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"THE POISON SPLINE SYSTEM--MARCH 1960

AUTHOR

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THE POISON SPLINE SYSTEM - MARCH 1960

By:

R. M. Smithers

March 10, 1960

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THE POISON SPLINE SYSTEM - MARCH 1960

By:

R. M. Smithers

The development and on-pile application aspects of the Poison Spline System have been continuously manned by Equipment Development Operation for three and one half years. Numerous problems have been surmounted and the very recent success of the spline coiler disposal machine at 105-KW indicates that the latest major development problem has been resolved. We believe that with the guidance and help of an engineering application group the system can now be fully applied for both start-up and flattening control at those reactors which need and desire it. A suggested source of this service is Plant Engineering Operation. We plan on curtailing our general engineering assignment for development of the poison spline system by June 30 or sooner if possible. Only thru widespread use of this system by various operating crews will the need for further refinement be demonstrated. After June 30 poison spline development effort will be performed upon specific requests for improvement or for individual pieces of equipment or tooling. This work will necessarily have to be judged against the needs and priorities of other development programs and requests should be addressed to E. C. Wood, Manager of Equipment Development Operation, for assignment.

Following is a short resume of the current status of this development program:

Spline Development

Solid boron aluminum splines are available and can be routinely applied to Hanford reactors with minimum difficulty. This spline is somewhat more costly but more trouble free than hollow splines which we initially developed. Future engineering application effort should be taken to reduce cost and ever examine the possibility for reuse of solid splines disposed of by the spline coiler. Reuse appears feasible now.

Seals

The seals in use work fairly well but we have had some comment from processing groups objecting to an occasional spray or drip. The problem presented is that dampness from spline seal leaks makes it difficult for reactor operators to notice and correct leaks from other causes on the front face. These seals are the result of extensive development work to overcome the causes of failure we first experienced 1957. A current short-coming is that the material, ARCO-Flex B, from which these seals are formed is available from only one

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source of supply. The problem as well as selection of alternate materials could be worked on beneficially by an application engineer. We have an order out for test lots of seals from five different materials. Other materials using the same seal design may prove suitable; however, the seal we have has proven feasible in use and meets most requirements of a rather unique and difficult criteria.

30 Disposal Equipment

The spline coiler while not having been used on-pile for an extensive length of time is of a design significantly more trouble free than the spline chopper flushing disposal system. Some minor development and evaluation is still required to obtain the optimum reel design following which the final prototype drawings will be revised as a suitable detail design for procurement. We believe the installation problems, different for each reactor, should be resolved by groups other than Equipment Development. Equipment Development will supply basic installation drawings for K type and B, D, and F type reactors since we developed these to prove the prototype design. Our two prototype machines are being assigned to KE and KW. D Processing is understood to be taking action toward procurement of coiler equipment for 105-B.

40 Summary

We feel that the total system presently available including the spline coiler and reel disposal unit is adequate for full plant application to attain benefits from flattening, from off-setting of long term gains and for obtaining significant production increase from the reduction of start-up losses. Detail data on this subject can be obtained from Operational Physics Operation but the incentive for action is immediate. 3 to 3 1/2% production increase over that obtained with PCCF. The equipment has been demonstrated as being compatible for use by the Maintenance and Process Operations personnel as D, KE, and KW have been in operation either totally or partially. Reactors 105-B, C, and F have begun spline system preparations. Caps, seals and other parts and fittings were procured for all reactors under an appropriation request now closed out. Financing of costs for new spline coiler disposal systems is a problem to be resolved by the respective Processing Operations. Splines are routinely procured as Essential Material and system parts which require frequent replacement are available from Spare Parts.

The essence of the above is that we do not have the manpower to manage application of poison splines on remaining reactors and you are extremely interested in assuring that the system is applied to obtain the 3% production increase as soon as possible. Outside of funds for new spline coilers at about \$7000 per reactor installed including \$1200-1500 installation cost, we see no obstacle to prevent very early application at 105-B, C, F and DR.

The pay-off period for an expenditure of \$7000 per reactor is two days at this stage of the game. Any comments you wish to return will be welcome.

Rm. Smithers
Supervisor, Mechanical Development "A"

RM Smithers:cn

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