in spite of my orders to the contrary. I warned him of the consequences and told him that if he did place fill on certain areas, it would surely have to be removed eventually. Following this he went ahead with his fill operation without regard to the wet condition of the fill.

For the record we took a series of soil samples from a random line across the fill at 25' intervals and checked for moisture content. They ranged from 12% to 16.6% moisture.

I immediately went to Kansas and informed Mr. Bingham of what was happening. He had Mr. Weyher get in touch with me. Mr. Weyher said he would have to take full responsibility for the foreman's action, and he asked me to tell the foreman to stop operations. I did this.

Mr. Weyher arrived at the job about 2:00 p.m. By this time the sun came out and the wind was blowing, which greatly helped to dry the uncovered portion of the fill. Mr. Weyher had his men remove all sloppy material and uncover some that had been covered. By 8:00 p.m. they had the fill back in workable condition and resumed normal fill operations.

Saturday, Sept. 30, 1961

33rd working day

It was clear and warm today and the borrow material was a little more dry than it has been. Fill operations were continued.

Saturday, Sept. 30, 1961 (Continued)

Mr. Bingham, Dr. Marsell, and Dr. Petersen visited the job and inspected the work. Dr. Petersen still thinks that the fill is safe. He did suggest that the edge of the fill where the rock was placed should be better compacted. He also asked that we continue to take density tests and try to make them accurate.

Sunday, Oct. 1, 1961

Non-working day

The work was going extremely well today. Two shifts were worked and about 6 feet of fill placed.

Monday, Oct. 2, 1961

33rd working day

The embankment is still spongy but the fill work is progressing nicely. The fill is now at elevation 9204.

Tuesday, Oct. 3, 1961

34th working day

The borrow area was getting extremely wet again. No fill was placed during the daytime shift while a new section of borrow was being cleared and stripped. Fill operations were resumed on the night shift.

Mr. Bingham spent about 2 hours at the site. The fill was still quite wet. Mr. Bingham said that the sponginess was the worst he had seen. He suggested that we eliminate the sheeps foot roller to prevent over compaction.

Wednesday, Oct. 4, 1961

35th working day

The fill was up to elevation 9215 today. The density today at 3:30 p.m. was 92% of maximum with moisture content 9.2% of maximum with moisture content 9.2%. Earlier the moisture content was higher.

Thursday, Oct. 5, 1961

36th working day

Fill work was still progressing at a rapid rate.

Mr. Weyher talked with us and told us that he was trying to concentrate all his efforts on the fill work now and was purposely leaving the other items of work.

Friday, Oct. 6, 1961

The fill is now at elevation 9229. The borrow is extremely wet. The contractor is having to search for material dry enough to use.

Saturday, Oct. 7, 1961

38th working day

Light snow flurries started today, but fill operations were continued. At the end of the night shift, the fill was within 6 feet of grade.

An attempt was made to use a large bulldozer on the downstream slope to shape the fill. The slope, however, proved to be too steep.

UTAH WATER AND POWER BOARD

MEMORANDUM

From: Elvon L. Bay

Date: October 19, 1961

To: Jay R. Bingham ✓

SUBJECT: Report of Construction of Little Deer Creek Dam for the Period October 8, through October 14, 1961

Sunday, October 8, 1961

Non-Working Day

Work on the fill was continued in spite of snow. By noon the fill and the borrow were so wet the equipment began bogging down, so the work was stopped. The crest of the dam on approximately the left half is up to grade. The other half is from 4 feet to 7 feet below grade.

There was 6 inches of snow on the ground by nightfall.

Monday, October 9, 1961

Non-Working Day

It was still snowing this morning with about 6 inches of snow remaining on the ground.

An attempt was made to work on a talus slide located 0.7 of a mile below the dam to be used as riprap, but by 10:30 it was impossible to work because of wet conditions.

Tuesday, October 10, 1961

Non-Working Day

It snowed during the night, leaving 1 foot of snow on the ground. No work on the dam was attempted.

The Contractor took out some of his equipment, including two D-8 bulldozers and the sheepsfoot roller.

Wednesday, October 11, 1961

Non-Working Day

Six inches of snow remained on the ground today and everything was extremely wet. No work was carried out on the dam.

