

ARC's Archiving and Information Management (AIM)

"Accessing Information to Deliver Business Results"

Executive Summary

Ready access to accurate information is imperative to achieving the business results required to remain competitive in today's power industry environment.

Whether electric power is generated by fossil, nuclear or renewable fuels such as wind or solar, timely access to information is essential to meeting daily demands for operation, maintenance and modification of existing power generating stations.

Companies seeking to establish effective information delivery platforms for its own staff, as well as interaction with external business partners, must consider a range of issues from the media on which information is stored to the multiple types of end user information needs. Media from paper or microform storage to fully digitized and electronic files are in the mix – each with its own challenges.

ARC Document Solutions is a customer-centric technology-based business solution provider. ARC partners with its client to develop effective strategies and deployment options to meet the unique challenges of capture, conversion, management and delivery of information required to accomplish work and achieve business objectives.

ARC Document Solutions' Archiving and Information Management (AIM) Program is a comprehensive suite of customizable services and technologies that leverage a SaaS delivery model. AIM enables a range of capabilities to support daily design, operations, maintenance and supply chain business functions for power generating stations.

"ARC creates information management-centric business solutions for our clients to support their unique business needs. These solutions include multiple media types and are based on a document ecosystem that enables the client's staff to effectively capture, organize, index, store and manage information for retrieval across the enterprise."

- Kumar Wiratunga, Director of Technology, ARC Document Solutions

POWER INDUSTRY - HISTORICAL PERSPECTIVE ON INFORMATION MANAGEMENT

The electric power industry focuses on the generation, transmission and distribution of power to end users. The major capital projects that delivered the capabilities to produce power typically valued the hard assets of physical equipment while minimizing the value placed on the **information assets** created for an operating station. Need to access equipment for operation, maintenance and repair was obvious. The need to have the same level of access to the information "about" the equipment was not obvious to management. Thus, the level of effort and resources applied to enable effective information management was minimal.

This perspective resulted in a wide range of approaches to managing documents and records. Overall, a vast majority of documents remained in paper format with hard copy being the distribution method of choice. Records were stored on multiple types of microform media. Neither of these approaches or methods forwarded the capability of end users to find and retrieve the information needed to perform required business functions.

As technologies improved, electronic document and record management practices emerged and have continued to evolve to enable better access to information embedded in documents and records. However, application of the evolving and advanced technologies were often "technology-driven" rather than business-solution driven. In essence, the new "tools" were looking for a home rather than the business determining where the new technologies could be applied to solve business problems. Effective integrated approaches engaging the end users and technology folks were rare. Thus, these historical practices have resulted in challenges to end users for accessing information necessary to get their job done!

THE CHALLENGES

Given the historical practices at many power plants, the ability to readily access required information to support current-day business functions remains challenging. From documents buried within file boxes stored in secure vaults, local warehouses and redundant remote locations, to current electronic files managed within an EDMS, power generating station personnel struggle to identify, locate and retrieve information necessary to perform routine, one-time and emerging job functions.

The spectrum of issues is wide and involves multiple aspects of the information management environment. These include information governance, information management strategies, records retention requirements, regulatory obligations, business processes and available information technologies. Combining these issues with continued pressures to control budgets in competitive deregulated energy markets, the outlook for improving ones' information management capabilities is less than desired.

The following areas are of specific concern in today's power generating environments and need to be addressed to improve information management capabilities within the industry.

Key IM and IT Issues

- **Multiple Media Types and Storage** - Many historical records remain in paper format or captured on microform media (reel tapes, microfiche, etc.). End-user-required information is not readily identifiable nor accessible from these media.

Optical disk media provided enhanced methods for storage of records; however, many strategies for indexing and subsequent retrievals were driven by records management requirements rather than end-user business needs. Result – continued difficulty in identifying and retrieving required information.

The emergence of electronic files from CAD, word processing and other software applications provided significant benefit to the “creation” of documents and associated content. However, challenges regarding retrieval of required information continued. Access to these files typically was constrained by costs and a limited number of licenses, required on-line access controls and confinement of access to internal staff.

In addition, typical practices limiting metadata or attributes to the base document and not building relationships to other documents or power plant equipment to which the documents pertain continued.

- **Document Relationships** - There is a need to identify applicable documents, records, and data required to execute work activities. This capability is typically restrained due to limited indexing strategies, processes and associated tools to enable cross-referencing related documents and records with equipment or other operational elements for a plant.
- **Collaboration and Information Exchange** – The need to collaborate and exchange information has always existed and will continue to be essential for communication among power plant staff and external entities. The mechanisms used for information exchange have evolved from courier packs to faxes to the predominant email attachments. In some cases, FTP file transfers have been used for secure and large file exchanges.

Advances in document transfers and exchanges have been made through leveraging core EDMS capabilities and integrating workflow, electronic approvals and other document exchange tools with the EDMS. The range of functions achieved varies; however, a core focus has been on movement of documents through various business processes rather than enhancing the information management capabilities and retrieval of required information.

- **Information Technology (IT) Infrastructure** – IT organizations are continuously challenged to support their internal clients’ evolving business needs using the existing infrastructure. Necessary infrastructure expansion is often restricted due to budget constraints and inability to demonstrate an ROI meeting management’s expectations.

