

THE VALUE OF HISTORICAL RECORDS AND CORPORATE MEMORY IN ENVIRONMENTAL RESTORATION WORK AT DOE FACILITIES

Barbara A. Swenson
EG&G Rocky Flats

Frank J. Blaha
Wright Water Engineers, Inc.

Ann K. Sieben
Doty & Associates

ABSTRACT

Historical records of older environmental and waste-related work at Department of Energy (DOE) facilities are often overlooked in the rush to meet current-time deadlines. Nevertheless, historical records of activities, and corporate memory of why specific activities took place, can prove extremely useful and cost-effective in modern environmental work. Already available information can save thousands to millions of dollars in the course of environmental restoration work at one DOE facility. This money can be better spent on sites and areas that require these expenses, rather than re-developing information that is already available and otherwise known. The intent of this paper is to present information on the value and types of historical records available at DOE facilities, and examples of possible uses of those records during current site environmental work. Illustrative examples of the use of historical records are drawn from experience gained at the Rocky Flats Plant (RFP), near Denver, Colorado. It is hoped that, where possible, such historical information will see increasing use in order to allow for more efficient, effective, and less costly environmental work at DOE facilities.

INTRODUCTION

A popularly held notion is that the DOE facilities have few historical records available that are of interest in current environmental remediation/management work. Some of the reasons that contribute to this notion include the following: environmentally related activities have only recently begun at DOE facilities and therefore no historical records could exist of current use; the secret nature of some DOE operations discouraged the maintenance of records; that records were destroyed if they ever existed; and a general lack of knowledge that historical records exist. The authors of this paper have found that extensive records exist at DOE facilities that can be of use in current environmental work. The problem with the use of these records is not finding records of interest, but rather in narrowing the search to those records of most interest and value. The authors admit that the access to these records may not be easy; however, the value of the information found in these files far outweighs the relatively nominal cost of obtaining and using these files.

The authors have extensive personal experience at the RFP in the access and use of historical records for current environmental work. These records have proven invaluable in site characterization and other environmental work at the RFP and have helped in the identification of the following:

- accurate locations of past releases and spills;
- hazardous materials associated with past releases or spills;
- currently unknown site characteristics governing the movement of contaminants;
- currently unknown engineering changes to the site that might also govern contaminant movement; and
- old environmental standards or other drivers that applied to a site and may have affected the exact actions taken at a site, such as past attempts to clean-up a site.

Detailed and valuable records have typically been found for nearly every project and issue at the RFP with which we have been concerned. Moreover, these records have proven to be extremely important in current-time environmental activities in the DOE complex. It has been found that with a complete history of a site, both current and old information can be combined into a coherent picture of the characteristic of, and activities at, the site. If contradictions exist in the information compiled regarding a site, it typically means that there were significant activities at the site of which the investigator is unaware. Knowledge of the past activities at a site can provide insights into current site characteristics and into potentially applicable clean-up actions. These insights can save significant amounts of time and money in the course of site characterization and clean-up. A basic premise of this paper is that a great level of detail is required to address some particular historical issue, a level of detail that is consistent with those required in the case of a lawsuit or in the case of a potentially responsible party (PRP) search. In other words, statements made should be fully supported by and referenced to historical primary documents when possible. Similarly, statements made that are based on technical evaluation and data analysis, or even based on opinions expressed during an interview, should also be fully supported.

VALUE OF HISTORICAL RECORDS

The authors believe that a major reason that historical records are not pursued more vigorously at DOE facilities is that people are unaware of the available information and its applications. Significant amounts of time and money are currently being spent within the DOE complex to identify and remediate sites that were contaminated in the past. Often environmental media at these sites must be sampled in order to determine the quantity and quality of contamination currently present at the site. However, significant cost and time savings can often be realized if historical records are accessed and used in the course of current work. Specifically, historical

records can provide information for the following general uses which are discussed in greater detail.

