The Training Center Institute
PO Box 966
Wrightstown, NJ 08562
800.392.3927

The Training Center Institute

Externship Program

PROGRAM GUIDE

SUMMER 2014

www.boilertraining.com

WELCOME TO YOUR EXTERNSHIP

Hi there.

If you're reading this, then you've chosen to be a part of a new, exciting industry-specific learning opportunity and I congratulate you!

While The Training Center has been around since 1982, our Externship Program is a very new, progressive learning system focused on building the foundation for a successful career in this industry, not just to get you a stationary engineering license. The power generation and boiler field is a stable career opportunity with room for growth if you have the knowledge and habits of a great operator. These courses were carefully designed by our entire team of industry experts in order to provide the truly relevant subjects required to have success in the modern plant environment. You won't need any prior experience in a plant. You'll only need to have the right attitude coming into your externship.

Students, or externs, will take 6 courses while also gradually attaining their state-required amount of sit time. After that, you'll be enrolled in the test-prep courses offered by The Training Center, which prepare you to pass the NJ State Black Seal High Pressure Stationary Engineering exam.
Even though this is a fairly new program, The Externship Program graduates from our past semesters have shown outstanding results in both job placement and performance. The ability to separate yourself in this industry is easy if you practice the habits taught in these courses.

Get involved. Stay engaged. Start practicing the fundamentals and habits learned in the classroom and apply it to your sit time right away. From there, you'll be fast on your way to a license and more importantly, a job. But don't just think of this as a job, think about it as your career.

John Moscatiello
Director

HOW THIS PROGRAM WORKS

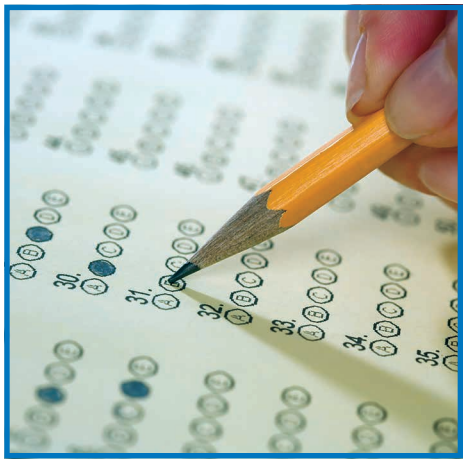
3 PHASES OF YOUR EXTERNSHIP

CLASSROOM

From your first class in your externship program, you'll start developing the professional, technical, and personal skills needed for the industry. You'll learn the foundations of being a great operator and industry professional. Your basic working habits and professional profile is the perfect starting point and from there we will discover the various technical aspects of a boiler plant and it's related systems. These 6 dynamic classes will translate into practical, real-world skills to get your career underway.

ON-SITE

We think the best way to learn about this trade is to get your feet wet in a real-world environment; that's where your on-site training or "sit time" comes into play. The state requires 120 hours of work experience in a high pressure boiler plant before taking the state exam. Here you'll put some of the practical skills learned in your classes to use in a real high pressure system. A combination of learning and performance activities will be organized for externs during this sit time.



EXAM PREP

Now that you've completed the first 6 courses of the Externship Program, you will begin preparing for the New Jersey State Black Seal High Pressure exam. The Black Seal Program consists of 4 classes, covering the various subjects that will be on the state exam. Students will have access to an Online Study Center, which aids in learning the materials as effectively as possible. Flash cards, practice quizzes, and instructor guidance will provide you everything you need to pass the test.

Our philosophy is to give you a complete education that brings together hands-on experience, traditional classroom learning, and industry-specific career development throughout your education. That unique combination will allow you to gain the knowledge and tools you'll need to succeed in this industry. Our customized lessons are a key part of that philosophy. These dynamic presentations cut the fat out of traditional industry readings, focusing on the skills and best practices for operators wanting a real career.

