


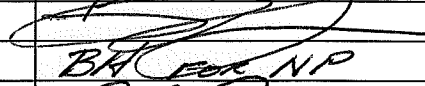
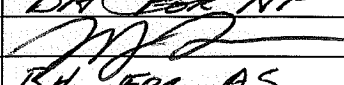
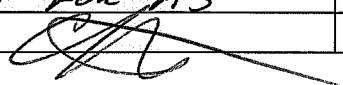
NUCLEAR SYSTEM INTEGRATION PROGRAM MANUAL

Non -Proprietary copy per 10CFR2.390
- Areas of proprietary information have been redacted.
- Designation letter corresponds to Triconex proprietary
policy categories (Ref. transmittal number NRC-V10-
09-001, Affidavit, Section 4.)

Document No.: NTX-SER-09-21

Revision: 1

Issue Date: 07/09/2010

	Name	Signature	Title	Date
Author:	Kevin Vu		Project Engineer	7/9/10
Reviewer:	Brian Haynes		Project Manager	7/9/10
	Nitin Patel	BH FOR NP	IV&V Director	7/9/10
Approval:	Jeff Larson		Nuclear Quality Director	7/9/10
	Andy Sykes	BH FOR AS	VP NA Nuclear Operations	7/9/10
	Clayton Scott		VP Chief Nuclear Officer	7-9-10

i n v e n t s y s TM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual		
Revision:	1	Page:	2	of	47
		Date:	07/09/2010		

Document Change History			
Rev	Date	Change	Author
0	08/31/09	Initial Issue	George Hughes
1	07/09/10	1. Document title changed to “Nuclear System Integration Program Manual”. 2. Major document rewrite. No revision bar shown.	Kevin Vu

i n v e n t s y sTM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual		
Revision:	1	Page:	3	of	47
		Date:	07/09/2010		

TABLE OF CONTENTS

1.0	INTRODUCTION.....	5
1.1	PURPOSE	5
1.2	SCOPE	5
1.3	ABBREVIATIONS, ACRONYMS AND DEFINITIONS	6
1.4	REFERENCES.....	8
2.0	ORGANIZATION	9
2.1	IOM NUCLEAR SYSTEM INTEGRATION ORGANIZATION CHART	9
2.2	RESPONSIBILITIES	10
3.0	PROJECT PHASES.....	13
3.1	ACQUISITION PHASE ACTIVITIES	13
3.2	PLANNING PHASE ACTIVITIES	13
3.3	REQUIREMENTS PHASE ACTIVITIES.....	15
3.4	DESIGN PHASE ACTIVITIES	16
3.5	IMPLEMENTATION PHASE ACTIVITIES	18
3.6	TEST PHASE ACTIVITIES.....	19
3.7	DELIVERY PHASE ACTIVITIES.....	20
4.0	DESIGN CONTROL	21
5.0	TEST CONTROL	23
6.0	SYSTEM INTEGRATION IMPLEMENTATION	26
6.1	GENERAL	26
6.2	PREREQUISITES.....	26
6.3	SYSTEM ASSEMBLY, CONSTRUCTION AND INSPECTION	27
6.4	SYSTEM POWER-UP TESTS.....	27
6.5	SYSTEM CONFIGURATION	27
6.6	SYSTEM TEST	27
6.7	PREPARATION, INSPECTION AND APPROVAL FOR SHIPMENT	27
6.8	SYSTEM SHIPMENT	27
7.0	NONCONFORMING ITEMS	28
7.1	REPORTING OF DEFECTS AND NONCOMPLIANCES - 10CFR21	28
8.0	CORRECTIVE ACTION	29
9.0	PERSONNEL TRAINING AND QUALIFICATION	30
10.0	PROJECT DOCUMENT & DATA CONTROL.....	31
10.1	PROJECT DOCUMENT CONTROL	31
10.2	PROJECT DOCUMENT/RECORD MAINTENANCE AND STORAGE.....	32
11.0	MATERIALS AND SERVICES	34
11.1	PROCUREMENT	34
11.2	PURCHASE REQUISITION.....	34
11.3	QUALITY CLASSIFICATION	35

i n v e n t s y s TM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual		
Revision:	1	Page:	4	of	47
		Date:	07/09/2010		