- Accurate Location of a Release Site
- Contaminants Released at the Site
- Previously Known Site Characteristics
- Old Standards Applicable to the site or Drivers for Previous Work

Accurate Location of a Release Site

In instances where there is a total lack of information on the exact site of a historical release, or when that information only generally identifies a release site, the approach is generally taken to identify the release site through some type of field activities. Typically these activities entail either gridding the general area of the release for non-targeted sampling, or for some type of field screening to be conducted that should identify the release site. In either of these cases significant time and money can be spent sampling, analyzing, or otherwise evaluating materials that are clean or otherwise not of interest. However, specific locations of release sites can often be accurately and completely identified by a careful review of historical files. Possible sources of information to determine the location of release sites include engineering and/or utility drawings (building drawings, pipeline drawings, and design or as-built drawings), obsolete topographic maps, aerial photographs (which can also, in certain instances, be used to create a topographic map for the time when the photograph was taken), incident or unusual occurrence reports made on the release, and site photographs.

Contaminants Released at a Site

In cases where the location of a release site is known, the exact contaminants that may have been released may not be known. In this case the approach is generally to sample and analyze the environmental media at the release site for a large number of chemical analytes in order to determine which analytes are of interest. Once again, historical records can prove valuable in the identification of a reduced list of analytes of concern, or to reduce the number of samples that must be analyzed for an extensive list of analytes. For historical records to be useful in the solution of this problem, one must either determine the types of waste streams (knowledge of the specific operations or buildings that were represented in the release), or identify previously conducted analyses of the waste stream. Possible sources of information to determine the types of waste streams represented in a release include engineering drawings, operational or pipeline schematic drawings, or general knowledge of the operations conducted at the location where the waste was generated. In some of these cases it may also be necessary to identify specific information such as operational procedures and raw materials used in the generating process in order to predict the types of materials that might be present in the waste release.

Previously Known Site Characteristics

It is often the case at DOE facilities that certain aspects of a problem have been investigated in the past, and that the knowledge of the site has not been passed down to the current people working on the project. These types of sites are often identified by the presence of engineered changes to the site, or indications of changes to the site, that are not adequately documented in typical engineering and utility drawings. An

example is the presence of a pipeline outfall where drawings indicate that there are no pipes. Our experience has been that the answers to the questions raised by these types of sites can generally be resolved by identifying and accessing the files of the individuals involved in the specific or general problem. We have also found interviews of the personnel involved to be particularly valuable with these types of problems. However, interviews were found to be of most value in our projects if conducted after a thorough review of all written records.

Old Standards Applicable to the Site or Drivers for Previous Work

Insights into understanding the location of release sites, the method of release, and the materials released can often be identified if one understands the old standards or concerns that were considered applicable to the site. It is possible that there were no previous standards or concerns, but it should be pointed out that often the intent had been to comply with some standards or to address some concern. Standards that might have been considered applicable can be found in a number of places such as in federal, state, and local environmental regulations, DOE and AEC orders and guidance, standards and typical operating practices for health or environmental practices (such as the "Los Alamos Handbook"), and standards and guidance on activities that were established by organizations outside the DOE complex and the normal environmental field (such as National Bureau of Standards Handbook Number 52).

CURRENT USE OF FILES AND RECORDS AT DOE FACILITIES

This section of the paper provides brief summary information regarding the types of files that may be considered for review in the course of research into past problems and projects. Following a brief discussion of the types of files that may be available, some guidance is also provided regarding how to manage those files for current use.

Types and Location of Records

The record sources below are known to exist at the RFP and were reviewed in the course of our recent activities. These types of files also exist at other DOE facilities, and should be considered as a possible source of information. Many current environmental problems are traceable to, or associated with, non-normal events (such as spills, contamination incidents, or other industrial accidents). More complete and detailed records are often kept of these types of events as opposed to more routine day-to-day events, making it more likely that records still exist of an event of particular interest to current environmental work.

There have always been requirements within the DOE weapons complex regarding the storage and maintenance of records. These requirements dictate that certain types of records be maintained and that those records meet certain criteria in form and content. The acceptable methods for storage of those records and the period of time that those records were to be held (retention schedules) are also defined. Keep in mind, however, that the exact requirements for storage and maintenance of records may or may not have been completely enforced. For instance, many records may have been maintained for a period longer than required by DOE simply by virtue of the records being sent to a main storage facility. So, even if one knows that certain files should not exist

(based on DOE retention schedules), one should still verify with field data whether or not such files really do or do not exist. It should also be remembered that multiple copies of most documents existed (copy for the author, copy for the addressee, and courtesy copies for those individuals also working on or otherwise involved with the project or issue). A listing of possible files available are presented in Table I. The files presented are inclusive of the general types of files maintained currently or in the past at DOE facilities. Other types of more specific files may have been kept at any given DOE facility. A brief explanation is provided below regarding the use of photographic files due to their extreme importance in our work at the RFP.