ABOUT US

OUR HISTORY

Established in 1982, *The Training Center* has been an industry standard of boiler licensing for over 30 years. This industry, however, remains a difficult one to break into. Strict regulations requiring work experience make it almost impossible for those without connections to access this field. With a need for a new, modern vocational solution for those targeting a successful career in boiler and power plant industry, we asked the question: "How can we provide our students exclusive access to a functioning high pressure plant *and* provide the best industry-specific educational experience possible?" What we came up with is the foundation for *The Training Center Institute*; **The Externship Program**. By basing this program around immersive, industry-relevant curricula, we strive to give students experience with the concepts they'll be working with in the boiler and power plant industry. Training and education that goes beyond passing a stationary engineering exam.

OUR MISSION

Our mission is to provide students with an innovative style of education, delivered by a staff of dedicated individuals, that addresses the career opportunities available in an ever-growing, constantly evolving industry. We do this by developing unique curricula that combine elements of industry fundamentals, real-world working experience, and academic achievement. Our experienced industry professionals serve your education via immersive discussion and dyanmic presentation tools, both in our classrooms, as well as through our on-site training plants.

This program is not all about learning the right answers to questions we think are important. We'll teach you how to find answers to real-world questions or problems for yourself. The growth in your own ability to learn is how we know you'll find success.

OUR STAFF

Calling Our Main Office

9am-3pm, Monday-Friday
(800) 392-3927
See staff extensions below.

Director

John Moscatiello *Ext 113*
john@boilertraining.com

Admissions

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Dan Moscatiello *Ext 127*
dan@boilertraining.com

Our Kenilworth Site

131 South 31st Street
Kenilworth, NJ 07033

PROGRAM TIMELINE

B101: O&M CAREER INTRODUCTION

20 MAY
10am-12pm or
5pm-7pm

An introduction to the Externship Program and the industry of power plant operations in general. Before diving into the technical topics of operation, students must first learn how to maximize their learning in both the classroom and when performing on-site boiler room coverage. Students will come away from this class with an understanding of what to expect.

B102: INTRO TO BOILERS

3 JUNE
10am-12pm or
5pm-7pm

This course is an introduction to the primary piece of equipment for stationary engineers, the boiler. We begin by learning some important fundamentals of science, specifically heat theory and the various energy principles that directly apply in the boiler room. From there, dynamic animations and simplistic instruction allow students to grasp how a boiler really works.

B103: FUEL & COMBUSTION

17 JUNE
10am-12pm or
5pm-7pm

In this course, the main focus moves to fuel and combustion. The main types of fuel used along with the systems in which they function. The combustion process is broken down from the basics and gradually into boiler combustion within the burner, while controlling the fuel-to-air ratio in the combustion process in order to maintain complete combustion.

B104: STEAM, DRAFT, CONTROL SYSTEMS

1 JULY
10am-12pm or
5pm-7pm

Students now learn the fundamentals of steam and its use within various plant environments. The fittings and trim involved in a steam system are illustrated to understand their functions and importance. We will learn the draft system, including the different types of draft. Students are introduced to boiler control systems and control loops in general.

B105: TROUBLESHOOTING & LOCKOUT/TAGOUT

22 JULY
10am-12pm or
5pm-7pm

One of the most important skills of an operator is his or her ability to solve problems in the plant. This course covers the core fundamentals and methodology involved with troubleshooting. Students will now be able to approach issues in an unbiased, intelligent manner. We'll also get into energy control programs, specifically lockout/tagout (LOTO).

B106: INVIVOTECH HANDS-ON WORKSHOP

9 AUG
12pm-3pm

Instead of learning in the classroom, the class is moved straight into the boiler room. At the Invivotech Plant in Hamilton, NJ, we'll cover almost anything we can in a "hands-on" fashion. With group discussion and teamwork, we'll perform some basic operator duties and then complete our Lockout/Tagout training by actually performing a LOTO on a boiler system.

