Mr. R. E. Speckmann, Manager
Regulations and Maintenance Standards
Shell Pipe Line Corporation
P.O. Box 2648
Houston, Tx 77001

Dear Mr. Speckmann:

Your letter of June 19, 1979, requested a finding under 49 CFR 195.260(e) that valves are not justified at certain water crossings in your planned installation of the 48-inch diameter LOCAP crude oil pipeline between the Louisiana Offshore Oil Port (LOOP) terminal at Clovelly, Louisiana, and the existing input terminal to the Capline system at St. James, Louisiana.

In your letter, you stated that the LOCAP pipeline begins at LOOP's Clovelly, Louisiana, underground storage dome in Section 32, T18S, R22E, LaFourche Parish, and extends in a northerly direction across marshes, numerous bayous, swamps, the Intracoastal Waterway, and some farmland to the Capline Pipeline St. James Terminal located in Section 56, T12S, R16E, St. James Parish, Louisiana. Conditions along the LOCAP pipeline route are such that approximately 85 percent of the pipeline will be installed in marsh and swamp areas using weight coating for stability. The pipeline will be welded together and floated in a ditch excavated through these areas. The pipeline will be submerged, and the floatation ditch will be backfilled to cover the pipeline. Brackish and fresh water will exist at various times of the year over most of the length of the new pipeline.

You indicated that precise compliance with ?195.260(e) would result in the placement of what the Shell Pipe Line Corporation (SPLC) considers to be an impractical number of valves. Instead you proposed to place valves at initiating and delivery terminals, near Highway 3199 and near Highway 20, and on each side of the Intracoastal Waterway. The valves at the initiating and delivery terminals and on each side of the Intracoastal Waterway will be remotely operable from the Capline St. James Control Center. Further, you also proposed to install two means to detect leaks, as discussed hereafter.

In the evaluation of your request, this Office considered the following factors as relevant to whether justification exists for not installing valves as required:

1. Effectiveness of Proposed Leak Detection and Shutdown System

We found your plans for automated leak detection with alarms and remotely controlled block valves and shutdown pumps at Clovelly Station to be an effective, integrated set of alternative measures which will assure a level of safety far exceeding that attainable by literal adherence to ?195.260(e). Your first method, a dynamic computer model of the pipeline, will provide rapid response to suddenly occurring leaks. I believe this model will read telemetered pressures and flow rates from Clovelly and St. James. Utilizing hydraulic surge theory, the model will calculate and compare calculated and telemetered hydraulic variables. Computerized computations will ascertain the divergence between real and calculated values and send appropriate alarms to the oil movements controller if a leak is indicated.

The proposed second method of leak detection by comparison of input and delivery volumes will be read into a computer line balance program and compared at periodic intervals. If a discrepancy exists between the adjusted input and output volumes exceeding a preset limit, the proposed leak detection alarm will be signalled to the oil movements controller, who will be able to shut down the pumps at Clovelly Station and isolate the pipeline by means of remotely controlled block valves at initiating and delivery terminals and on each side of the Intracoastal Waterway. Your proposed leak detection and shutdown appear to be safe and surpass the safety provided if shutdown capabilities were limited to manually controlled valves placed as required by ?195.260(e). Even if these remotely controlled valves failed to close in the event of a pipeline rupture, the response time required to manually close them should be no greater than the response time necessary to close any manually operated valves under ?195.260(e).

2. Threat to the Integrity of the Pipeline at the Planned Water Crossings

The waterways to be crossed other than the Intracoastal Waterway are all less than 10 feet deep and most are less than 7 feet deep. Flow rates are so low that erosion of the pipeline cover is highly unlikely. Marine traffic consists of light, shallow draft boats and an occasional flat-bottomed barge, none of which can be expected to damage the pipeline within its 5-foot, filled trench by direct contact or dragging anchor. For these reasons, we conclude that the probability of pipeline rupture at these water crossings is not appreciably greater than that for the remainder of the pipeline.

3. Drainage from Line after Shutdown

Placement of valves on either side of the water crossing is to limit line drainage into the waterway after shutdown in the event of rupture at a crossing. In your proposed valving plan locations, Drawing No. SK-0146 showing pipeline water crossings, even though a valve is not near a crossing, very little oil is expected to escape from any line rupture that might occur at the crossing after shutdown occurs and all dynamic effects cease. The maximum grade elevation variation along the pipeline is limited to approximately 15 feet. The elevation at Clovelly Dome is 0 feet to -1 foot, and at the St. James Terminal, the elevation is approximately +14 feet at the delivery manifold. Eighty percent of the pipeline will be installed in marsh and swamp areas using weight coating for stability. It is reasonable to postulate for practical purposes that the line will lie mostly beneath the water level and that after shutdown, water pressure will confine most of the line fill to the pipeline except for small amounts displaced by the differential in density between oil and water.

Therefore, in consideration of the above information and conclusions, the Materials Transportation Bureau finds that valves and a leak detection system installed and operated as proposed in you letter of June 19, 1979, will provide an acceptable level of public safety and that placement of valves on each side of every water crossing, other than the Intracoastal Waterway, along the LOCAP pipeline is not justified.

Sincerely,

Cesar De Leon
Associate Director for
Pipeline Safety Regulation
Materials Transportation Bureau

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June 19, 1979

Mr Caesar De Leon, Associate Director
for Pipeline Safety Regulation
Materials Transportation Bureau
Department of Transportation
Washington, D. C. 20590

Dear Mr. De Leon:

Shell Pipe Line will construct LOCAP Pipeline, a 48-inch diameter crude oil pipeline between the Louisiana Offshore Oil Port (LOOP) terminal at Clovelly, Louisiana, and the existing input terminal to the Capline system at St. James, Louisiana. Capline, in turn, delivers crude oil into the American mid-continent area.

