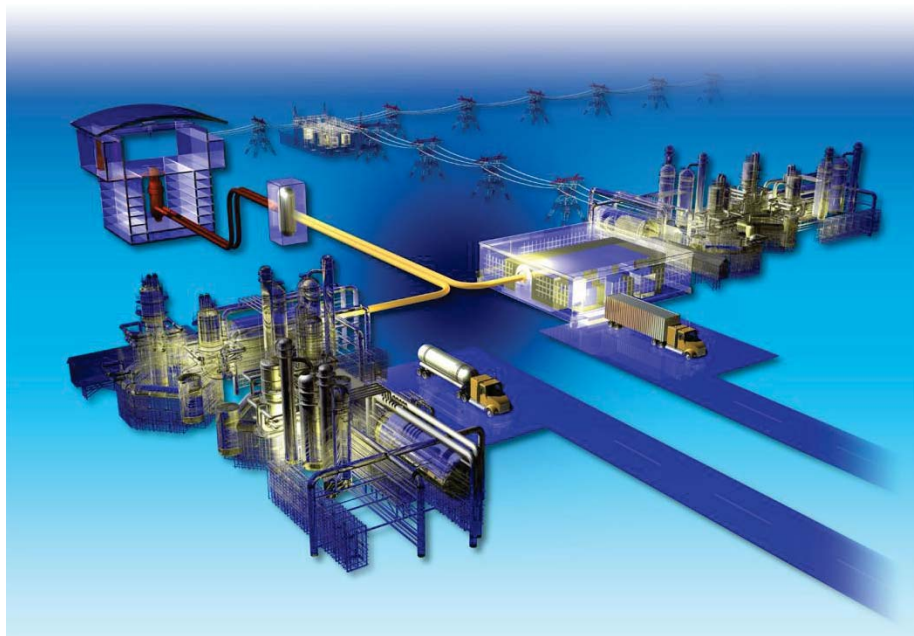


Use and Storage of Test and Operations Data from the High Temperature Test Reactor Acquired by the U.S. Government from the Japan Atomic Energy Agency

Hans Gougar

February 2010



The INL is a U.S. Department of Energy National Laboratory operated by Battelle Energy Alliance.



DISCLAIMER

This information was prepared as an account of work sponsored by an agency of the U.S. Government. Neither the U.S. Government nor any agency thereof, nor any of their employees, makes any warranty, expressed 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. References herein to any specific commercial product, process, or service by trade name, trade mark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the U.S. Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the U.S. Government or any agency thereof.

Use and Storage of Test and Operations Data from the High Temperature Test Reactor Acquired by the U.S. Government from the Japan Atomic Energy Agency

Hans Gougar

February 2010

**Idaho National Laboratory
Next Generation Nuclear Plant Project
Idaho Falls, Idaho 83415**

**Prepared for the
U.S. Department of Energy
Office of Nuclear Energy
Under DOE Idaho Operations Office
Contract DE-AC07-05ID14517**


Next Generation Nuclear Plant Project

Use and Storage of Test and Operations Data from the High Temperature Test Reactor Acquired by the U.S. Government from the Japan Atomic Energy Agency

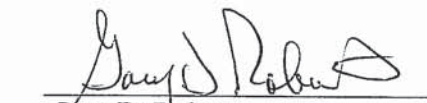
INL/EXT-10-17800
Revision 0

February 2010

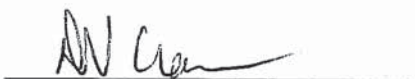
Approved by:


Hans D. Gougar
VHTR TDO Deputy Technical Director

7 Feb 2010
Date


Gary D. Roberts
VHTR TDO Quality Assurance

02/04/2010
Date


Diane V. Croson
VHTR TDO Project Management

2/4/10
Date

SUMMARY

Data acquired from foreign entities by the United States Government is subject to protections and restrictions that depend upon the nature of the data and its intended use. The storage and use of nuclear data is subject to international agreements, federal laws and Department of Energy regulations. Security systems and personnel are deployed at Department of Energy national laboratories in order to ensure that these laws are observed. Laboratory employees undergo extensive training in operational security to protect all sensitive and classified information. This document describes the facilities at which data from the High Temperature Test Reactor will be used. It also described the procedures and policies that ensure that this data is used only by authorized personnel and only for the purposes for which it is intended.