11.4	DEDICATION OF COMMERCIAL GRADE ITEMS OR SERVICES	35
11.5	RECEIVING/RECEIPT INSPECTION	35
11.6	HANDLING AND STORAGE	36
11.7	PACKAGING AND SHIPPING	36
Exhibit 1 -	Typical System Integration Project Flow Chart	37
Exhibit 2 -	Application Software Development	44

i n v e n s y sTM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual		
Revision:	1	Page:	5	of 47	Date: 07/09/2010

1.0 INTRODUCTION

1.1 PURPOSE

This Nuclear System Integration Program Manual (NSIPM) describes the requirements for Invensys Operations Management (IOM) Project Delivery (PD) nuclear system integration project activities conducted at IOM facilities. A system integration project is defined as any project that incorporates nuclear safety-related products into a fully operational integrated system in accordance with customer specified requirements.

The following documents are developmental references for this manual:

- ASME/ANSI NQA-1-1994, "Quality Assurance Requirements for Nuclear Facility Applications"
- IEEE 1012-1998, "Standard for Software Verification and Validation" and US NRC Regulatory Guide 1.168 (endorses IEEE 1012-1998)
- IEEE 730-2002, "Standard for Software Engineering Quality Assurance Plans"
- IEEE 1016-1998, "Recommended Practice for Software Design Descriptions"
- IEEE 1058-1998, "Standard for Software Project Management Plans"
- IEEE 828-1998, "Standard for Software Configuration Management Plans" and US NRC Regulatory Guide 1.169 (endorses IEEE 828-1990)
- IEEE 829-1998, "Standard for Software Test Documentation", and US NRC Regulatory Guide 1.170 (endorses IEEE 829-1983)
- IEEE 830-1998, "Recommended Practice for Software Requirements Specifications" and US NRC Regulatory Guide 1.172 (endorses IEEE 830-1993)
- IEEE 1074-2006, "Standard for Developing a Software Project Life Cycle Process" and US NRC Regulatory Guide 1.173 (endorses IEEE 1074-1995)
- Regulatory Guide 1.152, Rev. 2 "Criteria For Use Of Computers In Safety Systems Of Nuclear Power Plants."

1.2 SCOPE

The IOM Quality Management System Requirements Quality Manual (IOM-Q1) [Reference 1.4.13] and IOM Nuclear Quality Assurance Manual (IOM-Q2) [Reference 1.4.14] shall govern the quality affecting activities performed by PD personnel and at IOM facilities. These quality affecting activities shall be conducted in accordance with the IOM-Q1, IOM-Q2 and the applicable project quality plan.

The NSIPM shall be followed to implement nuclear safety-related system integration projects. Safety-related software shall be assigned a Software Integrity Level (SIL) 4 in

i n v e n s y sTM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual		
Revision:	1	Page:	6	of	47
		Date:	07/09/2010		

accordance with IEEE 1012 [Reference 1.4.4]. Exhibit 1 shows the process flow for a typical system integration project.

1.3 ABBREVIATIONS, ACRONYMS AND DEFINITIONS

1.3.1 Abbreviations and Acronyms

ANSI	American National Standards Institute
ASME	American Society Mechanical Engineers
CD-ROM	Compact Disk-Read Only Memory
EPRI	Electric Power Research Institute
FAT	Factory Acceptance Test
HRS	Hardware Requirements Specification
IEEE	Institute of Electrical Electronic Engineers
IOM	Invensys Operations Management
IV&V	Independent Verification and Validation
M&TE	Measuring and Test Equipment
NQA	Nuclear Quality Assurance
NRC	Nuclear Regulatory Commission
NSIPM	Nuclear System Integration Program Manual
PD	Project Delivery
PE	Project Engineer
PM	Project Manager
PQAE	Project Quality Assurance Engineer
PQAM	Project Quality Assurance Manager
QA	Quality Assurance
QC	Quality Control
SDB	System Design Basis
SDD	Software Design Description
SIL	Software Integrity Level
SQAP	Software Quality Assurance Plan
SRS	Software Requirements Specification
SVVP	Software Verification and Validation Plan
V&V	Verification and Validation

