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Nonactinide Isotopes and Sealed Sources Web Application

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Abstract

The Nonactinide Isotopes and Sealed Sources (NISS) Web Application is a web-based database query and data management tool designed to facilitate the identification and reapplication of radioactive sources throughout the Department of Energy (DOE) complex. It provides search capability to the general Internet community and detailed data management functions to contributing site administrators.

Acknowledgment

The authors thank George F. Bailey of Scientech, Inc. for his considerable effort in assuring the quality and integrity of the more than 30,000 data records incorporated in the initial release of the NISS database.

Contents

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Nonactinide Isotopes and Sealed Sources Web Application

Introduction

The Nonactinide Isotopes and Sealed Sources (NISS) Web Application is a web-based computerized tool designed to facilitate the identification and reapplication of radioactive sources throughout the Department of Energy (DOE) complex. It provides for query of the database based on user-supplied parameters and allows for contact of a Sandia representative in order to obtain additional information for selected items. The application also provides data management capability to selected individuals at sites that have contributed information to the database.

This report describes application performance, features, and explains the implemented security strategy.

Background

The Nonactinide Isotopes and Sealed Sources Management Group (NISSMG) is sponsored by the DOE Office of Environmental Management and is managed by the Albuquerque Operations Office to serve as a complex-wide resource for the management of DOE-owned Nonactinide Isotope and Sealed Source materials. NISS materials are defined as including (1) any isotope in sealed sources or standards and (2) isotopes with atomic number less than 90, regardless of form. The NISSMG assists DOE sites with the storage, reuse, disposition, transportation, and processing of these materials. As one of its' services, NISSMG is implementing a Virtual Source Bank to facilitate reuse by making excess DOE sealed source information available on the WEB. The Nonactinide Isotopes and Sealed Sources Management Group is developing this "virtual source bank" where people can go to see if an available source matches their needs, thereby avoiding buying a new one when an "old one" could be had - a waste minimization concept.

The NISS Web Application was conceived out of a data collection effort that began in 1998 and resulted in a 33,000 record database compiled by the NISS team. While the ensuing FileMaker Pro® database, compiled by Savannah River Site, provided a comprehensive inventory of radioactive sources from over 20 DOE and university facilities, it lacked the capability to provide a centralized data management system that incorporated ready access to decision makers within the complex. It did not provide means by which interested third parties could identify sources designated as available for reapplication and arrange for transfer to their facility.

The application began as a Sandia National Laboratories (SNL) sponsored student project in the spring of 2001. A four-person team of students from the University of New Mexico was tasked with designing and developing a prototype application that would meet basic design criteria specified by SNL advisors and would satisfy their university course requirements. The students delivered the prototype application with documentation in May 2001.

In September 2001, a team of SNL designers and developers was assembled to further the application development, incorporate Sandia standards and policies, and deploy it in the SNL computing environment for use via the World Wide Web (WWW).

System Operation

The application incorporates the popular "shopping cart" paradigm for browsing and selection of sources. The user interface allows for selection of sources available for reapplication based on basic search parameters including isotope, activity, type, physical form, and descriptive words. An advanced search capability that provides for additional parameters and search logic is also included.

When presented with a result set of source inventory, the user has the opportunity to select specific sources to add them to their shopping cart of selected items. Search and selection continue until the user is satisfied with the contents of their shopping cart and ready for "checkout". Throughout the "shopping" process, the user has the ability to view the contents of their cart and make adjustments as desired.

When satisfied with their shopping cart contents, the user may proceed with the checkout process by clicking the Request Info button on the shopping cart contents page. This results in the display of a request form requiring the user to provide identifying information. Successful submission of the form displays a confirmation page providing a summary of the number of sources for which information has been requested. This action initiates the sending of an electronic mail message to the NISSMG representative designated as "broker" for source reapplication as well as sending an electronic mail message to the user confirming their request.

Administrative users are offered a similar presentation style, but have browse and update authority for all data elements and groupings as specified in Appendix B.

Security Strategy

The application is designed to address requirements specified for two distinct target audiences:

1) Update-capable, data administrators and
2) Read-only, general browsing users.

In both cases, 128-bit cipher strength, Secure Socket Layer (SSL) web browsers are required for access. Following is a discussion of the security strategy for both classes of users:

Update-capable users

Site data administrator members are comprised of a few select individuals at DOE and other sites that have contributed radioactive source inventory information for their location to the centralized NISS application database. These individuals are issued Kerberos user identifiers and passwords in order to allow for authenticated access to the application and database. The individuals have full insert, update, and delete access to only their site data. The NISS application and Oracle database control data access using a combination of programming logic and database object authorization to ensure privacy of site-specific data across the population of site administrators.

