Southern California has just come through one of its most trying experiences. Rain and flood have taken their toll in property and well-being, and even in life itself.

In any such widespread disaster, it is necessary that a public utility service such as ours be kept in operation. Otherwise there would be serious additional suffering in the community. I am proud to say that our obligations in this respect have been met as completely as was humanly possible. Where service was interrupted, because of overwhelming ravages of the flood, it was restored as quickly as the ingenuity and courage of man could do it.

The purpose of this note is to tell the employees how much the Management of Southern California Gas Company, and I, personally, appreciate the fine way in which the people of our Company organization have performed the task of maintaining the gas service which is so necessary to the welfare of the community. The job called for prompt action, long hours, personal discomfort and inconvenience, sound judgment, willing hands and cool heads, often in the face of danger; and you measured up splendidly!

For Key to Pictures see Page 9.
Dependable Service
in spite of
High Water

By Wm. Moeller, Jr.,
Vice-President in Charge of Natural Gas
Production and Transmission

BEFORE describing the damage suffered by the natural gas transmission system supplying Los Angeles metropolitan area, I wish to state briefly the source of our natural gas supply, and the capacity of the various lines. From Ventura Avenue and the Coastal fields, gas is brought to Los Angeles through:

(1) Our own 12-inch line from Ventura to Glendale, daily capacity 35,000,000 cubic feet.

(2) The Southern Counties Gas Company 12-inch line from Ventura via Newhall to Glendale, daily capacity 35,000,000 cubic feet.

(3) The Industrial Fuel Supply Company 15-inch line from Ventura via Calabasas to Hollywood, daily capacity 70,000,000 cubic feet.

From the San Joaquin Valley fields, gas is brought to Los Angeles through:

(1) Our own transmission system, comprising the 12-inch and 22-inch lines from Taft to Newhall, daily capacity 88,000,000 cubic feet, thence to Glendale through the 12-inch and 16-inch lines, and to Slauson Station through the 22-inch-26-inch line via Sepulveda, Castaic crossing near Santa Clara River and the valve on the south side of Castaic Creek crossing near the Castaic Junction.

When our own 12-inch line failed at the Castaic Creek crossing, the Southern Counties 12-inch Ventura line also failed at the same point, being parallel to our line, and had to be shut off, thus we lost a total pipeline capacity of 70 million cubic feet daily from Ventura.

About 5 P.M. on Wednesday, word reached us that the Industrial Fuel Supply Company’s 15-inch Ventura line was washed out at the Santa Clara River crossing near Saticoy and had been shut off, causing the loss of an additional 70 million cubic feet daily capacity, so that at this time the entire pipeline capacity of 140 million cubic feet daily from Ventura and Coastal fields was shut off.

Valley Supply to Newhall

The most critical points on the transmission system between Taft and Glendale were the Castaic, Santa Clara, and Tujunga crossings. Anticipating failure, men had been stationed to observe these crossings and be prepared to close valves in the event of failure. At about 8:35 P.M. on Wednesday, the Southern Fuel line broke in the Santa Clara River and the valve on the south side was immediately closed and the cross-over between the Southern California 12-inch and the Southern Fuel 26-inch was opened to maintain service through the Southern Fuel line south of the Santa Clara River. At the same time, the Southern Fuel line was shut.
off on the north side of Castaic Creek and the cross-over between the Southern Fuel 26-inch line and the Southern California 22-inch line at No. 4 Patrol Station was opened in order to maintain the Southern Fuel 26-inch line in service north of this point.

The Santa Clara trestle crossing on the Southern California 12-inch line was badly damaged. The piling on the north and south sides was washed away, leaving the 12-inch and 16-inch lines suspended for a distance of 150 feet on the south side and 175 feet on the north side. The 16-inch line held, but the 12-inch line broke; thus, service was maintained through the 16-inch crossing line.

The 22-inch line remained intact between Taft and Newhall and operated continuously at maximum capacity. The 13-mile section of this 22-inch line from Mile 72 to Newhall was installed during the spring of last year and crosses both Castaic Creek and the Santa Clara River.

By using the crossovers between the Southern Fuel 26-inch line and our own 12-inch and 22-inch lines, we were able to maintain a combined daily capacity of about 170 million cubic feet between Taft and Newhall following the breaking of the Southern Fuel 26-inch line at Santa Clara River, which caused a loss of about 50 million cubic feet per day capacity from the north.

### Lines South of Newhall

South of Newhall the 16-inch line on Remsen Street broke where it crosses the Tujunga wash and was shut off about 6:30 o'clock Wednesday night. It was not until the following Sunday, March 6, that we were able to reach the break, after the water had subsided somewhat, and put the line back in service by making a temporary repair with a piece of 8-inch pipe connecting the two broken ends.

The Tujunga suspension crossing on the Southern Fuel 26-inch line was in grave danger because the Tujunga wash had overflowed the revetment on the north side of the channel, resulting in a very heavy flow of water over the north approach to this suspension, which threatened to wash out the 26-inch pipeline and cause the collapse of the suspension bridge. A large crew of men was maintained continuously, and, with the assistance and splendid co-operation of the Los Angeles County Flood Control, they were able to divert the flow of water and prevent possible damage to the pipeline.

A very serious leak developed in the 22-inch line between Newhall and Slauson Station near Haskell Avenue Station, where the line crosses the Los Angeles River. The heavy water flow apparently had pulled the line down stream, causing a weld on the line on the south bank to crack. The leak was reported about noon on Thursday, March 3, and the line was shut down and repaired by 9 o'clock that evening, thus safeguarding the flow of gas to Slauson Station and also protecting the district normally supplied by Industrial Fuel Supply Company's Ventura line south of Calabasas to Hollywood. The Industrial Fuel Supply Company's 15-inch Ventura line having been shut off by the failure of the Santa Clara River bridge crossing at Saticoy, it was necessary to find this line through the Haskell Station on Ventura Boulevard from the 22-inch Newhall-Slauson line.

Southern Counties 12-inch line south of Newhall was washed out at the Tujunga crossing and was shut off south of Newhall.

