IAEA/ANL
Interregional Training Course

Technical and Administrative Preparations Required for Shipment of Research Reactor Spent Fuel to Its Country of Origin

Argonne National Laboratory
Argonne, IL
13 - 24 January 1997

Lecture L.7.1

Preparation of Procedures

Peter C. Ernst

Consultant

International Atomic Energy Agency
Vienna, Austria

Argonne National Laboratory
Illinois, USA

MODULE 7

L.7.1

PREPARATION OF PROCEDURES

by

PETER C. ERNST

CONSULTANT

PREPARATION OF PROCEDURES

INTRODUCTION

WHY PROCEDURES

DEVELOPMENT CONSIDERATIONS

EXAMPLES

INTRODUCTION

PROCEDURES ARE SOMETIMES FOUND IN SEVERAL VOLUMES CALLED “MANUALS” OR “PROGRAMS” SUCH AS A FUEL MANAGEMENT PROGRAM. SMALL OR LOW POWER REACTORS MAY HAVE ONLY ONE SET CALLED “OPERATING INSTRUCTIONS”.

MOST REGULATORY BODIES REQUIRE OPERATING PROCEDURES TO HAVE A FORMAL PROCESS OF REVIEW, ASSESSMENT AND APPROVAL. IN SOME CASES, AND FOR SOME SPECIFIC PROCEDURES, THE FINAL APPROVAL MAY REST WITH THE REGULATORY BODY.

IN ANY CASE THE PROCEDURES SHALL BE DEVELOPED WITHIN AN ESTABLISHED QA PROGRAM TO ENSURE THIS REVIEW AND ASSESSMENT AND TO ESTABLISH THE RELEVANCE AND USE OF THE PROCEDURE.

PROCEDURES MAY TAKE SEVERAL FORMATS DEPENDING ON THE GENERAL STRUCTURE OF THE SET OF SAFETY-RELATED DOCUMENTS (SOMETIMES COLLECTIVELY CALLED THE “LICENSING DOCUMENTATION”) REQUIRED BY YOUR REGULATORY BODY.

TIERED APPROACH FOR OPERATING DOCUMENTATION

LICENSING DOCUMENTS

PROGRAM DOCUMENTS

PROCEDURES

INFORMATION, LISTS, FORMS, ETC.

WHY PROCEDURES ?

PROCEDURES ARE ONE OF MANY AIDS THAT HELP AN OPERATING ORGANIZATION ACHIEVE THE OBJECTIVE OF SAFE OPERATION OF THEIR FACILITY.

PROPERLY DEVELOPED AND WRITTEN PROCEDURES CAN HELP DEMONSTRATE A FACILITY'S COMMITMENT TO FURTHERING A SAFETY CULTURE AMONG ITS STAFF.

EVEN HIGHLY SKILLED AND TRAINED STAFF CAN USE ASSISTANCE IN PERFORMING COMPLICATED TASKS, ESPECIALLY THOSE TASKS PERFORMED INFREQUENTLY, SUCH AS A SPENT FUEL SHIPMENT.

PROCEDURES CAN, AMONG OTHER PURPOSES:

- ENHANCE SAFETY;
- REDUCE HUMAN ERROR;
- PROVIDE A TOOL FOR TRAINING;
- ENSURE PROPER PERFORMANCE OF THE STEPS NECESSARY TO A TASK;
- PROVIDE A MEANS OF ENSURING COMPLIANCE WITH REQUIREMENTS;
- PROTECT EQUIPMENT FROM DAMAGE; AND
- WITH DATA SHEETS, PROVIDE RECORDS FOR OPERATIONAL AND QA REQUIREMENTS.

DEVELOPMENT CONSIDERATIONS

DEVELOPMENT PROCESS

FORMAT

CONTENT

TRAINING

QUALITY ASSURANCE

DEVELOPMENT PROCESS

THE OPERATING ORGANIZATION IS RESPONSIBLE FOR ESTABLISHING PROCEDURES TO ENSURE THE SAFE OPERATION OF A FACILITY WITHIN THE OPERATING LIMITS AND CONDITIONS (OLC's) AND WITHIN THE ESTABLISHED ADMINISTRATIVE AND ORGANIZATIONAL REQUIREMENTS SOMETIMES EMBODIED IN AN "***OPERATING MANUAL***".

