Document management for VVR S Research Reactor Decommissioning - electronic archiving system

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SUMMARY

- Record – keeping system
- Retrieval of missing / old information
  - History operation search
- Archiving of information
  - Electronic archiving
- Long term records (who, where, how)
- Accessibility of information
- Bibliography:

RECORD – KEEPING SYSTEM – GENERALITIES

- The record keeping system and report management system will include all the important information related to decommissioning.
- The record keeping program
  - will maintain that the relevant records regarding the safety of decommissioning are kept; and
  - in this program will be find details about identification way, period of keeping, storage manner and responsibilities related to implementation and record keeping system are defined.

RECORD – KEEPING SYSTEM - GENERALITIES

- Informational system of the record integrated management
  - Documents are archived according too Law No. 16 from 2 April 1996 actualized at 5 June 2006 for national archiving and Law No 135 from 15 May 2007 for electronic documents archiving.
  - Records arising from operation and decommissioning of the VVR-Reactor are declared permanent.

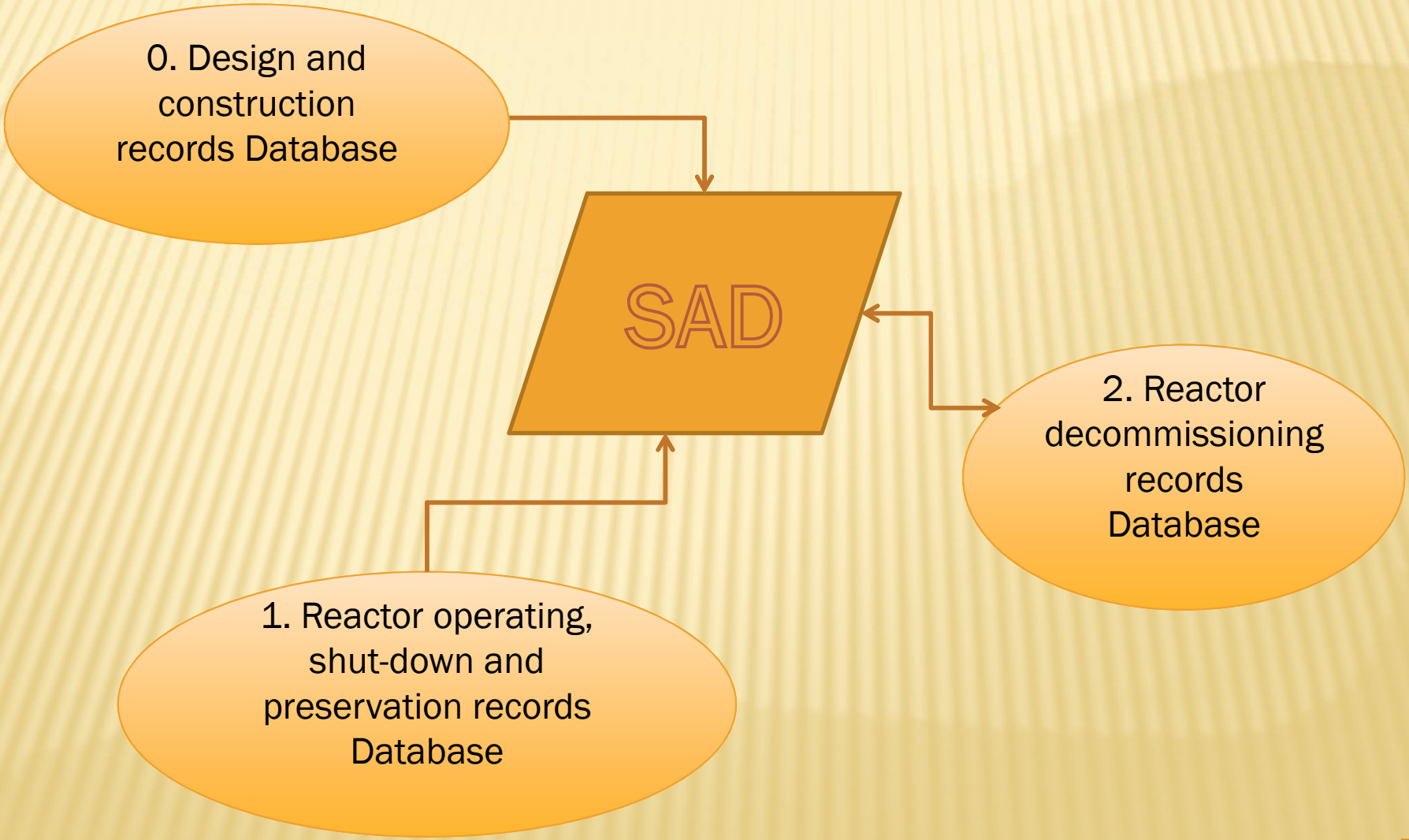
RECORD – KEEPING SYSTEM - STRUCTURE

- Informational system of the record integrated management
  - For an efficient administration of the documents, a dual system of physical and electronic record was implemented an interactive system - SQL type database:
    - Archive Server: ENTREPRISE.I Advanced server starter
    - Documents Flow Server: EASY LOGISTIC CENTER
    - Server for documents flow creation: EASY WORKFLOW ENGINE
    - Electronic documents will be stored using the Plasmon G-32 slot,960 GB optical Library with one 30 GB UDO drive single SCSI bus on the Media Plasmon 5x30GB UDO True WORM 8,192 Byte, sector 50 year data life.

