

ioMosaic®

Minimizing risk. Maximizing potential.®

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Remote Learning Successes Demonstrating the Effectiveness of PSL

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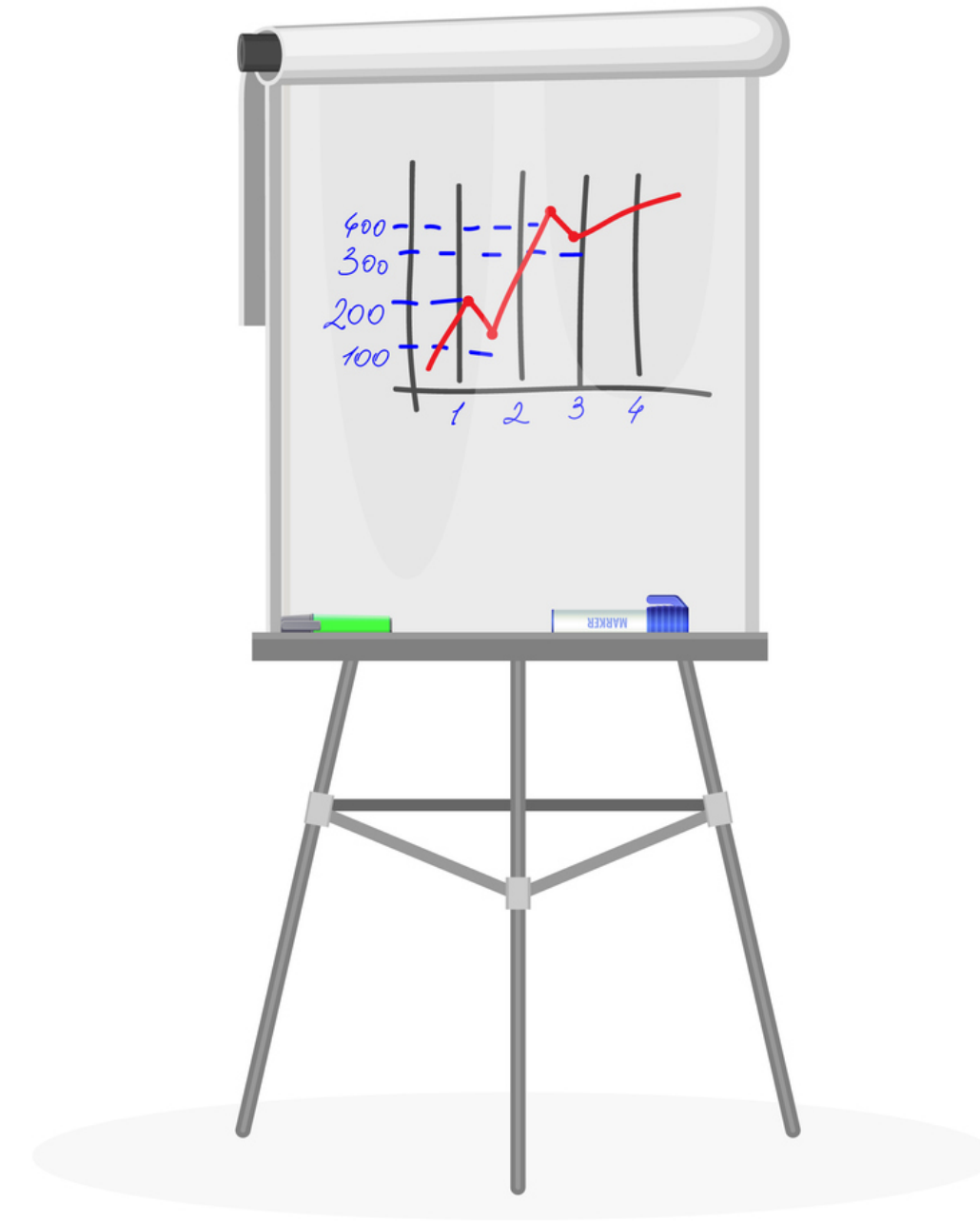
Neil Prophet – Senior Vice President and Partner ioMosaic Corporation



- ▶ B.Eng. (Honors), Chemical Engineering, University of Strathclyde
- ▶ More than 20 years' experience in the field of process safety including consulting, project management, technical support, technical sales, training course development and presentation and operations management, along with authoring many industry publications as well as presenting at various industry related organizations
- ▶ Technical Expertise includes:
 - ▶ Process Safety and Risk Management
 - ▶ Hazard Identification (FMEA, HAZOP, What-if, Checklist, SVA)
 - ▶ Auditing
 - ▶ Pressure Relief and Flare System design
 - ▶ Consequence Analysis, Quantitative Risk Analysis, Facility Siting
 - ▶ LNG
 - ▶ Litigation Support
- ▶ Contact info: prophet.n.tx@iomosaic.com

