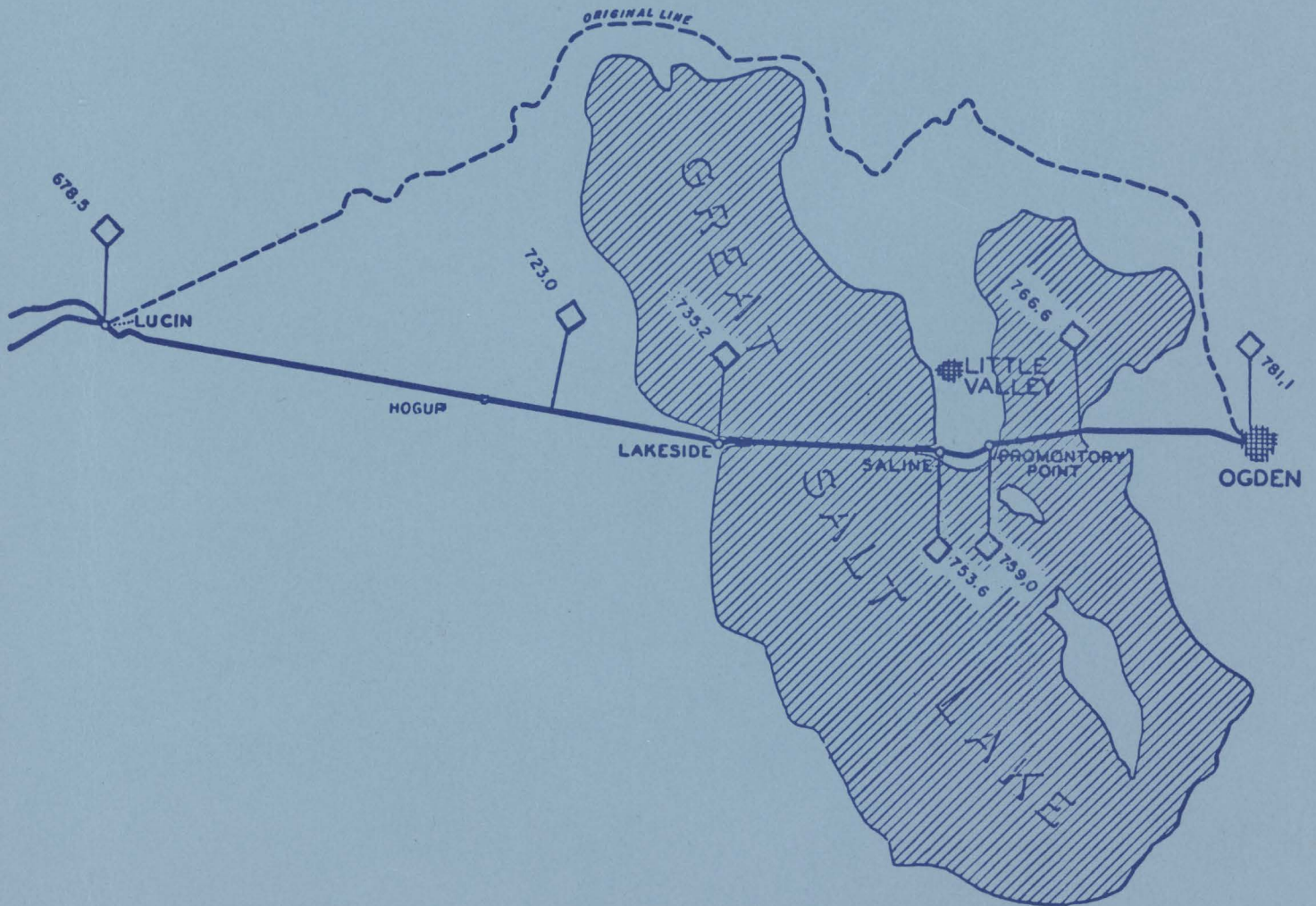


# SOUTHERN PACIFIC TRANSPORTATION COMPANY



TO THE AMERICAN RAILROAD ENGINEERING ASSOCIATION MEMBERS ATTENDING  
THE FALL TECHNICAL CONFERENCE - GREAT SALT LAKE FIELD TRIP

You are cordially welcomed to the historic Lucin Cutoff on behalf of the Sacramento Division of the Southern Pacific Transportation Company.

The Lucin Cutoff, between Lucin, Utah (MP 678.5) and Ogden, Utah (MP 781.1) was originally proposed by Collis P. Huntington, the last surviving member of the "Big Four" of Central Pacific and Southern Pacific fame. The Lucin Cutoff was to eliminate one crew change, a helper district, 44.8 miles of track, 4,000 degrees of curvature and 1,500 feet of rise and fall. The engineering design for the Lucin Cutoff was under the direction of William Hood, the Chief Engineer of the Southern Pacific, under both C. P. Huntington and E. H. Harriman.

Huntington was convinced the level of the Great Salt Lake would continue to decline as the fresh water inlets were tapped by settlers for irrigation and domestic purposes. In November of 1899, Huntington publicly presented his proposal for the Lucin Cutoff and the mammoth pile trestle of twelve miles which would be required. Hood, at that time, started to gather the necessary earth-moving equipment.

On August 13, 1900, C. P. Huntington died, putting further work on the Cutoff on an extremely reduced basis.

In 1901, control of the Southern Pacific was obtained by E. H. Harriman by his personal purchase of the Huntington family's stock from Huntington's survivors and purchases made of Southern Pacific stock by the Union Pacific Railroad and the Oregon Short Line. Harriman originally was not convinced of the feasibility of the Lucin Cutoff, but later acquiesced and authorized Hood to start construction.



Sometime after grading started eastward from Lucin and westward from Ogden, on August 21, 1902, the first piles for the trestle were driven. The last spike was driven on Thanksgiving Day, November 26, 1903, at Midlake on the trestle. The new Cutoff was 102.6 miles long, at a cost of 8.4 million dollars.

Originally, the Great Salt Lake crossing was as follows:

1. Rambo Fill, MP 735.2 (Lakeside) to MP 739.7 (Tresend).
2. Great Salt Lake Trestle, MP 739.7 (Tresend) to MP 752.2 (Bridge). Built to elevation of 4,217 feet above sea level (Hood's Datum).
3. Saline Fill, MP 752.2 (Bridge) to MP 753.6 (Saline).
4. Promontory Peninsula, MP 753.6 (Saline) to MP 759.0 (Promontory Point).
5. Bagley Fill, MP 759.0 (Promontory Point) to MP 766.62 (Little Mountain).

The Rambo and Bagley Fills were constructed by dumping from temporary construction trestles. The dump cars utilized were of 80-ton capacity and were called battleships.