DEVELOP PROCEDURES IN ACCORDANCE WITH A QA PROGRAM DESCRIBING THE PROCESSES FOR DEVELOPMENT, APPROVAL, IMPLEMENTATION AND MODIFICATION OF PROCEDURES. THIS SHOULD INCLUDE A PROCEDURE DEVELOPMENT FORM ON WHICH THE NECESSARY TRAINING, ETC. ARE NOTED.

OPERATING PERSONNEL SHOULD BE INVOLVED IN THE DEVELOPMENT OF PROCEDURES AND TRAINED IN THEIR USE.

BEFORE GIVING HIS APPROVAL TO A SAFETY-RELATED PROCEDURE THE REACTOR MANAGER SHALL SUBMIT THE PROCEDURE TO THE SAFETY COMMITTEE FOR REVIEW AND COMMENT. THE SAFETY COMMITTEE SHALL REVIEW SUBMITTED PROCEDURES AGAINST THE OLC'S AND POLICIES OF THE OPERATING ORGANIZATION AND MAKE SUITABLE RECOMMENDATIONS REGARDING THEIR ADOPTION.

THE REACTOR MANAGER SHALL ENSURE THAT THE LATEST REVISION IS READILY AVAILABLE FOR TRAINING AND IMPLEMENTATION AND THAT EARLIER REVISIONS HAVE BEEN REMOVED FROM USE.

FOR SPENT FUEL SHIPPING THE CO-OPERATION AND ASSISTANCE OF PERSONNEL FROM THE CHOSEN CASK VENDOR, CARRIER AND RECEIVING SITE SHOULD BE SOUGHT WHEN DEVELOPING CASK HANDLING AND SHIPMENT COMPLIANCE PROCEDURES.

OTHERS EXPERIENCED IN THE SUBJECT AREA MAY BE CONSULTED FOR ADVICE AND ASSISTANCE.

THE HEALTH PHYSICIST FOR THE FACILITY SHOULD BE INCLUDED IN THE DEVELOPMENT AND REVIEW OF PROCEDURES INVOLVING RADIOLOGICAL SAFETY.

THE RELEVANT AUTHORITIES RESPONSIBLE FOR PHYSICAL PROTECTION AND FOR SAFEGUARDS SHOULD LIKEWISE BE CONSULTED REGARDING PROCEDURES INVOLVING THEIR SUBJECT AREAS.

EMERGENCY PLANNING SHALL BE REFERENCED OR INCLUDED AS REQUIRED OR APPROPRIATE.

SUGGESTED DEVELOPMENT STEPS

DECIDE ON THE METHODS BEST SUITED TO A TASK AND CREATE A DRAFT PROCEDURE.

THE REACTOR MANAGER REVIEWS THE DRAFT FOR CONSISTENCY AND COMPLIANCE WITH OLC'S AND OTHER REQUIREMENTS.

VALIDATE THE DRAFT PROCEDURE THROUGH ACTUAL TRIAL USE AND OBSERVATION, OR, IF THIS IS NOT POSSIBLE, BY CONSULTING WITH PERSONS EXPERIENCED IN THE SUBJECT AREA.

REVIEW AND REVISE THE DRAFT AS NECESSARY.

SAFETY-RELATED PROCEDURES OR OTHERS REQUIRING IT, SHALL BE SUBMITTED TO THE SAFETY COMMITTEE FOR REVIEW AND ASSESSMENT BEFORE BEING GIVEN APPROVAL BY THE REACTOR MANAGER.

NOTE TRAINING REQUIREMENTS ON THE PROCEDURE DEVELOPMENT FORM

DISTRIBUTE THE PROCEDURES FOLLOWING STAFF TRAINING IN THEIR USE

FORMAT OF PROCEDURES

- FOR CONSISTENCY IN FORMAT AND CONTENT PREPARE PROCEDURES IN ACCORDANCE WITH A QA PROGRAM GOVERNING THEIR DEVELOPMENT, REVIEW AND DISTRIBUTION CONTROL.

- USE A CONSISTENT FORMAT TO AVOID CONFUSION.

- IDENTIFY WARNINGS AND CAUTIONS IN A UNIQUE MANNER SO THAT THEY STAND OUT ON THE PAGE.

- INCLUDE WARNINGS AND CAUTIONS AHEAD OF THE STEP TO WHICH THEY REFER.