Capital-intensive hardware and associated maintenance costs are no longer viable options for IT management, and increased cyber security requirements are being imposed for power plants by regulatory authorities. As a key “information enabler,” IT infrastructure must overcome these challenges in order to achieve the level of information management capabilities required to support effective performance of daily business activities.

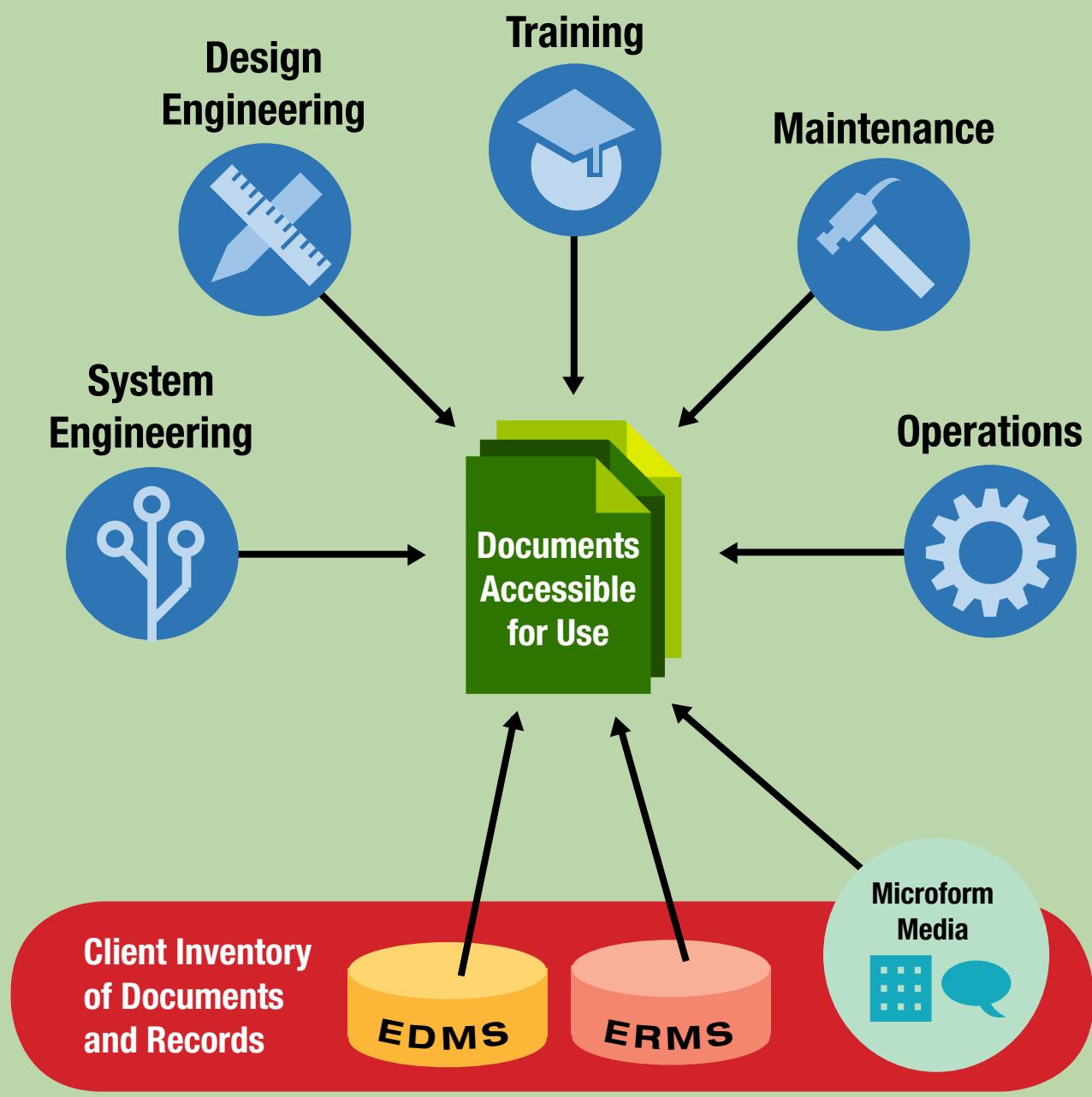
Key Business Functions

All power generating stations have similar needs for information to execute the core business functions of operations and maintenance (O&M) for the plant. To execute these functions, a plant staff requires a broad set of skills and expertise. Thus, there are multiple groups within the organization with each group having its own “perspective” as to what information they need to perform their work and how they expect to “find” that information.

In addition to core O&M functions, modifications to the plants are common projects and typically involve retrieval and use of a wide range of information types. For nuclear power plants, special programs and projects are established to address unique issues related to a nuclear power issues such as Configuration Management (CM), Plant Life Extension and Decommissioning. A new special program affecting US nuclear plants is the Flexible Projects or “FLEX” Program that addresses special design issues related to the Fukushima nuclear plant incident.