The trestle, when completed, was to be twelve miles long, consisting of 28,250 piles, ranging from 100-150 feet in length.

The Great Salt Lake Trestle was fifty years old and in need of major renovation by 1953. Studies for repair or replacement were as follows:

1. Renovation of existing trestle - determined to be unfeasible as repairs would have to be made under traffic.

2. Build a parallel trestle - a wood trestle was considered impossible due to required length of piling. A concrete bridge was considered, but shelved due to saline conditions.
3. Install a consolidated fill to parallel the old trestle - after evaluation of required engineering data by the best soils engineers of the day, a consolidated fill was determined possible.

A contract for 45 million dollars was let to the Morrison-Knudsen Company for the necessary earthwork to construct the Great Salt Lake Fill. Work was started in June of 1955.

The details of construction of the Fill would, in themselves, fill several volumes. Basically, underwater fill material was hauled by drop-bottom barges. As the fill material rose and restricted the drop-bottom barges, shallow draft barges with fill material were positioned so that bulldozers could push the material from the surface of the barges onto the Fill. After grading, the Fill was raised to its final level by huge dump trucks. The Fill was originally proposed for an ultimate top of rail of 4,217 (Hood's Datum), the height of the original trestle. Continued monitoring of construction data indicated a height of 4,212 was a maximum that could be obtained without fear of failure and the final fill construction was stopped at that level.

A fire on May 4, 1956, which consumed 645 feet of the trestle and caused a closure of six days, indicated the wisdom of the fill construction.

The Great Salt Lake Fill was opened for train traffic on July 28, 1959, nearly one year ahead of schedule. The last train operated over the old trestle in 1975.



In 1982, the Great Salt Lake started to rise steadily at an alarming rate. By 1986, the Lake rose to 4,215.25 (Hood's Datum), equaling its previous recorded high elevation of 1869. To increase the height of the fill to a level of 4,218, to protect against the ever increasing water depth, taxed both the Treasury of the Southern Pacific and the determination of its employees.

A completely different section of the railroad, not previously jeopardized, was at the mercy of the Lake, due to its ever increasing depth. This stretch of track was from MP 723.0 (east of Hogup) to MP 734.0 (west of Lakeside).

On June 6, 1986, a major storm on the Great Salt Lake caused catastrophic damage to the Southern Pacific from MP 723.0 to MP 734.0, MP 735.2 to MP 754.0 and MP 759.0 to MP 767.0. Train traffic was again operating on the Lucin Cutoff on August 25, 1986.

Since the storm of June 6, 1986, the Fill has been out of service as a result of storms on March 28, 1987, and April 19, 1987. Each storm caused a closure of seven days.

With the recent favorable weather and the West Desert Pumping Project, the Lake has dropped twenty-five inches as of this writing, creating much needed relief. Return of normal weather patterns for the Great Salt Lake Basin will guarantee the continued operation over the Lucin Cutoff for another eighty-four years.

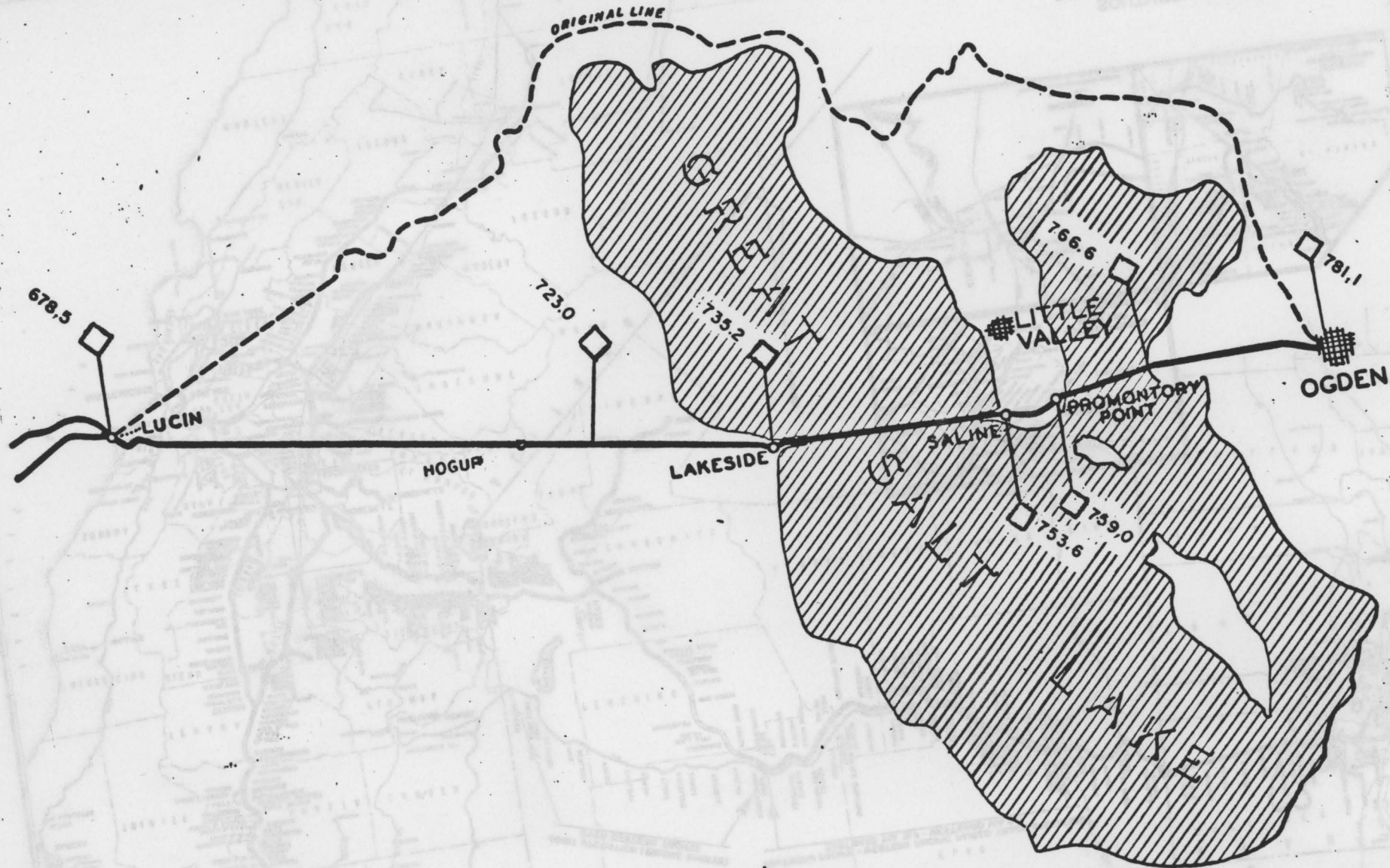
On the following pages you will find maps of the Sacramento Division and the Lucin Cutoff, elevations of the Great Salt Lake from 1850 to the present day, a letter from an individual actually involved in the 1903 construction and several pictures with captions.