i n v e n t s y sTM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual		
Revision:	1	Page:	7	of	47
		Date:	07/09/2010		

1.3.2 Definitions

Acceptance Testing – Testing conducted in an operational environment to determine whether a system satisfies its acceptance criteria (i.e., initial requirements and current needs of its user) and to enable the customer to determine whether to accept the system.

Anomaly – Any condition that deviates from the expected based on requirements, specifications, design, documents, user documents, standards, etc., or from someone's perceptions or experiences. Anomalies may be found during, but not limited to, the review, test, analysis, compilation, or use of software products or applicable documentation.

Baseline - A work product that has been formally reviewed and accepted by the involved parties as the revision level approved for the Implementation Phase of the project. A baseline should be changed only through formal configuration management procedures. Some baselines may be project deliverables while others provide basis for further work.

Component Testing – Testing conducted to verify the correct implementation of the design and compliance with program requirements for one software element (e.g., unit, module) or a collection of software elements.

Criticality - A subjective description of the intended use and application of the system. Software and hardware criticality properties may include safety, security, complexity, reliability, performance, or other characteristics.

Criticality Analysis – A structured evaluation of the software characteristics (e.g., safety, security, complexity, performance) for severity of impact of system failure, system degradation, or failure to meet software requirements or system objectives.

Hazard Analysis – A systematic qualitative or quantitative evaluation of software for undesirable outcomes resulting from the development or operation of a system. These outcomes may include injury, illness, death, mission failure, economic loss, environmental loss, or adverse social impact. This evaluation may include screening or analysis methods to categorize, eliminate, reduce, or mitigate hazards.

Integration - The process of combining software components, hardware components, or both into an overall system.

Life Cycle Process - A set of interrelated activities that result in the development or assessment of software products. Each activity consists of tasks. The life cycle processes may overlap one another. For V&V purposes, no process is concluded until its development products are verified and validated according to the defined tasks in the SVVP.

i n v e n s y sTM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual		
Revision:	1	Page:	8	of 47	Date: 07/09/2010

Risk – The combination of the frequency, or probability, and the consequence of a specified hazardous event.

Security – Protective actions taken against a predictable set of non-malicious acts (e.g., inadvertent operator actions or the undesirable behavior of connected systems) that could challenge the integrity, reliability, or functionality of a digital safety system.

Validation - Confirmation by examination and provisions of objective evidence that the particular requirements for a specific intended use are fulfilled.

Verification - Confirmation by examination and provisions of objective evidence that specified requirements have been fulfilled.