B101

O&M Career Orientation

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COURSE DETAILS

Course: B101: O&M Career Orientation
Instructor: Patrick Moscatiello
Time: 10am-12pm or 5pm-7pm
Location: Avis Bldg - The Training Center Inst.
131 S. 31st St.
Kenilworth, NJ 07033

OVERVIEW

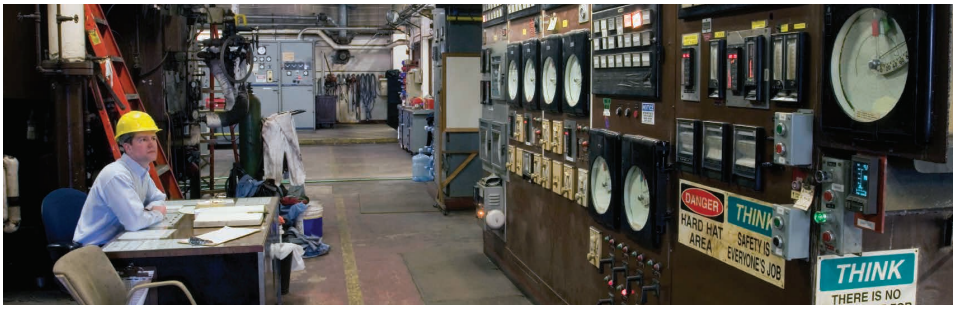
This course is an introduction to the Externship Program and the industry of power plant operations in general. Before diving into the technical topics of operation, students must first learn how to maximize their learning in both the classroom and when performing on-site boiler room coverage. We'll gain an understanding of an operator's working environment, the habits that will contribute to success within the industry, and even how to professionally use email and social media. This course is aimed at those exploring a career in the stationary engineering/operations industry. Students should take this course before starting any on-site training.

MATERIALS

Required Reading:
High Pressure Boilers, Fifth Edition - Steingress, Frost, Walker (provided)
Additional Reference Materials:
The Training Center website: www.boilertraining.com
Mastery LMS Safety Training (link will be provided)
Linked In Group (instructions to join will be provided)
Other Materials:
Externship Program Guide (this guide)

TOPICS

- ✓ Program Introduction
- ✓ Current Industry Landscape
- ✓ Career Paths & Opportunities
- ✓ Hierarchy of Boiler Rooms and Power Plants
- ✓ The Principles of Operation
- ✓ The Habits of a Great Operator
- ✓ Using Email & Social Media like a Professional
- ✓ Introduction to Sit Time
- ✓ Personal Protection Equipment (PPE)
- ✓ General Plant Safety
- ✓ Operator Relief
- ✓ Mastering the Operations Logbook
- ✓ Online Training Overview
- ✓ Qual Sheets Overview
- ✓ Q & A
- ✓ Discussion



METHOD OF INSTRUCTION

- 🕮 Dynamic Keynote Presentation
- 🕮 Lecture
- 🕮 Group Discussion

PREREQUISITES

None

B102

Introduction to Boilers

PROGRAM GUIDE 8

COURSE DETAILS

Course: B102: Introduction to Boilers
Instructor: Patrick Moscatiello
Time: 10am-12pm or 5pm-7pm
Location: Avis Bldg - The Training Center Inst.
131 S. 31st St.
Kenilworth, NJ 07033

OVERVIEW

This course is an introduction to the primary piece of equipment for stationary engineers, the boiler. We begin by learning some important fundamentals of science, specifically heat theory and the various energy principles that directly apply in the boiler room. With a true understanding of heat, we'll build a boiler from the ground up and discover the engineered logic behind the equipment. Students will learn how a boiler works, know it's fundamental process, and learn about the 4 main systems that interconnect with each other to maintain the plant process. We'll cover some general boiler room safety, including the key protection devices on the boiler that protect us during normal operation. The importance of water will be discussed, including the 2 main issues concerning water in the boiler. Students will be assigned some reading and on-site training exercises to follow-up on these boiler fundamentals that we have now learned.

TOPICS

- ✓ Heat Theory
- ✓ Heat Transfer
- ✓ Temperature Scales
- ✓ What is a Boiler?
- ✓ Main Types of Boilers
- ✓ Firetube Boiler Animation
- ✓ Watertube Boiler Animation
- ✓ Boiler Fundamentals
- ✓ Basic Principles of a Boiler
- ✓ The 4 Main Systems of a Boiler
- ✓ System Interconnectivity
- ✓ Key Protection Devices
- ✓ Intro to the Water System
- ✓ Boiler Safety
- ✓ On-Site Training Discussion
- ✓ Q & A