Another class of update-capable user is the NISS data administrator. This small group of individuals is comprised of select members of the NISSMG and have full insert, update, and delete access to all data contained in the database. This group also requires Kerberos authentication in order to gain administrative access to the application. As with the site data administrator group, the NISS application and Oracle database control data access

using a combination of programming logic and database object authorization to ensure only this class of user has full data access.

Read-only Users

The general web browsing population without special application access and authorization comprise the group of read-only users. These individuals have available to them only the "Browse for Sources" functionality within the application and are not presented with a signon screen to validate access, e.g. no Kerberos authentication is required. As a consequence of their unauthenticated access, only information authorized for public viewing is presented throughout the application. The application does collect information regarding their browser session and stores the individuals originating Internet Protocol (IP) address in the application database.

Once again, the NISS application and Oracle database control data access using a combination of programming logic and database object authorization to ensure that only information acceptable for public viewing is displayed to the unauthenticated user.

Appendix B lists access privileges by user classification for each data field contained within the database.

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Appendix A

Physical Configuration of NISS System

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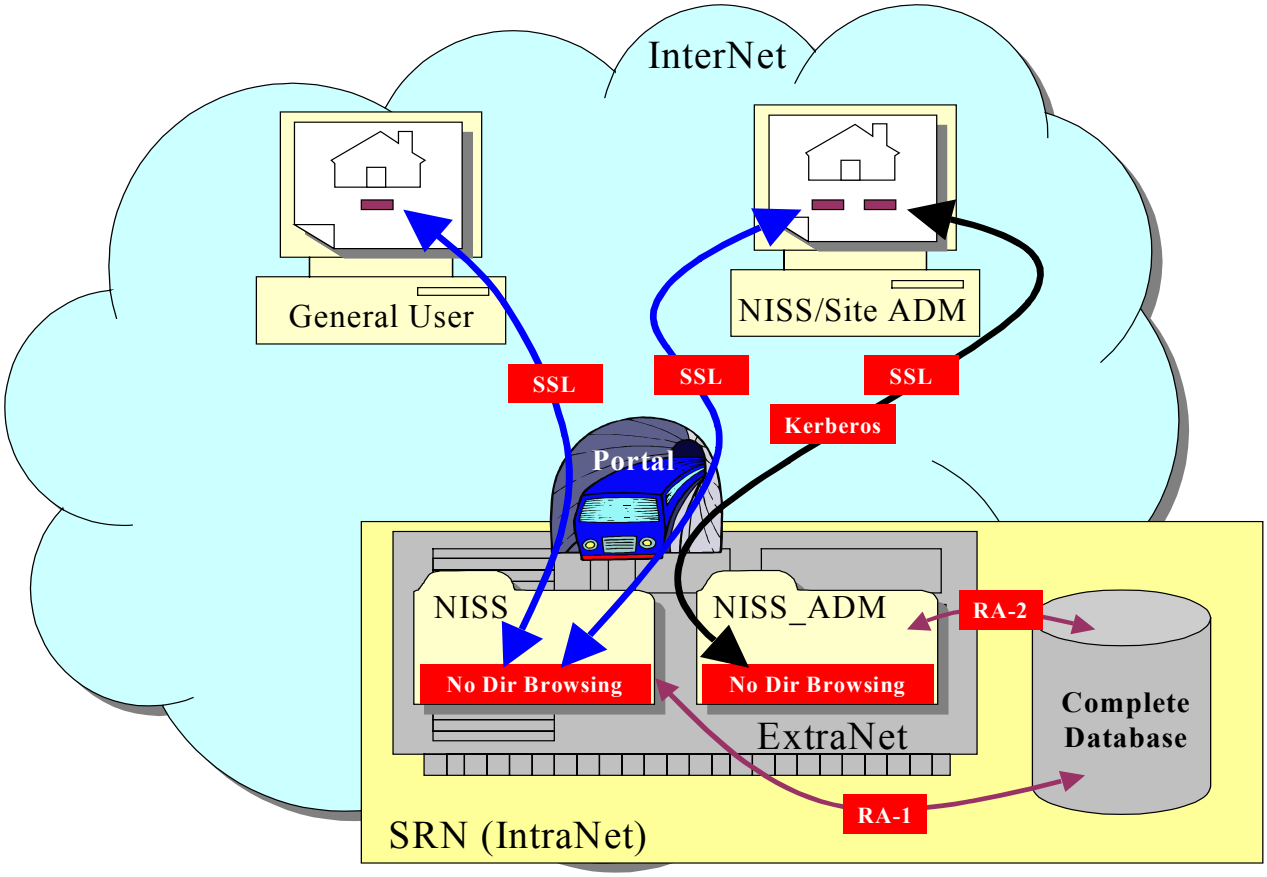
The primary components making up the NISS system are shown in the diagram below.