Most of the DOE facilities have had an on-site photography department since the early 1950s. These photography departments have created a photographic record of events and activities since the beginning of a plant that can be extremely valuable in current activities. Accessing and use of photography records is often difficult and time consuming, but it has proven to be well worth the effort at the RFP. Photographs have been taken at DOE facilities of events and activities that are both somewhat unusual as well as routine. Types of unusual photographs that may be of current interest include the following:

- photographs of events that have involved property loss or damage of one sort or another;
- photographs of accidents, such as the overtopping of a tank or a drum that was dropped from a forklift, that may have resulted in the release of materials to the environment;

- photographs of activities related to a special project that might be of interest to current environmental work; and
- photographs of construction activities that might be of interest to current environmental work.

Clearly, photographs of out-of-the-ordinary activities and events can be of current use. Less obvious is that photographs of more ordinary or routine activities may also be of use. Examples of photographs of more ordinary or routine activities, and a description of their potential value, include the following.

- Plant aerial photographs, whether taken by plant personnel or by commercial services, or general panorama shots may prove of interest in identifying old release sites or structures. The ages of release sites or a structure may also be determined from such photographs and could prove useful in developing the history of an event.
- Photographs of waste management or disposal activities and areas may also be of interest in identifying the location and general condition of those areas.
- Photographs of general plant facilities or operations may yield information on operations or the locations of an operation that is no longer in use.

It should be noted that if particular periods are of great interest to a current project, it has at times proven useful to review the negatives of all photographs taken during that period. Sometimes the area of interest will be found in the background of a photograph that is entirely unrelated to the subject of the photograph.

TABLE I
Typical DOE Facility Files

On-Site Files	Off-Site Files (Unclassified Only)
Classified Files in Vault Storage Unclassified Files Engineering Project Files Engineering Drawing Files Correspondence Files Waste Management Files Weapons Files Waste Shipment Files Analytical Reports for both Production and Environmental Activities Microfilmed Files Legal Files Incident and Property Loss Files Radiation Contamination Incident Files Purchasing Files Photography Files Property Utilization and Disposal Files Special Project Files Personnel Files for Previous Employees	Personal Files from Previous Employees Health Files (Including x-ray records) for Previous Employees Engineering Drawing Files Engineering Project Files AEC/ERDA/DOE Records (file according to the AEC filing system) AEC/ERDA/DOE Guidance and Orders Air Monitoring and Sampling Files Dosimetry Records Special Project Files Federal, State, and Local Standards Guidance and Nationally Recognized Standards (such as National Bureau of Standards Handbook 52) Radiation Contamination Incident Files Personal Files from Previous Employees

EXAMPLE I "East Trenches"

The East Trenches are currently undergoing Phase II of a site characterization. These trenches were used from 1953 until 1968. They were first described in terms of being considered an area of concern in a 1970 report. The report identified them as being used for the disposal of sanitary sewage sludge. Because the sanitary treatment plant accepted low levels of radioactive waste in the 1950s and 1960s, the sewage buried in the trenches was considered to be radioactively contaminated. The current investigation underway is considering the mixed nature of this waste. These trenches were studied in more detail for reasons other than the current characterization and extensive use was made of historical information. This further review produced additional facts to be considered in the ultimate remediation of the trenches. First, the location of the trenches has been definitively identified and is distinctly different than originally delineated. Second, a tenth trench has been suggested which has not previously been recognized. Third, the dates of operation of each of the trenches has been estimated. Finally, materials other than those described in the 1970 report have been identified as being buried in some of the trenches.