The employees of the Sacramento Division wish all of you an enjoyable day for your tour of the Great Salt Lake.

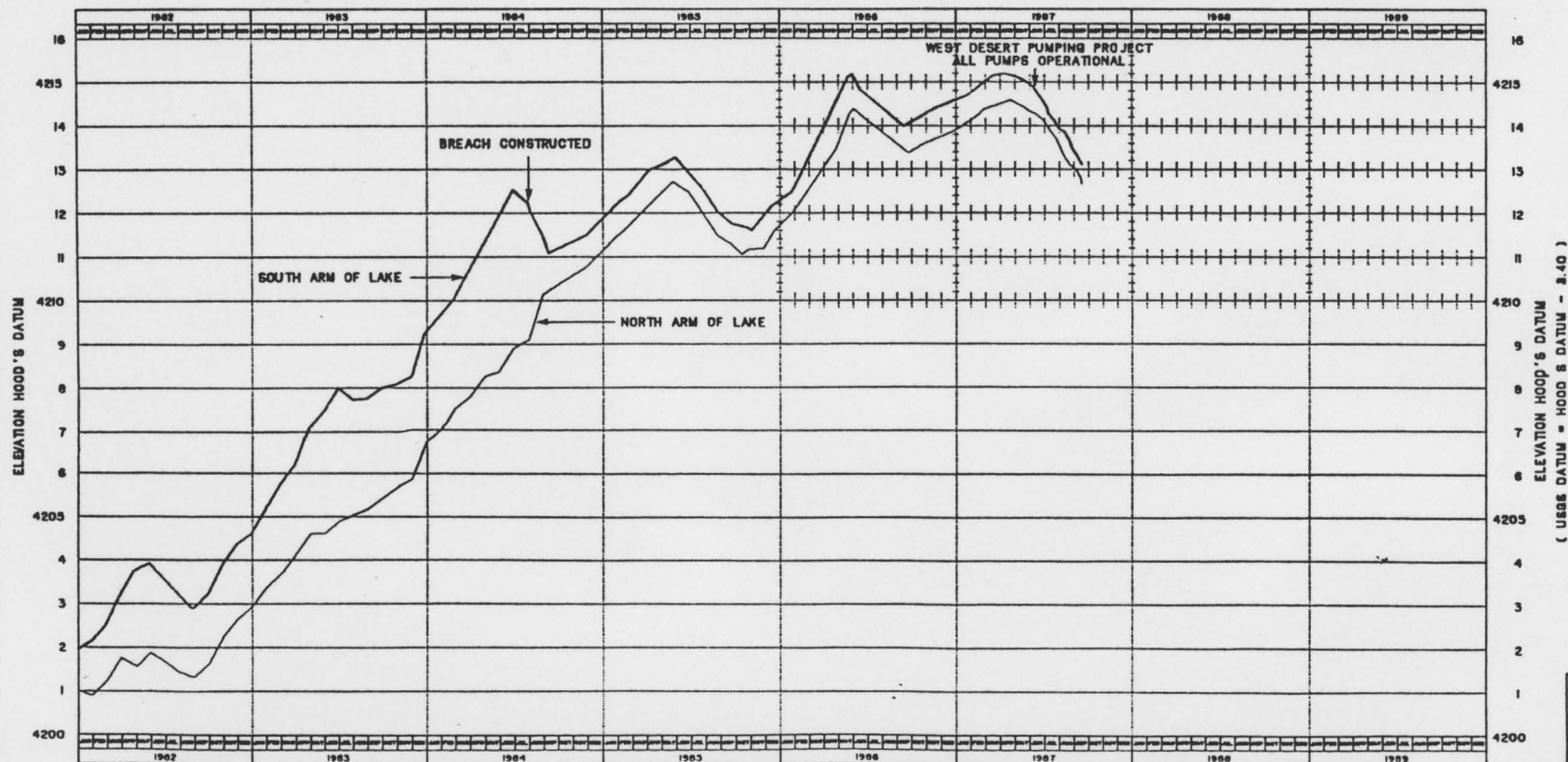
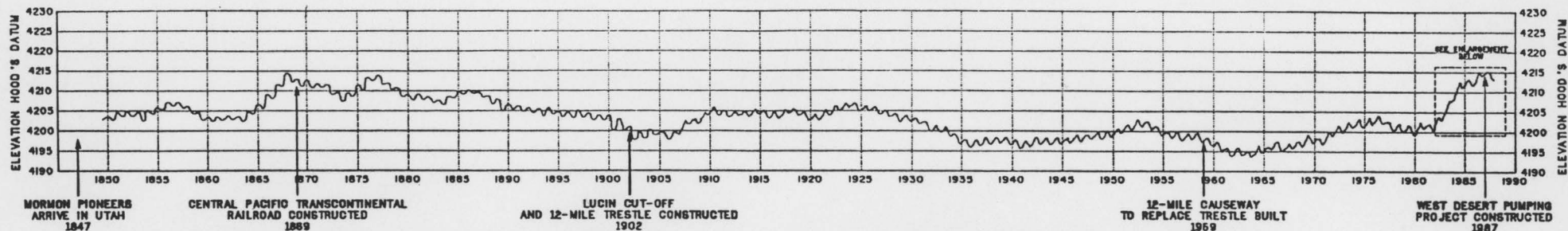
J. W. Lynch  
Superintendent