This Presentation Provides a Case Study of a Series of Training Courses which ioMosaic Presented in 2020

- ▶ Introduction
- ▶ Original plan
- ▶ Revised plan
- ▶ Challenges for online course



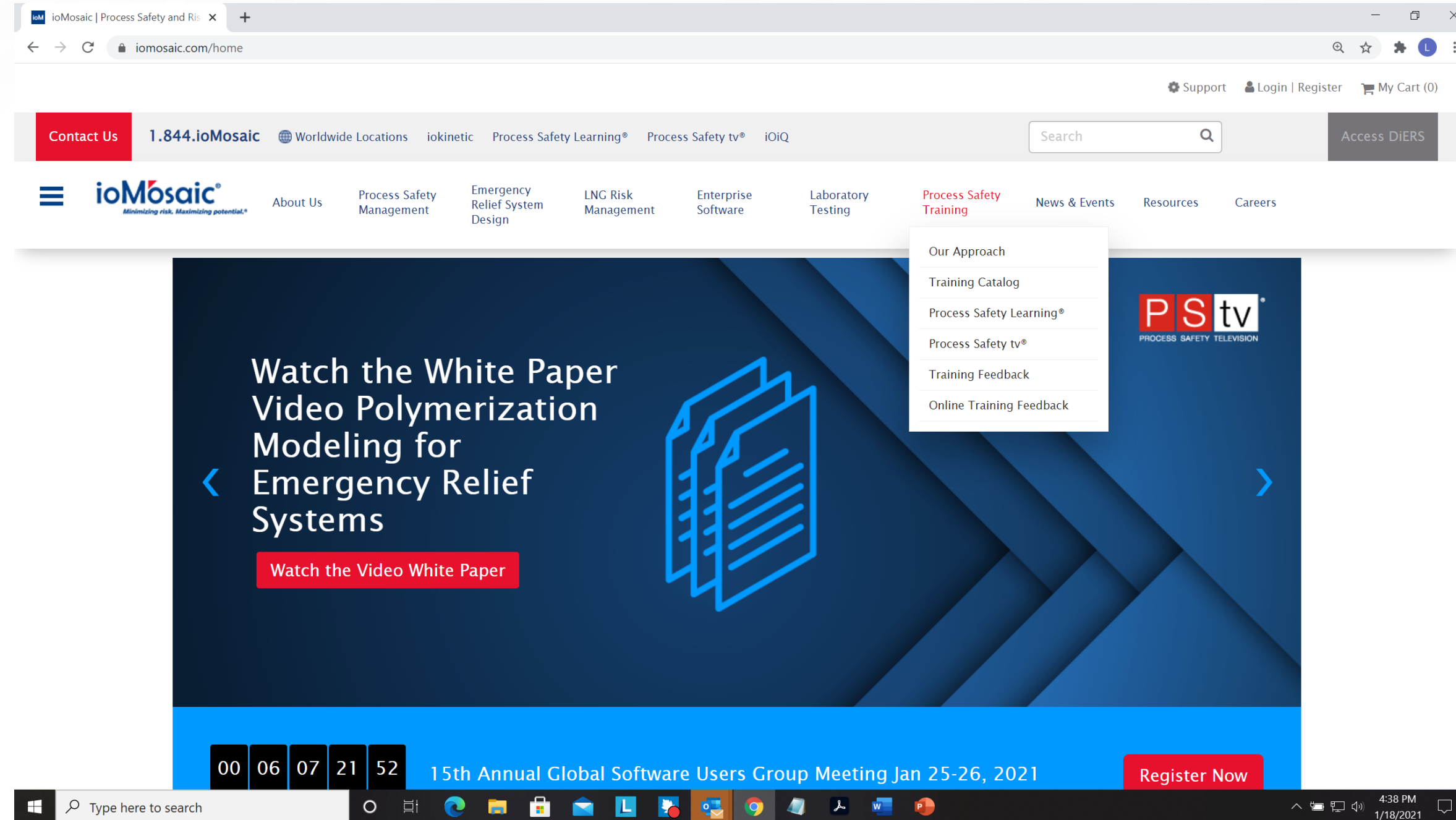
Source: ioMosaic Stock Image

Introduction



Introduction

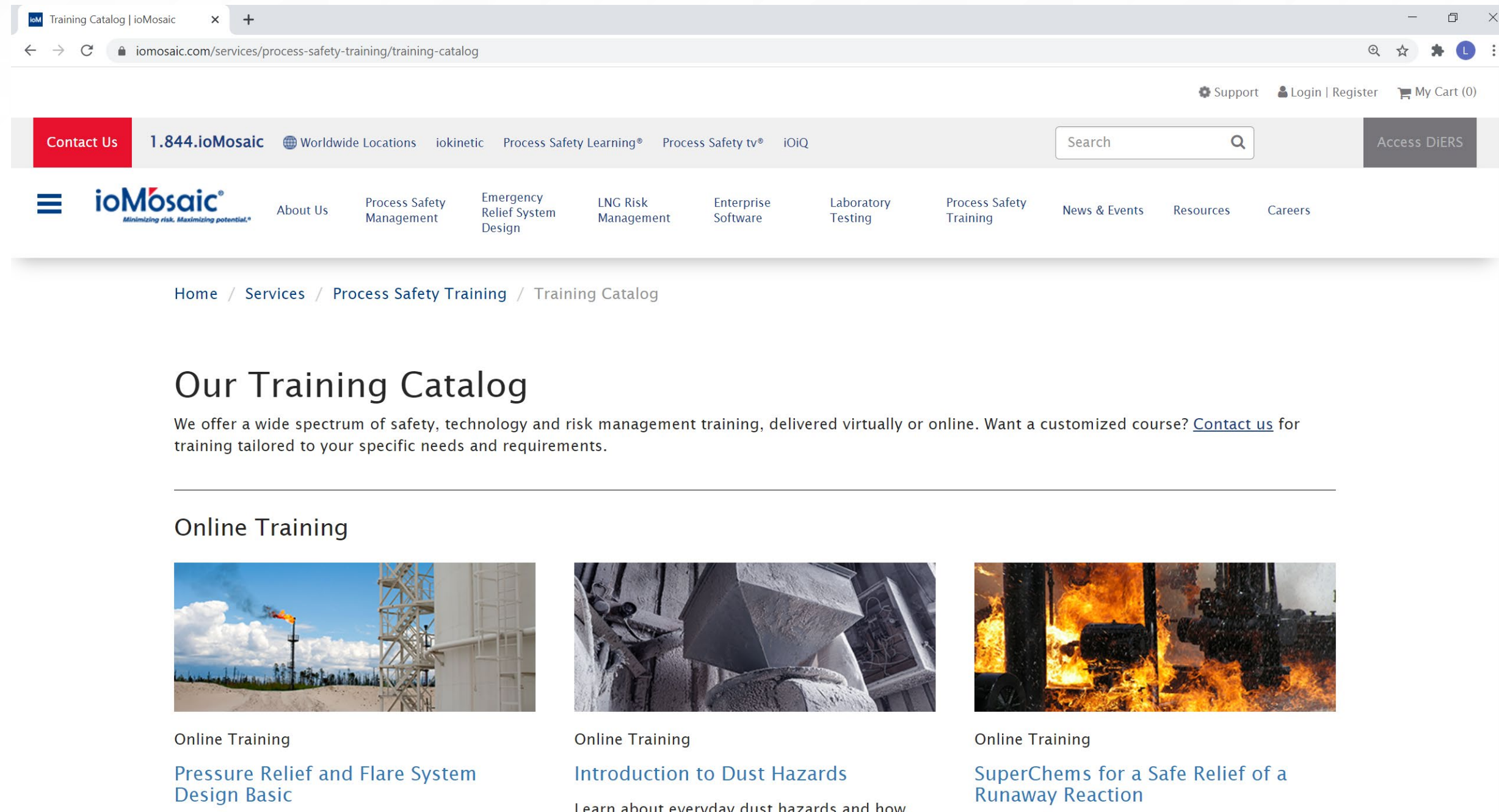
- ▶ A key service for ioMosaic is the provision of Process Safety Training courses



Source: Website: www.ioMosaic.com - ioMosaic Corporation

Introduction

- Our online Training Catalog lists many courses that we have available



Source: Website: www.ioMosaic.com - ioMosaic Corporation

Original Training Plan



Original Training Plan

- ▶ In Q1 of 2020, ioMosaic contracted with a multinational chemical company to provide in-person process safety training
- ▶ Incident Investigation Course
 - ▶ Customization to include company-specific requirements
 - ▶ Translation to multiple languages (Spanish, German, Japanese)
 - ▶ Eight two-day training courses
 - ▶ Training material provided to client (hard copies and electronic)
 - ▶ Maximum of 96 attendees (twelve per course)