Much of the new or changed information on this site was developed by a review of old photographs of the area during the dates of operation. This review has provided a great deal of information about the trenches. The location of each of the trenches can be relatively accurately defined based on these photographs. It is apparent that the first trench was subsequently covered by a paved access road. This trench was not identified in the 1970 report or in more recent site characterization activities. Photographs reveal approximately when the other trenches were active and in what sequence they were excavated, information which had not been known prior to this photograph review. In conjunction with the dates and locations identified in the photographs, knowledge of general plant operation through time can be used to estimate the types of contamination buried in the trenches. For example, the plant had a change in operation in 1956, converting to processes that produced waste with greater plutonium content than prior to that change. From this knowledge, it can be assumed that the first trench, one that was active prior to 1956 will have somewhat different waste characteristics than subsequent trenches. Other knowledge of plant operations, such as when certain solvents were used or not used, can provide estimates of waste characteristics which will lead to a more specific remediation plan than simply considering all of the trenches to have typical sanitary sludge constituents.

In the 1970 report, it was stated that one of the trenches had some radioactively contaminated asphalt buried in it in addition to the sludge. It was also stated that one of the trenches may have had some flattened contaminated drums. Further information recently identified during this historical review suggests that in addition to asphalt contaminated with plutonium and solvents, asphalt planking from a solar pond was also disposed of in one of the trenches. The specific trench has been narrowed down to two of the ten trenches based on the photographs and the time of the activities that produced the asphalt waste. During the research for this site, it was learned that aqueous lathe coolant, originating in Building 444, was disposed of in a trench. The processes that occurred in Building 444 are well documented in terms of the wastes generated. Therefore, combining the knowledge of the time of the event, the time the trenches were active, and the types of wastes generated, the remediation of the materials that are buried in the trenches can be more accurately planned. This information has been obtained from photographs and documents written at the time of the occurrences. These sources provide a discrete view of the operation of the trenches. For a more general idea of the process of using these trenches as waste disposal sites, interviews were held with former employees who operated the heavy equipment to bury the waste. This source is somewhat more speculative because memories of thirty-year-old events fade; however, no documentation was found which described the process. Knowledge of the processes which created the conditions which are now being remediated will allow for a more effective remediation program.

Current-Day Management and Use of Old Records

Guidance is provided below regarding how to manage historical files for current use. A number of approaches can be used to manage historical files for current use, but the assumption is that an immediate, specific environmental problem is driving the searching of historical records. Therefore, only a small subset of the overall files available at a DOE facility are of interest (even though this small subset may have a considerable number of documents contained within it, and may therefore present an organization and storage problem in its own right). The following thoughts are presented for your consideration prior to beginning a lengthy document acquisition process. These thoughts are based on the experience and projects of the authors at the RFP. The requirements of a particular project should dictate exactly what information you are interested in and how you would want to access that information.

Definition of Project Requirements

A difficulty in finding the documents that one wants is that searching of the files must generally be conducted manually. Manual review of files and skimming documents are tedious and time-consuming exercises. In order for the project team to make effective use of its time, it is critical that there be a clearly defined set of criteria within which a document should fall to most likely be of interest to the project. An additional difficulty is that the initial reviewer of a document may not be able to recognize the applicability of the document until more information is learned; however, it is important not to lose that document. The objective is to identify and capture all documents of potential interest to a current project with a single review of a set of files. This objective is especially important since the manual searching of files will typically be the single most expensive activity in the research of historical documents.

It is suggested that the selection criteria for a document to be included in the current project files should define the

EXAMPLE II

"Oil Sludge Pit"

The Oil Sludge Pit is currently included in a Phase III site characterization. Unfortunately, the scarcity of evidence has led to the misidentification of this site in the location of another site that has a completely different history. The location of a disposal site was first identified using a building as a reference. More than ten years after the first description, the site was placed on a map in a different location considerably farther from the building. The mislocated site is currently under review for a remediation investigation. Although a thorough understanding of this site may never fully be known due to the lack of documentation, a significant amount of information is available to at least circumstantially understand the site.

The original description for the incident at the location of this site is provided in a 1973 summary document regarding environmental incidents affecting soils at the facility. The account was as follows:

"Oil Disposal Pit (1958)

Approximately 30 to 50 drums of oil sludge from a storage tank cleanout were emptied into a pit which was then backfilled. No radioactivity involved."