J. J. Deis  
Division Engineer







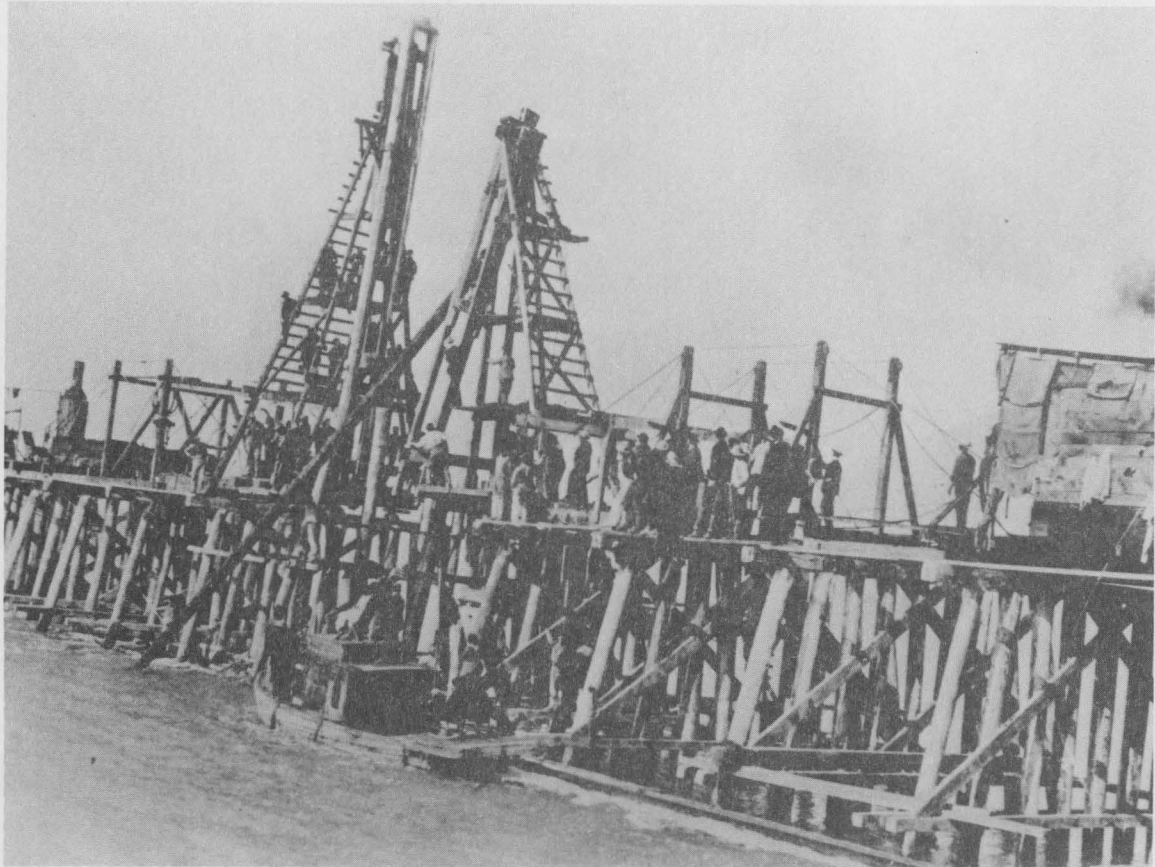


LAKE ELEVATION			
DATE	SOUTH	NORTH	
THIS WEEK - 9/24/87	4213.00	4212.55	
LAST WEEK - 9/17/87	4213.55	4212.75	
PEAK - 4/30/87	4215.10	4214.55	

**SP** Southern Pacific  
Transportation Company  
Engineering - 6400 Denver  
EN.M.GSL.LEVELS

ELEVATIONS OF THE GREAT SALT LAKE			
SCALE AS SHOWN	SHEET	DRAWN BY RK	CHECKED BY
ROUTE NO.	U.P.	DRAWING NO.	
DATE SEPT. 29, 1987		SHEET NO.	
REVISED TO		FILE NUMBER	

# Elevations of The Great Salt Lake



Driving some of the last piles on the Great Salt Lake Trestle - 1903.



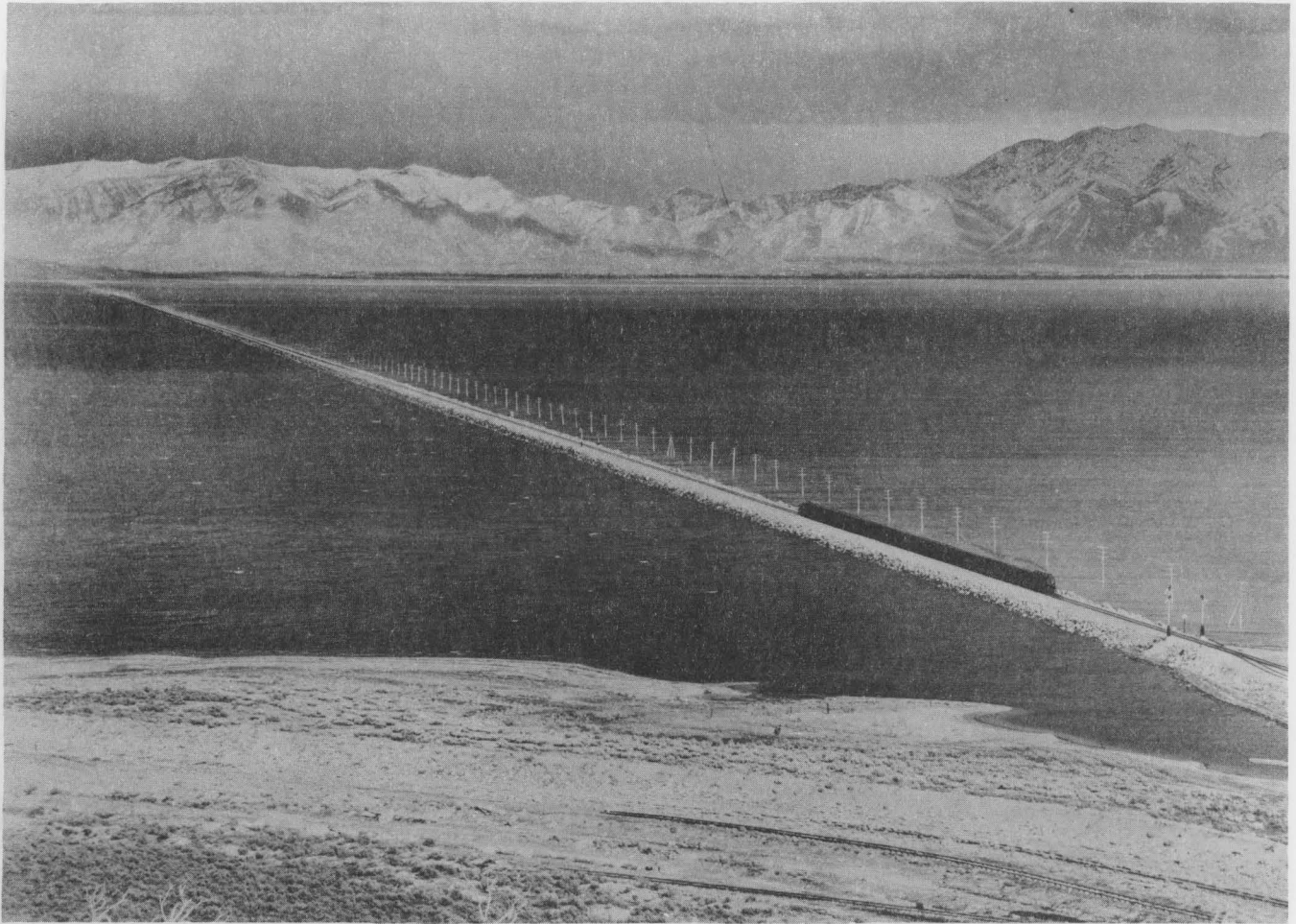
The Pile Driver "Utah 1" in the distance and the Steamer "Promontory" showing the installation of the construction trestle for the Bagley Fill.