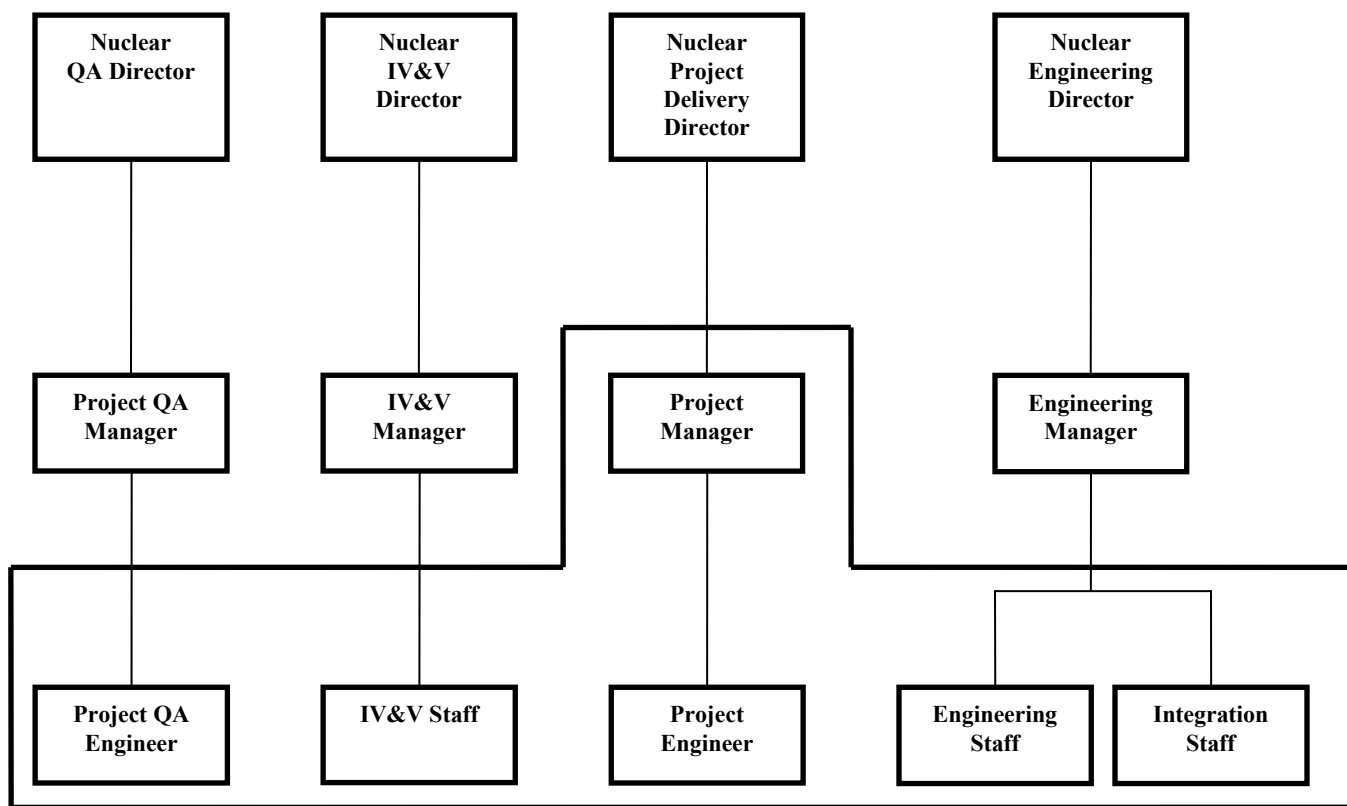
1.4 REFERENCES

- 1.4.1 Title 10 of the Code of Federal Regulations, Appendix B to Part 50 – Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants
- 1.4.2 Title 10 of the Code of Federal Regulations, Part 21 – Reporting of Defects and Noncompliance
- 1.4.3 ASME/ANSI NQA-1-1994, “Quality Assurance Requirements for Nuclear Facility Applications”
- 1.4.4 IEEE 1012-1998, “Standard for Software Verification and Validation” and US NRC Regulatory Guide 1.168 (endorses IEEE 1012-1998)
- 1.4.5 IEEE 730-2002, “Standard for Software Engineering Quality Assurance Plans”
- 1.4.6 IEEE 1016-1998, “Recommended Practice for Software Design Descriptions”
- 1.4.7 IEEE 1058-1998, “Standard for Software Project Management Plans”
- 1.4.8 IEEE 828-1998, “Standard for Software Configuration Management Plans” and US NRC Regulatory Guide 1.169 (endorses IEEE 828-1990)
- 1.4.9 IEEE 829-1998, “Standard for Software Test Documentation”, and US NRC Regulatory Guide 1.170 (endorses IEEE 829-1983)
- 1.4.10 IEEE 830-1998, “Recommended Practice for Software Requirements Specifications” and US NRC Regulatory Guide 1.172 (endorses IEEE 830-1993)
- 1.4.11 IEEE 1074-2006, “Standard for Developing a Software Project Life Cycle Process” and US NRC Regulatory Guide 1.173 (endorses IEEE 1074-1995)
- 1.4.12 Regulatory Guide 1.152, Rev. 2 “Criteria For Use Of Computers In Safety Systems Of Nuclear Power Plants.”
- 1.4.13 Invensys Operations Management Quality Management System Requirements Quality Manual IOM–Q1
- 1.4.14 Invensys Operations Management Nuclear Quality Assurance Manual IOM–Q2
- 1.4.15 Electric Power Research Institute (EPRI) Guideline NP-5652 (NCIG-07)