CONTENTS

SUMMARY	iv
ACRONYMS	viii
1. GENERAL	1
2. BRIEF DESCRIPTION OF FACILITIES	2
2.1 Idaho National Laboratory	2
2.2 Argonne National Laboratory	3
2.3 Nuclear Regulatory Commission	3
3. SAFEGUARDS FOR FOREIGN DATA	4
3.1 Personnel Security at DOE Facilities	4
3.2 Special Protection of Foreign Government Information	4
4. FEDERAL (U.S.) REGULATIONS GOVERNING EXCHANGE OF NUCLEAR INFORMATION	5

FIGURES

Figure 1. Hot Fuel Examination Facility at MFC.	2
Figure 2. Advanced Test Reactor Complex.	2

ACRONYMS

ANL	Argonne National Laboratory
ATR	Advanced Test Reactor
CFR	Code of Federal Regulations
DOE-NE	Department of Energy Office of Nuclear Energy
EROB	Engineering Research and Office Building
HTTR	High Temperature Test Reactor
INL	Idaho National Laboratory
IRC	INL Research Center
JAEA	Japan Atomic Energy Agency
MFC	Materials and Fuels Complex
NGNP	Next Generation Nuclear Plant
NNSA	National Nuclear Security Agency
NRC	Nuclear Regulatory Commission
OPSEC	Operations Security
PPA	Property Protection Areas
R&D	research and development
RTG	radioisotope thermoelectric generator
WCB	Willow Creek Building

Use and Storage of Test and Operations Data from the High Temperature Test Reactor Acquired by the U.S. Government from the Japan Atomic Energy Agency

1. GENERAL

Idaho National Laboratory (INL) is sponsored by the U.S. Department of Energy's (DOE) Office of Nuclear Energy (NE). DOE-NE promotes nuclear power as a resource capable of meeting U.S. energy, environmental, and national security needs by resolving technical and regulatory barriers through research, development, and demonstration.

Neither DOE-NE nor INL conducts research, development, or testing of nuclear weapons. That function is performed under the sponsorship of the National Nuclear Security Agency (NNSA) at NNSA's weapons laboratories, which includes Los Alamos National Laboratory and Lawrence Livermore National Laboratory.

This document describes the use and storage of data from the High Temperature Test Reactor (HTTR) acquired from the Japan Atomic Energy Agency (JAEA) by the U.S. Government for high temperature reactor research under the Next Generation Nuclear Plant (NGNP) Project.

2. BRIEF DESCRIPTION OF FACILITIES

HTTR data acquired from JAEA under the bilateral agreement will be stored and used primarily by scientists and engineers who are working on the NGNP Project at INL, Argonne National Laboratory (ANL), and the U.S. Nuclear Regulatory Commission (NRC). Basic research in high temperature reactors is also conducted at many universities with DOE support, but also using HTTR data.

2.1 Idaho National Laboratory

NGNP staff at INL are located in a number of buildings and complexes. The Idaho Falls Science and Technology Complex, home to most of the NGNP R&D staff, includes the:

- Engineering Research and Office Building (EROB)
- Willow Creek Building (WCB)
- INL Research Center (IRC).

Some work may be also performed in each of these buildings for various National and Homeland Security customers in the areas of cyber security, nonproliferation, or related activities. Very little, if any, work has a direct military application.

The Materials and Fuels Complex (MFC), located 45 kilometers west of Idaho Falls on the INL Site, focuses on research and development of nuclear fuels. Prototypes of new reactor fuels are also made and evaluated at MFC in fuels and materials characterization laboratories, such as the Hot Fuel Examination Facility shown in Figure 1.

Pyroprocessing, which uses electricity to separate waste products in the recycling of nuclear fuel, is also researched here. At the Space & Security Power Systems Facility, workers make nuclear batteries (radioisotope thermoelectric generators, called RTGs for short) for use on the nation's space missions. Such batteries are crucial to the nation's deep space missions, which travel to extremely cold regions of space where sunlight is too weak to power photovoltaic cells.

The Advanced Test Reactor Complex (see Figure 2), located 70 kilometers west of Idaho Falls at the INL Site, is engaged in research and development of nuclear reactor technologies. It is home to the Advanced Test Reactor (ATR), the world's most advanced nuclear test reactor, which is also a DOE National Scientific User Facility. ATR is vital for testing materials for the nation's next generation of nuclear power plants. ATR is also used to manufacture a significant portion of the medical nuclear isotopes used in the nation. In addition to



Figure 1. Hot Fuel Examination Facility at MFC.



Figure 2. Advanced Test Reactor Complex.

irradiating fuels and graphite for NGNP, the ATR provides irradiation services for the U.S. military, private, and international customers (including the Japan Atomic Power Engineering and Inspection Corporation). New and spent fuel from the ATR is stored at various INL facilities under strict safeguards.

2.2 Argonne National Laboratory

ANL is sponsored by the DOE Office of Science and thus does not engage in nuclear weapons research. It is likely that HTTR data will be provided to some ANL staff working on the NGNP Project, as they are working to increase the understanding of ex-HTR core behavior such as the performance of the reactor cavity cooling system. Both INL and ANL observe data and document control procedures that restrict the NGNP Project staff's access to records and data.

2.3 Nuclear Regulatory Commission

The NRC (based in offices near Washington, D.C.) will have access to HTTR data to support its HTR code validation efforts. The NRC only holds jurisdiction over commercial nuclear facilities and thus has limited or no interaction with the U.S. military. The NRC has strict document and data control procedures that would prevent the release of any HTTR data acquired in support of the NGNP Project.