When the Union Pacific notified us on Wednesday afternoon that their railroad bridge crossing Arroyo Seco south of Glendale was about to collapse because of the heavy water flow, we anticipated the probability that the Southern Fuel Company's 26-inch line might also collapse if the concrete supporting abutment on the south side of the Arroyo was washed out. Superintendent William Pipkin, of Southern Fuel Company, quickly conceived an ingenious and daring scheme to prevent the failure of the pipeline crossing, which was located just upstream from the railroad bridge. He dispatched a truck crane to the south side of the Arroyo, ran it out on the south side of the railroad trestle far enough to take hold of the 26-inch pipeline near the concrete supporting abutment. Having secured a hold on the pipe, the brakes on the crane were set and the pipeline was held in place after the concrete support was washed away. The following day, a new temporary wooden support was installed and the crane was released, having rendered a valuable and unique service.

The Southern Fuel 26-inch line is an important and vital feeder line south of Glendale, supplying gas to Aliso and Central Stations, in the Central Division, to Compton Station in the Southern Division, and through Spence Station via Santa Fe Springs to the Eastern Division.

### Eastern Division Supply

All of our own transmission lines supplying gas from Brea Station to Colton for the Eastern Division remained intact and rendered continuous service; however, the gas supply normally added at Chino from the Carbon Canyon 10-inch line of Southern Counties Gas Company was shut off due to failure of this line at a point south of Chino. Because of flood conditions it required considerable time to reach the pipeline break in order to shut off the line, and in the meantime gas was blowing from this line and caused a serious loss in pressure and a heavy drain on our Colton supply line.

### Repair Program

An inspection of the 12-inch Ventura-Castaic line after the flood damage revealed the following:

1. About 800 feet of pipe was washed out at Sespe Creek;

Continued on Page 14
Key to Pictures will be found on another page.
WHEN a big rainstorm thoroughly saturates the ground and a bigger storm follows in its wake, then things happen. The storm sweeping in Saturday night, February 26, and lasting until Monday evening, February 28, left 4.4 inches of rain in Los Angeles and about 7 inches in the various watersheds along the Sierra Madre and San Bernardino mountains. The rain was general throughout the Los Angeles Basin area. A second and more intense storm commenced early Tuesday evening, March 1, and continued until Wednesday night, March 2. Six and seven-tenths inches of rain fell in Los Angeles and as high as 14 inches in some of the watersheds. Result: a tremendous runoff which caused enormous property and utility damage.

“All’s well!” Such were the reports from all points Tuesday morning after the first deluge of rain. Our weather expert, Dr. Irving Krick, forecast rain starting Tuesday evening and increasing in intensity towards morning, continuing through Wednesday. This was a grave danger signal, and immediately plans were made for patrols to be maintained throughout the night and early morning hours at key points. At 5:30 A.M. Wednesday all points reported rising water and full streams.

In anticipation of heavy sendouts, all available gas was turned on and all holders were filled.

Our first trouble occurred at 1:30 P.M., when the east approach to the Sespe bridge crossing (location II) washed out, carrying 500 feet of both Southern California and Southern Counties 12-inch Ventura-Newhall pipelines. The loss of 70 million cubic feet capacity necessitated drastic measures and all large transport customers and certain industrials were ordered curtailed. Standby manufacturing plants were warming up and at 3:40 P.M. Colton Station started gas manufacture.

**Destruction**

At 3:50 P.M. the Southern California 16-inch and 12-inch line from Spence Station to Castaic Station was washed out by the rising Los Angeles River under the Ninth Street bridge (location XII).

The waters in the Rio Hondo and Los Angeles Rivers had reached such a high level by 4:30 P.M. that all valves on bridge approaches on Southern California transmission lines, except the 16-inch Santa Fe Springs line, were ordered closed.

At 4:55 P.M. the 10-inch Southern Counties Carbon Canyon line (location XIX) was found to be broken and about the same time the Industrial Fuel Supply Company’s 15-inch line on Saticoy bridge (location I) was torn out when the bridge gave way. This latter destroyed our last source of gas from the Coastal area.

At 5:25 P.M. the Southern Counties lost 1500 feet of 12-inch line across the Big Tujunga wash (location IX).

By 7 P.M. all but a small number of industrial customers had been curtailed, a supply of gas had been diverted to Hollywood via the Laurel Canyon 16-inch line, Southern California’s 16-inch Remsen Avenue line from Newhall to Glendale had been broken (location VII), practically all communication facilities were down and the following towns were short of gas service: Fillmore, Piru, San Bernardino, Redlands, and towns east, Corona, Elsinore.

At 8:35 P.M. the Southern Fuel 26-inch line at the Santa Clara River crossing (location VI) broke and caught fire. Prompt action in shutting off the gas at Castaic patrol station and Castaic Junction prevented the loss of the pack in the line. Crossovers to the Southern California system were opened on either side of the break, but the capacity from San Joaquin Valley sources was reduced 40 million cubic feet.

**We Make Gas**

About this time, lack of communication seriously handicapped us and messengers had difficulty in finding their way around on the flooded highways.

Between 9 P.M. and morning, four bridges across the Los Angeles River and Rio Hondo went out at Stewart-Gray Road, Gage Street,
Imperial Highway and Foster Road (locations XIII, XV, XVI, XIV).

Central Station started gas manufacture at 11:40 P.M.

At 2 A.M. Thursday, March 3, the Southern Fuel 26-inch line was reported broken on the north side of Imperial Highway (location T.M. 260). (Great difficulty was experienced in reaching this break and the line was not back in service until 11 P.M.)

To keep the pressures from building up on the lines south of Los Angeles, the Long Beach steam plant and several large transport customers were switched to gas fuel about 2 A.M., but by 4 A.M. they were again cut back to substitute fuels.

At 7:30 A.M. gas was turned back on in Fillmore and Piru, a supply having been made available from Shells Canyon field.

At 8 A.M. all remaining industrial customers were curtailed, and at 11:50 A.M. All diastation started putting oil gas in the holders.

The Santa Ana River was rising at its mouth and the main highway bridge approach was threatened. The 12-inch line from Huntington Beach to Dana Point was packed over 330 lbs. in order to assure Newport Beach, Balboa, and Laguna Beach a twenty-four hour supply.