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual		
Revision:	1	Page:	9	of	47
		Date:	07/09/2010		

2.0 ORGANIZATION

2.1 IOM NUCLEAR SYSTEM INTEGRATION ORGANIZATION CHART



- Functional Reporting
- Typical PD project structure

NOTE: The above organization chart represents the overall IOM Nuclear System Integration organization structure. The specific organization chart for each project will be provided in each project plan (typical project structure shown in the boxed outline).

i n v e n t s y sTM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual		
Revision:	1	Page:	10	of	47
		Date:	07/09/2010		

2.2 RESPONSIBILITIES

2.2.1 Nuclear Quality Assurance Director

The Nuclear Quality Assurance (QA) Director reports to the Global Quality Director and responsible for:

- Maintenance and implementation of the IOM-Q2 including any facility-level manuals, procedures and project quality plans.
- Development, implementation, and maintenance of IOM corporate-level procedures implementing requirements of this manual utilizing Corporate Nuclear QA support.
- Periodic audit/surveillance of each facility involved in the design, manufacture, integration or servicing of nuclear products.
- Monitoring of activities related to nuclear customer projects and providing the corporate level QA interface with nuclear customers, their representatives, and applicable agencies.
- The evaluation of defects and noncompliance for report ability to the Nuclear Regulatory Commission (NRC) in accordance with 10CFR21 [Reference 1.4.2].

2.2.2 Nuclear Independent Verification and Validation (IV&V) Director

The Nuclear IV&V Director reports to the Vice President Chief Nuclear Officer and is responsible for providing resources and expertise to V&V operations.

2.2.3 Nuclear Project Delivery Director

Nuclear Project Delivery Director reports to the Vice President of Nuclear Operations and is responsible for the commercial/financial performance of project delivery, customer satisfaction with our execution process, the integrated performance of nuclear project resources, and the tactical decisions in their respective area of responsibility.

2.2.4 Nuclear Engineering Director

The Nuclear Engineering Director reports to the Vice President of Nuclear Operations and is responsible for providing the engineering resources for projects operation.

2.2.5 Project Quality Assurance Manager

The Project Quality Assurance Manager (PQAM) reports to the Nuclear Quality Assurance Director and is responsible for development and implementation of the facility specific Quality Assurance manuals, procedures or project quality plan to satisfy the applicable requirements of this manual and customer contracts.

i n v e n t s y sTM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual		
Revision:	1	Page:	11	of	47
		Date:	07/09/2010		

2.2.6 IV&V Manager

The IV&V Manager reports to the Nuclear IV&V Director. Some of the major tasks and responsibilities are listed below.

- Provide V&V management oversight of nuclear projects.
- Provides V&V managerial interface with the customer and with other IOM departments, as needed.
- Assigns personnel to perform the V&V activities.

2.2.7 Project Manager

The Project Manager (PM) reports to the Nuclear Project Delivery Director. Some of the major tasks and responsibilities are listed below. The detailed tasks and responsibilities of the PM shall be described in each applicable project plan.

- Provides overall management of the project.
- Provides the managerial project interface with the customer and with other IOM departments, as needed.

2.2.8 Engineering Manager

The Engineering Manager reports to the Nuclear Engineering Director and is responsible for managing the engineering resources to support projects.