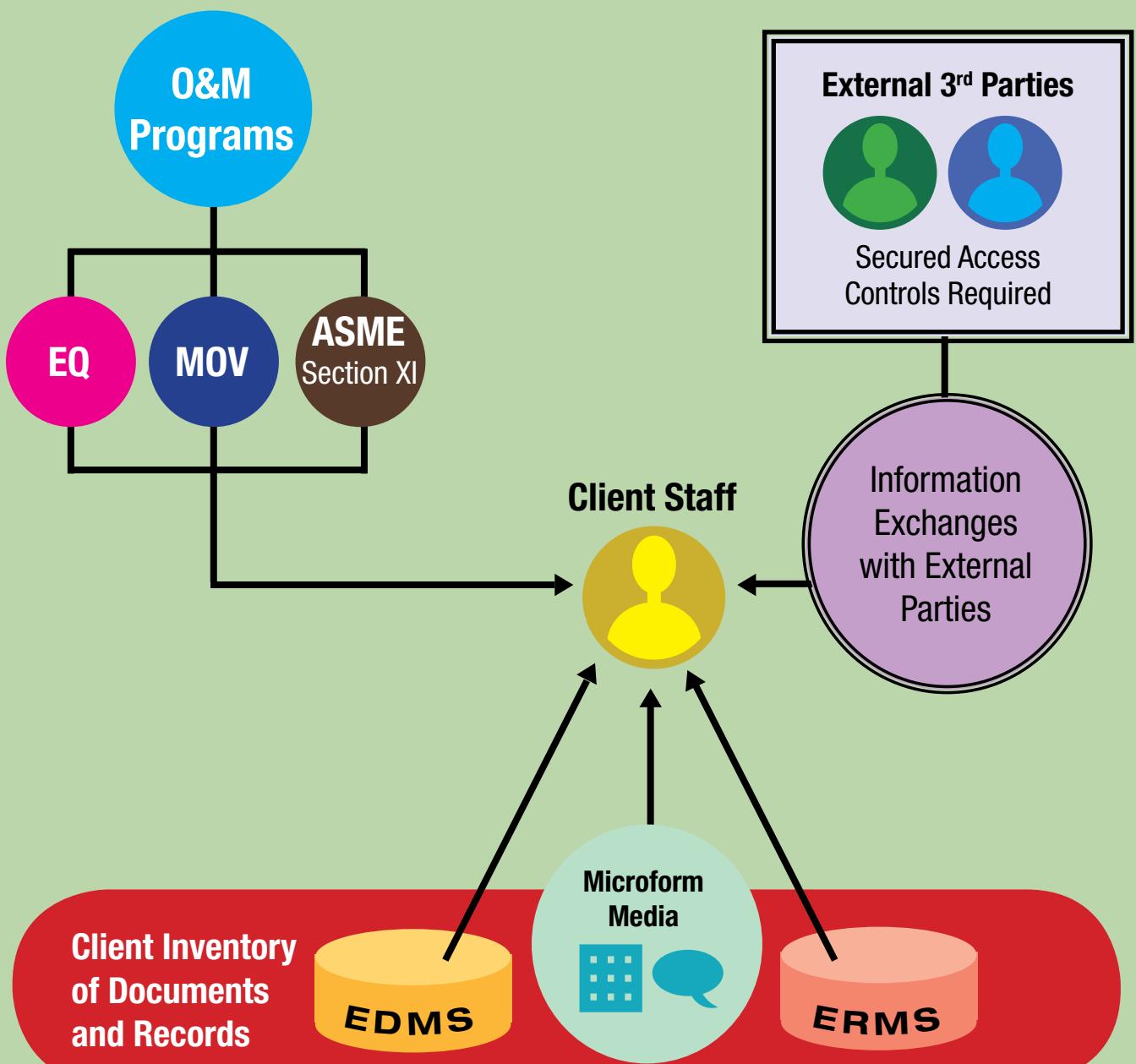
- **Daily Operation** – Routine activities are performed that require access to known documents and information. Typically, these documents are accessed prior to executing the work activity. However, conditions may be such that additional information is needed and the ability to identify the relevant documents is often not available.