Mild Weather Helps

Fortunately, the temperatures were not low and the domestic loads were not extra heavy. Some industries were put back on in the afternoon and by 6 P.M. oil-gas manufacture had ceased at all stations.

A leak was reported at 10:50 A.M. Thursday on the 22-inch Newhall-West Los Angeles line (location X) and at 4:45 P.M. the line was shut down for repairs. This seriously curtailed our supplies for Santa Monica, Beverly Hills, Hollywood, and contiguous territory. However, the big compressors at Slauson and Hollywood Stations pumped sufficient gas from holders to get us over the evening load. Difficulty was experienced in reaching the 22-inch break and it was 9:10 P.M. before the broken weld was repaired and the line returned to service. The shutting in of this line backed up the pressures over the Ridge and necessitated considerable field operation in the San Joaquin Valley field sources.

At 8:45 P.M. the 12-inch San Diego line was broken (location XVII) two miles south of Huntington Beach.

Telephone communication started Friday morning to many key locations and we were able to obtain a better picture of what was going on.

Crews were turning on meters in San Bernardino Friday.

With holders full and a moderate load, more industrials were switched to gas fuel Friday morning.

Gas Mains on Boats

During the afternoon, the Carbon Canyon 10-inch line was placed back in service and a temporary 2-inch line, 300 feet, was laid on boats south of Huntington Beach (location XVII) to connect Newport and Balboa to a supply of gas. This 2-inch line was replaced by 6-inch the following day, and with a 6-inch line completed at San Juan Creek (location XXVII) service to San Diego was restored.

Crews were restoring service to Redlands and other cities in Southern California's eastern district Saturday and Sunday.

By Sunday 3 A.M. the Southern Counties line from Ventura was ready for service. Work was completed on two fronts—the Sespe Creek crossing (location II) and the Camulos Ranch outage (location III).

The mild weather, coupled with the extra gas from Ventura, permitted us to put all industries back on gas by noon Sunday.

Repairs to the trestle across Santa Clara River were started Sunday morning and the 12-inch Southern California line from Castaic patrol station to Castaic Junction was shut down. This left a single 22-inch line between these two points, five miles, to handle the 160 million cubic feet from the San Joaquin Valley sources.

Early Wednesday, March 9, a temporary line across the Santa Clara River at Saticoy was completed, and on March 10 the 12-inch line across the Santa Clara River at Castaic Junction was placed back in service.

Business as Usual

For the first time since March 2, we were back to nearly a normal basis, with a majority of our transmission lines back in service, many temporarily repaired, and all of the 35,000 domestic and industrial customers that had been cut off placed back on gas service.

The Castaic Creek had exposed some 700 feet of the 26-inch pipeline and work was started preparatory to placing it back in service. Rain Friday night and Saturday morning hampered our work and necessitated constructing a huge diversion dam 1,000 feet long. Wednesday morning, March 16, this line was returned to service.

The same rain caused such a rise in Santa Clara River that the temporary line at Saticoy was torn loose at 7 A.M. March 12. Construction crews started action immediately and completed a more permanent line on March 16.

"A Mighty Fine Job"

The first four days of trouble were strenuous ones for gas dispatching centers. Changes were fast and frequent in order to take care of the many peculiar problems arising.

Personally, I think the gas industry in Southern California did a mighty fine job in keeping service going to over 95 per cent of our customers, in taking care of the many local service troubles and in turning back on, in such a short time, the customers that had suffered gas shortages.
FLOOD CONTROL MEN stationed at Pickens Wash, scene of the disastrous New Year's Day flood of 1934, report that a wall of water ten feet high surged down the canyon at the height of the recent storm. The debris basin, completed a year or two ago, was filled in three and one-half minutes, not with water, but with rock and gravel. This basin holds 135,000 cubic yards, which is the equivalent of 160,000 tons.

Statisticians estimate that 1800 billion gallons of water fell on Santa Barbara, Ventura, Los Angeles, San Bernardino, Riverside and Orange Counties in the 36 hours of the flood. This is equivalent to 6 million acre feet of water, or enough to fill a dam like the former Saint Francis Dam some 20 times.

At Saticoy, two sections of a long steel and concrete bridge disappeared. Some days later they were found a mile and a half downstream, almost buried in debris. The sections were each 200 feet long and weighed tons. The volume of water here was said to be as great as that which came down when the Saint Francis Dam burst in 1928, and the water actually rose higher on the streets of Santa Paula than during the 1928 flood.

It Is to Smile

No disaster is too great to be without its comic relief. A serviceman went down into a flooded basement to shut off pilots on the furnace and water heater. He swept the water with flashlight and was appalled to see two small bodies floating face down. Plunging in, he pulled them to shore, only to find they were dolls.

Many Redlands consumers, apparently under the impression that their gas service had been discontinued through failure to pay bills, flocked to the office, and on Friday the Redlands office had the greatest collections in the history of the District.

The man who sold snowballs to the Eskimos will now have to share honors with a Southern California Gas Company salesman in San Bernardino. This enterprising young man, undaunted by failure of the gas supply, sold a water heater on Thursday, the day after the flood, and would have made delivery that day, if the purchaser hadn't asked for installation Monday.

A tin meter was found half buried in the mud in the river bed at Long Beach. Its number proved it to be a meter that had been set at a house in Van Nuys—37 miles away.

Other Utilities Suffer

Other utilities suffered as greatly as the gas companies, the telephone company and the railroads perhaps more heavily than any of the rest. As if sufficient damage hadn't been done by raging rivers, a high wind on Thursday morning swept into the Ventura Valley and sent hundreds of trees crashing across roads and telephone lines. The sole remaining toll line to the north was destroyed when trees along the famous eucalyptus-lined drive south of Camarillo came crashing down.

From a Reporter's Book

By O.C. Mauthé

Special Representative

If trains had been able to make the same use of highway bridges as automobiles made of railroad bridges, train traffic would not have been at a stand still. In the Eastern Division enough highway and railroad bridges remained standing to enable servicemen to make their way across country, using one or the other, indiscriminately.