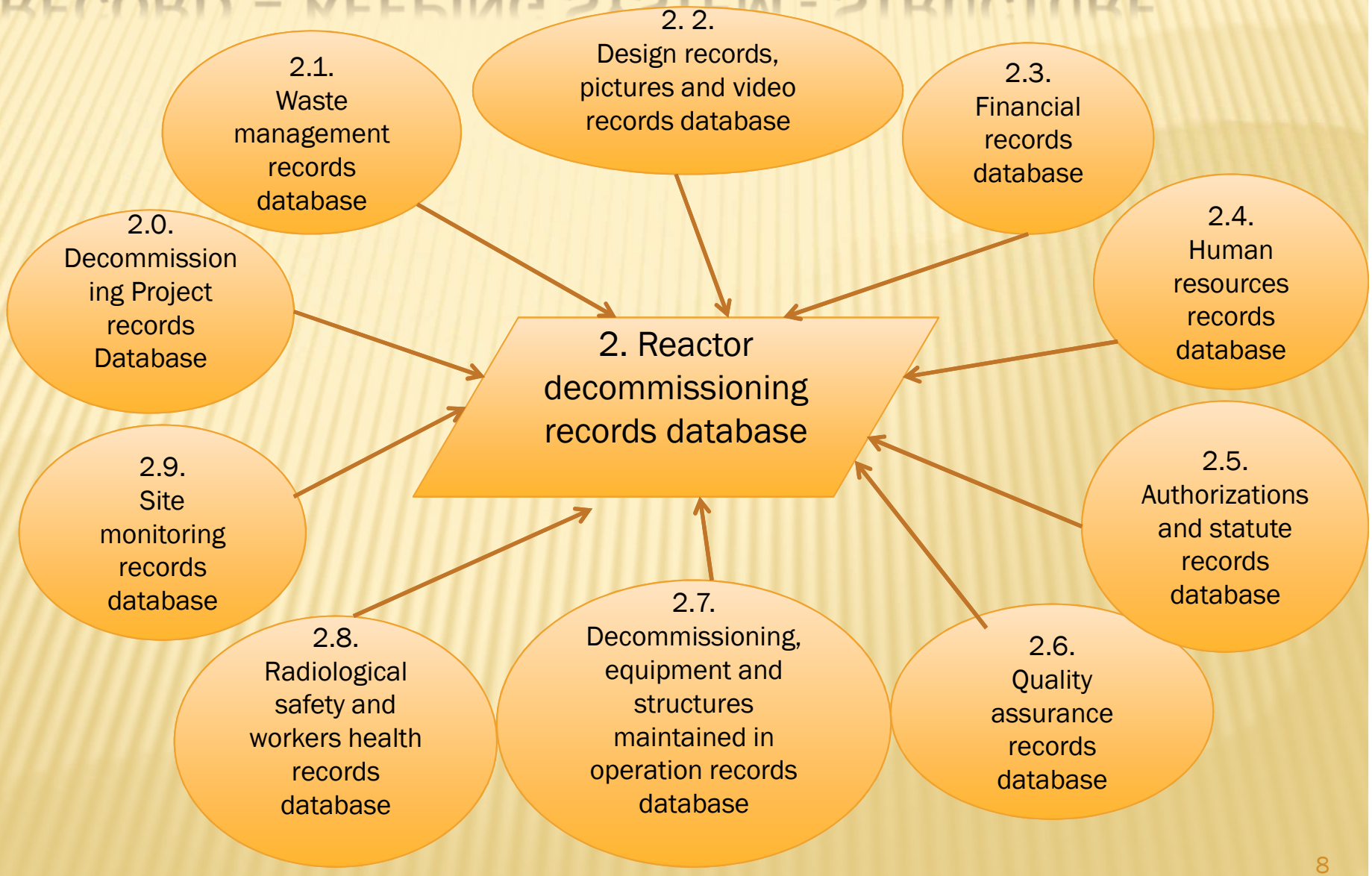
RECORD – KEEPING SYSTEM - GENERALITIES

- Identification and selection of the records referring to the decommissioning
  - In accordance with the studies performed by the IAEA and based on the experience acquired so far in the field of the nuclear reactor decommissioning completed by different owners and operators, it has been concluded that it is necessary to collect and introduce in the archive documentation typical of the decommissioning operations.
  - The archiving system of the documentation specific for the decommissioning project of Nuclear Reactor VVR-S, generic called SAD, was conceived as a computerized system and it will contain the following databases.

RECORD – KEEPING SYSTEM - STRUCTURE



RECORD – KEEPING SYSTEM - STRUCTURE



RECORD – KEEPING SYSTEM - STRUCTURE

- Informational system of the record integrated management
  - Primary data:

    An inventory considering all the available data referring to the design and construction phases was conducted in the first phase of the decommissioning data archiving system determination.

RECORD – KEEPING SYSTEM - STRUCTURE

- Informational system of the record integrated management
  - Data referring to historical waste
  - Present condition of the reactor system
  - Radiological characterization of the reactor
  - Relevant information about decommissioning operations

RECORD – KEEPING SYSTEM - STRUCTURE

- Completion of the database of the decommissioning phase includes the following activities:
  - Automatic introduction of some calculated values of the radioactivity and dose rates for each decommissioning phase;
  - Introduction of information referring to the fuel assembly;
  - Introduction of information (dose and radioisotope composition) related to radioactive waste;
  - Introduction of information referring to the technological space features, (map of measured dose values and of the instrumentation used)
  - Automatic introduction of the information related to the characterization, transport and disposal of waste packages
  - Introduction of information referring to the environment

RETRIEVAL OF MISSING / OLD INFORMATION

- History operation search

  Was made searches and established (using old personal history, nuclear operator operation book, initial Russian design documentations, kept archived documentation (reports, project reports, technical mission, license etc.) and old research history papers):
  - Operating history of VVR-S nuclear reactor
  - Authorized activities
  - History on the radioisotope production