Thursday, October 12, 1961

39th Working Day

The snow was melting fast today with only about an inch left on the ground. The fill was extremely wet.

Rock was being pushed down to the road from a talus area 0.7 of a mile below the dam. It is stockpiled by the road until it can be hauled out for riprap.

Excavation of the spillway was continued.

The A.S.C. State and County Committees visited the site today.

Friday, October 13, 1961

40th Working Day

The Duchesne Tunnel Road in the area of the spillway was widened by excavating into the hillside.

Saturday, October 14, 1961

41st Working Day

The reservoir gage was formed today and reinforcing steel placed.

Excavation of the spillway channel was continued.

Burning of timber in the reservoir area was started.

Numerous cut and fill stakes were placed on the upstream face of the dam to be used in shaping the slope.

UTAH WATER AND POWER BOARD

MEMORANDUM

From: Elvon L. Bay

Date: October 21, 1961

To: Jay R. Bingham

SUBJECT: REPORT ON CONSTRUCTION OF LITTLE DEER CREEK DAM FOR THE PERIOD
OCTOBER 15 THROUGH OCTOBER 21, 1961.

Sunday, October 15, 1961

Non-Working Day

The concrete reservoir gage was poured today. One inch thick wooden numbers were imbedded in the surface to denote height above the outlet gate. The 1/4, 1/2, and 1 foot marks will later be made using a carbide saw.

Some additional blasting was done in the spillway and excavation was continued. Forming of the spillway inlet structure was started.

Timber was still being burned today. The Duchesne Tunnel road was smoothed up after recent excavation. The dam itself was still too wet to work on.

Monday, October 16, 1961

42nd Working Day

Finish grading, smoothing and shaping of the borrow area was started today. Forming of the spillway inlet structure was continued.

~~The dam embankment was still too wet to work.~~ A series of grade stakes were furnished, on the upstream slope to aid in final shaping of the slope.

Tuesday, October 17, 1961

43 Working Day

Forming of the spillway inlet structure was completed and all except the wing walls was poured. The structure was covered for night with canvas and a salamander heater was used.

Spillway excavation was continued until the crawler tractor being used, broke down in the spillway channel. The most recent excavation reveals that a good portion of the spillway bottom is in rock and may not need rubble masonry. Much of the length is in a shale or slate material.

The representatives of the Water Company were on hand to discuss the rubble masonry work. They proposed several alternatives such as using a pipe and using concrete instead of rubble masonry. I told them a pipe would not work, but promised to check into the possibility of using concrete.

Final shaping of the borrow was continued.

Wednesday, October 18, 1961

44th Working Day

Forms were stripped from the floor and weir wall of the spillway inlet structure. It was found that portions of the structure were badly honeycombed and pitted. Instructions were given that the bad areas would have to be chipped out and repaired. Forms were completed on the wing walls.

Burning of timber was carried out on a large scale for the first time today. A good stiff breeze aided in the igniting and burning.

It was warm and clear today as it has been all week.

Thursday, October 19, 1961

45th Working Day

The spillway was repaired as needed and the wing walls were poured.

The work on the dam embankment was resumed today with one TD 25 tractor pushing earth from the borrow across the crest.

A dozer and a dragline were being used in the bottom upstream to remove the coffer dam and waste material.

Burning of timber was continued. Nothing more has been done in the spillway since Tuesday.

Friday, October 20, 1961

46th Working Day

It was cloudy and cold today.

Some additional embankment was placed today. The cofferdam material was also being removed and placed on the upstream toe. Burning was continued.

Mr. Lawrence and Mr. Zenger visited the job today.

Saturday, October 21, 1961

Non-Working Day

It snowed hard today, particularly during the morning.

The only work attempted was the removal of coffer dam material.

UTAH WATER AND POWER BOARD

MEMORANDUM

From: Elvon L. Bay

Date: October 26, 1961

To: Jay R. Bingham

SUBJECT: Report on Construction of Little Deer Creek Dam for the Period
October 22 through October 26, 1961.

Sunday, Oct. 22, 1961

Non-Working Day

The dam crest is now up to design grade except for about 100 feet of length which is about 4 feet low.