The Overland Limited westbound on the Bagley Fill not far from the location of the "Promontory" on the preceding view. The Bagley Fill was ultimately

The eastward Overland Limited approaching Promontory Point on the Saline Fill was also double tracked but later converted to single track due to the rapid rise of the Lake.



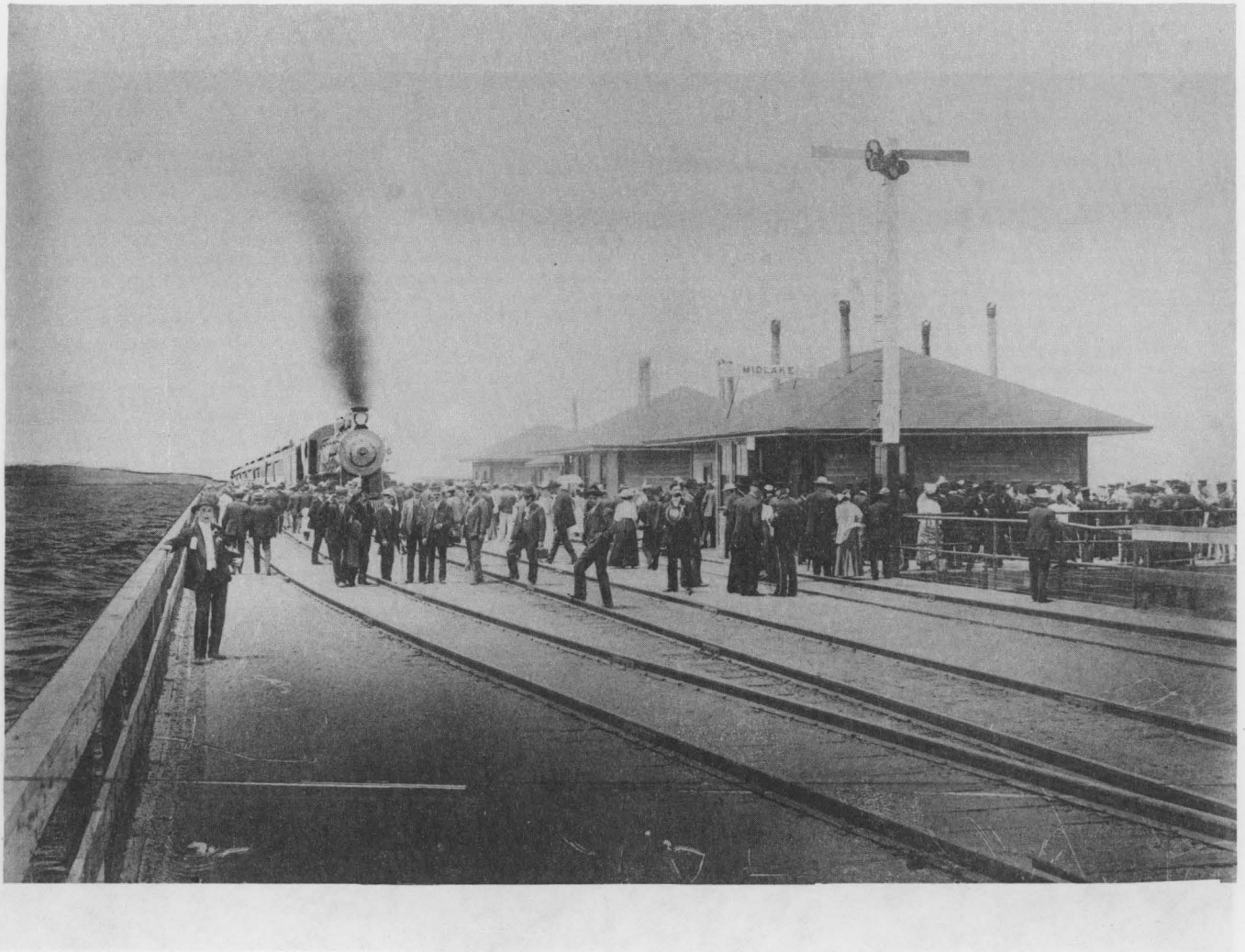
The Overland Limited westbound on the Bagley Fill not far from the location of the "Promontory" on the preceding view. The Bagley Fill was ultimately double tracked but returned to single track due to the rapid rise of the Lake from 1982 to 1986.



An excursion to Midlake on the old Trestle.