  - License (or authorization) history
  - Other necessary information
- Note: lack of information especially for detailed radiological caracterization

ARCHIVING OF INFORMATION - ELECTRONIC ARCHIVING

- This refers to information which is not required on a day to day basis, but which needs to be retained for a certain period, and also information which is retained in perpetuity and referred to infrequently but periodically. Such data is often removed from your day-to-day processing, thereby reducing the *overhead* on storage and processing resources
- Weaknesses in the longevity of the media used for archives can result in a failure to restore the required data when, eventually, it is needed.
- Archived data can often be retained in a proprietary format which is no longer supported by your present systems, thus frustrating attempts at access.
- Electronic archiving is based on Easy Enterprise solution comprised in SQL databases

LONG TERM RECORDS (WHO, WHERE, HOW) ~WHO ~

- Long-Term Preservation of Electronic Information
  - Keeping records is vital for any organisation especially for one implied in decommissioning, and although such records potentially form a mine of information, it has traditionally been difficult to make full use of this resource owing to the relative inaccessibility of paper based records.
  - As advances in technology increase apace, more and more of these records are now being generated, processed and stored in electronic format. This presents the opportunity for making the data readily available on-line and hence opening up a largely untapped resource to a much wider audience, potentially with substantial benefits

LONG TERM RECORDS (WHO, WHERE, HOW) ~WHO ~

- Long-Term Preservation of Electronic Information
  - Before this can be put into practice, there are several issues associated with long term storage of the electronic data that need to be addressed.
  - With paper based records, the storage medium and format of written or printed information have remained essentially unchanged over hundreds of years. In contrast, both the format of electronic records and the medium on which they are stored can easily become unreadable within a few years.
  - One only has to think of the number of now obsolete hardware and software formats that were industry-standards 15 years ago to begin to see the magnitude of the problem.
  - The difficulties are exacerbated for decommissioning organisations that are required by law not only to keep records for several decades, but also to demonstrate their authenticity.