Indomitable Servicemen

The highlight that stands out above all the rest is the manner in which gas servicemen established their right to be classed with such traditionally indomitable people as mailmen and actors. If the mail must go through, and the show must go on, gas service, too, has to be maintained. Everywhere one encountered stories of amazing feats of endurance, heroism and total forgetfulness of personal safety and comfort.

A young man, oiler in the Somis plant of the Industrial Fuel Supply Company, swam the raging Santa Clara River three times in an attempt to get a rope across, in order to restore the Industrial Fuel line at Saticoy. A group of 44 men walked for miles through mud and across streams to get

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GAS NEWS

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Edited by Daniel L. Scott

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Crowded Out!

EVERYTHING but flood stories and flood pictures is crowded out of this issue of GAS NEWS. We have tried to present a comprehensive account of this rampage of nature as it relates to our own business. We believe our readers will approve and our other contributors will be patient.

Key to Pictures

(Roman numerals refer to locations on Map, pages 10 and 11.)

Front Cover—Castaic Creek at Piru Highway, showing bridge and 12" gas main washed out.
No. 1—Cabins in Warm Creek, Waterman Avenue, San Bernardino.
No. 2—Home in Big Tujunga Wash, Magnolia Blvd., Van Nuys.
No. 3—Restoration. Warm Creek and Waterman Avenue, San Bernardino.
No. 4—26" line across Castaic Creek uncovered by flood. (V)
No. 5—Car tracks carried under bridge by flow, Big Tujunga Wash and Chandler Blvd., North Hollywood.
No. 6—16", 12" and 8" lines at North Fork of Santa Clara River. (VI)
No. 7—Line crossing on Foster Road bridge across Rio Hondo near Downey. (XIV)
No. 8—Broken 12" line at bridge across Sespe Creek. (II)
No. 9—Industrial Fuel Supply 15" line and bridge over Santa Clara River at Satc Hoy. (I)
No. 10—Southern Counties 12" line at Big Tujunga Wash, east of San Fernando. (IX)
No. 11—12" line on Newhall Land Company Property along Santa Clara River. (III)
No. 12—Line crossing at Imperial Highway—Los Angeles River. (XVI)
No. 13—26" line at Santa Clara River, north of Saugus. (X)
No. 14—Crane supporting Southern Fuel 26" line across Arroyo Seco, near junction with L. A. River. (XI)

The Meter That Went a-Sailing

No. 15—Ocean to Ocean Highway at Owl Creek, east of Banning.
No. 16—Industrial Fuel Supply 15" line across Santa Clara River at Satc Hoy. (I)
No. 17—Florence Avenue bridge across Los Angeles River.
No. 18—Southern Pacific tracks across Los Angeles River at Figueroa Street. (XI)
No. 20—Messrs. Gillespie and Miller use R. R. trestle on way to Elsinore. Temescal Canyon.
No. 21—8" line, I Street Bridge across Santa Ana River east of Colton.
No. 23—Line on Foster Road Bridge across Rio Hondo, near Downey. (XIV)
No. 24—4" line at Santa Ana River, near Norco.
No. 25—Break in 8" line at Gage Avenue and L. A. River, at Bell. (XV)

O. C. Mauhe—from Page 8

through aid in restoring service to floodstricken San Bernardino. Other men, forgetting their own need of sleep, worked night and day for 48 hours at a stretch, determined to restore gas service despite all obstacles.

There have been great floods before, and there will undoubtedly be great floods in the future. The gas industry will learn some valuable lessons from this flood. Of one thing they can be confident: that they have a force of loyal men who are ready to meet any emergency in a true spirit of service.
Location of Rivers, Dams, and Points of Trouble on Gas Companies' Systems in Los Angeles, Orange, Riverside and San Bernardino Counties.

Flood of March, 1938

Key to Locations on Map

I Saticoy bridge across the Santa Clara River.
II East approach to highway bridge across Sespe creek.
III 1 ½ miles west of Los Angeles—Ventura County line where the State highway skirts the river.
IV Bridge across Castaic Creek on the Newhall-Ventura highway.
V Pipeline crossings about ¾ mile east of State highway.
VI Pipeline crossings about ½ mile north of Saugus highway.
VII Remsen Ave. crossing on Big Tujunga River.
VIII Cable suspension Fernando Road.
IX Cable suspension Fernando Road.
X Los Angeles River
XI Arroyo Seco near geles River.
XII Los Angeles River
XIII Gage Street bridge.
on 26” line east of San

on 12” line west of San

13 r and Haskell Ave.

41
er at 9th Street.

e crossing.

XIV Foster Rd. bridge crossing.

XV Imperial Highway bridge crossing.

XVII Crossing 2 miles south of Huntington Beach, also, Highway bridge crossing on Santa Ana River.

XVIII Brookhurst and Crescent Streets, Orange County.

XIX Carbon canyon near Orange—San Bernardino line.

XX Auburndale bridge crossing north of Corona on the Santa Ana River.

XXI 1 1/2 miles east of Chino.

XXII—XXIII—XXIV Bridge crossings along Santa Ana River.

XXV and XXVI Bridge crossings along Lytle Creek.

XXVII State highway crossing at mouth of San Juan creek.
To the Rescue under Difficulties

By Elting Henderson,
 Superintendent of Distribution, Suburban Division

ABOUT 4:00 o'clock on the afternoon of March 2, we received a telegraph message from San Bernardino stating that flood conditions were so bad that it seemed probable the city would be out of gas shortly. Telephone communication had been disrupted about two and a half hours earlier, and as it took nearly that length of time to transmit messages by wire, because of loaded traffic conditions, we did not wait for verification of the message, but began preparations at once to dispatch a crew of trained service men and repair men to the area.

A crew of 43 men under the supervision of H. A. (Mike) Johnstone set out in a fleet of cars for San Bernardino about 4:30 A.M. March 3, and a service crew of 7 men under Gang Foreman Lasister, together with a truck load of pipe under H. G. Laub's supervision, left at about the same time.

The first difficulty was encountered east of Pomona, where the San Antonio wash crosses Valley Boulevard. The road was in such condition at this point that it was impossible to cross. I arrived at Pomona slightly ahead of the crews and truck and attempted to go through at various points, but found all the roads impassable. The road was partially cleared about 7:30 A.M., and Johnstone and his crew proceeded to Ontario. The truck and service crew followed a short time later.