The LOCAP pipeline segment was originally a part of the LOOP permit applications and approvals. Recently the owners of LOCAP Pipeline (Texaco, Inc., Marathon Pipe Line Company, Ashland Oil, Inc., and Shell Pipe Line Corporation) selected Shell Pipe Line Corporation to construct and operate it.

As shown on the attached sketch, the LOCAP line begins at LOOP's Clovelly, Louisiana, underground storage dome in Section 32, T18S, R22E, LaFourche Parish, and extends in a northerly direction across marshes, numerous bayous, swamps, the Intracoastal Canal, and some farmland to the Capline Pipeline St. James Terminal located in Section 56, T12S, R16E, St. James Parish, Louisiana.

Conditions along the LOCAP pipeline route are such that approximately 85 percent of the pipeline will be installed in marsh and swamp areas using weight coating for stability. The pipeline will be welded together and floated in a ditch excavated through these areas. The pipeline will be submerged, and the floatation ditch will be backfilled to cover the pipeline. Brackish and fresh water will exist at various times of the year over most of the length of the new pipeline.

As in the case of LOOP Pipe Line System, extensive wetlands exist along most of the LOCAP pipeline route. Since approximately 18 bayous and submerged land areas will be crossed where the width of the crossing exceeds 100 feet (reference attached SK-046 for crossing locations), we believe, as in the case of LOOP pipeline, strict adherence to 49 CFR 195.260(c), "Transportation of Liquids of Pipeline", is neither practicable nor justifiable in this particular case. Due to the existence of a combination of water and marsh or swamp along the proposed 48-inch pipeline, block valves at all locations required by DOT regulations would not improve line safety nor appreciably reduce pollution should a failure occur.

Accordingly, we propose to install block valves at both sides of the Intracoastal Waterway, near Louisiana Highway 3199, near Highway 20 , and at the initiating and delivery terminals. As shown on the attached sketch, valves located at terminals and the Intracoastal Waterway will be remotely operable from the Capline St. James Control Center. Maximum valve spacing will be approximately 16? miles. The recommended locations are accessible and serve a useful purpose should damage occur to the new pipeline.

Installation of valves in the above manner takes into consideration numerous related pipeline control factors including the following:

A. Leak Detection and Shutdown System

Line integrity features will be included in the supervisory control system to monitor the pipeline for leaks and provide rapid shutdown of the pipeline by the oil movements controller in the event a leak is detected. Two methods of monitoring for leaks will be included in the line integrity features. The first method, a dynamic computer model of the pipeline, will provide rapid response to suddenly occurring leaks. The model will read telemetered pressures and flow rates from Clovelly and St. James. Utilizing hydraulic surge theory, the model will calculate and compare calculated and telemetered hydraulic variables. Shell Pipe Line's computer program will ascertain the divergence between real and calculated values and send appropriate alarms to the oil movements controller if a leak is indicated.

The second method of leak detection functions by comparison of input and delivery volumes. Input and delivery volumes from custody transfer quality meters at Clovelly and St. James will be gathered each supervisory scan and will be read into a computer line balance program and compared at periodic intervals. At each comparison, line fill between the measurement points will be calculated by the computer and compared with the line fill calculation at the previous interval. Any change in line fill between the two intervals will be included in the line balance comparison. When a discrepancy exists between the adjusted input and output volumes exceeding a preset limit, a leak detection alarm will be presented to the oil movements controller.

Upon indication of a leak detection alarm, the oil movements controller will be able to shut down the pumps at Clovelly Station and isolate the pipeline by means of remotely controlled block valves at initiating and

delivery terminals and on each side of the Intracoastal Canal - Clovelly Station to East Bank of Intracoastal Canal, East Bank to West Bank of Intracoastal Canal, and West Bank of Intracoastal Canal to St. James Terminal. Pressure transmitters will allow monitoring of the pressure in each of the three line sections for indications of leakage.

B. Pipeline Integrity at Planned Water Crossings (Excluding the Intracoastal Waterway)

The waterways to be crossed are all less than 10 feet deep. The waterway flow rates are such that erosion of the pipeline cover is highly unlikely. Marine traffic consists of light, shallow draft boats and an occasional flat-bottomed barge, none of which can be expected to damage the pipeline within its 5-foot backfilled trench by direct contact or dragging anchor. A significant degree of protection from exterior mechanical damage will be provided by the steel reinforced concrete weight coating approximately five inches thick and surrounding the pipe. It may, therefore, be concluded that the probability of pipeline rupture at these water crossings is not greater than that for the remainder of the pipeline.

C. Drainage from Line after Shutdown

Under the proposed valving plan, even though a valve may not be near a point of rupture, very little oil is expected to escape from any rupture after shutdown occurs and all dynamic effects cease. Because the maximum grade elevation variation along the pipeline is limited to approximately 15 feet (Clovelly Dome is 0 feet to -1 feet, St. James Terminal is approximately +14 feet at the delivery manifold) and because much of the line lies beneath the water level, the line fill should be confined to the pipeline by water pressure except for small amounts displaced by the differential in density between oil and water.

In consideration of the above, your concurrence with LOCAP pipeline valve placement at water and road crossings as recommended

is requested in lieu of requirements established under the provisions of 195.260(e) Part 195, Transportation of Liquids by Pipeline, DOT - Pipeline Safety Regulations.

Very truly yours,

R. E. Speckmann, Manager
Regulations and Maintenance Standards

Attachments:

1. Sketch No. SD-13712 showing line location.
2. Drawing SK-1046 showing pipeline, water crossing, and proposed valve locations.

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