Original Training Plan

- ▶ Incident Investigation Course (1)
 - ▶ Mitigating the incident
 - ▶ Digging to the root cause
 - ▶ Collect immediately available information
 - ▶ Forming the investigation team
 - ▶ How and when to interview witnesses and those involved in the incident
 - ▶ How and when to use technical expertise
 - ▶ Getting past human error to root cause
 - ▶ Is the current incident a repeat incident that was supposedly fixed?
 - ▶ Determining why the existing safeguards failed

Original Training Plan

- ▶ Incident Investigation Course (2)
 - ▶ Addressing the root cause: Management of change
 - ▶ Interim actions till the final solution is completed
 - ▶ Actions which address the root cause, so the incident never reoccurs
 - ▶ Ineffective actions which will not address root cause
 - ▶ Testing the final solution.
 - ▶ Informing the affected personnel
 - ▶ Group and Individual Workshops to reinforce learning

And then....



Source: ioMosaic Stock Image

Revised Training Plan



Revised Training Plan

- ▶ Online Training Plan
 - ▶ Process Hazard Analysis Leader Training
 - ▶ Incident Investigation Training
 - ▶ Process Safety Management Essentials Training
 - ▶ Available in English and Spanish
 - ▶ Provided online through PSL

Revised Training Plan

- ▶ Process Hazard Analysis Leader
 - ▶ Introduction to PHAs
 - ▶ Preparing for a PHA
 - ▶ Process Safety Information
 - ▶ Select Study Sections or Nodes
 - ▶ Identifying Hazards, Causes and Consequences
 - ▶ Identifying Safeguards
 - ▶ Assessing Risk
 - ▶ Developing and Writing Recommendations
 - ▶ PHA Techniques (HAZOP, What-If, Checklist, Human Factors, Facility Siting
 - ▶ Layer Of Protection Analysis
 - ▶ PHA Revalidation

Revised Training Plan

- ▶ Incident Investigation
 - ▶ What is an Incident?
 - ▶ Why conduct an Incident Investigation?
 - ▶ Client Incident Investigation Procedure
 - ▶ What do you do when an Incident occurs?
 - ▶ Managing the Investigation and Team Activities
 - ▶ Collecting and Preserving Evidence
 - ▶ Interviewing Witnesses
 - ▶ How to establish Root Cause(s)
 - ▶ How to Develop Recommendations
 - ▶ How to Write a Formal Investigation Report
 - ▶ Stakeholders: Who are they and how do we treat them?

Revised Training Plan

▶ Process Safety Management Essentials

- ▶ Process Safety Information
- ▶ PHA
- ▶ Operating Procedures
- ▶ Training
- ▶ Mechanical Integrity
- ▶ Hot Work Permit
- ▶ Management of Change and Pre-Startup Safety Review
- ▶ Incident Investigation
- ▶ Emergency Planning and Response
- ▶ Contractors
- ▶ Compliance Audits
- ▶ RBPS 20 Elements - CCPS
- ▶ Process Safety Culture
- ▶ Safety Management Systems and Metrics
- ▶ OSHA Inspection

Challenges

- ▶ Accessing Training Material
- ▶ Verifying Understanding
- ▶ Ensuring Attendance
- ▶ Interaction
- ▶ Language Barrier

Challenges – Accessing Training Material

- ▶ A client-specific instance of PSL was created
- ▶ Each attendee could register, or was pre-enrolled
- ▶ Multiple courses are available on the PSL instance
 - ▶ Available courses are specific to each attendee
- ▶ Courses are broken into manageable pre-recorded modules (30 minutes - 1 hour)
- ▶ Prerecorded modules utilized presentation material, plus videos

Challenges – Accessing Training Material

The screenshot displays the Process Safety Learning dashboard with the following components:



- Header:** Process Safety Learning logo, user profile (Neil Prophet), and navigation options (Switch Role, Quick Adds).
- Left Sidebar:** Navigation menu including Dashboard, Learning Modules, Courses, My List, Batches, Messages (100), Profile, Manage Learners, Release Notes, Support, and FAQ.
- Dashboard Control Panel:**
 - Top 10 Course(s):** Courses with highest learner(s). Pie chart showing: Fundamentos de la Investigación de Incidentes (Rev: 1.0) at 55%, PHA Leader (Rev: 1.0) at 27.1%, and Incident Investigation Fundamentals (Rev: 1.0) at 17.9%.
 - Top 10 Learning Modules:** Learning Modules with highest learner(s). Pie chart showing ten modules, each at 10%.
 - Top 10 Certification Track(s):** Certification Track(s) with highest learner(s). Pie chart showing PSM Professional at 100%.
 - Recent Activities:** Section with a "View more Activities" link.
- Message Board:**
 - Angel Garcia: Received August 14, 2020. Message: "Buenas noches, adjunto workshop perteneciente a: Angel de Jess Garca Hernandez Rupert Arnulfo Bulbarela Croda Giovanni Antonio Bautista Zavala".
 - Carlos Hernandez: Received August 14, 2020. Message: "Buenas noches, adjunto evidencia de los talleres. Saludos."
 - Allan Matyger: Received August 14, 2020.
 - Sandra María Perez: Received August 15, 2020. Message: "Buen da. Adjunto la evidencia de los talleres. En espera de cualquier comentario para la mejora. Saludos cordiales!"
 - Angel Garcia: Received August 16, 2020. Message: "Dear Instructor,I would like to join the Course 'Incident Investigation Fundamentals'.Click on below link to Approve/Reject the request:http://orbia.processsafetylearning.com//PSL/ManageLearners/?verificationTab=CorseV Thank you."

Source: Process Safety Learning® ioMosaic Corporation

Challenges – Accessing Training Material

The screenshot displays the 'Course(s)' page in the Process Safety Learning system. The interface includes a top navigation bar with the user's name 'Neil Prophet' and options for 'Switch Role' and 'Quick Adds'. A left sidebar contains navigation links for Dashboard, Learning Modules, Courses, My List, Batches, Messages (100), Profile, Manage Learners, Release Notes, Support, and FAQ.

The main content area is titled 'Course(s)' and features a search bar and an 'Add New Course' button. Below this is a 'My List' section with a search input and 'Filter' and 'Cancel' buttons. A table of available courses is shown, with columns for Course, Revision, Description, Category, Added On, and Added By. The table lists two courses: 'Fundamentos de la Investigación de Incidentes' and 'Incident Investigation Fundamentals'. Each course entry includes a thumbnail image, a status indicator (Active), and a set of colored buttons representing different metrics.

Course	Revision	Description	Category	Added On	Added By
 <p>Fundamentos de la Investigación de Incidentes</p> <p>227 93 134 0</p>	1.0	Este curso de capacitación en los Fundamentos de la Investigación de Incidentes le ayudará a los participantes a entender el proceso de la investigación de los incidentes. Los temas que se cubrirán incluyen: • La mitigación del incidente • Investigar para encontrar la causa principal del incidente o Recaudación inmediata de la información que se tenga disponible o La formación de un equipo de investigación: Cuando formar al equipo y quien lo forma o Como y cuando entrevistar a la gente involucrada con el incidente o Como y cuando entrevistar testigos o Cuando hacer uso de experiencia técnica o Como mirar más allá de los errores humanos como la causa principal o ¿El incidente es una reincidencia de un incidente que ya ocurrió y supuestamente se había arreglado? ¿Por qué no funcionó el arreglo? o Determinar por que las salvaguardas existentes fallaron • Examinando la causa principal o Gestión de cambios o Acciones provisionales en lo que se implementa la solución final o Acciones que lidien con la causa principal, para que el incidente nunca vuelva a ocurrir o Acciones no efectivas contra la causa principal o Pruebas para la solución final o Informando al personal que se vea afectado		05/30/2020 05:01:03 PM	Lisa Ruth
 <p>Incident Investigation Fundamentals</p> <p>74 44 30 0</p>	1.0	The main objective of this course is to provide a thorough understanding on how to conduct an effective incident investigation. Specifically, the training will focus on the different techniques/methodologies to identify the root cause of incidents and near misses and effective action plans to address any issues. Trainees will analyze incident case studies as well as work in small groups using the learning from the course and applying critical thinking skills, to conduct several workshops.		05/23/2020 11:57:34 AM	Lisa Ruth

Showing 1 to 2 of 2 entries

Source: Process Safety Learning® ioMosaic Corporation

Challenges – Accessing Training Material

The screenshot displays the 'Process Safety Learning' web application interface. The top navigation bar includes 'Switch Role', 'Quick Adds', and the user profile 'Neil Prophet'. The left sidebar contains navigation options: Dashboard, Learning Modules, Courses, My List, Batches, Messages (100), Profile, Manage Learners, Release Notes, Support, and FAQ.