Information Required for Various Perspectives



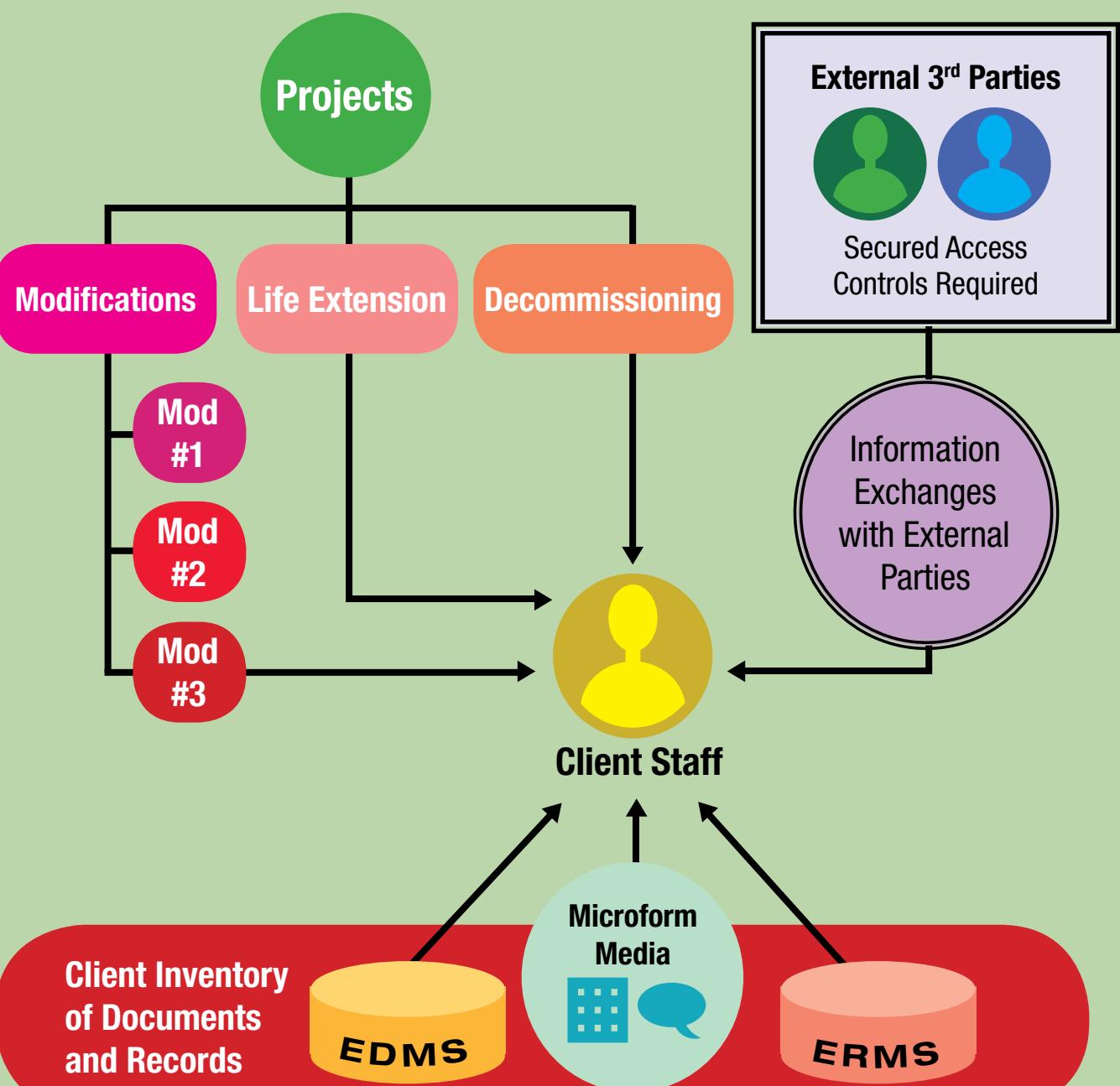
- **O&M Programs** – Many regulatory-driven programs are required for power plants to ensure their safe operation. With the complexity and unique aspects of nuclear power plants, there are a significant number of O&M Programs required to be implemented on a periodic basis. Each Program has its unique set of required information, documents and records to demonstrate compliance with the applicable program requirements. The ability to capture, group and access all relevant information associated with a given Program is essential to maintaining that compliance.

Maintain Program-Related Documents and Records



- **Plant Projects** – Typical plant projects involve modifications to the existing plant equipment. These projects are typical of all power plants regardless of fuel type. Special Projects applicable to nuclear power plants include Plant Life Extension (PLE), Decommissioning, and FLEX Program.

Identify and Maintain Project-Related Documents and Records



Plant Modifications

Plant modifications require access to technical information such as design basis and design requirements as well as engineering and operations documents. To achieve Configuration Management (CM) objectives for nuclear plants, all related documents and information sets should be identified for impact analysis. This requires that information and documents have established relationships with other documents and related equipment.

Managing the Change Control Process and Maintaining CM Equilibrium

Change Control Processes Support Maintaining Equilibrium

Impact
Analyses
Required

Affected
Documents

Design
Requirements
*What needs to
be there*

Physical
Configuration
*What is
actually there*

Facility
Configuration
Information
*What we say is
there*

*ANSI/NIRMA Standard CM 1.0

Modification
Package

Updated
Version

Current
Version

EDMS

ERMS

Client Facility
Configuration
Information

A primary objective of CM Programs is to ensure the physical plant is accurately reflected in all relevant documentation. The collection of documents, records and data that represents and provides detailed information on the plant equipment is known as the Facility Configuration Information (FCI) and is one of the pillars of the 3-ball model for CM Programs. Thus, change controls must be such that all documents affected by a change must be identified and assessed for the impacts of the change. This “impact analysis” is a key function that demands effective information capabilities and is integral to CM Programs.

Plant Life Extension (PLE)

PLE involves identification and accumulation of information that supports authorization for extension of the original 40-year operating license of a nuclear plant. PLE includes an application process, review and approval by the regulatory agency (NRC) and on-going tasks required to comply with PLE commitments. Thus, a significant amount of information is captured and managed and must be readily available for demonstrating compliance to PLE obligations.

Decommissioning

Decommissioning involves shutting down the nuclear plant and removal/storage of all nuclear fuel and plant equipment. This is an inevitable task and requires significant planning on the part of the owner operator of the plant. The key to an effective and efficient decommissioning project is the availability of accurate information on the as-built condition of the plant and nuclear radioactivity-related records required to ensure personnel safety as the plant is disassembled and removed. Given a third party performs the decommissioning work, advanced availability of required information for the third party will produce significant cost savings for the owner operator.

THE SOLUTION

The needs for accessing information and the challenges for establishing effective information management capabilities are many. No single “ingredient” will resolve the Challenges noted above and other relevant obstacles restricting enhanced information management capabilities for power plant organizations.

However, ARC’s AIM Program can provide a path forward that enables organizations operating and maintaining a power plant to improve its information management capabilities and achieve business objectives that are dependent on ready access of current and accurate information.