- IDENTIFY RECORDING AND QA REQUIREMENTS.

- KEEP QA AND DATA ENTRY REMINDERS TOGETHER WITH THE ITEM(S) THEY REFER TO.

- HIGHLIGHT CONDITIONAL STEPS.

- IDENTIFY RECORDING AND QA REQUIREMENTS

EXAMPLES OF WARNINGS, CAUTIONS, CONDITIONS AND VERIFICATIONS

10.4 Cleanup

10.4.6 Pool

(a) Return all tools to their storage locations.

(b) Put the cut snouts in a convenient location. If the dose-rates are acceptable, use dry storage.

10.4.7 Hot Cell

****

!! WARNING !!

Treat the Hot Cell as an active area until otherwise determined

****

(a) Check all surfaces and components for contamination. Cleanup as required

---

CAUTION

ot allow the hoist cable and air hose to become twisted when raising the basket into ool adapter and transfer flask to avoid damage to equipment

10.4.6 Verify proper operation of the transfer flask and pool adapter using an empty or dummy basket.

. **IF** proper operation is not achieved,

THEN make the necessary adjustments and re-test.

Enter and verify on WCC

10.4.6 Obtain radiation dose rate readings and swipes from other desired locations.

IF results are acceptable;
THEN proceed;
IF NOT, THEN consult with Health Physics regarding decontamination.

Enter radiation survey results on SFS-F08.
Enter contamination survey results on SFS-F09.

10.4.7 Install container(s) on trailer.

Enter and verify on WCC.

CONTENT OF PROCEDURES

- ♦ USE A STANDARD FORMAT FOR CLEAR AND CONSISTENT PRESENTATION
- ♦ ESTABLISH ORDER OF PERFORMANCE WHEN MORE THAN ONE PROCEDURE USED
- ♦ INCLUDE PREREQUISITES, CAUTIONS AND WARNINGS WHEN NECESSARY
- ♦ INCLUDE STEP BY STEP PERFORMANCE OF NON-ROUTINE ACTIVITIES
- ♦ INCLUDE DATA SHEETS TO RECORD DATA AND TEST RESULTS
- ♦ INCLUDE QUALITY ASSURANCE REQUIREMENTS FOR RECORDING, COMPLIANCE AND VERIFICATION
- ♦ INCLUDE THE FOLLOWING ELEMENTS (THOSE IN BRACKETS ARE OPTIONAL)

ELEMENTS OF A PROCEDURE

IDENTIFICATION NUMBER

REVISION NUMBER AND DATE

(REVISION HISTORY)

APPROVALS

TITLE

PURPOSE / SCOPE

(INTRODUCTION/BACKGROUND)

(DEFINITIONS)

(REFERENCES)

RESPONSIBILITIES

PREREQUISITES

(PRECAUTIONS/ADDITIONAL REQUIREMENTS)

INSTRUCTIONS

DOCUMENTATION

VERIFICATION

(MEASUREMENTS, CALCULATIONS AND ACCEPTANCE CRITERIA)

IDENTIFICATION NUMBER:
A unique alphanumeric identifier for the procedure. This should appear on each page.

REVISION NUMBER AND DATE:
The current revision number and date should appear on each page to ensure operating personnel are aware of the revision in use.

(REVISION HISTORY):
If included, this should give the dates and numbers of previous revisions along with a summary of the current revisions.

APPROVALS:
Signatures and dates of approvals.

TITLE:
A consice description of the content.

PURPOSE / SCOPE:
A statement of the purpose for the procedure including any limitations.

(INTRODUCTION/BACKGROUND):
Any introductory or background information that will clarify or assist in the performance of the procedure or to set the procedure in context. This may include a discussion of methods.

(DEFINITIONS):
Definition of terms used in the procedure that are necessary to understand and to perform the procedure.

(REFERENCES):
References upon which the procedure is based and that are referred to in the text.

RESPONSIBILITIES:
Specific delineation of the requirements for and responsibilities of operating personnel in order to perform the procedure.

PREREQUISITES:
Specific conditions for systems, equipment and personnel required to perform the procedure.

(PRECAUTIONS/ADDITIONAL REQUIREMENTS):
Delineation of special tools or equipment, support services, radiation protection measures, and special safety precautions related to the performance of the procedure.