Removal of the cofferdam material upstream was continued today. No work has been resumed on the spillway. The snow storm yesterday put out all of the fires in the piles of cleared timber.

Monday, Oct. 23, 1961

47th Working Day

More work was done in the cofferdam area, with waste material still being removed from the channel. Some of the cleared timber piles were restocked and re-ignited.

Tuesday, Oct. 24, 1961

48th Working Day

The Contractor's work force consisted of only four men today. The only work done included the reshaping of timber piles and burning of timber.

Wednesday, Oct. 25, 1961

49th Working Day

The only work accomplished today included burning of timber and some excavation of the lower spillway channel.

Thursday, Oct. 26, 1961

50th Working Day

The Contractor's work force consisted of 5 men today. Work done included burning of timber and some spillway excavation.

George Lawrence and Woodruff Allen of the Soil Conservation Service visited the site and made an inspection. They were shown over the entire project and construction methods used were discussed with them. Mr. Lawrence thought that the dam would be safe, providing the side slopes were shaped properly and left at the design slopes. He also suggested the dam be carefully watched during the initial filling and initial drawdown.

A meeting was held at the dam with Mr. Bingham, Mr. Weyher, Mr. Staples, Mr. Berrett and myself present. Mr. Weyher had asked that we get together to discuss the possibility of shutting down for the winter. He thought that it would be impossible to finish the work, and the attempt to do so would be costly. He claimed that it is presently impossible to work the slopes of the dam. This further prevents the placing of riprap or the construction of the gate lift apparatus.

Afer due consideration and discussion it was mutually agreed that no attempt should be made to install the outlet gate or store water until the dam embankment was properly compacted and covered with riprap. Going on the assumption that the slopes could not be worked due to wet conditions, it was decided that the job could be stopped for the season.

Mr. Weyher agreed to complete removal of the cofferdam material and construct a contour drainage ditch on the south abutment to reduce erosion. After doing these things he would remove his equipment.

As it turned out, the decision to stop work was timely. Thursday night brought a heavy snow, with some of the work crew barely making it out. By Friday the road above Kamas was completely closed.

It should be noted that there is one hazard in leaving the job in its present state. If the trash racks become plugged with debris while the dam is inaccessible the water may rise to a level making it difficult to drain even at a later date.

A^o report on the present status of work at Little Deer Creek will be made in the near future.

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UTAH WATER AND POWER BOARD

MEMORANDUM

From: Daniel F. Lawrence

Date: August 8, 1962

To: Jay R. Bingham

SUBJECT: REPORT ON CONSTRUCTION OF LITTLE DEER CREEK DAM FOR THE PERIOD
JULY 26 THROUGH AUGUST 8, 1962.

Thursday, July 26, 1962

I arrived at the job at approximately 9:00 a.m. and introduced myself to the Superintendent, Les Staples, and Foreman, Karl

The contractor was placing riprap by means of dumping from trucks at the top of the fill. The rocks would not roll down the fill without segregation when pushed by the dozer. The contractor also placed the thimble and gate.

Dave Goslin and Richard Lawrence assisted me in checking grades. I returned to the office at 2:00 p.m.

Friday, July 27, 1962

I was not at the job. The contractor placed the gate stem approximately up to the 9200 level and continued hauling riprap.

Saturday, July 28, 1962

I was on the job the entire eight hours. Richard Lawrence and Wayne Lawrence assisted in checking grades.

Work on the downstream face was progressing unsatisfactorily, as the contractor could not push the rocks down the slope with the dozer without becoming bogged down. Les Staples and I agreed that the rock fill should be placed in the bottom and brought up in a horizontal bench prior to doing any more with the smoothing operation.

Mr. Staples requested permission to use quartzite rock downstream from the dam on the right side of the creek. I obtained permission from Mr. Bingham.

Chance McNeil was on the job all day.

Sunday, July 29, 1962

Les Staples worked part of the day opening up the rock area at the dam.

Monday, July 30, 1962

I was on the job all day with Dave Goslin.

The Huffloader spent about 1/3 of the day hauling rock along the gate stem. Trucks continued hauling rock and the dozer was successful in pushing rock about half way down the slope by walking on top of the first layer. The contractor used a dragline on a roadway which he cut at the midpoint of the slope, and placed rock to the 9200' level by means of this machine.