An accompanying map identified the 50-foot circular area as being between two fences, approximately 140 feet south of the southeast corner of Building 881. A draft 1985 document reiterated this statement and in it was an evaluation of the relative hazard potential of the site. The hazard potential of the site was rated very low, but it was stated that further characterization would be performed.

In 1986 and 1987, a review of potentially hazardous sites was performed to compile a list of RCRA-regulated Hazardous and Radioactive Mixed Waste Units, Solid Waste Management Units, and CERCLA areas. This document described this site as follows:

"Oil Sludge Pit, Land Disposal Unit, 1958

In 1958, two No. 6 fuel oil tanks south of Building 881 were cleaned out. Approximately 30 to 50 drums of oil sludge from the tanks were disposed of in a pit located south of Building 881. The pit was then covered with fill. The pit is approximately 50' by 80' in plan dimensions and was located approximately 180' south of the southeast corner of Building 881. Later information described the location of the oil sludge pit as being further north than the location identified on the aerial photographs taken in 1963. Located in the same area was a chemical burial pit."

The location of this unit was mapped in 1986 based on dark areas visible in aerial photographs. A map provided in a 1991 document which describes the characterization of hazardous waste sites at the facility identified the location of this site as being over 400 feet south and 80 feet east of the southeast corner of Building 881. The dimensions of the site are indicated to be 50 feet by 80 feet.

After an extensive search through documents written both at the time of and subsequent to the incident, no documentation was found which makes any reference to the disposal of oil sludge in the area south of Building 881. The documents reviewed included the documents that would have recorded this type of waste disposal incident. Interviews were conducted with many employees of the facility at the time, some of whom were familiar with the area and the operations of the area. No first-hand knowledge of oil sludge disposal is known to exist. One could conclude that either the incident did not occur as stated in the 1973 document due to uncertain recollection or confusion of different incidents, or that those involved did not deem it worthy of documentation and therefore, because it is not known who was involved, the corporate memory is all but lost regarding this incident. At the time, a great deal of attention was paid to radioactive waste and a relatively small quantity of nonradioactive oil sludge would not necessarily remain in the memory of those involved. At any rate, because direct evidence is not available, circumstantial evidence must be considered.

In March 1955, two small retention ponds were constructed in the area south of Building 881 for the purpose of retaining water to allow sampling for water quality. One of these ponds, at the time termed Pond 8, was originally located approximately 400 feet south and 80 feet east of the southeast corner of Building 881. This pond had the approximate dimensions of 50 feet by 80 feet. Water discharged to Pond 8 included cooling tower overflow/blowdown in addition to storm water runoff. The area is typified by a rather steep unstable slope. In 1960 and again in 1961, the hillside failed, partially destroying the patrol road south of Building 881. Pond 8 was located just south of the patrol road. The road was realigned to the north to mitigate the landslide potential and a pond functionally equivalent to two previous ponds (Ponds 7 and 8) was reestablished considerably south of its original location. In the 1963 aerial photograph, Pond 8 is identifiable as a dark rectangular area approximately 800 feet south and 400 feet east of Building 881. Although these ponds are not currently active in terms of sampling, their former locations can be discerned by the location and vegetation.

No aerial photographs are available from 1957 through 1962 for the facility. Therefore, if the oil sludge were disposed of in the pit in 1958, no photographic evidence is known to exist that could be used to verify its occurrence and location. The original Pond 8 was in existence since 1955, which predates the oil sludge disposal. Unless the oil sludge was disposed of in Pond 8, the location currently being investigated is not the location of the incident. The location identified in the 1973 document is not specifically under investigation; however, hydrocarbon contamination would tend to migrate toward the original location of Pond 8 due to the hillside and hydrologic gradient, and ultimate remediation of the oil sludge pit area would be achieved during the ongoing remediation program. The issue of remediation may be a moot point because of the lack of substantiation that the event even occurred as described more than fifteen years after the stated date may indicate that the event did not take place as described.