The main content area shows the course 'Incident Investigation Fundamentals' (Revision: 1.0) with a description: 'The main objective of this course is to provide a thorough understanding on how to conduct an effective incident investigation. Specifically, the training will focus on the different techniques/methodologies to identify the root cause of incidents and near misses and effective action plans to address any issues. Trainees will analyze incident case studies as well as work in small groups using the learning from the course and applying critical thinking skills, to conduct several workshops.'

Below the course description, there are tabs for 'Learning Modules', 'Learners', 'Batches', 'Documents', 'Certificates', 'Groups', 'Descriptions', 'Settings', 'Related Courses', and 'Activities'. The 'Learning Modules' tab is active, showing a search bar and a list of 13 available learning modules. The list includes:

<input type="checkbox"/>	Learning Module	Revision	Description	Prerequisites	Added On	Added By
<input type="checkbox"/>	Incident Investigation - Manual 73 39 34 0	1.0	Incident Investigation – Manual/Training Overview The Incident Investigation training will help attendees understand the incident investigation process.		05/23/2020 11:27:04 AM	Lisa Ruth
<input type="checkbox"/>	Incident Investigation - Introduction 73 41 32 0	1.0	This module serves as an introduction to the Incident Investigation Fundamentals training course. It provides a brief course overview and learner outcomes.		05/28/2020 10:51:30 PM	Lisa Ruth
<input type="checkbox"/>	Incident Investigation - Incident 73 42 31 0	1.0	A general understanding of process incidents and the motivations to investigate them is provided in this module.	Incident Investigation - Introduction	05/28/2020 11:02:56 PM	Lisa Ruth
<input type="checkbox"/>	Incident Investigation - Managing Investigation 73 42 31 0	1.0	This module focuses on what to do and outlines the steps that must be taken when an incident occurs. It addresses important components and considerations to effectively manage an incident investigation and outlines the team activities and roles.	Incident Investigation - Incident	05/28/2020 11:49:50 PM	Lisa Ruth
<input type="checkbox"/>	Incident Investigation - Collecting Evidence 73 43 30 0	1.0	The process of collecting and preserving physical evidence as well as the managing of statements and interviewing witnesses is	Incident Investigation - Managing Investigation	05/29/2020 12:01:44 AM	Lisa Ruth

The bottom of the screenshot shows a Windows taskbar with the search bar and various application icons. The system clock indicates 3:21 PM on 1/19/2021.

Source: Process Safety Learning® ioMosaic Corporation

Challenges – Verifying Understanding

- ▶ Each module has a multiple-choice test with a required pass rate of 80%
- ▶ Modules can be watched multiple times to reinforce understanding (or retake the test)
- ▶ Workshop assignments were issued to attendees, and returned assignments were reviewed by ioMosaic tutors
- ▶ The PSL Message Board enables attendees to raise questions, and submit their completed workshops
- ▶ Multiple Live Webinars were used to recap and reinforce each module
 - ▶ Smaller group sessions for Live Webinars
 - ▶ Live Webinar content was intended to generate interaction and discussion

Challenges – Verifying Understanding

The screenshot displays a learning management system interface. On the left, a sidebar shows the course structure: 'Incident Investigation - Managing Investigation' (50% progress), 'II - Managing Investigation', and 'II Assessment - Module 3'. The main content area features a question: '3. The results of the investigation should be shared with other sites and facilities.' with 'True' and 'False' radio button options. Below the question are buttons for 'Save and Previous', 'Save and Next', 'Mark For Review and Next', and 'Clear Response'. A 'Submit' button is located at the top right of the question area. A note states: 'Note: Clicking on submit will finish the assessment.' A timer shows 'Time Left: 9 Hrs, 59 Mins, 35 Secs'. A 'Questions:' section shows five numbered items, with the first two marked as answered. A 'Filter:' dropdown is set to 'All'. A 'Legends:' section defines the status icons: Answered (green), Not Answered (orange), Not Visited (grey), Mark For Review (purple), and Answered And Marked For Review (purple with checkmark). On the right, a 'Learning Modules Preview' section shows a list of activities. The first activity is 'Considerations to effectively manage an incident investigation and outlines the team activities and roles.' with a status of 'Completed' and a 'Change to Learner' button. Below this is a search bar and a table with columns for 'Status' and 'Completed'. The table shows one row with the status 'Completed'. Navigation buttons 'Previous', '1', and 'Next' are at the bottom of the table.