MATERIALS

Required Reading:
High Pressure Boilers, Fifth Edition - Steingress, Frost, Walker (provided)
Additional Reference Materials:
The Training Center website: www.boilertraining.com
Mastery LMS Safety Training (link will be provided)
Linked In Group (instructions to join will be provided)
Other Materials:
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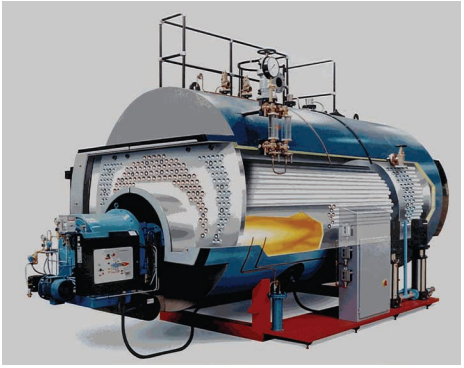


METHOD OF INSTRUCTION

- 🕮 Dynamic Keynote Presentation
- 🕮 Lecture
- 🕮 Group Discussion

PREREQUISITES

B101 (*Recommended*)

B103

Fuel & Combustion

COURSE DETAILS

Course: B103: Fuel & Combustion
Instructor: Patrick Moscatiello
Time: 10am-12pm or 5pm-7pm
Location: Avis Bldg - The Training Center Inst.
131 S. 31st St.
Kenilworth, NJ 07033

OVERVIEW

With a general understanding of how a boiler works, we now learn the fundamentals of burning fuel for combustion in our boiler. It starts with breaking down the different types of fuels being used in various plants and their specific characteristics. Using dynamic animations, your instructor will build a fuel-oil and a natural gas system as it comes into the plant and to the boiler's burner. Combustion fundamentals are discussed with a focus on boiler combustion theory. The equipment, valves, and fittings involved in the fuel and combustion process are broken down for easy understanding.

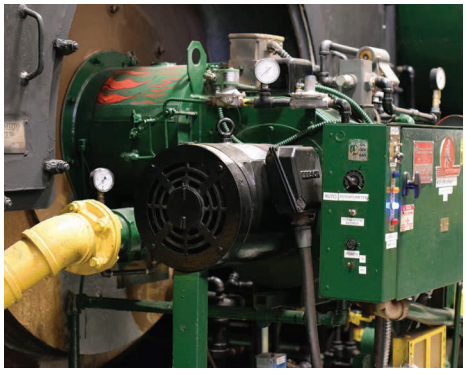
We'll learn the importance of controlling the fuel-to-air ratio in the combustion process in order to maintain complete combustion. If we had incomplete combustion in our plant, students will know the signs and how to correct the issue. The final topic of the course walks students through the sequence of operation, or starting-up of the boiler properly as an operator. We'll cover the permissives and steps involved in this process and what to look for if we have failures or alarms during this process. After this course, students now have an understanding of boiler fundamentals along with fuel systems and boiler combustion.

TOPICS

- ✓ Review
- ✓ Fuel Types
- ✓ Fuel Oil
- ✓ Fuel Oil Types
- ✓ Fuel Oil Components
- ✓ Fuel Oil System Overview
- ✓ Natural Gas
- ✓ Natural Gas Components
- ✓ Natural Gas System Overview
- ✓ Combustion Theory
- ✓ Boiler Combustion
- ✓ Combustion Equipment
- ✓ Fuel/Air Ratio
- ✓ The Burner
- ✓ Complete Combustion
- ✓ Incomplete Combustion
- ✓ Sequence of Operation

MATERIALS

Required Reading:
High Pressure Boilers, Fifth Edition - Steingress, Frost, Walker (provided)
Additional Reference Materials:
The Training Center website: www.boilertraining.com
Mastery LMS Safety Training (link will be provided)
Linked In Group (instructions to join will be provided)
Other Materials:
Externship Program Guide (this guide)



METHOD OF INSTRUCTION

- 🕮 Dynamic Keynote Presentation
- 🕮 Lecture
- 🕮 Group Discussion

PREREQUISITES

B101, B102

B104

Steam, Draft, Control Systems

COURSE DETAILS

Course: B104: Steam, Draft, Control Systems
Instructor: Patrick Moscatiello
Time: 10am-12pm or 5pm-7pm
Location: Avis Bldg - The Training Center Inst.
131 S. 31st St.
Kenilworth, NJ 07033