Tuesday, July 31, 1962

I arrived at Kamas at 7:30 a.m. and went with John Lambert and Chance McNeil to see Larry Colton on possible locations for quarrying rock. He gave us general permission to take rock from anywhere in the area off the highway.

We spent the morning looking for rock south of the dam with no success. We did find a suitable rock pile on the logging road about 1-3/4 miles from the dam. It appears that the present rock quarry will only be sufficient for the upstream face. An estimated 2,000 yards is needed for the downstream. The contractor became discouraged on the rock quarry at the damsite and discontinued that operation.

The Huffloader worked about 1/2 the time on the rock riprap for the gate stem. The dragline was working on rock; trucks continued to haul.

I spent some time measuring the gate stem apparatus. The galvanized pipe will have to be cut, and it will be necessary to re-design the concrete to fit.

Wednesday, August 1, 1962

A delegation met at the dam to discuss the problems of approval and re-design of the downstream face. The following persons participated:

- Wayne Criddle
- John Bradshaw, S.C.S.
- Gilbert Searle, S.C.S.
- Dean F. Peterson, Consultant
- Jess Tuttle, A.S.C.
- John Gilman, A.S.C.
- Don Norseth
- Jay R. Bingham
- Daniel F. Lawrence
- John Lambert
- Tom McNeil

The front slope was considered satisfactory. It was agreed that the loose material on the downstream slope should be removed and compacted if possible. The large rock should be moved down to the toe and the downstream section should be filled with rock to elevation 9178. From this point new material is to be benched in and compacted up to grade. The quartz rock should be used and this should be carried up to the top of the dam one foot thick from elevation 9178.

Wednesday, August 1 (Continued)

In a private conference with Jay Bingham it was agreed:

- A. Stripping of the rock from the downstream face is part of the cleanup and not an extra item.
- B. The cutting out and re-compacting should be decided after a joint meeting with Elvon Bay.
- C. The quartz rock is considered an extra, and we should get a unit price bid if possible; otherwise, we should work on an equipment rental basis.

The contractor agreed to put the rock in at \$4.50 per foot up to level 9178, but would not give a price for the one foot layer until it can be seen what procedures are necessary for the work. I ran a line of levels down the slope preparatory to setting grade stakes and cross-sectioning for rock.

Thursday, August 2, 1962

I staked a line along Station 1 + 78 and took cross sections at Left Station 70 + 24 and also at 1 + 40. With the transit at Station 1 + 40 on line 178 I made a transit stadia topog of the area below elevation 78.

The contractor continued to place rock on the front slope. He also opened up the rock area at the damsite and did some leveling in the bottom relocating some of the rock previously placed. I agreed to pay for all rock placed subsequent to Jay Bingham's cross-section (approximately July 21). Rock placed below that level was done on an hourly basis. The contractor began about 2:00 p.m. placing fill on top of the dam.

Friday, August 3, 1962

At 8:00 a.m. I set toe stakes for the top of the dam. The contractor placed compacted fill against the spillway structure. Dozers discontinued filling about 3:00 p.m. and a dragline was brought in to pull material from the downstream face onto the top of the fill.

Wayne Lawrence assisted.

Saturday, August 4, 1962

Brent Bingham and I cross-sectioned the downstream toe of the dam below elevation 9178 and took readings on a 10-foot grid using direct levels.

The contractor, in preparing for placing the fill, had moved some of the rock and the downstream 10 feet is well above grade. I agreed to include this rock for payment because of its value as a stabilizer at this location.

Saturday, August 4 (Continued)

Elvon Bay arrived at 2:00 p.m. and we discussed general and specific specifications. In conference with the contractor Mr. Bay stated that the downstream material had been placed according to orders from the Engineer.

Mr. Bingham arrived at 4:00 p.m. and inspected the job briefly.

The dragline broke down at 3:00 p.m.

Sunday, August 5, 1962

The Superintendent and Foreman placed some rock in the downstream toe.

Monday, August 6, 1962

We established a transit point on line 1 + 78 at Station left 110 and checked grade on the rock slope by vertical angles computed for horizontal increments of 10°. The rock operation worked better than usual.