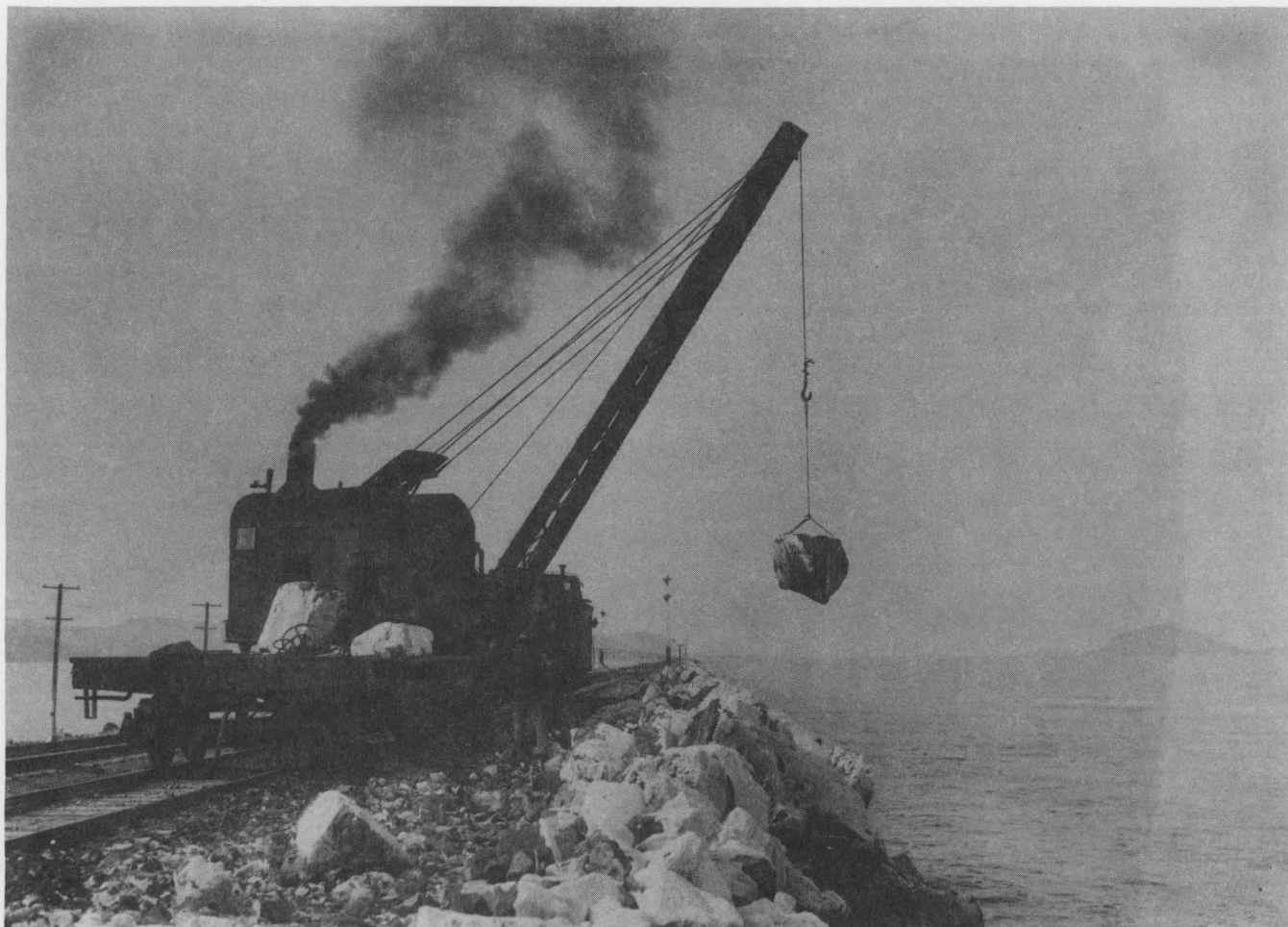
The westbound Overland Limited on the Rambo Fill approaching Lakeside. Note the elimination of the pole line and the photographer's touch-up of the riprap. This photo was used for an advertising post card.





An excursion to Midlake on the old Trestle.

The westbound Overland limited on the Rambo Hill approaching Lakeside. Note the elimination of the pole line and the photographer's touch-up of the trestle. This photo was used for an advertising post card.



A steam derrick placing riprap on the Rambo Fill about two miles west of the westbound Overland Limited in previous picture. Note pole line and riprap.



Damage between Hogup and Lakeside due to the storm of June 6, 1986. Restoration work in progress.



MP 727 where forces restoring track. Eastward from Hogup and westward from Lakeside after storm of June 6, 1986.





Restored fill between Hogup and Lakeside after storm of June 6, 1986.



Eastward work train loading at Hogup with fill material for repair work after June 6, 1986, storm.



Work train passing over restored track between Hogup and Lakeside after storm of June 6, 1986.



Typical damage as the result of the storm of March 28, 1987, on the Great Salt Lake Fill, looking west to Lakeside.

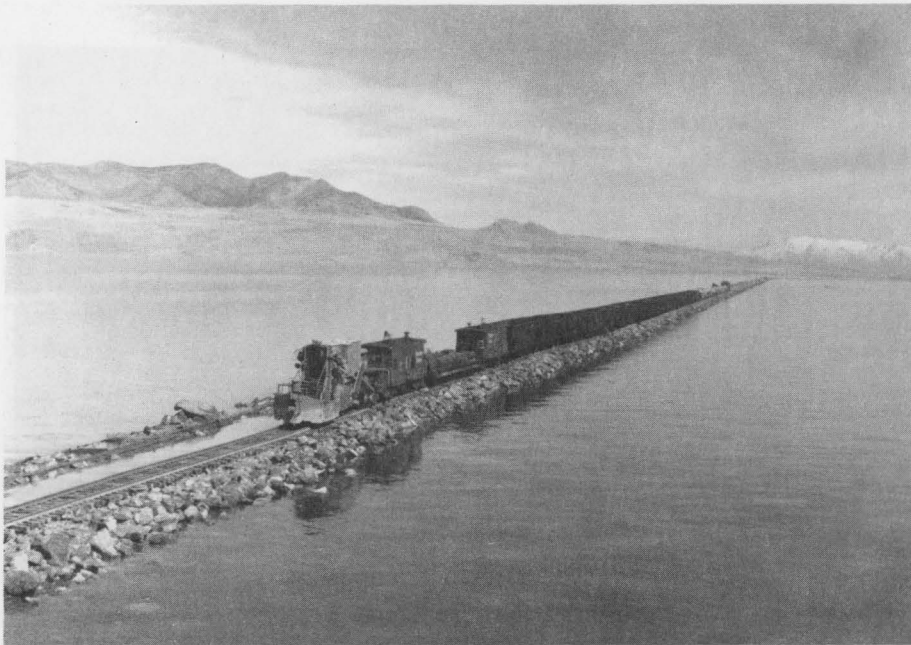


Additional damage to the Great Salt Lake Fill from the storm of March 28, 1987, looking east to Promontory Point.

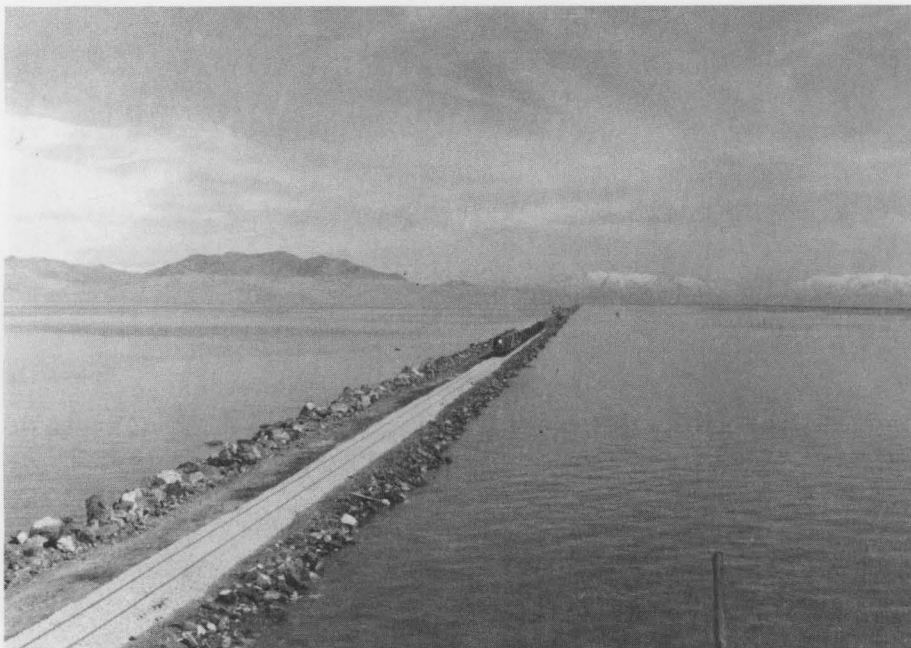


Track workers preparing track to allow passage of work train to dump ballast and fill after storm of March 28, 1987.