LONG TERM RECORDS (WHO, WHERE, HOW) ~WHO ~

- Long-Term Preservation of Electronic Information
- Definitions:

Record: “any document made or received and set aside in the course of a practical activity”.

Authentic record: “a record that is what it purports to be and is free from tampering or corruption”.

LONG TERM RECORDS (WHO, WHERE, HOW) ~WHO ~

- Long-Term Preservation of Electronic Information
- Digital (or electronic) records, that are records stored on a computer system, whilst serving largely the same purpose, are inherently different from paper records.
- To access a paper record involves the user looking at and understanding the words, numbers or pictures on a piece of paper.
- To access a digital record requires the interaction of various items of hardware and software, combining to present the record to the user, typically on a computer screen.

LONG TERM RECORDS (WHO, WHERE, HOW) ~WHO ~

- Long-Term Preservation of Electronic Information
- It is important to note that the record itself is this presentation or rendition of the information to the user, not the bit-stream of the computer files involved, or the section of the tape or disk where these bits are stored.
- Preservation of an authentic digital record means that we preserve the ability to present the information to the user, in such a way that it passes on the message intended by the creator of that record.

LONG TERM RECORDS (WHO, WHERE, HOW) ~WHO ~

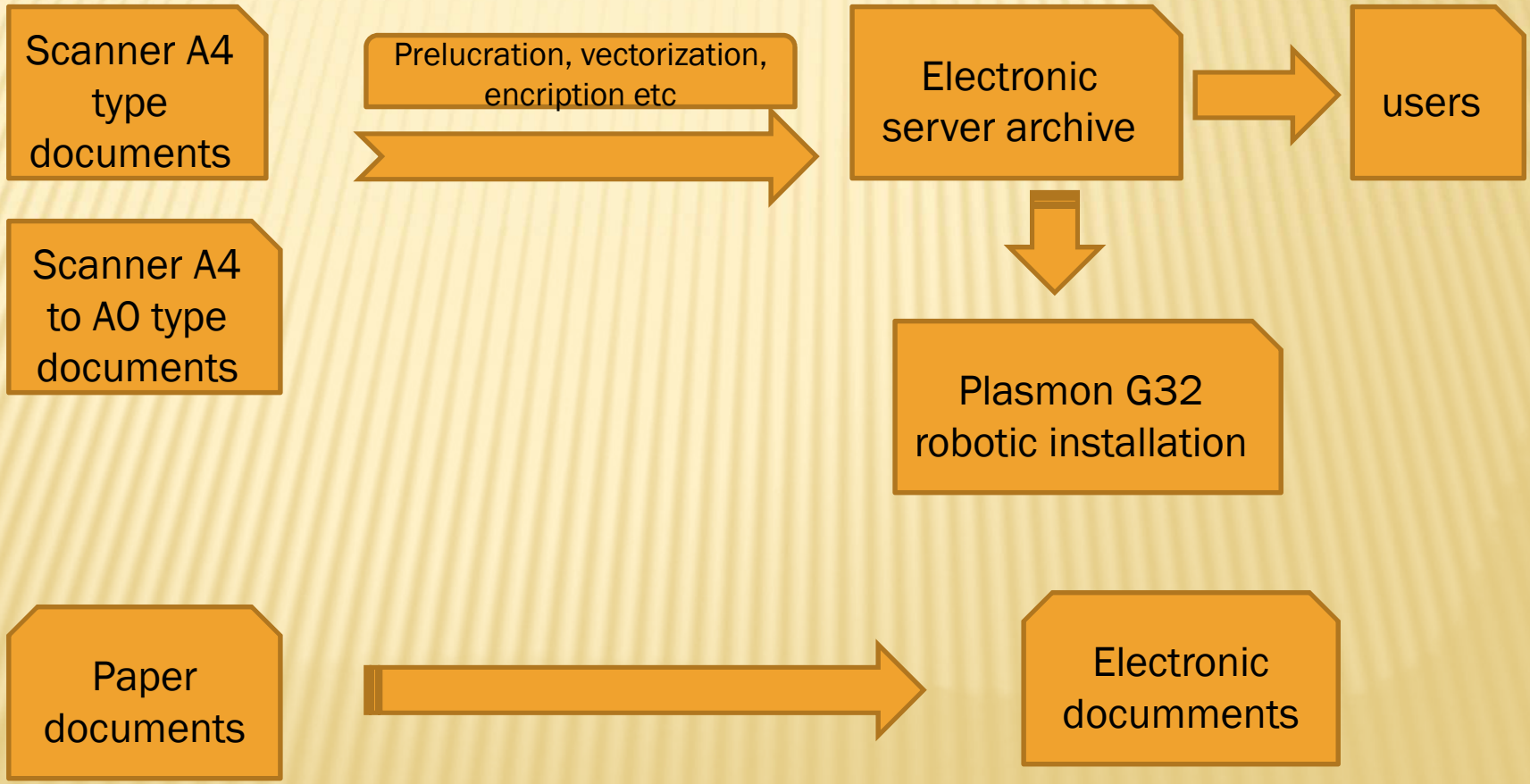
- An explanation of the problem
- The technology required to store and render a digital record can be divided into three main components:
  - the storage medium - e.g magnetic tape or disk
  - computer hardware , including a device to read the storage medium (e.g. disk drive) and a processor to execute the programming instructions
  - computer software, including operating system, device drivers and application software, to extract the stored information from the disk, process it and present it to the user in the required way

