

## **Use of Attenuation Standards for CAT Scanning Applications Within Oil and Gas Production Research**

By

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### **Abstract**

Computer Axial Tomography (CAT scanning) has been shown to be a valuable tool in production research because it provides the ability to non-destructively identify and evaluate the internal structural characteristics of reservoir core material systems. Historically, much of the information obtained from CAT scanners utilized in both the medical and other industries has consisted primarily of a visual assessment of CAT scan images. In this capacity, the scanner has been utilized within the petroleum industry to identify and evaluate internal structural characteristics and discontinuities of core material. In addition to this qualitative assessment of the CAT scan images, quantitative information such as density, porosity and saturation distributions can be extracted from CAT scan images with appropriate processing and calculations. A major emphasis of current research is the improvement of the ability to obtain quantitative information from X-ray attenuation values obtained from CAT scan images. In order to calculate accurate quantitative information from CAT scans obtained over a period of several days, CAT scans must be properly standardized to compensate for drift of the X-ray source and detectors. Many standardization techniques developed and used in medical applications are not sufficient for applications involving core sample material. This paper explains the CAT scan measurement and associated theory and the development and application of a method to properly calibrate CAT scan results, utilizing appropriate attenuation standards. Examples illustrating the resulting improvement in accuracy and precision of calculated saturation values are provided.