AIM

Association for Information and Image Management

1100 Wayne Avenue, Suite 1100
Silver Spring, Maryland 20910

301/587-8202

Centimeter

Inches

MANUFACTURED TO AIM STANDARDS
BY APPLIED IMAGE, INC.

ADDITIONAL EVALUATION OF "LDS MOLDABLE" FOR MELTER CONSTRUCTION

by
W. W. F. Yau

Savannah River Site
Aiken, South Carolina 29808

DOE Contract No. DE-AC09-89SR18035

This paper was prepared in connection with work done under the above contract number with the U. S. Department of Energy. By acceptance of this paper, the publisher and/or recipient acknowledges the U. S. Government's right to retain a nonexclusive, royalty-free license in and to any copyright covering this paper, along with the right to reproduce and to authorize others to reproduce all or part of the copyrighted paper.

MASTER

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

This report has been reproduced directly from the best available copy.

Available to DOE and DOE contractors from the Office of Scientific and Technical Information, P. O. Box 62, Oak Ridge, TN 37831; prices available from (615) 576-8401.

Available to the public from the National Technical Information Service, U. S. Department of Commerce, 5285 Port Royal Rd., Springfield, VA 22161

Keywords: LDS Moldable
Thermal Expansion
Shell Stress

cc: J. A. Gentilucci, 704-S
J. E. Owen, 704-29S
D. C. Witt, 704-29S
D. C. Iverson, 704-29S
E. F. Duhn, 773-A
D. A. Crowley, 704-1T
C. Gong, 773-42A
SRTC Records, 773-52A (4)

October 8, 1993

TO: E. W. HOLTZSCHEITER, 773-A

FROM: W. W. F. YAU, 773-41A *W. Yau*
(5-1726)

ADDITIONAL EVALUATION OF
"LDS MOLDABLE" FOR MELTER CONSTRUCTION - (U)

Introduction

Reference 1 concludes that use of "LDS Moldable" material for the cushion layer of melters is acceptable. The conclusion is based on calculations according to the geometry of the early melter that we designed 13 years ago. Reference 2 pointed out the size difference of the DWPF melter and requested additional evaluation of the LDS Moldable" for melters that are about 50% greater in diameter. This memorandum reports the evaluation results.

Summary

Use of "LDS Moldable" as a cushion material for future DWPF melters is deemed feasible, because it serves the purpose of reducing the stress in the steel shell to acceptable levels. The assessment is based on the design geometry of the DWPF melter currently undergoing testing.

Authorized Derivative Classifier

Discussion

The DWPF melter is a scaled-up version of the 1980 design. The horizontal cross-sectional dimensions are scaled up to approximately 50%. The refractory has an ID of 72 inches and OD of 96 inches. The thicknesses of the cushion layer and steel shell are 0.75 and 1.50 inches respectively. For conservative estimation of cushion layer compression and steel shell tension, the temperature at refractory OD is set at 600 °C, and the refractory expansion coefficient is 0.000008/°C. It can be shown under normal operating conditions, the cushion is compressed by 43%, and the shell stress is below 18,000 psi.

References

1. WSRC-RP-93-861, W. W. F. Yau to E. W. Holtzscheiter, "Evaluation of Mechanical Properties of 'LDS Moldable' for the Cushion Layer of New Melters", June 9, 1993.
2. OPS-DTF-930097, D. C. Iverson to W. W. F. Yau, "Evaluation of Replacement of DSM-24 Material for Future DWPF Melters", September 24, 1993.

Independent Reviewer

C. Gong, Principal Engineer
ATS

WWFY/tyb

DATE

FILMED

6 / 23 / 94

END