2.2.9 Project Engineer

The Project Engineer (PE) reports to the PM. Some of the major functions and responsibilities of the PE are described below. The detailed responsibilities of the PE shall be described in a project plan.

- Translates customer technical requirements into project documents and drawings.
- Ensures development of required project design documents.
- Ensures that only approved documents are used by project personnel.

2.2.10 Engineering staff

The Engineering staff reports to the Engineering Manager and supports the PE in developing project hardware design, software design, and project documentation.

2.2.11 Integration staff

The Integration staff (Technician or Engineer) reports to the Engineering Manager and supports the PE in system integration activities. Integration staff shall also perform system pre-test checkout of the wiring and software installation.

i n v e n t s y sTM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual		
Revision:	1	Page:	12	of	47
		Date:	07/09/2010		

2.2.12 Independent Verification and Validation (IV&V) staff

The IV&V staff reports to the IV&V Manager. Some of the major functions and responsibilities of the IV&V staff are described below. The detailed functions and responsibilities of the IV&V staff shall be described in each applicable project plan.

- Prepare the Software Verification and Validation Plan (SVVP).
- Perform independent review/verification of software design documents.
- Generate and execute Verification and Validation test procedures.

2.2.13 Project Quality Assurance Engineer

The Project QA Engineer (PQAE) reports to the PQAM. Some of the major functions and responsibilities of the PQAE are listed below. The detailed functions and responsibilities of the PQAE shall be described in each applicable project plan.

- Provides project quality oversight to help ensure that the requirements of the Quality Assurance Program and customer requirements are satisfied.
- Advises the PQAM and the PM on potential quality problems and recommends appropriate solutions.
- Prepares a project quality plan that defines how the project quality requirements will be satisfied.
- Prepares a project Software Quality Assurance Plan (SQAP)
- Conducts periodic surveillances of project activities to help ensure project compliance with quality requirements.

2.2.14 Project Group

The Project group consists of the PM, PE, Engineering staff, and Integration staff. The Project group shall be responsible for project hardware and software design, system integration and system delivery.

2.2.15 Project Review Committee

A project review committee consists of members of the Project group, IV&V group, QA group, and customer, as applicable. A project review committee shall meet for project related activities defined below.

- **Phase Exit** - Review project activities associated with the major project phases (requirements, design, implementation, and test) and evaluate the risks and provide recommendations associated with lessons learned prior to entering the next project phase.
- **Test Activities** – Release system for test, review and evaluate test results to determine acceptability of the tests, and to discuss any problems identified during the testing.

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual		
Revision:	1	Page:	13	of	47
		Date:	07/09/2010		

3.0 PROJECT PHASES

Nuclear safety-related projects shall consist of the following project phases. The project phases and description of the major deliverables are listed in the below sections. Refer to Exhibit 1 for additional detail.

- Acquisition Phase
- Planning Phase
- Requirements Phase
- Design Phase
- Implementation Phase
- Test Phase
- Delivery Phase

Phase completion meetings shall be held by a project review committee at the completion of the requirements, design, implementation, and test phase. A project review committee shall assess the risks and make recommendations for incorporating lessons learned prior to starting activities associated with the next project phase.

a, b

invenSYSTM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual				
Revision:	1	Page:	14	of	47	Date:	07/09/2010

a, b

i n v e n t s y s TM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual		
Revision:	1	Page:	15	of	47
		Date:	07/09/2010		

a, b

invenSysTM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual				
Revision:	1	Page:	16	of	47	Date:	07/09/2010

a, b

invenSysTM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual		
Revision:	1	Page:	17	of	47
		Date:	07/09/2010		

a, b

i n v e n s y sTM
Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual		
Revision:	1	Page:	18	of	47
		Date:	07/09/2010		

a, b

invenSYSTM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual		
Revision:	1	Page:	19	of	47
		Date:	07/09/2010		

