

Archival Backup & Disaster Recovery Committee Progress Report #1

Our committee is currently addressing the preservation of recorded permanent records that result from real property transactions. We have met on two separate occasions and individual members have attended various state, local and private records preservation conferences.

Important to a discussion about records preservation is the definition of a Life Expectancy rating. Life Expectancy ratings are assigned to information storage media to inform users about the useful access life of the media under consideration. These ratings are based the existence of and adherence to manufacturing standards, storage standards and technical changes to retrieval systems that could affect the probability of future access. Life Expectancy values are typically written as “LE” followed by a number where the number indicates the number of years from the date of recording that the information on that media is expected to be retrievable.

The following is a summary of the thoughts and preliminary conclusions of the committee. We encourage you to read and comment on this document. Your input will help us with our development of best practices for preserving recorded documents.

MEDIA OVERVIEW

Optical Media

CDR/DVDR – Over the past several years, CDR has become a popular media to store computerized information. Data recorded on CDR follows a standardized volume and file structure that is defined by ISO 9660:1988. It is this standard that assures that data on CDR is readable by any CD drive. At this time, there is no corresponding standard for DVDR media. Recently manufactured drives, however, are generally capable of writing and/or reading today’s DVD+R and DVD-R formats. The introduction of “next generation” blue laser DVD media and drives in 2004 poses a question about the compatibility of today’s red laser media with the new higher density blue laser drives.

Manufacturing standards for CDR/DVDR media do not currently exist. This means that raw materials and their method of assembly can vary with manufacturer and price. ISO 18927:2002 is the standard that describes the process to determine an estimated life expectancy for CDR based on storage temperature and relative humidity. Any LE value derived from this process is only valid for the specific media tested and may not be applicable to media that differs in manufacturing process or material content.

Optical Disk – There are a series of file interchange standards for 130mm (5.25”) platters that when followed, allows newer drives to read older platter formats (from 1.0Gb to 5.2Gb densities). In contrast to CD and DVD, optical disk platters are commonly enclosed in a cartridge that helps to protect them from physical damage. As the price of CDR media and drives became more affordable, the popularity of optical disk storage appears to have declined.

Paper

Paper still comprises a significant percentage of stored information in many counties. As long as paper records are physically retrieved as reference material, their LE cannot be determined. In addition to handling, the chemical content of the paper and the type of ink used for recording are significant factors in determining a useful life expectancy. There are private companies that can improve the appearance and stability of paper documents thereby extending the lifetime of these records.

Microfilm

Microfilm has established standards that when followed, qualify it for a Life Expectancy rating of 100 years for acetate base film and 500 years for polyester base film. These standards are:

- ISO 1062:1995 – Standard for manufacturing silver halide film.
- ISO 18917:1999 – Standard for maximum level of residual fixer on processed film.
- ISO 18902:2001 – Standard for non-reactive enclosures for silver halide film.
- ISO 18911:2000 – Standard for acceptable environmental storage conditions.

Beyond standards, silver halide film technology is over 100 years old and has played a role in records preservation for over 50 years giving it “real world” credibility. Microfilm is capable of storing both image and index data. Although viewing microfilm images requires relatively simple technology, effective retrieval requires equipment with projection optics, a focused light source and a suitable drive system.

Transactions in today’s real estate environment can include paper documents, digitized reproductions of paper documents, purely digital records and combinations of all three. Current document recording systems are capable of generating electronic files from digitized and digital documents that are compatible with microfilm production systems like the Kodak Archive Writer, Image Graphic’s Electron Beam Recorder, and the new European Staude File Converter. The popularity of systems like these indicates a continued acceptance of microfilm as a preservation tool in the “digital age”.

Magnetic Tape and Disk

Most vendors of records management software support RAID-type systems backed up by tape products like LTO (Linear Tape-Open) or DLT (Digital Linear Tape). The read/write speed, cost and reliability of RAID devices make them attractive for document storage and retrieval. Although there are no standards that would produce a LE rating for these systems, their use as a component in a preservation strategy is being given serious consideration by some public and private agencies.