OVERVIEW

B104 provides an understanding of boiler steam, draft, and control systems through a study of the various fittings and systems installed with the equipment. This course is essential for an operator's understanding of the different types of steam produced in boiler systems and the valves and fittings used to control it. We will discuss the relationship between pressure and boiling point, saturated steam vs superheated steam. Using dynamic presentation builds, we will actually build a basic boiler room steam system in order to easily illustrate how the process, or steam cycle, really works. As operators, we must manage the various problems that could occur in the steam cycle, including carryover and maintaining dry steam. We cover the draft system and all of it's functions in the boiler's process, including combustion air, combustion gas, and emissions control.

When it comes to control systems, we start by teaching how a fundamental process control loop works. From there we can apply these various control loops to the boiler's programmer or "brains". We also break down the differences between BMS (Burner Management System) and BPCS (Boiler Process Control Systems).

MATERIALS

Required Reading:
High Pressure Boilers, Fifth Edition - Steingress, Frost, Walker (provided)
Additional Reference Materials:
The Training Center website: www.boilertraining.com
Mastery LMS Safety Training (link will be provided)
Linked In Group (instructions to join will be provided)
Boiler Control Systems Engineering, Second Edition, G.F. (Jerry) Gilman
Other Materials:
Externship Program Guide (this book)

METHOD OF INSTRUCTION

- Dynamic Keynote Presentation
- Lecture
- Group Discussion

TOPICS

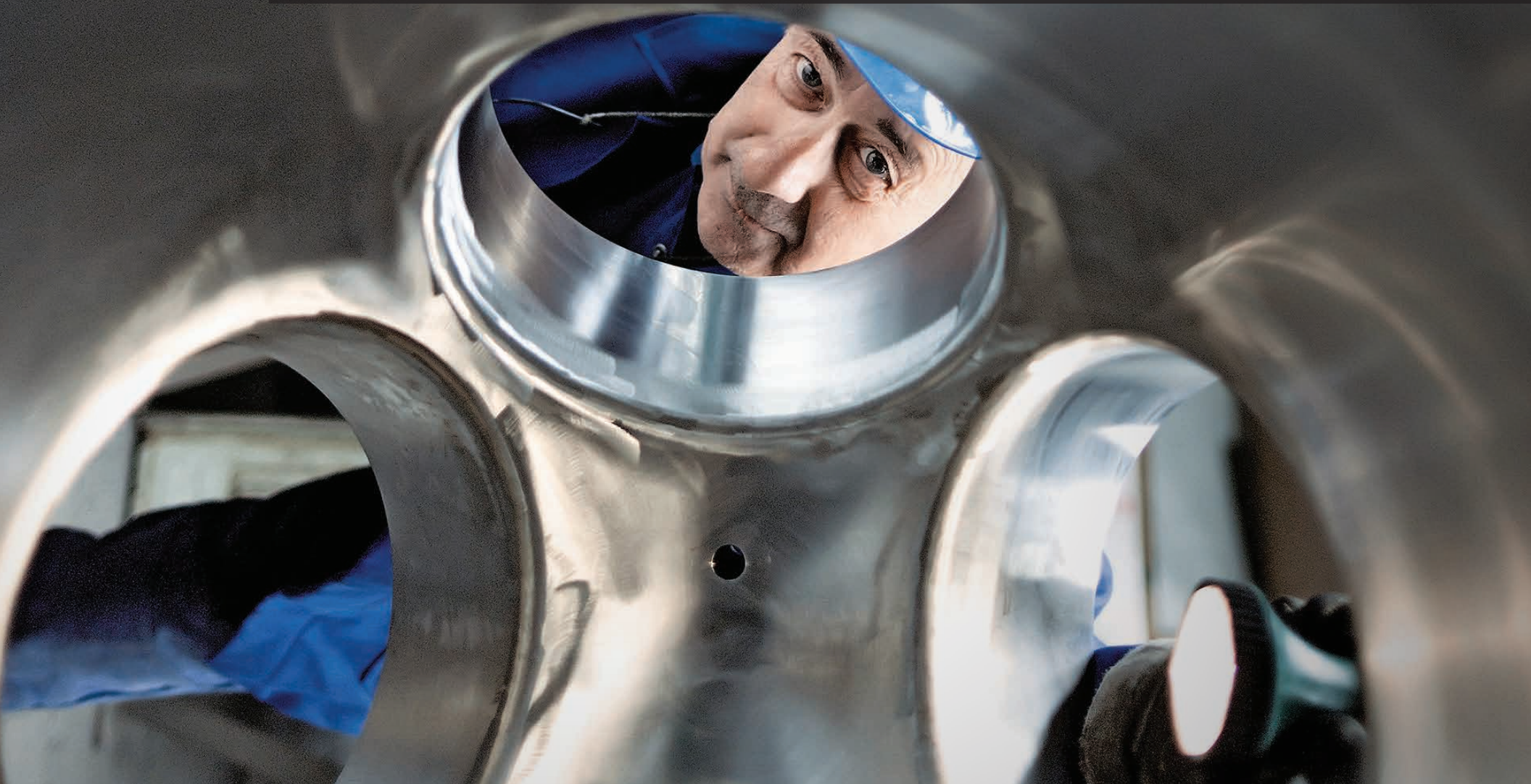
- ✓ Review
- ✓ Understanding Steam
- ✓ Types of Steam
- ✓ Superheated Steam
- ✓ Steam Fittings
- ✓ Safety Valves
- ✓ Measuring Steam
- ✓ Boiler Valves
- ✓ Steam Traps
- ✓ Keeping Steam Dry
- ✓ Preventing Carryover
- ✓ Draft System Overview
- ✓ Types of Draft
- ✓ Air Heaters & Economizers
- ✓ Emissions
- ✓ Intro to Control Systems
- ✓ Process Control
- ✓ Control Loops
- ✓ Basic Process Control System (BPCS)
- ✓ Burner Management System (BMS)
- ✓ Control Strategies
- ✓ Operating Limits & Interlocks
- ✓ BMS Interlock Example