East of Ontario, the highways were found to be impassable at that time (about 9:30 A.M.). Johnstone and his crew stored their cars at a highway garage and crossed the flooded area east of Ontario on the Union Pacific Railway trestle. They walked to the Guasti Winery, where two trucks were obtained, with which they were able to reach San Bernardino about 11:30 A.M.

Use P.E. Tracks

In an attempt to find a way through for the truck load of pipe, Mr. Laub, Serviceeman Gregory and I inspected the various routes in the area east of Ontario, Highland Avenue and Foothill Boulevard were strewn with boulders, debris, and running water as late as 10:00 on the morning of March 3. We crossed the section on Valley Boulevard which was washed out, by using the Pacific Electric Railway tracks for a distance of about two miles, and were able from there to get to Foothill Boulevard and then on through to San Bernardino, arriving there about 1:00 P.M. Mr. Laub returned to Ontario to bring the truck and service crew through as soon as the road was opened. This he was able to do about 8:00 o'clock, arriving in San Bernardino at 9:00 P.M.

We found, upon arriving in San Bernardino, that service there and at Highlands had been discontinued on March 2 at 5:30 P.M. Repairs were being made as rapidly as possible, and by using all available men, including the 44 from Los Angeles, turn-offs were completed at 2:00 A.M., March 4. In the meantime, the broken mains had been plugged or repaired and preparations made to resume service at 6:00 A.M., March 4.

Turn-ons were started about 6:30 A.M. the same day, with approximately 75 men, and request was made for additional help from Los Angeles. Forty-three men arrived about noon, and were immediately put to work in assisting with the turn-ons in San Bernardino and Highlands. The men from Los Angeles were all used in groups of from three to five men, with a local employee familiar with the streets and communities acting as foreman or guide, thereby eliminating a great deal of confusion and lost effort that might have occurred. All customers were turned on by 12:45 A.M. on March 5 in both San Bernardino and Highlands excepting C.G.L.'s ("can't get in's"), which amounted to about 10 per cent of the total. Thirteen thousand turn-ons were actually made, and about 14,500 calls made.

Police Escort

A radio broadcast at 7:00 P.M. on March 4, to the effect that during the night men would visit all customers not then being

Continued on Page 14
Southern Division Carries On

By J. F. Murray, Manager, Southern Division

The heavy rains of Tuesday night, March 1, acted as an alarm bell to the employees in charge of the Distribution System in the Southern Division.

Actual work of patrolling the lines in areas subject to flood water damage in the Division was started about 6 o'clock Wednesday morning. Men were sent at that time to inspect the various wooden bridges in the division and to make surveys of those major pipelines which were in areas subject to damage from flood waters.

As the run off of flood water increased in flow and the streams were swollen far beyond their normal stage for that time of the year and the threatening conditions assumed greater proportions, men were stationed at the valves on each side of the bridges crossing the San Gabriel River and the Rio Hondo River where those bridges were used as supports for our pipelines. Close contact was maintained at all times with the men stationed at the bridges and the operations of the gas flow in this division were regulated as directed by our Chief Gas Dispatcher, Mr. Keasling.

Still later in the day, due to pipeline trouble on the Ventura lines and the lines coming across the ridge from the San Joaquin Valley, a great many of our large industrial consumers were requested to switch from natural gas to their standby substitutes.

For quite a while, high flood stages in the Rio Hondo River and the San Gabriel River threatened to take out all of the wooden bridges. At times the water flowed within 18 inches of the bridge decks and the waves in the stream were continually splashing over the decks of the bridges. A section of the Foster Street Bridge across the Rio Hondo River went out and was the first actual damage to one of the bridges supporting our pipelines. When this section was destroyed by the water, a portion of our gas line, about 70 feet in length, was left suspended in the air. Gas service was continued through this pipeline until the line itself actually gave away. This line was kept in service as long as possible due to the necessity of maintaining a supply of gas through it for a portion of the Central Division.

More Bridges Fail

A little later a section of the Workman Street Bridge, which is on Imperial Highway west of Cherry Avenue, went out, taking with it a section of our gas line. The valves on both sides of the bridge were immediately closed.

Next the Studebaker Road Bridge showed signs of failing when one span on the west side of the river collapsed to the river bed, falling free from our pipeline, and leaving it suspended. Due to the fact that it was apparent that this line would fail it was necessary for us to turn gas into the north end of the system from the Telegraph Road 16-inch line at Williams corner.

The Olive Street Bridge in Compton was threatened by the high waters which splashed across its deck and, also, due to the fact that timbers of the Workman Street Bridge which had come down the river were lodged against the abutments, thereby placing a terrific strain on the bridge. The bridge was closed to traffic and we also closed our valves on the line going across this bridge. These valves were kept closed until the threat of the bridge collapse was removed by the decrease in the flow of flood waters.

The Wilmington pipeline trestle across the Los Angeles County Flood Control west of Golden Avenue was damaged by floating timbers and one support was knocked out. Although the Associated Oil Company and the Union Oil Company shut off their lines suspended from this bridge with the first sign of failure of the trestle, we maintained our line in service for a number of hours by keeping men stationed at the valves with instructions to close off the valves upon failure of the pipeline. The trestle at no time completely failed, and we were able again to open the pipeline across this structure.

Emergency Measures

In Compton, flood waters followed the trenches which had been opened for the installation of storm drains, and at several points threatened serious damage to our pipeline system. However, several of our crews constructed temporary supports for these exposed pipelines and these supports held even though the streets caved in back to the curb and the flood waters threatened to

Continued on Page 19
(2) About 2,000 feet of pipe was washed out at a point about 1½ miles west of the Los Angeles County line;  
(3) About 300 feet of pipe was washed out at the Castaic River crossing.

Permanent repairs will be made as quickly as highway and bridge repairs are made. In the meantime, temporary repairs were made to the Southern Counties 12-inch line between Ventura and Newhall, and this line was placed in service Sunday morning, March 6. This line is now used jointly by Southern California Gas Company and Southern Counties Gas Company to deliver about 40 million cubic feet daily from Ventura to Newhall.