Westward work train working out of Promontory Point,  
dumping ballast and fill after storm of March 28, 1987.



Eastward work train working out of Lakeside, dumping  
ballast and fill after storm of March 28, 1987.



Surfacing gang working behind westward work train after storm of March 28, 1987.



Work trains loading fill and riprap material at Lakeside Quarry.



Work train unloading slope protection rock in the vicinity of Lemay in connection with the West Desert Pumping Project.



Work train unloading slope protection rock in the vicinity of Groome in connection with the West Desert Pumping Project.





Finished slope protection in the vicinity of Groome  
in connection with the West Desert Project.



Work train unloading slope protection rock in the  
vicinity of Groome in connection with the West Desert  
Pumping Project.

1960 East Foothill Blvd.  
Glendora, California  
March 8, 1957

Station Agent  
Southern Pacific Railroad Co.  
Lakeside, Utah

Dear Sir:

I have before me four pages of the January issue of Popular Science Magazine showing the operation of transporting crushed rock from the mountainside to a wharf in the lake via a conveyor belt system.

I understand the theory of the operation and am really amazed at the wonderful strides that have been made in the last fifty years with relation to handling material. What I'm particularly interested in is where the rock is being quarried and if it is not asking too much of an entire stranger, I should like to know the approximate location.

I was one of the train dispatchers at Lakeside from January 22, 1904, until the completion of the construction work, when it was turned over to the operating department in January 1905 and remained on the job as a stand-by dispatcher for the operating department until February 15, 1905 to take over in case of an emergency, such as a "sink" or a bad wind storm. Occasionally the lake became so rough the heavy waves would knock down the telegraph poles during a gale and of course that would cripple communication from the Ogden Dispatcher's Office that had taken over from the Construction Dispatchers' Office at Promontory Point and Lakeside. Up until this time Promontory Point had handled the line from Midlake to Ogden and Lakeside from Midlake to Lucin.

A book could be written about the construction of the Lucin Cut-off. It isn't my intention to burden you with a lot of happenings so long ago, however, if you will permit me, I should like to relate a few of them. You will probably find some of them amusing and others pathetic and still others extraordinary.

I had been working a trick in Livingston, Montana, for some time when the force was cut right in the middle, which left me an extra man and those days, even though we worked every day of the year, the salary was very small, so seldom did anyone take a day or two off. There was no place to go or nothing exciting to do, so the dispatchers just worked and me being a young sprout, just married, was looking for a steady job and through a friend landed a job at Lakeside. I didn't know a single thing about Lakeside, in fact I couldn't find it on the map, but away we went with all of our belongings in a couple of suitcases. We arrived at Ogden and found out where we were to go. We took a swing train out to Camp 10 about two or three miles out into the lake and on account of the line not being connected up beyond there we had to take a tug, the name was the "Tiddley-Addley" - a small boat, the only one that was considered adequate to make the trip this particular day. The wind was blowing a gale and the waves were eight or ten feet high. I don't mind saying I was plenty scared but I didn't dare admit it, because my wife was so frightened that she declared she wouldn't get on that boat under any circumstances. They were working short one man at Lakeside and I felt like I really had to make the effort to get there and when the time came for leaving my wife crawled under the bed in the dockman's office and I had to drag her out by the heels and grab her around the waist and carry her onto the tug. The platform was just even with the top of the cabin from time to time when the waves receded and I waited my chance to hop on at the right time and when I stepped over on to the cabin I grabbed hold of the top of the exhaust stack, never realizing that it would be red hot. Well the result was, that I had a cooked left hand that gave me quite a bit of trouble for a long time. I can see that darn tug in my mind's eye everytime I think of the Cut-Off - it was bobbing around like a cork on a rough sea, but we finally made it to Camp 31, later called Rambo, where Superintendent Dan Ogden was waiting for me with Engine 1732 to take to Lake Side. He had no idea I would show



up with a wife and I don't mind saying, he was not at all pleased. He grabbed my wife like she was a sack of wheat and tossed her up into the gangway and we started in over the roughest piece of railway that you can imagine and it seemed like we were making fifty miles an hour, but suppose it was nearer fifteen or twenty. But we finally made it and then our troubles really began. It was about 8 or 9 p.m. dark and colder than Montana it seemed to us and no place to stay. There were bunk houses for men, certainly no place for an eighteen year old girl and they insisted on me going right to work really before I knew what it was all about. There were several white families there then that were living in box cars and through the kindness of our friend Harvey Morley and his wife, they allowed my wife to sleep on two of their trunks, one higher than the other with a few old rugs, coats and such. I say sleep - she didn't sleep at all because it was so very cold she darn near froze. I went to work on the third trick that night and tried my luck sleeping on the trunks during the day and it makes my back ache every time I think about the two weeks we put up with this sort of thing. We had our meals at the Officers' Boarding House, which was not bad at all and finally got a car. It was an old Central Pacific Fruit Express Car No. 28185 and full of bed-bugs, even after being steamed out but we finally got rid of the bugs and after borrowing and building a few pieces of furniture along with the donation of a little oil cook stove from the Commissary, we set up house-keeping and from then on we got along very well - in fact we enjoyed it. I think this is enough about our escapades and I'll give you a little history about the construction of one of the biggest railroad jobs up to 1905.

After the fill was completed out to Camp 10, which was in fairly shallow water, the pile driving for the trestle began. First with about 40 to 50 foot piling to reach solid bottom, but as they continued West the slope gradually increased until they were using 125 foot spliced piling and then not reaching solid bottom, so there is where the fill had to be started. I remember very well seeing some

of the last piling driven. A 1600 pound hammer was used and one tap of the hammer would drive a pile down anywhere from 4 to 8 feet at a clip and many times it was necessary to hook a chain around a pile and drag it up to level. On several occasions the pile would go down so far that the hammer would slip out of the slides and snap the cable and go into the lake and if I'm not mistaken they are still there as I can't remember of ever having heard of one being retrieved.