PREREQUISITES

B101, B102, B103

B105

Troubleshooting & Lockout/Tagout



COURSE DETAILS

Course: B105: Troubleshooting & Lockout/Tagout
Instructor: Patrick Moscatiello
Time: 10am-12pm or 5pm-7pm
Location: Avis Bldg - The Training Center Inst.
131 S. 31st St.
Kenilworth, NJ 07033

OVERVIEW

While normal operating conditions in a plant can be rather smooth and stress-free, problems do occur. The question is, how will you handle it? A very deliberate, obvious gauge on a great power plant employee is how he or she performs their duties during problems with the system. Multi-million dollar power plants are wise to staff themselves and rely on people of specific characteristics, which we will discuss. Successful problem solving, or troubleshooting, depends on logic and knowledge. We cover the various types of learning that contributes to our troubleshooting skills and then introduce a 7-step process, or flowchart, that we can apply to a broad class of problems. By the end of this class, students will immediately be able to apply these frameworks and strategies to everyday problems.

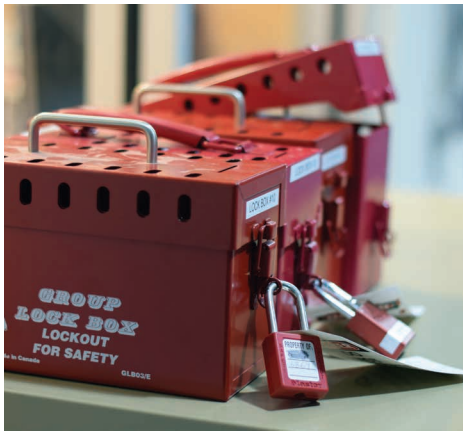
Power plants require energy control programs, also known as lockout/tagout (LOTO). We teach you the basic principles of hazardous energy control and introduce you to an actual lockout/tagout procedure. With knowledge of the procedure, students will actually perform a lockout/tagout at B106: Invivotech Hands-On Workshop.