At Santa Clara River, new piling was driven on the north and south sides of the crossing to reinforce the damaged trestle crossing and the 12-inch line was repaired and placed in service. To re-establish service in the Southern Fuel 26-inch line at Santa Clara crossing, a 12-inch bypass line was laid to connect the 26-inch line at the north side of the river with our 16-inch line on the trestle. With the existing connection between this 16-inch line and the 26-inch line on the south side, the 16-inch line on the trestle will be used temporarily to replace the broken 26-inch line crossing the river. Permanent repairs will be made later.

In addition to the pipeline breaks above mentioned, there are many locations where the transmission lines were uncovered and otherwise damaged. At these locations temporary repairs were made, sufficient to protect the lines and keep them in service. Permanent repairs must be made later.

In view of the difficulties in surface transportation, coupled with the fact that means of communication practically ceased for a time, much credit is due the Transmission Department personnel for the efficient handling of transmission facilities and the maintenance of a gas supply sufficient to meet the needs of the Los Angeles metropolitan area during this period.

Co-Operation Everywhere

At the Pedley bridge north of Arlington, 350 feet of our main was washed out with the bridge and since this offered the quickest means of getting gas to Corona and Elsinore, it was decided to install a temporary line on a cable across the washed-out span. Here a casting rod was used to throw a nut with a line attached, to a sand-bar in the river, and from there it was picked up from the other side and a rope drawn across, to which was attached a steel cable. The cable was made fast at either side and the line suspended from it and attached to the portions of the existing mains. A line was used in one case to convey instructions from one side to the other.

Some difficulty was encountered in San Bernardino in obtaining sleeping quarters for the men, and one group was housed at the Santa Fe Railway yards in Pullman cars. These fortunate individuals on the night of March 3 were the only ones who had heat and hot water in their quarters.

The utmost in co-operation was received from the Police Departments, both State and Municipal; from the Fire Departments, and in almost every case, from our customers.

The job was considered complete, as far as the emergency was concerned, on March 5, and the help from the outside Divisions returned to their homes. The permanent repairs, however, will probably not all be completed for months. Since there were 31 points where repairs to mains of some sort were made before service was resumed, naturally many of them were not what is considered standard practice for permanent installation.

Wm. Moeller—from Page 4

Eling Henderson—from Page 12

served with gas, was of marked benefit, as the percentage of C.G.I.'s after the broadcast was much less, and everything was in readiness for the turn-ons to be completed.

It appeared on Friday that service could be resumed in all sections of the Eastern Division on Saturday if it were possible actually to turn the lines on. However, based on the fact that all the turn-offs had not been completed, and approximately 14,000 consumers were out of gas in these sections, more help would be required, and a request was made for additional servicemen from Los Angeles. Sixty-two men arrived at about 7:00 A.M., Saturday, after having been escorted by State Police from Ontario through the flooded area.

Arrangements had been made to send the first contingent to Palm Springs, it being the farthest from the operating headquarters; the next to Beaumont and Banning and another to Corona, Elsinore, and Hemet, and the remainder to Redlands, where several thousand turn-offs were yet to be made. The men were sent in groups of from 20 to 50, depending upon the size of the area affected.

Prior to starting, they were fed in groups of from 25 to 50 in various restaurants having accommodations for that number at one time.

Based on our experience of the previous day in San Bernardino, where 112 turn-ons were completed per man, it was thought that the job could be completed on Saturday. This, however, was not the case. The longer distances involved, the sparsely settled nature of some of the communities, and the larger homes with more appliances, reduced the average materially, and the final turn-ons were not affected until about noon, Sunday.

It was necessary to keep a number of employees with cars for messenger service at the San Bernardino office, since even to order a change in pressure at Colton necessitated a trip to the Colton Plant.

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Northern Division
on the Job

By S. C. Singer, Manager Northern Division

March, 1938, was ushered into Southern California like the proverbial lion, and the Northern Division was in no way exempted from the wrath of the destructive waters of March 2 and 3.

Without doubt the most extensive damage occurred in North Hollywood in the area extending northwest from Universal City and lying between the two branches of the Tujunga Wash. Due to the collapse of most of the bridges in this area, and the loss of mains and power and telephone lines, the entire district was completely isolated, being left without gas, electricity, telephone service or water for many hours.

The extent of the damage may be measured by the following figures: 11 gas mains were washed out or broken at bridge crossings; service to 2,061 customers was interrupted for periods ranging from 18 to 48 hours; 80 meters were buried; 7,500 feet of 2-inch, 3-inch and 4-inch main was destroyed; 40 services were broken or destroyed; and 40 homes were washed away or so badly damaged as to be beyond repair.

Additionally, an enormous amount of damage was done to pole lines, telephone conduits, water mains, sewers, street pavements, and traffic and railroad bridges.

In Tuna Canyon, located north of Roscoe, 43 customers were affected by the washing out of the feed line on La Tuna Canyon Road.

In the Pacoima District, 30 customers served directly from the Southern Counties 12-inch transmission line were without gas for some time due to a break in this line at the Tujunga Wash.

The Burbank District was not seriously affected outside of the Sunset Canyon area where landslides broke three services and left the only road impassable.

In Glendale comparatively little damage was experienced, due to the many check dams, debris basins and other flood control projects recently built in and to the north of Glendale. Without these structures in place this area would have suffered greater destruction than it did in the New Year’s flood of 1934.

Flood Cuts New Channels

However, where the fast-moving water in the Los Angeles River cut a new channel for itself at the bend at Western Avenue, several fine homes on Riverside Drive were swept away, and about 1800 feet of 2-inch, 3-inch, and 4-inch main, which crossed under the river channel, was washed away.

Because of the current reconstruction of the bridge over the Verdugo Wash in the Rossmoyned District of Glendale, a portion of the concrete walls was not in place, thus permitting the runoff from the north to escape from the channel at this point. As the storm progressed, the channel walls adjoining the missing section were undermined and collapsed, allowing the water to flow down Ethel Street and Glenoaks Boulevard to Louise Street, where it broke through into the channel again. Silt and debris was swept over lawns and into many of the fine homes in this fine residential district. Approximately 125 meters in this section were turned off as a precautionary measure and after the water had receded, some 50 meters were found to have been buried.