NISS – The web application for browsing sources available for re-use

NISS_ADM – The web application for administering the source data (two levels of access: full and specific site only)

SRN (Intranet) – The internal web and computer systems on the Sandia Restricted Network

Extranet – Web server on the SRN with portal to allow access from the Internet

Internet – The World Wide Web

SSL – Secure Socket Layers (128-bit encryption) NOTE: Browsers equipped with 128-bit encryption are export protected.

Kerberos- Sandia's primary user authentication system

No Dir Browsing – Directories may not be browsed by anyone

RA-1 – Restricted Account for Cold Fusion to communicate with database (read only except for system tables)

RA-2 – Restricted Account for Cold Fusion to communicate with database (read and write with exceptions)

Limited Database – Database consisting of selected fields appropriate for general users or the application

Complete Database – Database consisting of all fields deemed unclassified

General User – Scientists and engineers from other DOE labs

NISS/Site ADM – Select cadre of scientists from the NISS Management Group

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Appendix B

NISS Tables and User Access

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The following table shows the data fields that different levels of users can access. The system can access all the fields so a separate column was not provided for that class of user. The key to the abbreviations used is found at the end of this appendix.

Table	Field	General Users	NISS Admin	Site Admin
SOURCE_MASTER	NISS_SOURCE_ID			
	SITE_SOURCE_ID		A	S
	PHYSICAL_FORM	Y	A	S
	SOURCE_DESC	Y	A	S
	SOURCE_DIMENSION_VALUE	Y	A	S
	SOURCE_DIMENSION_UOM	Y	A	S
	SITE_ID_FOUND_ON		A	S
	SOURCE_SHAPE	Y	A	S
	NIST_STATUS_FLAG		A	S
	RTG_FLAG		A	S
	SEALED_FLAG	Y	A	S
	DEFENSE_FLAG		A	S
	PROGRAM_OWNER		A	S
	PIECE_COUNT	Y	A	S
	MANUFACTURER	Y	A	S
	MFG_MODEL_NUM	Y	A	S
	MFG_SERIAL_NUM		A	S
	MFG_KIT_NUM	Y	A	S
	MFG_DATE	Y	A	S
	TECH_AREA		A	S
	BLDG		A	S
	LOCATION		A	S
	OWNING_SITE		A	S
	PRIMARY_CUSTODIAN		A	S
	ALTERNATE_CUSTODIAN		A	S
	SOURCE_TYPE_FLAG	Y	A	S
	SOURCE_STATUS_FLAG	Y	A	S
	KG_GROSS_WT		A	S
	KG_NET_WT		A	S
	EXEMPT_NISS		A	S
	INTEGRITY_DATE		A	S
	LICENSEE		A	S
	PACKAGING_DESC		A	S
	PACKAGE_STATUS_FLAG		A	S
	DISPO_PATH		A	S
	SITE_ID_DISPOSED_TO		A	S
	DISPO_DATE		A	S
	DISPO_SCHEDULE		A	S

Table	Field	General Users	NISS Admin	Site Admin
	DISPO_ASSIGNED		A	S
	DISPO_COMMENTS		A	S
	SITE_ID_TRANSFERRED_TO		A	S
	TRANSFER_DATE		A	S
	TRANSFER_COMMENTS		A	S
	SITE_ID_RECEIVED_FROM		A	S
	RECEIVE_DATE		A	S
	SOURCE_HISTORY		A	S
	SOURCE_DOCUMENT		A	S
	MAP_NAME		A	S
	MAP_STREAM		A	S
	NISS_MTC		A	S
	MATERIAL_TYPE_CODE		A	S
	CREATED_BY		A	S
	CREATION_DATE		A	S
	LAST_UPDATED_BY		A	S
	LAST_UPDATE_DATE		A	S
	NEEDS_REVIEW_FLAG		A	S
SOURCE_ISOTOPE	NISS_SOURCE_ID			
	ISOTOPE	Y	A	S
	BSL_ACT_VALUE	Y	A	S
	BSL_ACT_UOM	Y	A	S
	BSL_ACT_DATE	Y	A	S
	CI_VALUE	Y	A	S
	MATERIAL_MMP_CODE		A	S
	CREATED_BY		A	S
	CREATION_DATE		A	S
	LAST_UPDATED_BY		A	S
	LAST_UPDATE_DATE		A	S
SOURCE_COMMENTS	NISS_SOURCE_ID			
	COMMENT_ID			
	COMMENTS		A	S
	CREATED_BY		A	S
	CREATION_DATE		A	S
	LAST_UPDATED_BY		A	S
	LAST_UPDATE_DATE		A	S
ISOTOPE	ISOTOPE	Y	A	S
	ALT_ISOTOPE		A	S
	VALID_SEARCH_FLAG		A	S
	LIGHT_FLAG		A	S
	REVIEWED_FLAG		A	S
	ISOTOPE_DESC	Y	A	S