EXAMPLE III Solvent Spills

The Solvent Spill Site is currently undergoing a Phase III characterization. It consists of two separate areas, the East and West Area Solvent Spills. These areas were originally identified as hazardous waste sites because it was believed that drums of solvents were stored in the area and some of these solvents spilled onto the ground. The original document in which these sites were identified stated that the dates of operation were 1960 through 1961. Subsequent groundwater monitoring has identified the presence of volatile organic compounds in the alluvial material in the immediate area. The constituents are consistent with the activities believed to have occurred; however, additional historical evidence was uncovered in a study not related to the current characterization that has raised questions as to the activities that led to the contamination.

It was learned through a review of documents written at the time of the occurrence and through a review of photographs that solvents were not stored and spilled at the two sites but that the areas were used for the storage of scrap metals and other materials prior to sale for reuse or recycle. The areas were used by the Property Utilization and Disposal (PU&D) group between 1967 and 1971 and was near areas used by the Waste Disposal group at the same time. Photographs of the area before and after that range do not show any ground disturbance. Even though photographs are not available for that timeframe, it is highly unlikely that the area was used for the storage and spilling of solvents. The proximity of the sites may have led to the misunderstanding of the functions of the areas. These areas were used distinctly and materials from the PU&D yards should not have gotten mixed in with the wastes of the waste disposal group.

PU&D handled materials from various groups on site that were no longer required and not waste. These materials varied from desks and chairs to used motor oil and scrap metal. All materials were monitored for radioactivity prior to being stored in these areas but no exclusion was made for hazardous constituents. Materials were segregated by type and generally stored on the ground or in drums on the ground. Once enough materials had accumulated, they were sold to government or commercial buyers. Typically, the segregated piles of scrap metals that had accumulated had residual oils or solvents on them from cutting and machining operations that dripped onto the ground. The metals were in all shapes and sizes and some can be seen on the ground today. The areas used for the storage of these materials were widespread to accommodate the segregation of the materials; however, documentation indicates that the areas were considered to be untidy by other groups. For that reason and because of the proximity to the waste disposal areas, the PU&D storage areas were moved to a different part of the plant within a few years after they were initiated.

overall intent of the project (big picture), as well as more narrowly defined selection criteria that are relatively specific. Examples and explanations of what would constitute a document of real interest should also be provided. The criteria and examples should not be so narrowly defined that documents are excluded from consideration that could prove to be valuable.

A difficulty inherent in the review of files is that often a document is found that has an extremely small amount of information pertinent to the current project. The document, by itself, may not be valuable. However, the document may prove to be extremely valuable if it can be cross-correlated with other documents that also pertain to the same activity or event. The cross-correlation of documents of interest that were found in disparate locations and files is a critical aspect of using historical files.

Document and Information Management

The management of documents and the cross-correlation of information within those documents can be done either manually or with a computerized database. The anticipation of a large number of documents or a long-term project may lead to the use of a computerized database. The types of databases of most use for cross-correlation of files are those that allow for the entry and storage of bibliographical and other information from and about a document. A number of different types of commercially available databases exist that fulfill these general requirements. These databases are being extensively used in the legal field for the tracking and identification of documents of interest. Some of these databases can be easily tailored to a specific project for environmental or other considerations. A consideration in the selection of a

computerized database is the ability of the system to access optically scanned documents and information.

Optical scanning of a document can be broken down into two broad categories: optical "pictures" (bitmaps) of the document, or optical character recognition (OCR) reading of a document. An optical picture of a document is useful since it will store an exact image of the document in computer memory, making document storage and access somewhat easier as well as archiving the document without alteration from its original form. However, OCR data from a document is useful in a different way since the computer "understands" the contents of an optically scanned document. An OCR database makes it possible to conduct full-text word searches. Full-text word searches allow one to search for words, phrases, or names anywhere within the documents on the database. A drawback to optically scanning documents is the cost. A basic optical scan to create a bitmap typically costs on the order of \$0.50 to \$2.00 per page, and the cost to optically recognize a document is on the order of an additional \$1.00 to \$2.00 per page after bitmapping. It should also be pointed out that there are additional levels of technical complexity in optically recognizing a document, for instance type face and font changes can prevent the computer from capturing the information, and, at best, information capture is on the order of 95 percent. Information capture can be significantly less than this if the document being scanned is a poor carbon copy, faded original, or in otherwise poor condition. Optically scanned documents can be very useful for certain projects but is certainly not necessary for all environmental work.