LONG TERM RECORDS (WHO, WHERE, HOW) ~WHO ~

- An explanation of the problem

  The challenge of digital preservation is thus to maintain the ability to present the original information in a record to the user, in the way the creator intended, using a complex network of hardware and software components, where every one of these components may need to be replaced several times over the lifetime of the record.

LONG TERM RECORDS (WHO, WHERE, HOW) ~WHO ~



LONG TERM RECORDS (WHO, WHERE, HOW) ~WHO ~

- An explanation of the problem
  - The architecture of the system must be highly modular, with the interfaces between the modules strictly defined.
  - Communication between the modules should be in a format with the best chance of longevity, thus with present technology, an XML based messaging approach is a good choice. - This allows individual components to be replaced without affecting other parts of the system.
  - The multi-tier layered architecture common in modern data management applications is well-suited to an archiving system, separating the data, the “logic” i.e. the understanding of how to retrieve meaningful data from the data storage system, the presentation layer and the user interface.

LONG TERM RECORDS (WHO, WHERE, HOW) ~WHO ~

- An explanation of the problem
  - The system must be protected from damage, whether it be due to hardware failure, physical damage such as fire or malicious digital attack, for example by viruses or hacking.
  - Therefore the system must be duplicated or backed up in such a way that it can be completely and reliably rebuilt and it must be protected from unauthorised access. It should be incorporated in a disaster recovery plan it must include an audit trail so that the history of all changes to a record is preserved (e.g. migration to a new format, addition of metadata, renewal of digital signatures, etc.)

LONG TERM RECORDS (WHO, WHERE, HOW) ~WHERE ~

- The electronic archive is located in laboratory building near the old reactor control room (room 214 at floor 1)
- The electronic archive storage has the following characteristics:
  - size 5,5x2,75,3,75m
  - the walls are painted in glossy white paint
  - the floor is concrete screed covered by PVC linoleum
  - 1 seal access doors from PVC with size 2x 2,2 m
  - 1 window with PCV frame and double glazing with size 2x2,5 m , one glass can be open
  - 1 seal service door
  - is sealed from solar light with Venetian blind

LONG TERM RECORDS (WHO, WHERE, HOW) ~WHERE ~

- Because of the environment and safe requirements for the electronic devices and media storages the electronic archive storages have the smoke detectors, burglary detectors,, 2 portable extinguishers loaded with carbon dioxide and inert gaseous and air - conditioning installation.
- The air - conditioning installation maintain the specific parameters: temperature and humidity in the programmed value (temperature 18-22 ^{0}C, humidity maximum 40%). the environment parameters monitoring is made continuum using a special device sensor connected online to a PC.