I don't remember how many trains there were in operation out of Promontory Point, but at Lakeside we handled 27 gravel trains, 5 rock trains and two water trains until the line was connected up and after that we had a swing train that made a round trip to Ogden daily to handle provisions and local service. The 27 gravel trains ran between Hogup pit and the dump, the rock trains between Lakeside and the dump and they worked 24 hours a day every day. The water trains ran between Lakeside and Montello. You see we had no fresh water on the West side and every drop had to be hauled 80 miles.

I presume you are pretty well up on what a train dispatcher has to contend with - I should have said what they used to have to contend with. Things are different now, but when I tell you we used to have to use three train sheets to handle the train movements for 24 hours you will know we had no time to throw away and after the line was connected up and some of the through commercial trains were routed over the lake, our work was increased. However, the commercial trains were inferior to the work trains and were taken subject to delays and they usually had them. One Eastbound fruit train with about 50 cars of oranges was moving by Rambo and the old fill began to sink and several cars of oranges went down with it until only about two or three feet of the top of the cars were above water. The engine and a few cars reached the trestle and continued on to Ogden. The rear end was moved back to Lucin and taken over the old line, but it was over a week before the cars in the sink were fished out, but we all had plenty of oranges for a long time.

These sinks were treacherous - everything would look fine one minute and the next down she would go. Fortunately there was only one spot on the West side where they occurred and that was just west of the trestle. Mr. Marsh, the Engineer in charge, explained it to me quite clearly one evening while he was sort of visiting when I was working second trick. He also drew a diagram of his theory of the contour of the rock bottom and he estimated that the valley would be about 1400 feet below surface level. He had informed the Chief Engineer in San Francisco, also the Consulting Engineer in Chicago, Mr. John D. Isaacs, and they both told him he was mistaken, but when the job was finished they had filled in just 1425 feet and that one single mile of fill cost \$31 million dollars.

There was another little incident at this particular sink that I might mention in passing and that was when U.P. Engine 1610 was unloading and before Engineer Johnson and his fireman could get out of the cab the engine was upside down in the lake and the boys got a fast unwanted bath. It took two derricks to get the 1610 back on the dump again, the regular railroad wrecking derrick and one on the old steamer Promontory. I still have a picture of this operation among my souvenirs.

One day during the summer I think it was the 2804 moving 30 or 40 Roger ballast cars from Hogup to Pigeon pit to be loaded with sand and had a meet with the Water train 2006 West at Jackson. Both trains arrived about the same time, the 2804 had to take the siding and was a little slow heading in. The 2006 East had 20 cars of water out of Lucin and had picked up a car of black powder and 15 or 20 live outfit cars with about 200 men at Pigeon Pit for Lakeside. Naturally the powder should have been switched to the rear of the train, but sometimes people don't follow instructions and it was right behind the engine and the next car was the kitchen car. When the Engineer on the 2006 could see that the 2804 wasn't getting in to clear, he naturally applied the air, but not in time. Water is a difficult thing to stop quickly. It slushes back and forth and the 2006 being a



light engine and the outfit cars not having air brakes, side swiped the 2804 and jig was up. The collision in itself didn't amount to much, but was sufficient to upset a cook stove in the kitchen car and within a few minutes it ignited the powder and the explosion occurred that was heard at Lakeside approximately 30 or 35 miles away. There were 29 men killed instantly and many more injured seriously. It completely destroyed Engine 2006, blew a hole in the sand that took five or six cars of gravel to fill, one driver was blown half a mile from the accident and the whistle was found about two miles away.

The Operator, a Mr. Taylor, was taking an order at the time and his wife, who worked nights, was asleep in her bedroom in the depot. The depot was practically destroyed and it was a train length from the accident. A fragment of some sort shot through the bay window striking Mr. Taylor on the jaw and took his lower jaw off and Mrs. Taylor was blown about 20 or 30 feet from her bedroom and when they found her there was a car axle with one wheel blown off arched over her presumed to have blown through the bedroom.

Strange as it may seem neither Mr. nor Mrs. Taylor were killed, but naturally very seriously injured. They sued the Company for two or three hundred thousand dollars and it was thrashed around in the courts for a couple of years and they finally settled for \$132,000. Several of the 29 laborers that lost their lives were picked up in baskets. All of these men had been on the job quite awhile and had saved every dime they had earned and each man was supposed to have had between two and four thousand dollars in gold carried on their person in a heavy money belt. Some of the belts were destroyed and the gold pieces scattered in the sand and I believe there was something like 19,000 dollars picked up by special officers during the week. You see these men were all Greeks and Austrians right from the old sod and couldn't speak or understand English and of course they wouldn't trust anyone to take their money into Ogden and deposit it in a bank. There were about 9,000 laborers on the job and they all carried their money in their belts.

When the Construction Company turned the job over to the Operating department all the Greeks and Austrians went back to their home countries. Most of the train and engine crews were off the S.P. and U.P. and went back to their former jobs. There were a few that had been hired and most of them went down to Panama as that job was just starting up and a few came down here to work on the San Pedro, Los Angeles and Salt Lake R.R. which was just opening up, among those were Engineer Ed. R. Bailey, with whom I had worked on the Northern Pacific at Livingston, Montana, Conductor Everett E. Hines, and myself. Both Bailey and Hines have passed away and I guess I am the only one left.

The reason that I mention Bailey is that if you should happen to see any of the old timers up there, they will surely remember him as he was there from the beginning to the end and his wife kept the Commissary at Hogup. I'll mention a few other names and it is possible you may come in contact with someone who will remember them..... besides W. E. Marsh, the Engineer in charge, there was Dan Ogden, Superintendent, later relieved by W. E. Bell, Superintendent, Jimmy Hope, Master Mechanic, J. W. Pike, R. A. Pierce, Otto Shackelford, Gus Bullard, Trainmasters, and twelve other Trainmasters on the entire line, but I have forgotten their names now.

Among the Train Dispatchers at Promontory Point I can remember only one, C. E. Smith. At Lakeside there was Dewey Morgan, Chief and first trick for awhile, then - Harvey Morley took his place and I relieved Morley after working third trick for about three months and Harry Adams relieved me on third trick and that's the way we wound up.

If this has become boresome to you, I apologize; but I'm sure you will forgive an old-timer who has been in bed six months with a heart condition, for blowing off a little steam of the yesteryear.

Yours very truly,

/s/ FRED H. CRAWFORD

Retyped from a reproduced copy furnished by F. A. DENTON, former Southern Pacific Assistant Chief Train Dispatcher, Dunsmuir, California.