3. SAFEGUARDS FOR FOREIGN DATA

3.1 Personnel Security at DOE Facilities

HTTR data will be used for code validation purposes only. It will therefore be stored and used by scientists and engineers working on the NGNP Project at INL, ANL, and NRC.

The Idaho and Argonne National Laboratories are Property Protection Areas, meaning that they implement full-time protective forces to protect people, property, and equipment. Unescorted access requires that individuals be employees of those laboratories and submit to a level of background/suitability checks to identify whether an individual has been charged with a felony, including crimes against nature. Each individual must submit to an initial drug test and is prohibited access to the laboratory for at least 90 days (for crafts people at the INL site facilities) and up to one year of employment, if tested positive for drugs within the past 12 months.

Property Protection Areas (PPA) are controlled using key-card access where authorized individuals are provided a badge to allow access. Inside of each PPA are security area islands where additional levels of control are maintained by a level of security clearance, additional key-card access, combination dials on doors (and safes) and/or vault type rooms, keys, and spin-dial combination safes.

Both INL and ANL have a rigorous levels of Operations Security (OPSEC) in which buildings are regularly surveyed to ensure sensitive unclassified information is protected from unauthorized access. Password protection on each computer is required and if found unprotected, the employee or individual is reported to his/her management to ensure that appropriate actions are taken to discipline the employee in some manner.

Security refresher briefings are provided to each employee on an annual basis to inform and remind individuals of their security responsibilities for protecting information. Incomplete training from individuals restricts them from unescorted access to facilities and/or computers until they acknowledge their responsibilities to security requirements; at which time, access will be restored.

3.2 Special Protection of Foreign Government Information

DOE has published guidelines for the classification and control of information acquired from governments of foreign countries. Security of *Foreign Government Information* is either (1) provided to the U.S. Government by foreign governments or international organizations of governments with the expectation that the information, its source, or both will be held in confidence, or (2) produced by the U.S. Government pursuant to or as a result of a joint arrangement with foreign governments or organizations of governments requiring that the information, the arrangement, or both to be held in confidence, or (3) received and treated as *Foreign Government Information* under the terms of Executive Order 12958, classified national security information, or a predecessor order. The foreign government may request, in writing, various levels of classification and protection for the information that they provide. This guide is included with this letter.

4. FEDERAL (U.S.) REGULATIONS GOVERNING EXCHANGE OF NUCLEAR INFORMATION

The transfer of data from JAEA to the U.S. Government will be governed by the DOE-JAEA Bilateral Agreement and the IAEA Guidelines for Nuclear Transfers (IAEA: INFCIRC/254/Rev. 1, Part 1, Mod. 1, July 1993). These documents restrict the use of HTTR data to peaceful purposes.

Furthermore the U.S. Code of Federal Regulations (CFR) identifies the types of activities that are allowed under such agreements. The following section of the CFR lists the activities which are allowed in support of the peaceful development of nuclear energy.

10 CFR Part 810, Section 7 §810.7, “Generally authorized activities”

In accordance with section 57b(2) of the Atomic Energy Act, the Secretary of Energy has determined that the following activities are generally authorized, provided no sensitive nuclear technology is transferred:

- (a) Furnishing public information as defined in §810.3;
- (b) Furnishing information or assistance to prevent or correct a current or imminent radiological emergency posing a significant danger to the health and safety of the off-site population, provided the Department of Energy is notified in advance and does not object;
- (c) Furnishing information or assistance, including through continuing programs, to enhance the operational safety of an existing civilian nuclear power plant in a country listed in §810.8(a) or to prevent, reduce, or correct a danger to the health and safety of the off-site population posed by a civilian nuclear power plant in such a country; provided the Department of Energy is notified in advance by certified mail, return receipt requested, and approves the use of the authorization in writing; the Department will notify the applicant of the status of the request within 30 days from the date of receipt of the notification.
- (d) Implementing the Agreement between the United States of America and the International Atomic Energy Agency for the Application of Safeguards in the United States;
- (e) Participation in exchange programs approved by the Department of State in consultation with the Department of Energy;
- (f) Participation approved by a U.S. Government agency in IAEA programs, and activities of IAEA employees whose employment was approved by the U.S. Government;
- (g) Participation in open meetings as defined in §810.3 that are sponsored by educational, scientific, or technical organizations or institutions;
- (h) Otherwise engaging directly or indirectly in the production of SNM outside the United States in ways that:
 - (1) Do not involve any of the countries listed in §810.8(a); and
 - (2) Do not involve production reactors, accelerator-driven subcritical assembly systems, enrichment, reprocessing, fabrication of nuclear fuel containing plutonium, production of heavy water, or research reactors, or test reactors, as described in §810.8 (c)(1) through (6). [51 FR 44574, Dec. 10, 1986, as amended at 58 FR 39639, July 26, 1993; 65 FR 16127, Mar. 27, 2000]