Tuesday, August 7, 1962

The contractor used the TD-24 for placing rock on the down slope. This work continued until about 2:00 p.m. Rock is now above elevation 9178 and there is considerable fill yet to be placed up to approximately elevation 9200.

After I informed Les Staples that the yardage computed out to be 650 yards he decided he could not continue placing rock at \$4.50 beyond this level; therefore he began dressing up the downstream slope. This work is very difficult but some progress was made. The D-7 Cat and the laborers spent the day clearing stumps from the reservoir area.

My engineering crew spent the day in the field office computing yardage and designing the gate stem lift structure.

Wednesday, August 8, 1962

I arrived at the job at 8:00 a.m. and the contractor was completing a smoothing operation on the downstream portion of the dam.

I set grade stakes at elevations 9223, 9208, 9193, and 9178. At each of these lines I ran a line of lath and placed blue ribbon for grade, red ribbon 1-foot up, and white ribbon 3 feet above grade.

I instructed Les Staples to begin placing earth fill immediately above elevation 9181 and he objected on the grounds that this should be an extra pay item and refused to do the work without written instructions. I, therefore, wrote a letter of instructions (see attachment).

In the afternoon the survey crew took a complete set of cross-section notes for the entire face of the dam above elevation 9181 and below elevation 9233.

Wednesday, August 8 (Continued)

The TD-24 spent most of the day smoothing out the borrow area and replacing top soil. Karl worked with the laborers and the D-7 Cat on reservoir cleanup. The dragline was still broke down.

Henderson's tractor operator removed the rock from the spillway floor by pushing with a bucket scraper and this material is on the outlet end of the spillway. I instructed Les that this would have to be entirely removed from the spillway channel.

Mr. VanderVeer, the General Superintendent, arrived at the job about 2:30 p.m. and he and Les discussed my letter. My instructions were, briefly, that the work must be completed prior to acceptance of the job and that I would consider this part of Zone 2 unless instructed otherwise; however, as a basis for discussion and for the record I would cross-section the dam and keep time on the equipment during the placing of this material.

The engineering crew consisted of Daniel F. Lawrence, Dave Goslin, and Brent Bingham.

UTAH WATER AND POWER BOARD

MEMORANDUM

From: Daniel F. Lawrence

Date:

To: Jay R. Bingham

SUBJECT: REPORT ON CONSTRUCTION OF LITTLE DEER CREEK DAM FOR THE PERIOD

Thursday, August 9, 1962

The contractor continued to clear the reservoir site using the D-7 Cat and two laborers. Some time was also spent smoothing the area immediately adjacent to the upstream face of the dam.

The TD-24 was started at 10:30 pushing earth material from the top of the dam on the downstream slope to fill the low areas. This appears to be the only practical way with the equipment available. I kept time on the equipment and will report this in summary later. The D-7 Cat also worked some on this item.

The dragline was repaired and moved onto the job about 2:00 p.m. and completed the excavation for the spillway immediately below the concrete structure. At 4:30 the dragline was ready to finish the riprap at the top of the dam.

I reviewed with Mr. Staples the items of work left to be done. These include:

- Dressing down the upstream face,
- Completing riprap on the front,
- The concrete gate lift structure,
- Bringing the downstream fill up to grade,
- Removing rocks from the spillway outlet channel and from the stream below the dam,
- Leveling the borrow areas,
- Placing top soil and planting grass seed.

Grade stakes were placed for the upstream riprap and some time was spent directing the fill operation downstream.

Friday, August 10, 1962

The D-7 tractor completed the reservoir clearing and was sent home at 9:00 a.m. The TD-24 tractor began at 7:00 a.m. on the downstream slope earth fill, but at 9:30 the right track came off and the tractor was broke down until 4:30 p.m. Work continued again until dark.

SUMMARY OF EQUIPMENT TIME

Thursday, August 9, 1962, on downstream face.

TD 24 dozer with operator 10:30 to 12:00
1:30 to 7:00 p.m.

7 hours'

D 7 Cat with operator 3 hours

August 10, 1962 (Continued)

The dragline spent about half a day on the top of the dam trimming up and placing rock riprap on the front face. Laborers spent most of the day removing trees and rock from the area downstream from the spillway and also in helping repair the tractor.

