

NGNP Experiments



NGNP Data Management and Analysis System (NDMAS)



NGNP User Communities: Scientists, Engineers, Industry, NRC, etc.

The Energy of Industry

Data Management and Analysis System

Next Generation Nuclear Plant

The Very High Temperature Reactor (VHTR) Technology Development Office Program is working to develop high temperature gas-cooled reactor (HTGR) technology that will meet the commercial needs of a wide range of industrial end users. Idaho National Laboratory (INL) manages the research and development of NGNP for the Department of Energy (DOE).

Several experiments are being conducted in support of the NGNP program. These experiments will provide irradiation performance data, qualify fuel and materials for

a HTGR, support development of computer codes, and qualify metals and alloys for the process heat mission.

Data from these experiments (fabrication to post-irradiation and high-temperature testing) will be maintained by the NGNP Data Management and Analysis System (NDMAS).

NDMAS provides:

- A controlled data repository
- Data qualification
- Data analysis and
- Web delivery to the NGNP community.

Example NDMAS output includes reactor power status,

cooling flows, temperatures, and release-to-birth ratios for each experimental capsule and for each reactor cycle.

Controlled Repository

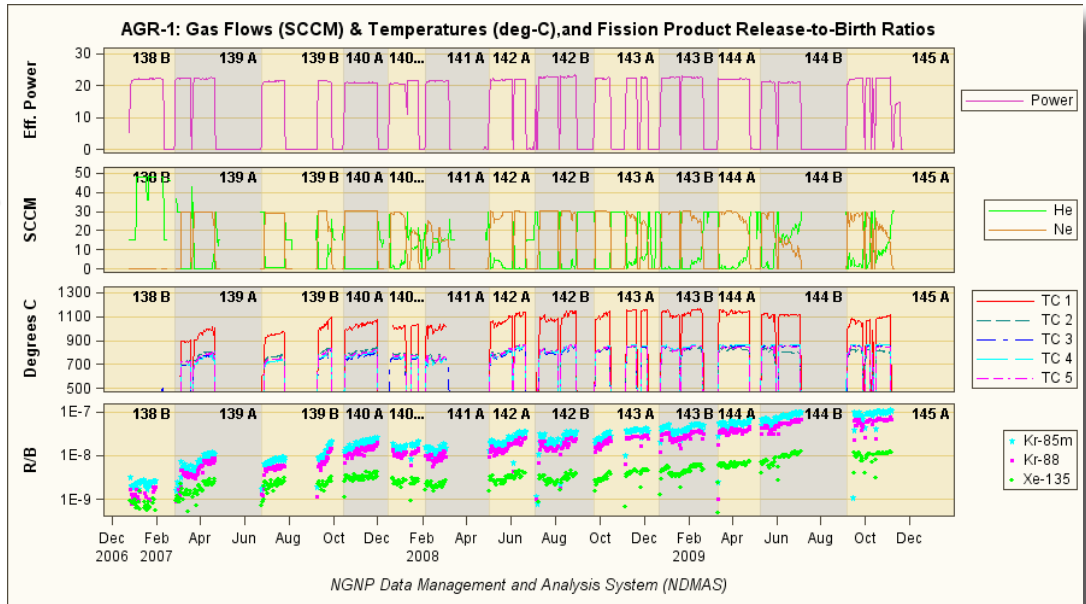
NDMAS provides a single system for data management of all NGNP data including fabrication, characterization, irradiation, post-irradiation examination, reactor simulation, code validation, and analysis results. The system processes virtually any type of raw records, including digital data streams, text files, Excel spreadsheets, and manually logged information. It preserves data for future needs, mitigates loss of pedigree,

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All Cycles: Capsule 6

Example NDMAS output includes reactor power status, cooling flows, temperatures, and release to birth ratios by experimental capsule and reactor cycle.



For more information

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and synchronizes simulation inputs and outputs.

Data Qualification

Data users and data generators determine the data that are needed and requirements the data must meet. Much of the data generated in support of the NGNP mission will be used to support design decisions and licensing of the HTGR and are collected within an NQA-1 quality assurance program. Testing by NDMAS and independent review by quality assurance and technical staff verify that the data collected within an NQA-1 program have met the requirements for the designated planned data collection activity. The outcome of the review and testing can be one of three qualification states; qualified, trend, or failed. Qualified data meet all requirements, trend data have minor flaws but are still useful to the program, and failed data are deemed unusable.

Records of testing and reviews are maintained in the NDMAS system to provide an auditable trail of data qualification and to control the use of data. Reports of data qualification progress are published on the Web to provide users information on the status of data qualification activities.

Data Analysis

NDMAS is based on the SAS Enterprise Business Intelligence software. It contains extensive statistical and graphical analysis capabilities. NGNP experimental data are received into NDMAS, qualified, and made available to users in configurable tables and plots.

Statistical analysis capabilities range from calculating simple statistics to advanced modeling and experimental design. Stored processes are developed based on user requests for capabilities such as displays for arbitrary, user-specified time ranges. These stored pro-

cesses can then be run by users to create desired outputs.

NDMAS analysts apply statistical analysis methods such as control charting, correlation analysis, and regression analysis for instrument failure detection. Feedback can also be provided to the program for experiment control based on statistically combining measurement and simulation data.

Web delivery

NDMAS is a Web-based system and provides operation monitoring of experimental conditions and a single point of easy access to all associated data. Displays are automatically refreshed as more data accrues. Access is controlled and authenticated based on the needs and roles of the users. Data downloads and interactive tables and graphs are available to the users through the NDMAS Web site, based on the access level of the user.