Strategy

The foundational aspect of the AIM Program is ARC’s focus on the client’s business objectives and associated information needs. Once these are established, ARC collaborates with clients to establish a strategy for improving information management capabilities and enabling end users to effectively identify and retrieve information necessary to perform their respective work functions. Client strategies will include:

- Current information environments, technology infrastructure and end user methods for accessing information
- Prioritizing the client’s business objectives with budgetary considerations to align implementation plans
- Establishing a future state information environment architecture with supporting AIM technologies which will **compliment not replace** existing Electronic Document Management Systems (EDMS) or Electronic Records Management Systems (ERMS).

Once the results are translated into an AIM-supported technology-based business solution, clients will be able to unlock the valuable information assets necessary to achieve business goals and objectives.

Unlocking the Information Assets

Enhanced Indexing & Additional Relationships:

- Apply ARC indexing tools
- Apply Intel OCR
- Doc-Doc relationships
- Doc-Tag ID (SSC)



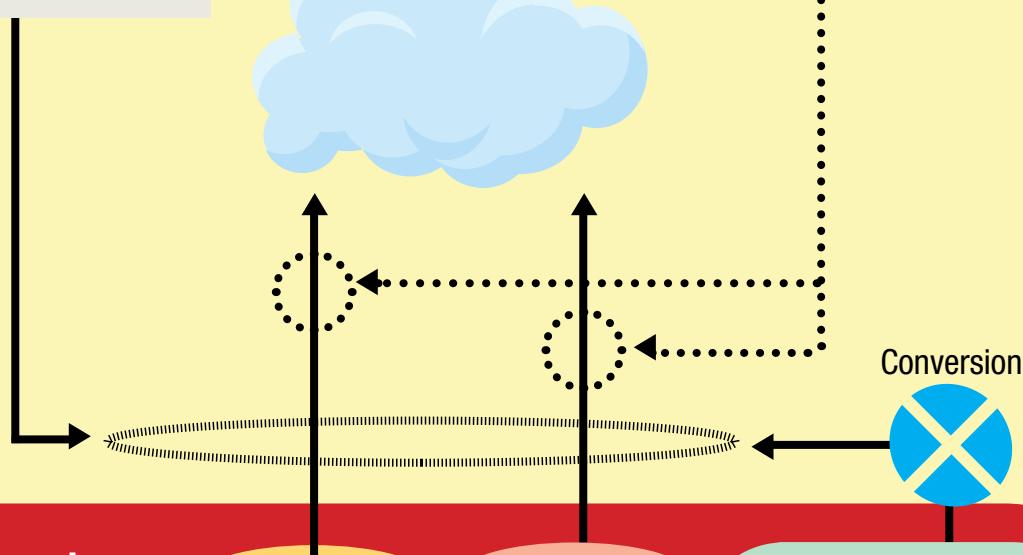
AIM

**Synced
with Record
Copy**

**Client Inventory
of Documents
and Records**



**Microform
Media**



Plan

ARC will work with clients to plan the activities necessary to enhance their information management capabilities. Needs will be assessed against ARC's AIM suite of technology-based services and implementation of ARC's SaaS-based delivery model. Key topics to be covered would include:

Assessment of existing “on-line” and “off-line” (non-electronic) document and record archives

- Using the assessment, a strategy and plan would be developed to enable both types of documents and records to coexist in a single operational platform accessible to internal staff and external entities
- Capabilities required for synchronization of documents accessible via the PlanWell platform with the official copies in the repository of record
- User interface requirements including file folder structures, document types, and user access controls
- Anticipated collaboration capabilities needed to interface with external parties for programs or projects via the PlanWell Collaborate (PWC) Platform

Design & Implementation

ARC will work with assigned client staff to accomplish all design and implementation activities. Examples will include:

- Coordination of AIM technologies and client's systems for information transfers or synchronization functions
- Conversion and indexing of “off-line” information from paper or microform media to electronic files readily available for end users to accomplish work
- Enhanced indexing through expanded capabilities for assigning additional metadata/attributes to documents/records
- Enabling external entities to identify and access information stored and accessible via the PWC Platform