TOPICS

- ✓ Review
- ✓ Intro to Problem Solving
- ✓ Common Problems in the Plant
- ✓ Troubleshooting Logic
- ✓ Troubleshooting Methodology
- ✓ 7-Step Process
- ✓ Root Cause Analysis
- ✓ Problem Simulation
- ✓ Troubleshooting Safety
- ✓ Hazardous Energy Control
- ✓ Intro to Lockout/Tagout (LOTO)
- ✓ Hazardous Energy Types
- ✓ LOTO Terminology
- ✓ LOTO Procedure
- ✓ LOTO Permits
- ✓ Q & A

MATERIALS

Required Reading:
High Pressure Boilers, Fifth Edition - Steingress, Frost, Walker (provided)
Additional Reference Materials:
The Training Center website: www.boilertraining.com
Mastery LMS Safety Training (link will be provided)
Linked In Group (instructions to join will be provided)
Troubleshooting: A Technician's Guide, Second Edition, William Mostia Jr, PE
The Training Center Group - Lockout/Tagout Procedure (provided)
Other Materials:
Externship Program Guide (this book)



METHOD OF INSTRUCTION

- 🕮 Dynamic Keynote Presentation
- 🕮 Lecture
- 🕮 Group Discussion

PREREQUISITES

B101, B102, B103, B104

B106

Hands-On Workshop: Invivotech Plant

COURSE DETAILS

AUGUST 09

Course:	B106: Invivotech Hands-On Workshop
Instructor:	Patrick Moscatiello and Guests
Time:	12pm-3pm
Location:	Invivotech Plant 17 Black Forest Rd. Trenton, NJ 08691

OVERVIEW

Here the classroom is moved right into the plant! Students will get "hands-on" with specific boiler room procedures and be able to ask questions about just about anything involved with being an operator. Instructors will group students up and perform various operator duties and best practices. Lockout/Tagout certification will be issued after students actually perform a Lockout/Tagout on one of the boilers and it's various components. Daily duties, rounds, water chemistry, LWCO tests, and blowdowns are among other exercises that be will performed by students under the supervision of our experienced training staff. Many students find this to be the most helpful of all the courses in this program, connecting what they've learned in the classroom and applying it directly in an actual boiler room.

MATERIALS

Other Materials:

Externship Program Guide (this book)
Hard Hat, Safety Glasses, other PPE (provided)
Safety Footwear

METHOD OF INSTRUCTION

- Group Discussion
- Hands-On Practice
- Team-Oriented Activities

TOPICS

- ✓ Plant Overview
- ✓ Turnover/Relief of Shift
- ✓ Operator's First Round
- ✓ Operator's Best Practices
- ✓ Tracing the System
- ✓ Plant Safety
- ✓ Lockout/Tagout Review
- ✓ Lockout/Tagout Organization
- ✓ Lockout/Tagout Permits
- ✓ Conduct a Lockout/Tagout
- ✓ Low Water Fuel Cut-Off Test
- ✓ Bottom Blowdown
- ✓ Water Chemistry
- ✓ Other Boiler Room Training
- ✓ Q & A

PREREQUISITES

B101, B102, B103, B104, B105

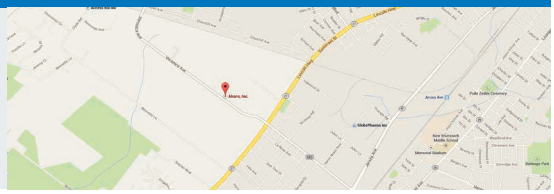
SIT TIME

120 Hours of On-Site Training

ON-SITE TRAINING

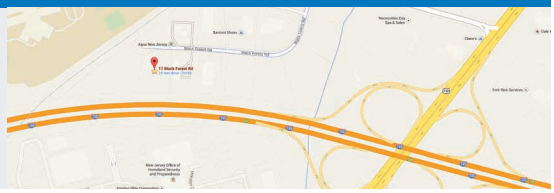
AKORN: SOMERSET, NJ

Akorn Pharmaceuticals
72 Veronica Ave
Somerset, NJ 08873



INVIVOTECH: HAMILTON, NJ

Invivotech
17 Black Forest Rd
Trenton, NJ 08691



MY ON-SITE TRAINING SCHEDULE

Schedule by calling or emailing Lisa Fox (800) 392-3927 Ext 112, lisa@boilertraining.com

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