

I have always been interested in cutting-edge technology and innovative thinking when it comes to addressing digital transformation and creating a high-tech environment where people are not bound by stacks of books and information that is neither user friendly nor intuitive. As the Construction Manager for one of our new sites in Southern California, I was asked to develop a training program that would support the flexible schedules of our existing operators who were tasked with running the legacy units until the first fire of our new units. Since vendor instructors are not always on-site, the program needed to be versatile enough to allow students to refer back to material at any given moment in time to make good decisions. Given these constraints, we needed to be creative and develop a program that was new to our company. Below is an example of our problem statement and key objectives developed.

## Training and Beyond



### AES Southland 3D Modelling, LMS & Simulator Based Training & Qualification Program

#### Background

Changes in California environmental law provided AES with an opportunity to ensure a cleaner, more reliable energy future by replacing our existing plants with a modern natural gas combined cycle power plant that is more efficient and responsive to California's electricity needs.

#### Problem Statement:

- AES Southland talent with over 25 years of experience with conventional gas fired units with limited CCGT experience.
- Develop a program with presentation and content that would fill the knowledge gaps, provide a qualification process to develop a fully cross qualified team to support the assumptions and goals in our business model.

#### Goals & Objectives:

- On-Board O&M staff early to train and commission NewCo
- Have qualified Control Room Operators on board by the time we first fire the machines
- Have qualified Cross Functional Technicians with the ability to cover all the outside equipment and systems
- Manage the high expected EAF from the PPA
- Manage the demand expected of technicians to operate the existing units for committed capacity sold into the market by creating a training program that is flexible

### Obtaining Operational Excellence



As a result of our review process, we decided to use three companies to build a custom program that fit all of our needs.

To develop the first part of our program, we enlisted Technical Training Professionals (TTP), a company that specializes in development of site-specific, detailed 3D training content. TTP has received a warm welcome from personnel ranging from new employees, to experienced employees to top management. The ability of their content to quickly convey complex flow paths, function, design, and procedures is clearly illustrated by the following combination of video cuts:

TTP was able to import site engineering models and add significant internal and external content for CT, HRSG, ST, ACC, and other systems such as CEM and Boiler Cycle Chemistry Panel. This level of detail, in addition to equipment models supplied for training, has allowed us to create training that the employees actually look forward to seeing and using. As a result of the initial training, we are now in the process of continuing this type of site-specific detail by providing end users information on how to:

- Conduct a major overhaul on our gas turbines
- Tear apart boiler feedwater pumps in great detail
- Conduct repairs on site-specific valves

We are now considering translating the material to different languages. One of the largest benefits of using TTP was the ability for technicians to start training on material and courses from very similar plants

during the development phase while the plant-specific material was being finalized for our official classroom start date. The ability to have this as an option helped to reduce downtime during the early stages of site-specific training. We were also able to start preparing our operators and technicians early so they could go into the classroom with a good understanding of how a combined cycle plant works while the final material was developed.

*Below are some Hyperlinks to some examples of material provided;*

[Compilation of Videos for AES Alamos & Huntington](#)

[CT Link – CT Hydraulic Oil System - Embedded](#)

[7FA.05 Hydrogen Cooled Generator – Seal Oil System – Embedded](#)

[ST – Stop Valve and Pilot Valve - Embedded](#)

The second part of our program required an LMS platform that would give us the ability to develop a qualification process around our site-specific content. We have a long-standing relationship with GP Strategies, and they had all the key elements we were looking for.

GPiLEARN+™ is the GP Strategies solution designed to fill the gap of a traditional LMS in technical industries. GPiLEARN+ is a best-in-class LMS with industry-driven technical and safety content backed by an experienced customer support team.

Coupled with GP Strategies subject matter expertise, GPiLEARN+ provided a seamless experience that helped us develop an industry-leading training program. The GPiLEARN+ content and site-specific TTP 3D training material allowed us to qualify technicians and cross-train team members to support all aspects of our operations.

Additionally, GP Strategies' subject matter experts worked with our leadership team to develop the training program and ensure our leaders had a clear digital dashboard to see the overall progress of their personnel. The GP Strategies team reviewed vendor training materials, provided course feedback, and helped ensure overall success of our operator and technician training programs.

The final part of our equation was to bring in a company that would be able to provide the site with a full-blown simulator that was an exact replication of our existing assets. We had this system in place 4 months prior to first fire to support the initial qualification of our technicians. The company we chose was Western Services Inc. (WSC).

WSC is a privately held, technology-driven company with engineering simulation as its core competence. WSC's vision is to provide the power industry with innovative, state-of-the-art, simulation technology products and services that will add value in the design, commissioning, and safe and reliable operation of their power-generating or process plant assets.

