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Interoffice Correspondence from D. G. Neville to R. A. Skultety (Nov. 15, 1991), re: Review of Corrosion Evaluation Log from Montebello MGS 20-13

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INTEROFFICE CORRESPONDENCE

SOUTHERN CALIFORNIA gas COMPANY

TO R. A. Skultety FROM D. G. Neville DATE November 15, 1991

SUBJECT Review of Corrosion Evaluation Log From Montebello MGS 20-13

Summary

During a recent casing corrosion survey in Montebello, results from a downhole evaluation tool (Vertilog) and a surface pipe inspection (West Coast Pipe) were compared. The Vertilog tool indicated much more corrosion than was actually observed from the surface inspection. This study reviews the results from both procedures and attempts to draw some conclusions regarding casing evaluation tools, more specifically, the Vertilog.

Montebello MGS 20-13

In September 1991, MGS 20-13 at Montebello was worked over to remedy a tubing leak which resulted from corrosion. After the tubing was pulled from the well, a casing evaluation tool (Vertilog) was run to check for corrosion in the inner 6-5/8" casing string. The Vertilog indicated 46 joints with Class II metal loss, 6 joints with Class III metal loss, and 2 joints with Class IV metal loss. Since the metal loss was severe, a decision was made to pull the 6-5/8" inner string. The string was sent to West Coast Pipe Inspection for a more thorough surface inspection. The surface inspection indicated only 6 joints of significant metal loss to be classified as rejected. Of these 6 joints, the Vertilog had only identified 2 of them and failed on the other 4. Further, the amount of metal loss on the rejects were only in the 12-18% range and not serious enough to warrant pulling the casing. Table 1 includes a tally of the bad joints (Class II and above) from the Vertilog and the corresponding West Coast Pipe Inspection results.

Discussion

In Montebello MGS 20-13, the Vertilog was obviously inaccurate in its diagnostic capabilities of the 6-5/8" casing string. The tool largely overexaggerated the degree of metal loss in the casing. A meeting with Mike Flecker, Western Atlas was conducted on 10/31/91 to review the Vertilog and compare to West Coast Pipe's surface inspection. Results of the meeting led to several possible explanations for the log inaccuracy.

1) Western Atlas tool may not be functioning as specified in Atlas literature. This may be due to

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the inherent characteristic of the tool itself, or to a poorly calibrated tool used on the job. In order to counter this possibility Western Atlas has decided to have their research group in Houston review the job. Their report will be attached when the work is completed.

2) We may be expecting too much from flux leakage tools in general to identify and quantify pits, cuts and general corrosion. The Vertilog as with other electromagnetic flux leakage tools measure magnetic flux anomalies in the casing wall. These anomalies will result due to any defect, i.e., pit, hole, cut, split or general corrosion in the casing metal. Measurements of flux leakage are converted to a percent casing wall penetration based on empirical correlation charts (Table 2). Therein lies the problem of being able to quantify the amount of metal loss. Correlation charts are presented for various casing sizes and grades with conversions limited to holes and general corrosion only. In the MGS 20-13 log, what appeared to be a Class IV (over 80% penetration) hole was actually a shallow (less than 10%) 3 inch transverse cut. There is no way of distinguishing a hole from a transverse cut with the Vertilog. In fact, 4 of the 9 Class III and aboves were actually shallow transverse cuts.

Schlumberger is more careful in their approach to quantifying metal loss. "The flux leakage tool response to holes in casing is good; however, such responses may be generated by corrosion, pits and holes. Although potential problem intervals can be identified, it may not be possible to determine if holes exist." (from Schlumberger literature).

3) Casing eccentricity may have prevented accurate readings. According to John Ludke with West Coast Pipe Inspection, the casing from #20-13 exhibited extreme pipe eccentricity. Mr. Ludke explained that due to eccentricity, a more involved method of diagnosing pipe rejects had to be employed. This included running an electrolog to first measure the depth of the defect and then running an additional electrolog to determine whether the defect was on the light or the heavy side of the pipe. Western Atlas is aware of the eccentricity problem and is researching what effect eccentricity may have on Vertilog measurements.

Recommendations

1) Run the next casing evaluation log using a different vendor to determine which tool may be the most accurate for the Montebello work. Unless the Western Atlas research group can provide a more conclusive report as to the inaccuracy of the Vertilog, their accuracy has probably been established. In the meantime, Schlumberger and Halliburton should be considered.

2) The amount of emphasis placed on logs of this type at present, should only be used to identify possible corrosion problems on a qualitative basis. At Montebello, inner casing strings should probably still be pulled on minimum signs of casing corrosion. The severity of the corrosion problem, and the fact that we are still in the process of evaluating the corrosion mechanism warrants being overly cautious at Montebello.

3) Casing should be clean prior to running the log. The logging companies recommend clean internal pipe prior to running the casing logs. This is important in determining whether a defect is internal or external, as positive contact must be obtained by the tool pads for an accurate eddy current reading. The pipe appeared to be clean in the MGS 20-13 well and was thus probably not a major factor.

4) When used casing is run back in to a well, a documentation of initial casing flaws should be made. This could involve simply noting the joint number of for instance a transverse cut, and including the information in the well file. Thus, when a casing evaluation log is run, the flaw will not be mistaken for corrosion.

DGN:bb
(COREVAL)

cc: R. M. Dowell
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