In the La Cañada area, 13 customers in the Verdugo Woods Estates were left without gas when the main across the Verdugo wash at New York Avenue was destroyed. About 400 feet of main was washed out here and on Lowell Avenue north of Foothill.

In the Alta Cañada District, service to 2 customers was interrupted when 160 feet of main on Jesse Drive was washed out where the street crosses Weber Canyon. Flood waters in Blanchard Canyon destroyed 450 feet of main, resulting in interruption of service to 3 customers.

Transmission Lines Hit

A number of transmission mains in the Valley were broken, the first casualties occurring at 1:30 P.M. on March 2, when the
12-inch Ventura line and the 12-inch Southern Counties line coming from Ventura went out at Sespe. Following in quick succession, breaks occurred in the 12-inch Industrial Fuel Supply Company's line from Ventura, the 12-inch Southern Counties and the 16-inch Southern California lines from Newhall, and the 26-inch Southern Fuel line. The 22-inch Southern California line on Haskell Avenue was damaged at the Magnolia Street crossing over the Los Angeles river the following morning, evidencing the continued destruction long after the peak of the storm had passed.

It should be noted that throughout this period continuous contact was maintained with the Chief Gas Dispatcher and the General Superintendent's office, so that all interested persons might be kept in touch with the situation existing during the emergency. This was particularly valuable in the case of the transmission line problems which arose as the various lines went out during the course of the storm. Through the interlocking of these lines continuous service was maintained from the north, and at one time it was even necessary to back gas from Hollywood through the 26-inch line into the 16-inch line on Ventura Boulevard at Haskell Avenue, feeding as far north as Calabasas. This also ensured gas supply to the Laurel Canyon district meter which feeds a large portion of North Hollywood.

Service Under Difficulties

Maintenance of service along distribution lines, too, was attempted wherever possible. When it was seen that interruptions were inevitable in the North Hollywood area, work was immediately begun on the writing-up of "turn-off" orders for all meters in the district which was threatened. Throughout the Division, mains which appeared to be in danger of being broken were, where possible, shut off at valves at either side of the anticipated break. After the break in the 4-inch main at the Universal City bridge it was found that pressures in part of the North Hollywood District were rapidly falling. The valve between the Burbank and North Hollywood systems was accordingly opened, and gas supplied from this source, thereby boosting pressure sufficiently to open valves or mains were properly shut off. Men were dispatched to check pressures in outlying districts and to watch for any sudden changes in orifice meter send-outs which would indicate broken mains.

Reports of bridges being washed out along the east fork of the Tujunga began coming in on Wednesday morning, March 2, and breaks in distribution and transmission lines followed one after the other. Much of the damage occurred the following day, Thursday, for, due to the necessity for reducing the pressure against the Tujunga and Pacoima dams, so we were informed, water was released to flow uncontrolled through the two forks of the Tujunga wash. Before gas service could be restored to this area it was, of course, necessary to turn off all the meters in the District. Accordingly, a crew of 40 men, including employees of the Sales and Customers departments, was turned into the field on Thursday, and by 7:30 o'clock that night practically all turn-offs had been made. Because of lack of street and house lighting the men were released until 7:30 the next morning.

Restoration

Even while the main lines were going out, a survey was under way to determine the most feasible method of restoring gas supply to the stricken area. Temporary mains were installed across the west fork of the wash at Chandler and at Magnolia, and a broken main at Vineyard and Tujunga was repaired, thus ensuring at least three feeds to the district. Purging of mains, and locating and repairing of broken mains and services was commenced at 7:30 Friday morning, and by 8:30 crews were ready to begin the work of making the turn-ons. The location of every meter had been carefully checked to make sure that all meters were turned off before gas was allowed to enter the mains.

Approximately 1000 turn-ons were made on Friday, March 4, by a crew of 30 men, and by Saturday night all customers had been called on at least once. Nothing was allowed to stand in the way of restoration of service to our customers, and obstacles which ordinarily would have been thought insurmountable were readily overcome. Roads and bridges were completely washed out, telephone communication was cut off, homes without lights or water, street lights were out, and meters were covered with water and silt, to the extent that restoration of service was, in many cases, quite hazardous.

It might be added that, in spite of the damage suffered in the Northern Division, we loaned 14 men to the Eastern Division to assist in restoring service in that area.

"Hats Off to the Boys"

Summarizing, the storm destroyed 10,179 feet of main, broke 48 services, buried 130 meters, wrecked 41 houses and caused us to turn off and run 2158 meters due to interrupted service. An estimated 12 million cubic feet of gas was lost on March 2 and 3.

An interesting sidelight on the flood is the fact that a meter formerly located at 10765 Aqua Vista, North Hollywood, was picked up at Long Beach, having traveled down the Los Angeles river for a distance of 37 miles. Also, an Electrolux from 11258 Moorpark Avenue in North Hollywood was picked up in the Los Angeles river in Glendale, five miles from the home in which it had been installed.

Hats off to the boys, white collared and otherwise, who, side by side in the mud and water, enthusiastically rendered heroic service, and without accident either to consumer or employee.
28 Inches of Rain in 36 Hours

By H. C. McAllister, Manager Eastern Division

O F THE 35,000 gas meters put out of service by the storm on March 2, nearly 29,000 were in the Eastern Division. In other words, San Bernar-dino and Riverside Counties bore the brunt of the disaster that struck Southern California.

The reason for this is seen in the fact that 28 inches of rain fell on the San Bernardino watershed in the 36 hours from 9 P.M. Tuesday until early Thursday morning—over 6 inches more than fell anywhere else in the storm area. Most of this water, due to the fact that the watershed was unable to absorb any more moisture, flowed into the Santa Ana River and its tributaries and Lytle and Warm Creeks, resulting in the greatest flood in the history of this part of the country.