LONG TERM RECORDS (WHO, WHERE, HOW) ~WHERE ~

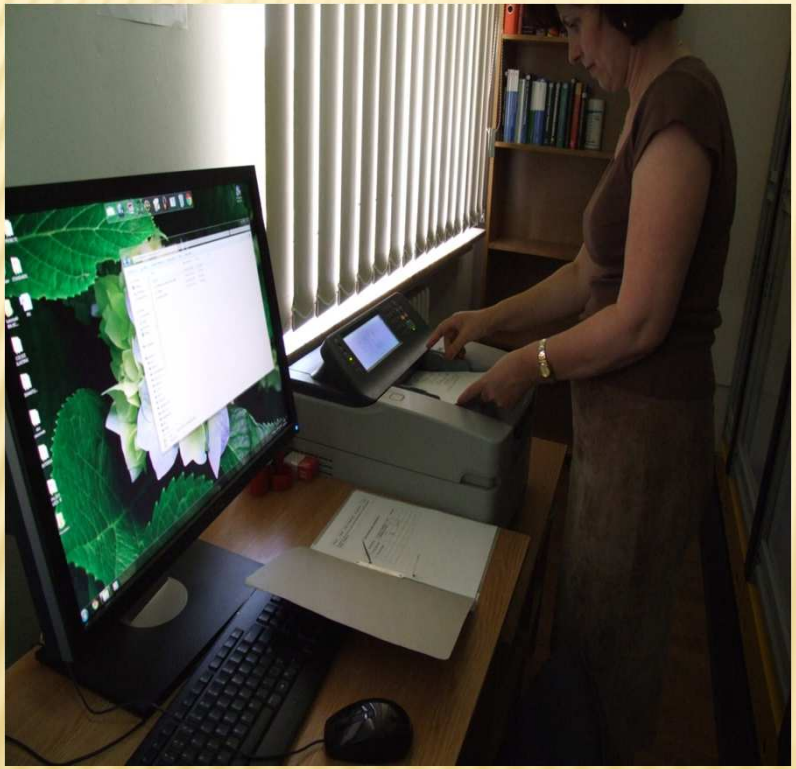
The air - conditioning installation

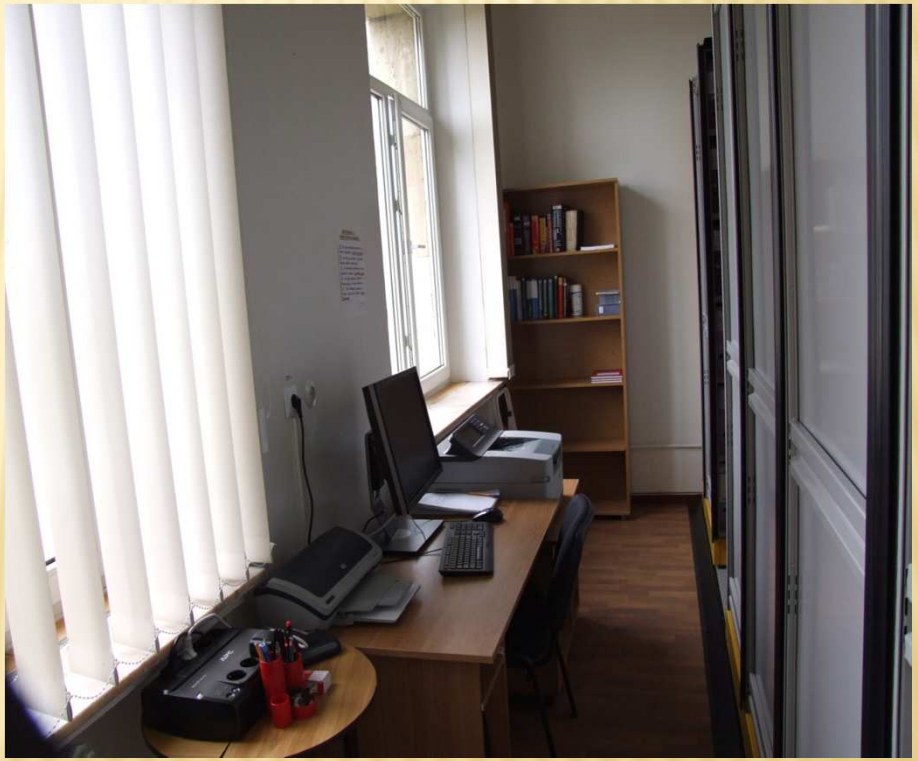
LONG TERM RECORDS (WHO, WHERE, HOW) ~HOW~

- The documents are converted in electronic format scanning the originals.
- The storage in the electronic format was made using "pdf" format in folders on years on the PC hard-disk from archive room