PRELIMINARY CONCLUSIONS

Our committee currently believes that most CDR and all DVDR media should be thought of as transfer media. The LE uncertainty created by evolving manufacturing methods and the evolution of retrieval software, make the use of CDR or DVDR unwise as a sole solution for preserving permanent records. If CDR were to be used as a part of a multi-media preservation

scheme, media with a phthalocyanine organic dye and a reflective layer made from gold would be the most suitable.

WORM optical disk is a higher quality product than today's CDR/DVDR media. Optical disks recorded on drives that are compliant with ISO file interchange standards have an improved chance of retrieval as optical drives evolve. Because there is no LE rating assigned to the media itself, WORM OD should not be considered a sole, passive solution for preservation.

Although microfilm continues to be the media of choice for records preservation, the committee expressed concern about the practicality of recovering a sizable number of records from film. Our concerns included the cost of recovery and the continued availability of the high-speed equipment necessary to convert the data quickly to its preferred electronic format. It is for these reasons that we believe that it would be valuable to develop a plan to maintain digital and digitized records in an encoded form and be able to reliably migrate them to new media and formats as needed.

In an electronic preservation strategy, microfilm may still play an important role. We have concluded that preserving digital and digitized records requires effort and perseverance; the intensity and nature of both are unknown at this point. Information on microfilm does well in a more passive setting as long as the standards listed above have been met. The possibility of information loss during a migration is real and perhaps even likely. In the event that this occurs, recovering these records from microfilm may prove to be invaluable.

Microfilm can also play a critical role for counties that do not have the human or financial resources necessary to properly manage the preservation of electronic records.

For these reasons and microfilm's unsurpassed LE-500 rating, the committee believes that, for the time being, microfilm should be included as a component in a multi-layered electronic preservation strategy and could, in certain cases, serve as the only media necessary in a single layer preservation scheme.

At first, a preservation strategy that includes magnetic media may seem inappropriate for permanent records. The committee believes that any computerized storage solution that is intended to preserve encoded information will require significantly more attention than that needed for microfilm. Today's RAID type devices are worth considering because:

- ❑ The systems are cost effective.
- ❑ In the event of a system drive failure, they are designed to reconstruct lost data.
- ❑ Their transfer rates are high allowing data to be imported and exported quickly.
- ❑ Software can monitor the validity of stored data quickly and continuously.
- ❑ Systems can be mirrored and linked.
- ❑ Index data can be more easily included in the preservation scheme.

Although it seems obvious that a serious effort should be made to preserve computerized records in their electronic form, the question that remains is how best to do this. Some of the issues that the committee has touched on are:

- ❑ Can we rely on a single strategy or is redundancy necessary?
- ❑ Is TIFF the preferred preservation format regardless of the input image format such as XML?
- ❑ If not TIFF, then what?
- ❑ Basic records management auditing procedures that would support document authenticity.
- ❑ What kind of error checking needs to be done and how often?
- ❑ If an error is found, how is it best corrected?
- ❑ How are index databases and the links to images preserved?
- ❑ What are the various State Archives working on that we should consider?
- ❑ Should relationships between vendors, title companies or others that use electronic real estate records be included as part of a data recovery plan?

In summary, our committee believes that preserving computerized images in an electronic form is an important and necessary goal. Our uneasiness about optical media is based on the continuing evolution of retrieval software and hardware; the latest example being the introduction of blue laser disks and drives. Although these changes are normal and beneficial, they are the underlying reason why this technology does not lend itself to standardization.

It's clear that preserving computerized data will require more attention and resources than was required for microfilm. The question is where is this effort best placed? Although more research is needed, actively managed, redundant hard drive arrays have monitoring, recovery and import/export capabilities that make a compelling case for their participation in an active electronic preservation scheme.

The committee believes that until a "best practice" strategy has been developed, tested and proven for the storage and migration of permanent electronic images and indices, it would be prudent to include microfilm in a records preservation program even if optical or magnetic media are already in place. We also recognize that not all counties have the same technical and/or financial resources and their needs may be met by a simpler solution like microfilm. The simplicity, trustworthiness and adaptability of microfilm may earn it an enduring presence in a multi-layered document preservation plan.