Rising waters carried away many bridges and approaches, taking along major gas transmission lines. By 5:30 P.M. Wednesday the three mains supplying the 13,000 meters in the San Bernardino-Lake Arrowhead district were washed out where they cross Lytle Creek. At the same time, 2,300 customers above San Bernardino in Highlands, Lake Arrowhead, Cottage Gardens and Museum were deprived of service. When the disaster struck West Riverside that evening, causing great physical damage, approximately 300 meters were affected. Redlands, the second largest community affected, with 5,000 meters, and Palm Springs with 1,000 meters, sustained by holds, maintained service until 12:15 P.M. Thursday. Other communities, including Corona, Elsinore, Norco, Beaumont, Banning, Hemet, Mentone, Yucaipa, and Loma Linda, went out between 6 and 9 A.M. Thursday.

There were 31 separate locations in the Eastern Division where damage to distribution and transmission lines occurred. The lines held at some of these points, but at others were broken at one or more places.

No Telephone Service

Telephone communication between Eastern Division headquarters at San Bernardino and Los Angeles ceased during Wednesday afternoon, and all orders and information had to be handled by telegraph, which required from two to four hours in transmission. Communication between communities in the Eastern Division itself also was cut off, which made the securing of accurate information exceedingly difficult, particularly since many roads were impassable.

With practically the entire staff of the Division busy turning off meters, additional trained help was requested from Los Angeles, and 42 service men from the Distribution Department set out to try to get through early Thursday morning. Some 20 miles from their destination they were forced to abandon their cars and had to hike through washes and over railroad bridges most of the rest of the way, arriving in San Bernardino about noon. By 2 A.M., March 4, all meters in San Bernardino were turned off. Gas was restored to the lines at 6 A.M. Turning on of meters began at 6:30 A.M., and all had been restored to service at 12:45 A.M., March 5.

Customers were informed by radio station and newspapers that the gas company was ready to resume service, provided access to homes could be gained.

In the meantime, telephonic communication had been re-established between the Eastern Division and Los Angeles headquarters. Connection was made through a long distance hookup which covered five states and followed a circuitous route of 2,400 miles through San Francisco, Salt Lake, Denver and Phoenix.

It is interesting to note that the “Amos and Andy” broadcast was made from Palm Springs over the same hook-up until more direct telephonic communication was restored.

“Seems Almost Unbelievable”

Another large force of trained men from Los Angeles was dispatched on Friday to assist in restoring service to the rest of the Division. By working almost without sleep and rest, these men and the local forces were able to restore service to Redlands by Sunday morning, and to the other communities in the Division by Sunday night. Hospitals and hotels already were on butane service and were cut over to natural gas as rapidly as possible. Except where houses had been washed away, evacuated, or were unoccupied at this time of year, every customer in the Division had natural gas by nightfall, March

Continued on Page 19
“Where Credit Is Due”  
By H. P. George

OTHER NARRATIVES have covered the damage done and the difficulties encountered during the storm which began March 2, and the effect of that storm on Southern California.

While we were busy with our problems here, Johnny Farmer and his boys in Avenal by constant vigil day and night and close co-operation with the local Division of Highways maintenance men, were successful in keeping the bridges intact over the Kings River, by preventing accumulation of debris coming down with the heavy water flow. These bridges carry our transmission pipelines which supply Fresno and our San Joaquin Valley Division.

Tex Newby and his boys in the Kern Division escaped serious damage to facilities in their district, but stood by to render aid to others as needed.

Outage of transmission facilities centered in the Newhall Division, where Stuart Donaldson and his boys did a fine job under trying circumstances. Good management is reflected in having men at the right place, at the right time, and as a result of this, W. N. Curtis, Foreman at Ventura, was in position to shut off the Ventura line on the downstream side of the Sespe washout immediately after the failure of the line, but was obliged to spend a couple of days’ “vacation” marooned in Fillmore, this highway having been washed out on either side.

And Hundreds More

Dave Gamble and his crew were on the south side of the Santa Clara River Wednesday night when the Southern Fuel Company line failed and caught fire, and after recovery from this awe-inspiring sight, were in position to close the valve on the south side of the river.

Roscoe Sutton drew a tough assignment in shutting off the valve on the north side of this break, in wading about 1,000 feet through water over his boot tops to reach the main line valve, and then was obliged to enter the deeper water in the valve box to make a shutoff.

At the time the storm broke, Bill Pipkin, Superintendent of the Southern Fuel Company, had under consideration plans to undergo an operation, but laid aside that rather personal matter to give his full attention to maintaining the Southern Fuel Company 26-inch line in service. He and his staff were successful at all points except the Santa Clara River, although the line at Castaic, Pacoima, Tujunga and Arroyo Seco was tottering on the brink.

It was indeed gratifying to note the excellent judgment which was exercised by all of our men, who were cut off from communication with headquarters and were acting on their own responsibility.

J. F. Murray—from Page 13

Our Murphy-Dillon 10-inch line south of Slauson Avenue, one of the main supplies to the entire beach front area, was seriously threatened by swift running water which undermined the banks of the wash adjacent to this line. Patrolmen were on duty along this line with instructions to close off the line at Slauson Avenue and Centinela Avenue upon actual failure of the line. Although the line was undermined and suspended in the air in numerous places it remained intact and no interruption of service of the line was experienced.

Other than the two lines lost on the Foster Street Bridge, and the Workman Street Bridge crossing the Rio Hondo River, no pipelines were washed out in the Southern Division. The only actual interruption of service to customers occurred to four domestic customers just west of the Foster Bridge, and we were successful in supplying them with Butane tanks in a few hours. We then bull-plugged the lines near the bridge terminals and natural gas was again restored to these customers.

Due to the fact that the actual damage to our system was relatively small we were in a position to release thirteen of our service men for use in the more seriously damaged Eastern Division, and to send one street crew with a patrolman to check the transmission line from Brea to Colton.

The splendid service and co-operation given by the men of the Street, Service, Measurement, and Stores Departments of this Division by their performance of duty over long hours and under trying circumstances, again displayed the splendid spirit of the organization, which was evidenced in that trying time following the earthquake of just five years ago.

H. C. McAllister—from Page 18

6. Service was restored to Lake Arrowhead Monday.

No comment on the flood situation in the Eastern Division could be complete without mention being made of the part that employees in the Division and from Los Angeles played in restoring service. The job of turning off 29,000 meters and turning them on again in two days seems almost unbelievable, and it could not have been accomplished unless every man had more than done his share.
For Key to Pictures
see page 9