THE RESULTS

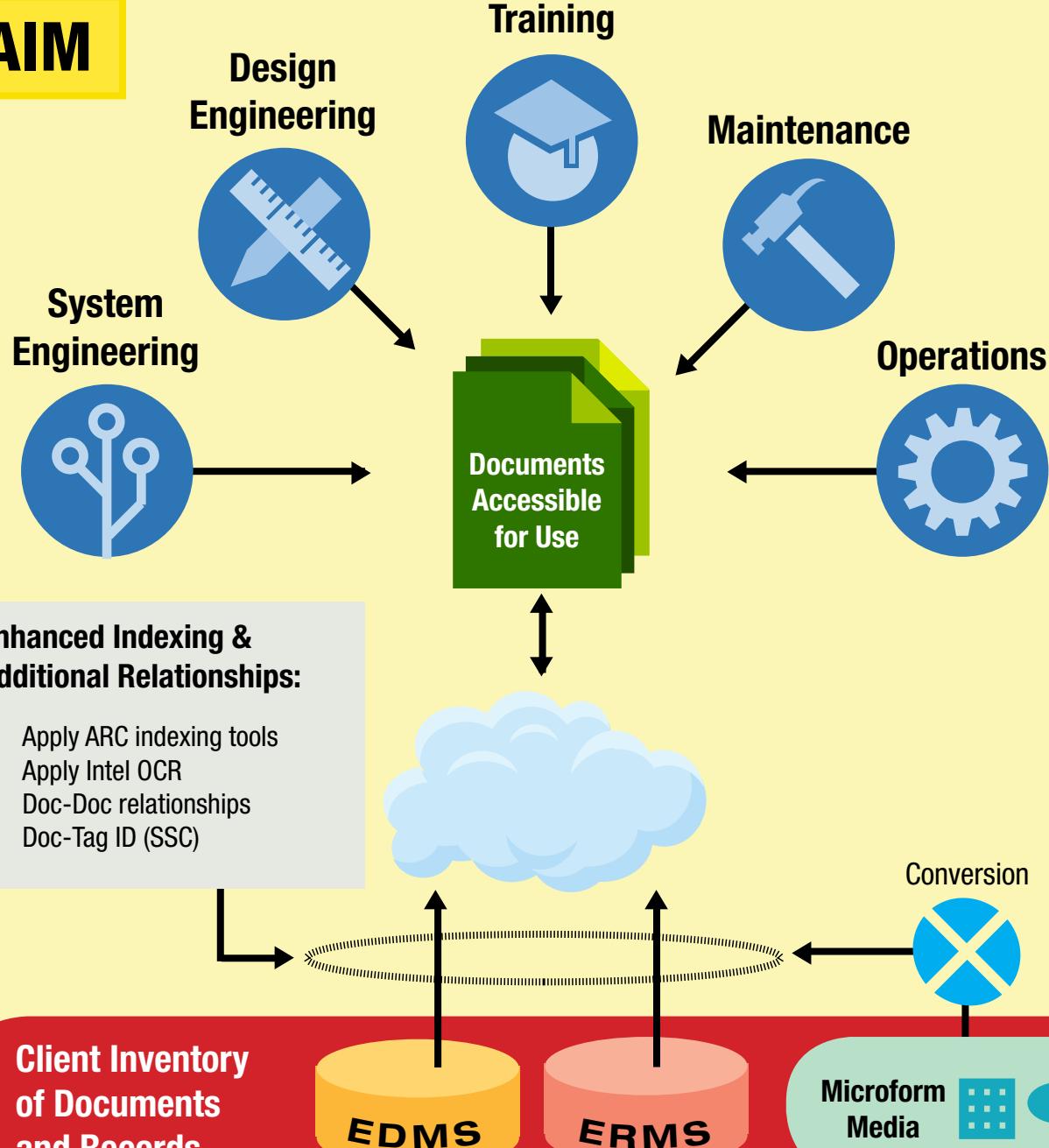
Through a well-designed and effective strategy for unlocking the information assets and making them available, ARC clients can achieve a single integrated business solution that supports all the core business functions noted above.

Daily Operation

With required conversion of non-electronic information files and enhanced indexing in an AIM-based solution, client staff from multiple organizations can readily access information based on their own perspectives and unique methods for searching for information. With “Google-like” capabilities, users can find “what they need when they need it.”