LONG TERM RECORDS (WHO, WHERE, HOW) ~HOW~

The PC station for A4 scanning





LONG TERM RECORDS (WHO, WHERE, HOW) ~HOW~

The PC station for A4 to A0 documents scanning and processing

LONG TERM RECORDS (WHO, WHERE, HOW) ~HOW~

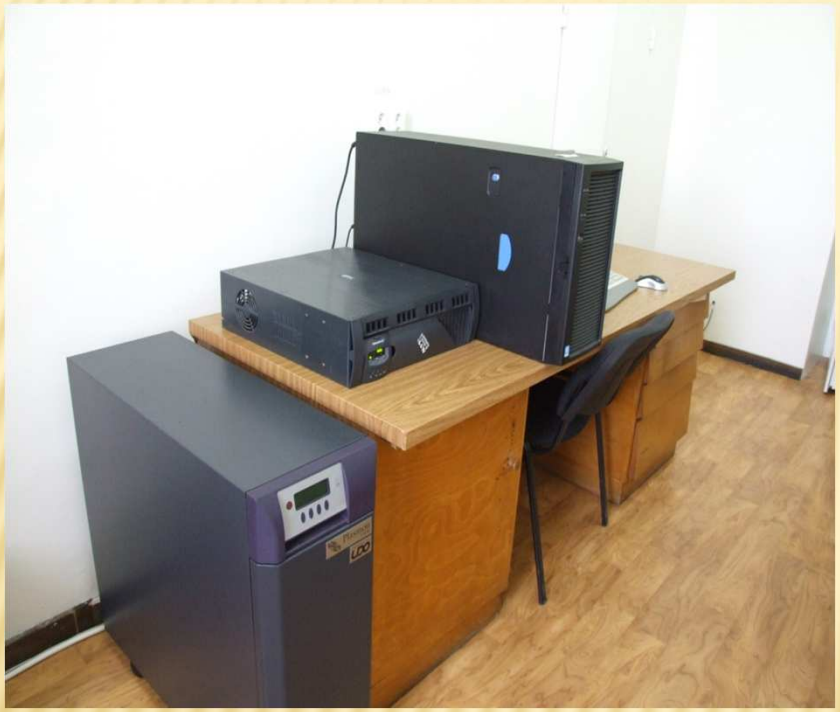
- associated metadata documents will have at least:
  - data and hour of the electronic conversion of the document
  - the necessary keywords for the document identification
  - the necessary elements to localize the original documents in the normal archive (archive index set in issued year approved archive nomenclature and if applicable document code and applicable revision)
  - localization elements for the for physical support in electronic archive
  - level of the classified document, if applicable
  - year of the issue

LONG TERM RECORDS (WHO, WHERE, HOW) ~HOW~

- the following type of the documents are stored in the electronic archive:
  - project documentation for the nuclear installation
  - obsolete documents stamped with "ANULAT" (obsolete)
  - other types of the record where the scanning is possible
- the documents in the electronic format are verified for de completeness and readability with the paper originals
- after scanning and verifying the document are transmitted to the electronic archive server for safe storage

LONG TERM RECORDS (WHO, WHERE, HOW) ~HOW~

The PC server station & PLASMON robotic station



LONG TERM RECORDS (WHO, WHERE, HOW) ~HOW~

- in the January of the next year the stored scanned documents on the electronic archive server are written with the record equipment PLASMON type on storage media by 30 GB capacity "ONCE WRITE" for safe storage for 50 years
- on the box of every media disk are applied stickers "ELECTRONIC ARCHIVED DOCUMENTS" , code PO DDR-831-01 , witch is written as a minimum:
  - archiving date
  - number of the archived files
  - listing traceability of archived files
  - signature for the confirmation of the archiving operation

LONG TERM RECORDS (WHO, WHERE, HOW) ~HOW~

- storage of the media storage on the plastic box in a cupboard from the electronic archive location
- quarterly
  - random access of at least 5% from files for verification of the data file preservation
  - make confirmation of the accessed data file by listing the accessed files
  - these listing will be kept for confirmation
  - must be respected the condition for the manipulation and storage for the media
- the media is forbidden to be exposed to the vibration and shock
- is forbidden to be touched the active media surfaces.

ACCESSIBILITY OF INFORMATION – ELECTRONIC ARCHIVE

- Understanding the successful adoption of information technology is largely based upon understanding the linkages among quality, satisfaction, and usage.
- All information has an ease accessibly in function of job nature and the data rights.
- Quality management responsible, Project management and the senior database manger have the authority to change the rights in function of the integrated management system, project requirements and staff changes, work nature etc.
- Project manager have the higher authority, quality management responsible must supervise all document integration and quality requirements, the senior database manger have access to all necessary instruments to make implementation in function of the requirements of the project manage and the quality management responsible.