WSC's state-of-the-art 3KEYSOFTWARE® technology has its roots in nuclear and thermal power plant operator training simulators. WSC continues to invest a significant proportion of its profits in its products, adding value to the engineering design and construction process through simulator-assisted engineering and to plant operation economics through simulation grounded equipment reliability and asset lifecycle management processes.

The projected growth in the power industry over the next 15 years coincides with the bow wave of baby boomer retirement. WSC will continue to invest in new product development and introduce knowledge capture and educational software to support the industry's investment in recruitment and training for the next generation of operators and maintenance engineers.

WSC's mission is to meet or exceed customer requirements and expectations by:

- Providing innovative, state-of-the-art, high-quality training simulators and simulation products to meet customers' operation, training, and safety needs
- Maintaining and sustaining the highest quality in our simulation products to support the use of simulation as an integral part of the engineering process in new plant design or plant upgrades
- Promoting continuous improvement in our products and services while complying with applicable regulations and standards

## Training and Beyond

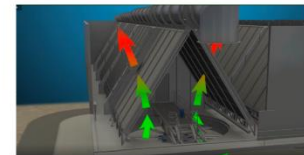
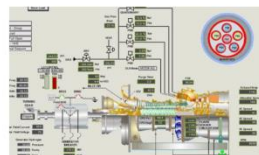


AES, along with GP Strategies and Training Technical Partners, leveraged their acquired product knowledge and utilized the 3D plant model to:

- Present classroom training in a very detailed format
- Enhance OEM content
- Create detailed 3D maintenance procedures for Assembly, Disassembly, Calibration
- Create operating procedures
- Enhance system descriptions with 3D graphics

Content provides a deeper understanding, and quicker learning (up to 5x faster), than through conventional books and PowerPoints.

This content opens the door to a cost-effective Virtual Reality Training Development. First target for this development will be maintenance procedures.



As an added benefit to the overall process, we received both Silver and Bronze awards from the Brandon Hall Group for our programs. “Brandon Hall Group Excellence Awards Program has recognized leading organizations for the past twenty-plus years for the latest trends in Human Capital Management,” said Rachel Cooke, Brandon Hall Group COO and leader of the HCM Excellence Awards Program. “The initiatives that were honored are not only innovative but fit the unique needs of the business and create truly remarkable success stories.”

Award entries were evaluated by a panel of veteran, independent senior industry experts, Brandon Hall Group analysts, and executives based upon the following criteria: fit the need, design of the program, functionality, innovation, and overall measurable benefits.

<http://www.brandonhall.com/excellenceawards/past-winners.php>

### 1. Silver | Best Customer Training Program (AES)

**AES Develops Custom Training and Qualification Program to Support a Safe and Efficient Power Plant Startup**

AES realized the importance of equipping their workforce with a training program focused on critical skills and competencies in the areas of compliance, safety, operability, and maintainability to prepare operators for new plant startup. In partnership with TTP, GP Strategies, and Western Services, they developed a comprehensive training program that included 3D model-based training, instructor-led training (ILT), site-specific 3D videos, an online learning management system (LMS) for qualification tracking, and a high-fidelity simulator. This robust program will help support successful plant startup and safe ongoing operations.

## 2. **Bronze | Best Use of Blended Learning (AES)**

### **AES Develops Custom, Blended Training Program to Support Safe Plant Operations**

AES, in partnership with TTP, GP Strategies, and Western Services, developed a comprehensive training and qualification program that includes the following: 3D model-based training, instructor-led training (ILT), site-specific 3D videos, an online learning management system (LMS) for qualification tracking, and a high-fidelity simulator to prepare plant operators for two new power plant startups and to help them maintain successful, ongoing plant operations.

As an added benefit to the above I will be presenting a comprehensive overview of the procedures, manuals, training classes, and detailed 3D content at Power Gen 2019 in New Orleans on Tuesday, November 19 and Thursday, November 21, 2019. Should anyone attending want to meet us and discuss more lessons learned from this project, please let me know.

On a final note, I would like to share some key takeaways I have from going through this journey. All too often we get caught up in our daily work and forget to share lessons learned and ideas with our peers and look for ways to become better. Below are a few items I thought worthy of sharing and discussing with each other.

1. As leaders, we always discuss the importance of people in our organizations, since people are our #1 asset. Don't forget to spend time and money on training programs; the more knowledge our people have, the better our business performance will be.
2. This type of 3D training material can be developed for any type of industry. The amount of knowledge people retain from this level of training is typically five times more effective.
3. As a result of this program, we were able to achieve a 95% pass rate during our initial classroom training, which consisted of OEM training and our detailed 3D training programs. The retention rate of the students was much better than the typical monotonous PowerPoint method. 😊
4. The ability to have a training program that is not dependent on having trainers on-site all the time is very powerful. We were able to create a program that is available for people to take anytime and provide a level of training that is higher than just typical static PowerPoint programs.