a, b

invenSYSTM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual		
Revision:	1	Page:	20	of	47
		Date:	07/09/2010		

a, b

invenSYSTM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual				
Revision:	1	Page:	21	of	47	Date:	07/09/2010

a, b

inveniss™

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual		
Revision:	1	Page:	22 of 47	Date:	07/09/2010

a, b

invenSYSTM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual		
Revision:	1	Page:	23	of	47
		Date:	07/09/2010		

a, b

invenSysTM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual		
Revision:	1	Page:	24	of	47
		Date:	07/09/2010		

a, b

invenSYSTM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual				
Revision:	1	Page:	25	of	47	Date:	07/09/2010

a, b

invenSYSTM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual				
Revision:	1	Page:	26	of	47	Date:	07/09/2010

a, b

invenSysTM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual		
Revision:	1	Page:	27	of	47
		Date:	07/09/2010		

a, b

invenSYSTM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual		
Revision:	1	Page:	28	of	47
		Date:	07/09/2010		

a, b

invenisTM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual		
Revision:	1	Page:	29	of	47
		Date:	07/09/2010		

a, b

invenisysTM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual		
Revision:	1	Page:	30	of	47
		Date:	07/09/2010		

a, b

invenSysTM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual		
Revision:	1	Page:	31	of	47
		Date:	07/09/2010		

a, b

invenSysTM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual		
Revision:	1	Page:	32	of	47
		Date:	07/09/2010		

a, b

invenSysTM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual		
Revision:	1	Page:	33	of	47
		Date:	07/09/2010		

a, b

invenSYSTM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual		
Revision:	1	Page:	34	of	47
		Date:	07/09/2010		

a, b

invenSysTM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual		
Revision:	1	Page:	35	of	47
		Date:	07/09/2010		

a, b

invenSysTM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual		
Revision:	1	Page:	36	of	47
		Date:	07/09/2010		

a, b

i n v e n t s y sTM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual		
Revision:	1	Page:	37	of	47
		Date:	07/09/2010		

Exhibit 1 - Typical System Integration Project Flow Chart

a, b

i n v e n t s y sTM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual		
Revision:	1	Page:	38	of	47
		Date:	07/09/2010		

Exhibit 1 - Typical System Integration Project Flow Chart

a, b

i n v e n t s y s TM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual		
Revision:	1	Page:	39	of	47
		Date:	07/09/2010		

Exhibit 1 - Typical System Integration Project Flow Chart

a, b

i n v e n t s y s TM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual		
Revision:	1	Page:	40	of	47
		Date:	07/09/2010		

Exhibit 1 - Typical System Integration Project Flow Chart

a, b

i n v e n t s y sTM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual		
Revision:	1	Page:	41	of	47
		Date:	07/09/2010		

Exhibit 1 - Typical System Integration Project Flow Chart

a, b

i n v e n t s y s TM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual		
Revision:	1	Page:	42	of	47
		Date:	07/09/2010		

Exhibit 1 - Typical System Integration Project Flow Chart

a, b

i n v e n t s y s TM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual		
Revision:	1	Page:	43	of	47
		Date:	07/09/2010		

Exhibit 1 - Typical System Integration Project Flow Chart

a, b

i n v e n s y sTM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual		
Revision:	1	Page:	44	of	47
		Date:	07/09/2010		

Exhibit 2 - Application Software Development

a, b

i n v e n t s y sTM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual		
Revision:	1	Page:	45	of	47
		Date:	07/09/2010		

Exhibit 2 - Application Software Development

a, b

i n v e n t s y sTM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual		
Revision:	1	Page:	46	of	47
		Date:	07/09/2010		

Exhibit 2 - Application Software Development

a, b

i n v e n t s y sTM

Operations Management

Document:	NTX-SER-09-21	Title:	Nuclear System Integration Program Manual				
Revision:	1	Page:	47	of	47	Date:	07/09/2010

Exhibit 2 - Application Software Development

a, b