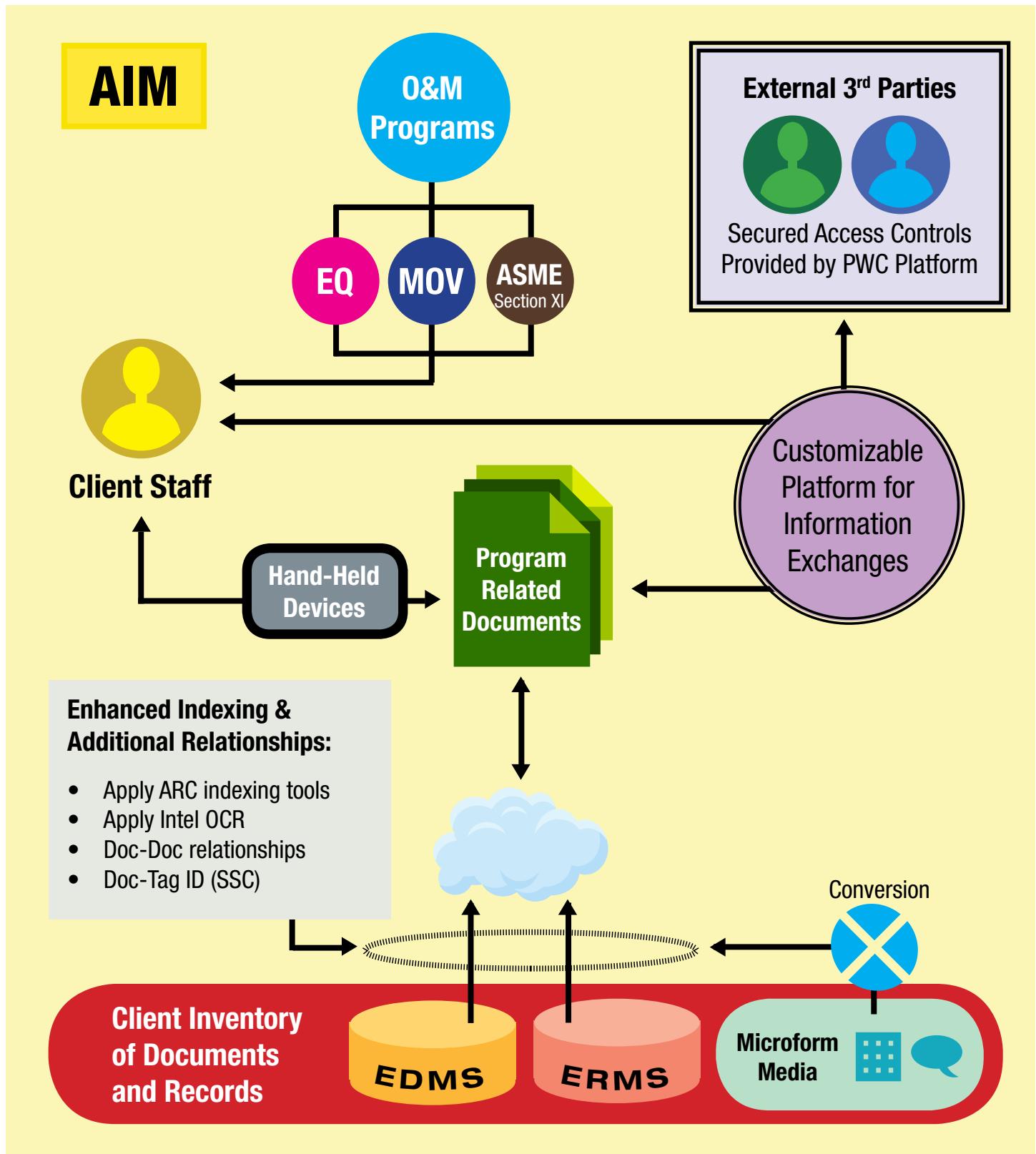
Information on Demand

AIM



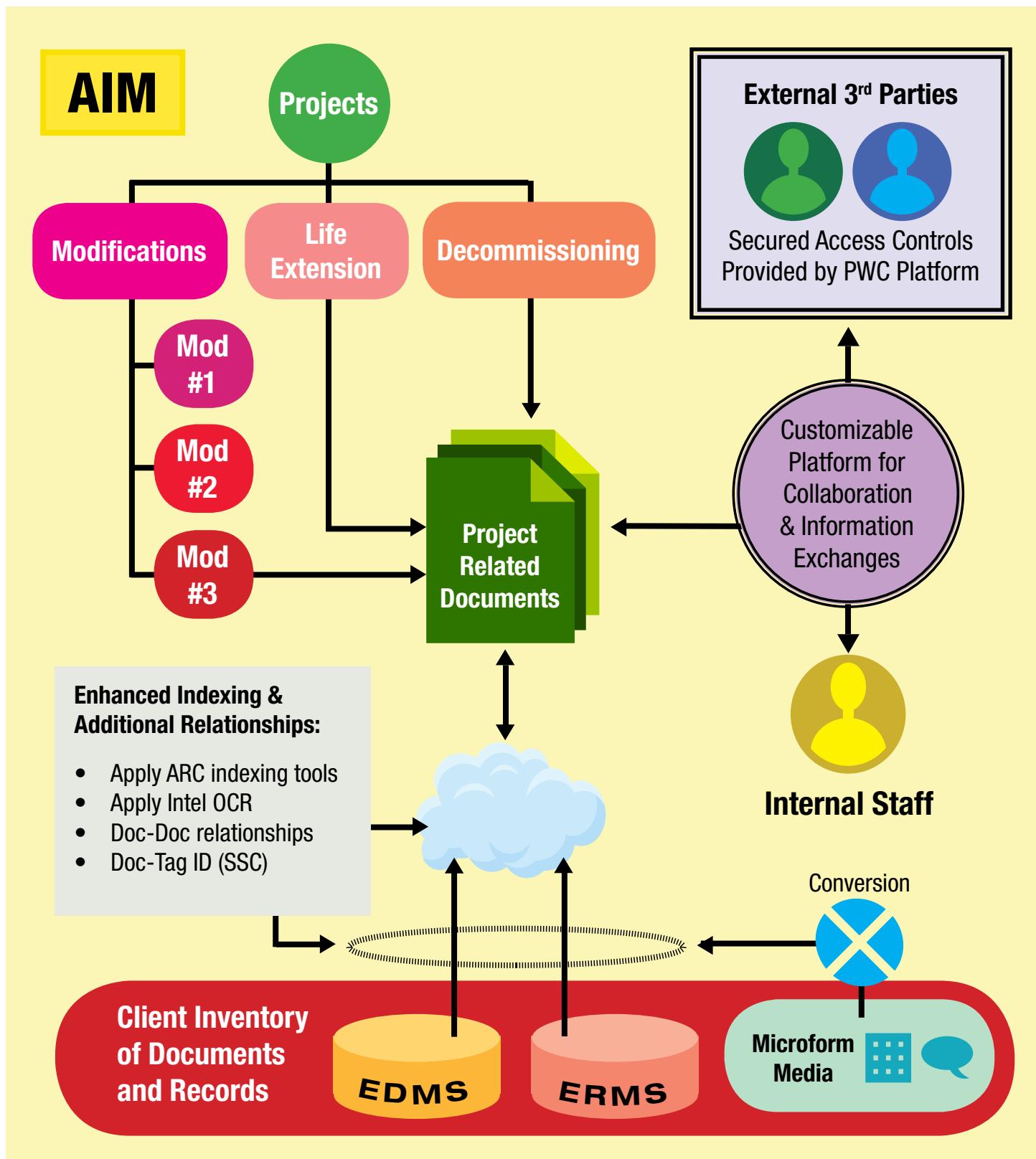
O&M Programs

With expanded capabilities for collecting and grouping documents, data, and records associated with a given O&M Program, those responsible for maintaining compliance with regulatory, as well as in-house, O&M obligations can manage the required information in a single location while synced to relevant information in the source repositories. In addition, exchanging information with external contractors or regulatory staff will be enabled providing improved communications and efficient and effective information exchanges.