ACCESSIBILITY OF INFORMATION – ELECTRONIC ARCHIVE

- The electronic archiving system has a potentially:
  - to make Implementation of archiving module directly from Microsoft Office - Easy Office Integration in according with approved integrated management system
  - implementing the integration of electronic archives with the e-mail system on the workstation
  - to implement acquisition module directly in the archive of documents sent to the printer (COLD + WINCOLD) in according with approved integrated management system
  - to create a unique access to both archives and documents assets, based on user name, password and rights granted by the system administrator (senior database manager).

ACCESSIBILITY OF INFORMATION – ELECTRONIC ARCHIVE

- The electronic archiving system has two primary components:
  - 1. Off data/ stored data – data used, staled, archived for long storage
  - 2. Data in use - data necessary for the professionals for their activities, active procedures, general usage data, training data etc.

ACCESSIBILITY OF INFORMATION – ELECTRONIC ARCHIVE

- Consultation:
  - right access and possible modification to an electronic archived document are established exclusive by the Head of the QM staff (quality management responsible) granting the access rights
  - senior database manager (administrator of the electronic system) keep the records of the rights granted
  - classified documents are treated in conformity with the Romanian law (law 182/2002)
  - responsibility for the establishment of the access rights to a document is to the quality management responsible
  - responsibility for the compliance of the accorded rights is to the system administrator (senior database manager)
  - media storage with activated documents in electronic format can't be borrow.

ACCESSIBILITY OF INFORMATION – ELECTRONIC ARCHIVE

- Search, retrieval and playback:
  - Easy archive system in SQL format have a large variety of functions with operate at document metadata level or at document content with the declared scope to localize, find and access archived document.
  - The system is based on a visual basic schedule that help implementation, cyclicality, records, reports and procedure following .
  - The system can find and retrieve all the documents that it has.

ACCESSIBILITY OF INFORMATION – ELECTRONIC ARCHIVE

- Security and control
  - The access to the system can be made in function of the established right on the user format and the group user format
  - Access to the core system is strictly prohibited and is permitted only to the authorized personnel with rights and obligation to maintain it.
  - Network access can be made under firewall, password and control network switches.

ACCESSIBILITY OF INFORMATION – ELECTRONIC ARCHIVE

- Audit
  - Electronic system ensure the keeping in unaltered state of the audit, it is capable to record all information for the actions performed in the electronic archive both on the documents and the management system

ACCESSIBILITY OF INFORMATION – ELECTRONIC ARCHIVE

- Salvage and restoration
  - Electronic archive system have two way to maintain the physical security of the stored data:
    - Raid 4 backup system on the archive computer server
    - Periodic data saves on the backup systems
  - Salvage is doing using records on the PLASMON type system disk

ACCESSIBILITY OF INFORMATION – ELECTRONIC ARCHIVE

- Keeping and destruction
  - Documents are kept in the electronic archive permanently
  - Is forbidden delete or destruction both of the activated documents and the media storage

ACCESSIBILITY OF INFORMATION – ELECTRONIC ARCHIVE

- Juridical regime
  - Documents from electronic archive have evidence value equal with the original.

ACCESSIBILITY OF INFORMATION – ELECTRONIC ARCHIVE

- Document evidence
  - Data evidence is kept by the system administrator
  - Note: the system have the capability to track itself
  - Quarterly the system administrator tracks the document evidence listing them.

ACCESSIBILITY OF INFORMATION – ELECTRONIC ARCHIVE

- Rank of archived document
  - Media storage has organized in function of the approved nomenclature archive for every organisational structure from the department
  - Media storage for the archived electronic documents are kept in the special boxes (cardboard or plastic).

ACCESSIBILITY OF INFORMATION – ELECTRONIC ARCHIVE

- Access to the electronic format data
  - As solicitude of the department professionals, quality management responsible (head of the quality management staff) give the permit at the archived documents, ONLY in read only format without print rights
  - The access is permitted as follow the right accord.
  - The access to the archived data in electronic format can be done after metadata information.

ACCESSIBILITY OF INFORMATION – ELECTRONIC ARCHIVE

- The rights accept /reject criteria
  - data record will be made only by specialized professionals from associated terminals to paper support archiving a and only after approval of the quality management responsible and with announcement of the archive senior manager

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- [9] Norms regarding specific requirements for quality management systems applied to the decommissioning of nuclear installations (NMC-11)]

END;

Thank you for yours attention