Source: Process Safety Learning® ioMosaic Corporation

Challenges – Verifying Understanding

Messages 100 new messages

Compose

- Inbox 100
- Learning Module(s) +
- Course(s) +
- Sent

Inbox

Show 50 entries

Search:

	From	Subject	Sent On
<input type="checkbox"/>	Angel Garcia	Request for the Course 'Incident Investigation Fundamentals' from the user 'Angel Garcia'	August 16, 2020
<input type="checkbox"/>	Sandra Maria Perez	Fundamentos de la investigación de Incidentes – Talleres – Sandra María Pérez Sánchez	August 15, 2020
<input type="checkbox"/>	Allan Matyger	Matyger - Workshop 4	August 14, 2020
<input type="checkbox"/>	Carlos Hernandez	Fundamentos de la investigación de Incidentes – Talleres – Carlos Hernandez	August 14, 2020
<input type="checkbox"/>	Angel Garcia	Workshop 4	August 14, 2020
<input type="checkbox"/>	Pam Youell	Workshop homework	August 13, 2020
<input type="checkbox"/>	Enrique Rivera	Fundamentos de la investigación de Incidentes – Talleres 1-4 –Enrique Rivera González, Víctor Javier Sánchez González	August 13, 2020
<input type="checkbox"/>	Francisco Sanchez	(No Subject)	August 13, 2020
<input type="checkbox"/>	Francisco Sanchez	Talleres 3 y 4	August 13, 2020
<input type="checkbox"/>	Francisco Sanchez	Talleres 1 y 2	August 13, 2020
<input type="checkbox"/>	David Pizza	FW: Incident Investigation - Workshops -Augusto Pizza, Andres Tafur, Maury Romero	August 13, 2020
<input type="checkbox"/>	David Pizza	Incident Investigation - Workshops -Augusto Pizza, Andres Tafur, Maury Romero	August 13, 2020
<input type="checkbox"/>	Eliana Gomez	Fundamentos de la investigación de Incidentes – Taller III Eliana Gómez	August 12, 2020
<input type="checkbox"/>	Eliana Gomez	Fundamentos de la investigación de Incidentes – Taller II_ Eliana Gómez Varela	August 12, 2020
<input type="checkbox"/>	Eliana Gomez	Fundamentos de la investigación de Incidentes – Taller 1_ Eliana Gómez Varela	August 12, 2020
<input type="checkbox"/>	Oscar Hernandez	Desbloqueo de modulo	August 12, 2020
<input type="checkbox"/>	Oscar Hernandez	Desbloqueo de modulo	August 12, 2020
<input type="checkbox"/>	Allan Matyger	Incident Investigation Workshop #3 - Matyger	August 12, 2020

Source: Process Safety Learning® ioMosaic Corporation

Challenges – Ensuring Attendance

- ▶ PSL tracks each attendee's progress
- ▶ Participants could only attend specific Live Webinars after successful completion of prior modules, and submission of workshop assignments
- ▶ ioMosaic instructors reviewed completed workshop assignments for accuracy
- ▶ Completion certificates were only issued after successful completion of everything

Challenges – Ensuring Attendance

Process Safety Learning

Switch Role Quick Adds Neil Prophet

Manage Learners

Home > Manage Learners

Learning Modules Schedule Requests

Open Registration Requests

No Requests Found

In Attendance (67)

Show 5 entries Search:

Learner	Name	Requested On	Enrolled On	Progress
David Duran	Investigación de Incidentes - ¿Qué es un incidente y por qué se debe investigar?		07/15/2020 04:39:51 PM	50%
Hector Torres	Investigación de Incidentes - ¿Qué es un incidente y por qué se debe investigar?		06/15/2020 01:41:35 PM	50%
Miguel Moreno	Investigación de Incidentes - Administración del Equipo		06/29/2020 05:48:52 PM	50%
Ricardo Omar Martínez Montes	Investigación de Incidentes - ¿Qué es un incidente y por qué se debe investigar?		06/16/2020 06:23:53 PM	50%
Alfredo Iván Serrano	Investigación de Incidentes Fundamentos - Introducción		10/23/2020 01:17:36 PM	0%

Showing 1 to 5 of 67 entries Previous 1 2 3 4 5 ... 14 Next

Pending Learning Module Verification

No pending learning module verification

Recent Graduates (2090)

Show 30 entries Search:

Learner	Name	Started On	Completed On	Certificate
Juan Trucco	Investigación de Incidentes Fundamentos - Introducción	06/15/2020 01:23:20 PM	10/07/2020 07:46:42 PM	-
Wilmer Castro	Investigación de Incidentes -Legislacion de Seguridad de Procesos	07/30/2020 11:43:14 AM	10/01/2020 07:58:15 PM	-

Source: Process Safety Learning® ioMosaic Corporation

Challenges – Interaction

- ▶ Multiple Live Webinars were scheduled during course duration
- ▶ Workshop assignments were conducted in groups
- ▶ Live Webinars reviewed course material to date, and workshop submissions
- ▶ Live Webinars had limited numbers attendees
- ▶ Live Webinars provided an opportunity to see instructors and interact directly with them
- ▶ Live Webinar material was designed to generate discussion

Challenges – Language Barrier

- ▶ Course content was translated to Spanish through in-house ioMosaic resources
- ▶ Course attendees had the option to enroll in identical English or Spanish language courses
- ▶ Live Webinars utilized a simultaneous translation service
- ▶ ioMosaic instructors could respond to Message Board in English or Spanish



Challenges – Language Barrier

The screenshot shows the 'Course(s)' page in the Process Safety Learning system. The interface includes a sidebar with navigation options like Dashboard, Learning Modules, Courses, My List, Batches, Messages (100), Profile, Manage Learners, Release Notes, Support, and FAQ. The main content area displays a table of available courses.

Available Course(s) [Add New Course](#)

My List Filter Cancel

Show entries Copy Excel PDF CSV Print Refresh Search:

	Course	Revision	Description	Category	Active	Added On	Added By
	Fundamentos de la Investigación de Incidentes 227 93 134 0	1.0	Este curso de capacitación en los Fundamentos de la Investigación de Incidentes le ayudará a los participantes a entender el proceso de la investigación de los incidentes. Los temas que se cubrirán incluyen: • La mitigación del incidente • Investigar para encontrar la causa principal del incidente o Recaudación inmediata de la información que se tenga disponible o La formación de un equipo de investigación: Cuando formar al equipo y quien lo forma o Como y cuando entrevistar a la gente involucrada con el incidente o Como y cuando entrevistar testigos o Cuando hacer uso de experiencia técnica o Como mirar más allá de los errores humanos como la causa principal o ¿El incidente es una reincidencia de un incidente que ya ocurrió y supuestamente se había arreglado? ¿Por qué no funcionó el arreglo? o Determinar por que las salvaguardas existentes fallaron • Examinando la causa principal o Gestión de cambios o Acciones provisionales en lo que se implementa la solución final o Acciones que lidien con la causa principal, para que el incidente nunca vuelva a ocurrir o Acciones no efectivas contra la causa principal o Pruebas para la solución final o Informando al personal que se vea afectado		Active	05/30/2020 05:01:03 PM	Lisa Ruth
	Incident Investigation Fundamentals 74 44 30 0	1.0	The main objective of this course is to provide a thorough understanding on how to conduct an effective incident investigation. Specifically, the training will focus on the different techniques/methodologies to identify the root cause of incidents and near misses and effective action plans to address any issues. Trainees will analyze incident case studies as well as work in small groups using the learning from the course and applying critical thinking skills, to conduct several workshops.		Active	05/23/2020 11:57:34 AM	Lisa Ruth

Showing 1 to 2 of 2 entries Previous 1 Next

Source: Process Safety Learning® ioMosaic Corporation

Conclusions



Conclusions

- ▶ PSL enabled training to proceed during worldwide lockdown
- ▶ The training delivered was able to successfully combine online recorded modules, with interactive sessions
- ▶ Training records can be maintained moving forward
- ▶ Training certificates with CEU/PDH were issued upon successful completion
- ▶ The cost to train an individual online was significantly less than training someone in person



Source: ioMosaic Corporation

About ioMosaic Corporation

Through innovation and dedication to continual improvement, ioMosaic has become a leading provider of integrated process safety and risk management solutions. ioMosaic has expertise in a wide variety of areas, including pressure relief systems design, process safety management, expert litigation support, laboratory services, training, and software development.

ioMosaic offers integrated process safety and risk management services to help you manage and reduce episodic risk. Because when safety, efficiency, and compliance are improved, you can sleep better at night. Our extensive expertise allows us the flexibility, resources, and capabilities to determine what you need to reduce and manage episodic risk, maintain compliance, and prevent injuries and catastrophic incidents.

Our mission is to help you protect your people, plant, stakeholder value, and our planet.

For more information on ioMosaic, please visit: www.ioMosaic.com