INSTRUCTIONS:
Specific step by step instructions for performing a procedure. The level of detail should be such that qualified personnel can follow the instructions without further directions. Instructional steps should begin with action words (e.g. turn, record, energize, set, note, check, lift, press, test, insert).

DOCUMENTATION:
A listing of any checklists, data sheets or reports necessary to document the results or completion of the procedure and what to do with them.

VERIFICATION:
How the procedure completion is verified, if applicable.

PROCEDURE ELEMENTS (Continued)

(MEASUREMENTS, CALCULATIONS AND ACCEPTANCE CRITERIA): For some procedures that require measurements and calculations, documentation of the basis for the measurements and calculations and acceptance criteria may be provided to assist operating personnel in understanding the steps performed in the procedure. This may be included in an appendix.

GENERAL

- FACILITY SYSTEMS AND EQUIPMENT NEEDED
- RECORD KEEPING
- PERSONNEL REQUIREMENTS
- INSTRUCTIONS FROM THE CASK OWNER

PREPARATION OF THE FUEL ASSEMBLY

- IF CROPPING OF THE ASSEMBLIES IS TO BE DONE IT SHOULD NOT BE DONE SIMULTANEOUSLY WITH THE LOADING OF THE CASK.

- INSPECTION OF THE ASSEMBLIES TO ESTABLISH THEIR CONDITION AND VERIFY THEIR IDENTIFICATION.

- ASSEMBLIES WITH SUSPECTED CLADDING FAILURES REQUIRE SPECIAL TREATMENT SUCH AS SIPPING TESTS AND CANNING.

RECEPTION AND MOVEMENT OF THE SHIPPING CASK

- SPECIFY EQUIPMENT AND HANDLING NECESSARY FOR CASK RECEPTION AND MOVEMENT
- RADIATION AND CONTAMINATION SURVEY
- CLEAN AND DECONTAMINATE
- CHECK FOR DAMAGE
- MOVE INTO BUILDING OR LOADING AREA

PRE-USE INSPECTION
AND TESTING OF THE CASK

- VISUAL INSPECTION FOR DAMAGE TO THE CASK OR ITS LIFTING DEVICES
- INSPECTION OF THE INSIDE OF THE CASK AND THE CASK BASKETS
- INSPECT CLOSURE SEALS AND REPAIR OR REPLACE AS NECESSARY
- PERFORM ANY COMPLIANCE TESTS REQUIRED
- VERIFICATION OF NEUTRON ABSORBING MATERIALS, IF REQUIRED

LOADING THE SHIPPING CASK

- MOVE OPEN CASK TO LOADING POSITION IN POOL
- LOAD CASK
  (CRITICALITY MEASUREMENTS IF REQUIRED)
- PLACE LID ON CASK
- REMOVE FROM POOL
- SURVEY AND DECONTAMINATE

LOADING THE SHIPPING CASK

- LOAD BASKETS
- *MOVE TRANSFER FLASK TO LOADING AREA
- *LOAD BASKET INTO TRANSFER FLASK
- *SURVEY FLASK
- *MOVE FLASK TO CASK
- *TRANSFER BASKET TO CASK
- PLACE LID ON CASK

PRE-SHIPMENT TESTING OF THE LOADED CASK

- PRESSURE TESTS
- TEMPERATURE EQUILIBRIUM
- COOLANT ACTIVITY
- DOSE RATES
- SURVEYING FOR CONTAMINATION
- DECONTAMINATE AS NECESSARY

SHIPPING THE CASK

- LOADING OF THE CASK ONTO THE TRANSPORT VEHICLE
- FINAL SURVEY
- COMPLETE PAPERWORK
- COMPLIANCE VERIFICATION
- LABELLING CASK AND TRANSPORT VEHICLE.
- INSTRUCTIONS FOR THE DRIVERS AND ESCORTS
  - EMERGENCY PLAN
  - SECURITY PLAN
- NOTIFICATIONS

ADDITIONAL DOCUMENTS

THE FOLLOWING ADDITIONAL DOCUMENTS SHOULD BE PREPARED USING THE SAME GENERAL PRINCIPALS AS FOR THE PROCEDURES.

- TRANSPORTATION PLAN
- PHYSICAL PROTECTION PLAN
- EMERGENCY PLAN
- INSTRUCTIONS TO DRIVERS