PI-73-0100

January 3, 1973

Mr. E. P. Doremus, P.E.
Service Division
Cathodic Protection Service
P.O. Box 66387
Houston, Texas 77006

Dear Mr. Doremus:

Thank you for your letter of November 2, 1972, in which you forwarded information and comments concerning the two-electrode surface potential survey method for locating areas of active corrosion. Your comments were made with reference to an interpretation contained in the OPS Advisory Bulletin 72-8 of August 1972 in which it was stated that OPS does not feel that the "leap frogging" survey method will provide any useful information in determining where active corrosion is taking place on Dresser-coupled pipelines (insulated joints). The Bulletin went on to say that there are other types of electrical equipment that will do this job.

Your letter suggests that the "leap frogging" technique is no longer in use and that, therefore, it may not be appropriate to refer to it. However, the interpretation quoted in the Bulletin was in response to a specific question, and, as indicated "leap frogging" is not useful for Dresser-coupled pipelines with insulated joints. On the other hand, the "leap frogging" surface potential survey method is being successfully used for locating areas of active corrosion on electrically continuous pipelines. As your letter recognizes, the purpose of "leap frogging" is to compensate for electrode potential differences. While we recognize that there is equipment available today which makes it unnecessary to use "leap-frogging," the leap-frogging technique remains available for use on electrically continuous pipelines.

Your letter also states that the two-electrode surface potential survey method is the most satisfactory approach for providing Dresser-coupled pipelines with adequate cathodic protection. To the extent that you are referring to the use of two electrodes in continuous contact with the earth, we agree. The proper technique provides for a continuous voltage difference measured between one electrode placed over the pipeline and the other electrode located five feet from the pipeline and perpendicular to the pipeline. The survey is normally conducted on both sides of the pipeline to identify existing galvanic anodes.

Your interest in this important aspect of pipeline safety is appreciated. If you have further questions or comments, please contact us.

Sincerely,
SIGNED
Joseph C. Caldwell
Director
Office of Pipeline Safety

Cathodic Protection Service
P.O. Box 66387
Houston, Texas 77006

November 2, 1972

Office Of The Secretary Of Transportation
800 Independence Avenue SW
Washington, D.C. 20590

Attention: Mr. Joseph C. Caldwell Director
Office of Pipeline Safety

Gentlemen:

We are attaching a copy of a letter from your office which has been brought to our attention by several of our clients. The contents of this letter were also published in the DOT Advisory Bulletin No. 72-8. As a result, we have received a number of inquiries as to the meaning of the contents.

In the interest of clarifying some confusion in the minds of the readers, and to dispel certain erroneous conclusions which could be drawn from the letter, we consider it important to bring the following information to your attention.

The letter refers to "the use of the two-electrode 'leap frogging' surface potential survey method for locating areas of active corrosion on Dresser coupled pipelines (insulated joints)?" First, we wish to point out that the term "leap frogging" in connection with the surface potential survey method refers to a procedure which was utilized in the early development stages of the two-electrode surface potential survey some 20 years ago. The purpose of "leap frogging" at that time was to accommodate electrode imbalance by averaging out the error between the two electrodes. The two-electrode surface potential survey technique was refined many years ago to avoid this awkward and confusing procedure of "leap frogging". Today's surface potential surveys are accomplished using very stable copper/copper sulfate electrodes with the electrodes being balanced against each other at maximum 1,000' intervals. If the imbalance between the two electrodes exceeds two millivolts, the electrodes are cleaned, and the copper/copper sulfate solution replaced to return the electrodes to a balanced condition. Such being the case, we feel that the usage of the term "leap frogging" was unfortunate in that it refers to a procedure which has not been utilized in connection with the two-electrode surface potential survey, with possible rare exceptions, for many years.

The conventional two-electrode surface potential survey procedure has been successfully used for many years to locate and define localized and gross corrosive areas on bare Dresser coupled lines. For many years, our contracts with clients have specified that when corrosion is detected at or on a Dresser coupling, the center ring and follower of the coupling will be bonded to the adjacent joints of piping and the anode installed at the coupling location. Over the years, and over many hundreds of miles of Dresser coupled lines surveyed, we have encountered many of these Dresser couplings which were corroding and at which bonding and anode installation was accomplished.

It should be pointed out here that the reference in the DOT letter to "insulated joints" is considered to be somewhat misleading in that the standard Dresser coupling rarely functions as an insulating coupling. For a standard Dresser coupling to serve as an insulating coupling, the alignment of both joints of pipe and the coupling would have to be absolutely perfect. It is possible but a rare case indeed when such a condition exists after the line is backfilled and subject to soil stresses, and when taking into consideration the expansion and contraction characteristics of a bare steel pipeline. It is quite true that Dresser couplings can and frequently do develop high resistance contacts. However, this situation is entirely different than that of an insulating Dresser coupling. During a well conducted surface potential survey, an underground insulating Dresser fitting is detectable from surface potential data. It is in some cases difficult to determine from surface data that the Dresser coupling per se is actually subject to concern able corrosion attack. However, in the majority of cases, if the corrosion process is taking place at or near the coupling, this fact will be reflected by surface data. If indeed there should be any doubt from surface data, then the standard procedure is to excavate and to confirm by visual inspection.

In summary, we submit to you that, based on our many years of experience and successful corrosion control results with

Dresser coupled pipelines surveyed by the two-electrode surface potential survey method, and followed by "hot spot" protection with magnesium anodes, the two-electrode surface potential survey method is the most thorough, practical and economical approach to providing bare Dresser coupled pipelines with adequate cathodic protection.

This information is furnished to you on the basis that we do not feel that it was the intent of DOT to publish information which by inference might be misunderstood or misleading to the industry as a whole, or to rule out a proven procedure which has served industry well for many years.

We would appreciate your comments on this matter in the near future. A copy of this letter is being furnished to the clients who have contacted us with questions concerning the Advisory Bulletin No. 72-8.

Very truly yours,
Cathodic Protection service
E.P. Doremus, P.E.