Some of the types of information that have been found to be particularly useful and that should be considered for information management are provided below.

- **Location:** The location or files in which a document was found can be extremely useful should it ever prove necessary to re-access those files. The project team may forget the specific location and file in which a given document was found.
- **Bibliographical Information:** The bibliographical information recorded should include the date, author, originating agency/department, addressee, title (create a title if the document is untitled), and subject of a document.
- **Attachments:** Any appendices or attachments that are a part of, or referenced by, the document should be noted in the document record.
- **Synopsis:** A brief synopsis of the document should be recorded. Reading this synopsis should identify why the document was considered to be of potential interest to the project.
- **Project-Specific Information:** Information that is specific and tailored to the current project should be recorded for general project and cross-reference purposes.
- **Keywords:** Keywords should be identified so that the document may be cross-referenced and found during quick searches for a specific topic.

A form could be created that prompts a project team member to identify the above information related to a particular document. The team members should have a supply of these forms so that a form can be filled out for each document thought to be of potential interest to the current project. A copy of the document of potential interest should be made, and the form should accompany the document to the project headquarters where the information of interest is entered into the recordkeeping system.

CHALLENGES IN THE USE OF HISTORICAL RECORDS

The factors working against the current access and use of historical records within the DOE complex are many. This section will examine some of the more important factors working against current access and use of the records, and ways in which these factors can be overcome.

Information not Available in One Location

Although it has been found through experience that detailed records exist for nearly every project and issue that the authors have had cause to investigate, these records have rarely been found in only one location. Typically, pertinent records are found in a number of different locations with the records in each location addressing slightly different aspects of the project or issue. Only by trying to obtain and correlate records from all known sources can a complete and comprehensive picture of a project or issue be developed. The records from different sources will generally complement one another, helping one to understand the project or issue far better than if one relied only on records from one source or group.

Unusable Format or Information

Even when older documents are found that are known to be related to a current project, it may be found that the files do not contain information or data in a format useful for the current project, or the information provided may not be identifiable as related to the current project. Part of the reason for this difficulty is generally that the older documents were prepared for a purpose other than the one currently at hand. Therefore, the types of information contained in the documents, and how that information is presented and arranged, fits the old uses or purpose of the record rather than the current use of the record. However, we have found that this difficulty can often be overcome if one is willing to cross-correlate documents and information from multiple sources in an attempt to answer the current question of interest. In many respects the difficulty encountered with "format" is similar to the difficulty encountered by having records of interest in multiple locations. However, the perception of the format problem is very different, with the immediate appearance being that the records only contain unusable information.

All documents that potentially relate to a subject should be obtained in the course of searching through files since documents that appear to contain only un-useful information may ultimately be found to contain extremely useful information.

Need to Interview Former Employees

Even after searching through numerous file sources and cross-correlating files, questions may still exist regarding certain issues in the old files. In this case it may prove useful to interview those personnel who were directly involved in the incident, event, or project in order to clear up areas of uncertainty. Although calling an individual on the telephone is useful, it has been found to be more productive to meet the person and bring documents, drawings, photographs and maps that relate to the project and questions that remain. These documents will often help an interviewee recollect the activities and events of a particular project, and can prove useful during the discussion of the issue. Care should be taken to avoid suggesting answers to an interviewee until after the interviewee has been unable to answer a question. If possible it is quite useful to have a number of interviewees that were related to a project all be interviewed in the same session. The various personnel may recollect different aspects of the project and be able to help each other remember specific events. It is also strongly suggested that specific questions are posed to an interviewee that relate to a particular issue rather than general questions, i.e. do homework before the interview in order for it to be most effective.

Belief That Historical Records Cannot be Useful, and Lack of Knowledge that any Historical Information Exists

Finally, there is a dual problem associated with the belief that no historical information exists or that the historical records are not useful if they do exist. These statements can, at times, prove to be true, but it has been our experience that in general they are not. We feel that the underlying cause for these problems is simply that few people have knowledge of the extent and usefulness of historical records. We feel that this paper will, to some extent, help in solving this problem.