Daniel F. Lawrence, Dave Goslin, and Brent Bingham surveyed the reservoir gage placing marks at each 1 foot and $\frac{1}{2}$ foot location.

About 3:00 p.m. a Board of Directors of the canal companies met with Jay R. Bingham at the job to discuss rock riprap on the downstream face. It was voted that we would not have the contractor place this rock because of the high cost which would be involved. Final decision as to whether any rock is to be placed will come at a later time; however, Mr. Bingham pointed out that the Soil Conservation Service and Consultant, Dr. Peterson, did agree to omitting the rock entirely. I pointed out that extra rock has been placed on the downstream slope making the mass of that greater, the slope being perhaps 3 or 4 to 1 at the very toe. This adds to the stability.

Mr. Bingham asked me to urge the contractor to begin the final cleanup.

Saturday, August 11, 1962

The contractor worked on the top of the dam placing riprap until about 9:00 a.m. and then began excavation for gate lift structure. Forms were placed and concrete was poured by 4:30 p.m. The concrete had a slump of about 3 inches and extra cement had been added over and above a 4,000 pound design. I took two concrete cylinders, but breaking of these cylinders would be an academic thing as I am sure this concrete will go way above the 3,000 pound specification strength.

The laborers spent most of the day on cleanup and the TD-24 tractor was working in the area upstream from the dam on cleanup. ✓

Sunday, August 12, 1962

I arrived at the job about 11:30 a.m. and left at 1:00 p.m. The contractor was removing forms on the gate lift structure and doing final finishing. We discussed the need for welding the last section of the gate stem to fit the position of the pedestal.

The dragline was finishing the riprap on the top of the dam to blue top stakes which I had placed. The TD-24 was working on the top of the dam and on the downstream slope. The operator was doing a good job in compacting the new material but this operation has to be straight down the slope because of the very limited room for turning at the bottom. The wet spots do not show as they did a week ago. There is a definite improvement in the condition of the downstream slope.

The contractor indicated he would like to finish the job Tuesday, so I arranged with the canal company officials to plan an inspection for that day. The dragline moved to the bottom for cleanup of the rock downstream.

Monday, August 13, 1962

The dragline worked in the bottom removing rock from the stream channel and the spillway exit and placing it on the downstream toe of the dam. Laborers were working on cleanup. The TD-24 was on the front slope and general cleanup.

My survey crew, consisting of myself, Brent Bingham, and Dave Goslin made a topograph of the final condition upstream on the toe of the dam below the riprap and around the southerly side of the dam.

Tuesday, August 14, 1962

The dragline finished at 9:00 a.m. on the rock placing and went home. The TD-24 worked on cleanup of the borrow areas backfilling the top soil.

The inspection group, consisting of Directors of the irrigation companies and Larry Colton of the Forest Service, arrived about 9:00 a.m. Ben Flowdgen, engineer for the Forest Service, also participated. In general they approved the cleanup operation. They suggested that two trees in the bottom of the reservoir may float to the surface and clog the outlet works. I instructed the contractor to remove them.

Trees placed by the contractor in the South end of the borrow area are to be wind-rowed so that they can be burned by the Forest Service at a later date. Trees knocked down by the contractor during the stripping operation of the borrow area are to be dozed back with the top soil and scattered throughout the backfill area as a soil erosion preventative measure. This was at the suggestion of Mr. Colton. He pointed out that although somewhat unsightly, the condition is better from the conservation standpoint. The contractor was instructed to do this and agreed.

A drainage way is to be placed above the dam to carry water downstream below the outlet and another drainage way is to be placed to carry water upstream so that it does not run down the front face of the dam.

The contractor completed the downstream cleanup and I accepted this. The gate lift gear mechanism was installed, oil placed in the pipe, and the operation of the gate was tested. When I left the job at 4:30 the contractor was continuing his cleanup and expected to be completed early Wednesday.

I took cross sections on the in-place rock on the downstream toe for payment of this item, and I also measured by stadia survey the area of the borrow pit which is paid for at the rate of \$500.00 per acre.