Projects

With expanded cross-referencing of documents and increased search capabilities in an AIM-based solution, both tactical and strategic projects will be better supported and allow for consolidation of relevant information in subject-based folder structures. This will provide costs savings through efficiencies of access and retrieval. In addition, the use of AIM's customizable platform for exchange of information with external parties will reduce risks and create a true collaborative environment for all groups participating on projects.

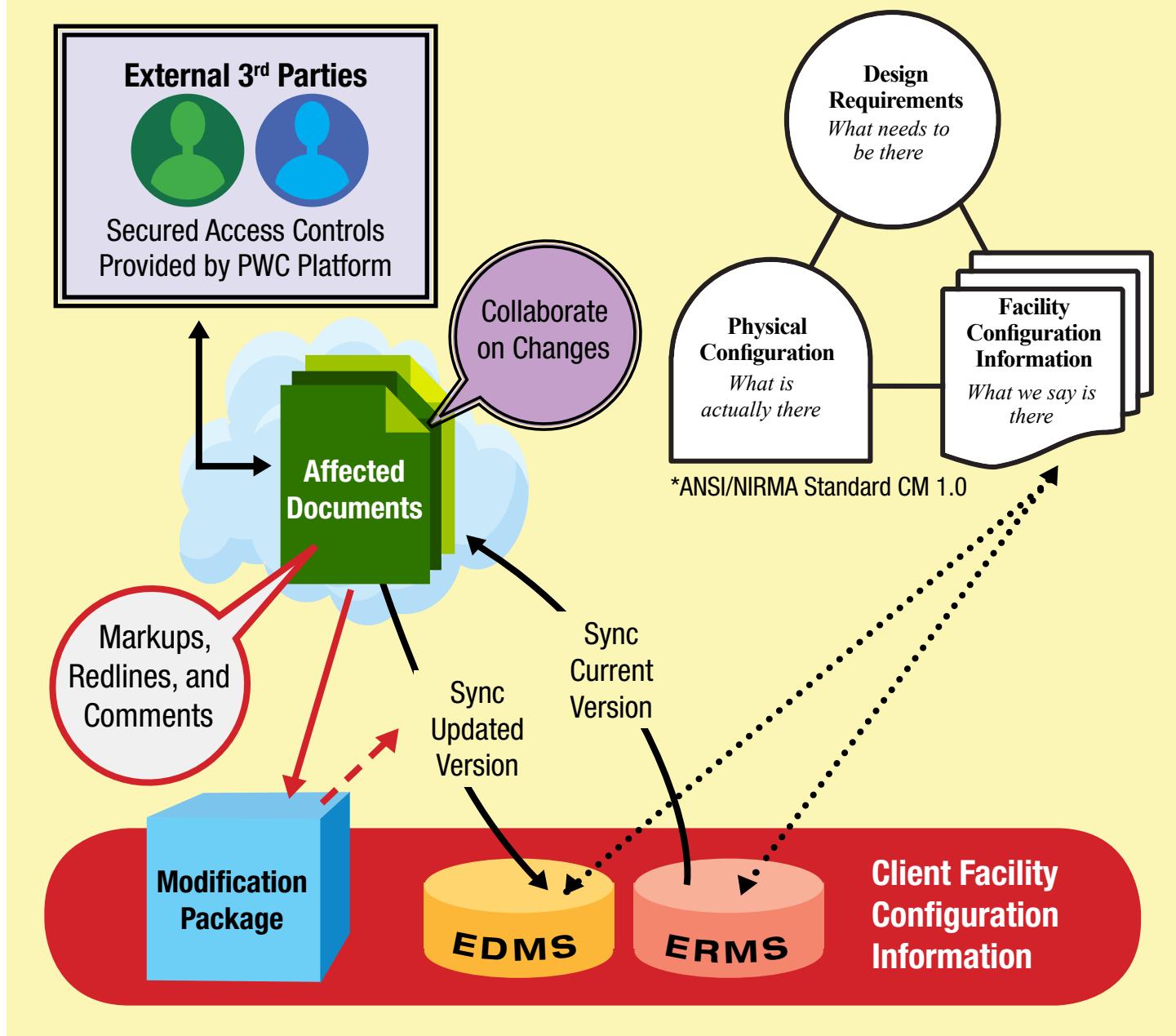


Configuration Management

With expanded cross-referencing of documents and ability to establish relationships between documents and plant equipment identifiers (TAG IDs), impact analyses due to changes will be greatly improved. This enhanced capability will significantly improve achieving the CM objective of effective change control. In addition, the markup and comment capabilities within the PlanWell platform will support real-time awareness of changes and allow additional impacts to be evaluated quickly; thus saving time and costs for plant modifications. Leveraging the sync capabilities within the technology suite, current and updated revisions of documents will be managed and available for use by multiple parties as needed.

AIM

Change Control Processes Maintaining CM Equilibrium



TRAINING

ARC delivers a user-based training program for its clients, either on site or in a classroom setting. Client Teams will be oriented to the superior administrative capabilities on authorized user access controls and data management.



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