Table	Field	General Users	NISS Admin	Site Admin
	HALF_LIFE_DAYS		A	S
	CI_PER_GRAM		A	S
	EXEMPT_QTY_CI		A	S
	ATOMIC_NO		A	S
	ATOMIC_WT		A	S
	MMP_CODE		A	S
	SOURCE_COMMENTS		A	S
	CREATED_BY		A	S
	CREATION_DATE		A	S
	LAST_UPDATED_BY		A	S
	LAST_UPDATE_DATE		A	S
PERSON	USER_ID		A	S
	SITE_ID_ASSIGNED		A	S
	LAST_NAME		A	S
	FIRST_NAME		A	S
	PHONE_AREACODE		A	S
	PHONE_NUMBER		A	S
	PHONE_EXT		A	S
	EMAIL		A	S
	REQUEST_EMAIL_FLAG		A	S
	NISS_ADMIN_FLAG		A	S
	PRIMARY_CONTACT_FLAG		A	S
	TERMINATION_DATE		A	S
	CREATED_BY		A	S
	CREATION_DATE		A	S
	LAST_UPDATED_BY		A	S
	LAST_UPDATE_DATE		A	S
RESPONSIBLE	USER_ID		A	S
	SITE_ID		A	S
	CREATED_BY		A	S
	CREATION_DATE		A	S
	LAST_UPDATED_BY		A	S
	LAST_UPDATE_DATE		A	S
SITE	SITE_ID		A	S
	SITE_NAME		A	S
	CREATED_BY		A	S
	CREATION_DATE		A	S
	LAST_UPDATED_BY		A	S
	LAST_UPDATE_DATE		A	S
SOURCE_REQUESTED	SOURCE_ID_REQUESTED			
	REQUESTOR_USERID		A	S
	REQUEST_STATUS_FLAG		A	S

Table	Field	General Users	NISS Admin	Site Admin
	COMMENTS		A	S
	CREATED_BY		A	S
	CREATION_DATE		A	S
	LAST_UPDATED_BY		A	S
	LAST_UPDATE_DATE		A	S
SOURCE_REQUESTOR	REQ_USERID		A	S
	REQ_FIRST_NAME		A	S
	REQ_LAST_NAME		A	S
	REQ_COMPANY		A	S
	REQ_AREA_CODE		A	S
	REQ_PHONE		A	S
	REQ_EXT		A	S
	REQ_EMAIL		A	S
	REQ_MAILING_ADDR		A	S
	REQ_MAILING_ADDR1		A	S
	REQ_CITY_TOWN		A	S
	REQ_STATE_PROVINCE		A	S
	REQ_ZIP		A	S
	REQ_COUNTRY		A	S
	COMMENTS		A	S
	CREATED_BY		A	S
	CREATION_DATE		A	S
	LAST_UPDATED_BY		A	S
	LAST_UPDATE_DATE		A	S
BROWSE_LISTS	IP_ADDRESS			
	NISS_SOURCE_ID			
	CREATION_DATE			
CG_REF_CODES	RV_DOMAIN			
	RV_LOW_VALUE			
	RV_HIGH_VALUE			
	RV_ABBREVIATION			
	RV_MEANING			
CHECKED_LIST	IP_ADDRESS			
	NISS_SOURCE_ID			
	CREATION_DATE			
EXCEPTIONS	ROW_ID			
	OWNER			
	TABLE_NAME			
	CONSTRAINT			
	CREATED_BY			
	CREATION_DATE			
LOGON_TABLE	USER_ID		A	

Table	Field	General Users	NISS Admin	Site Admin
	SESSION_ID		A	
	CREATION_DATE		A	
LOV_CONVERSION	SITE_ID			
	OLD_LOV_NAME			
	OLD_LOV_VALUE			
	OLD_LOV_MEANING			
	NEW_LOV_NAME			
	NEW_LOV_VALUE			
	NEW_LOV_MEANING			
	CREATED_BY			
	CREATION_DATE			
	LAST_UPDATED_BY			
	LAST_UPDATE_DATE			
SL_DEBUG_TABLE	NAME_ID			
	LINE_CNT			
	DEBUG_STR			
	CREATION_DATE			
	CREATED_BY			
	LAST_UPDATED_BY			
	LAST_UPDATE_DATE			
SL_ERROR_TABLE	SL_SQLCODE			
	SL_SQLERRM			
	SL_PROGRAM_NAME			
	SL_USER_MESSAGE			
	SL_SQLNAME			
	CREATION_DATE			
	SL_KEYFIELD			
	SL_CALLING_PROGRAM			

Key

Y= yes
S= site restricted
A= all sites
BLANK= no

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