

KLM Technology Group and our Key Partners have assisted our clients by providing Facilitators (team leaders) and Scribes (technical recorders) in a variety of industries using these techniques:

Hazard and Operability (HAZOP)

Layer of Protection Analysis (LOPA)

What-If?

Checklist

FMEA (Failure Modes and Effects Analysis)

Qualitative Safety Integrity Level (SIL) Selection Analysis

The following list provide partial lists of process safety related projects where KLM and our Key Partners has served our clients and helped them ensure a safe operation.

Chemical Facilities

Natural Gas Liquids (NGL) Plants

Petroleum Refineries

Petrochemical Facilities

Pipeline and Terminal Facilities

Explosives Manufacturing Plants

Miscellaneous Types of Facilities

Training Courses Provided

Chemical Facilities

Type Facility	Service Provided	Location
Carbon Dioxide Capture Plant	Process Safety Information	Tennessee
Chemical Plant	Process Hazard Analysis (PHA)	Louisiana
Chemical Plant	PSM/RMP Compliance Audit	Tennessee
Chemical Plant	Relief Valve Process Safety Information Development	Tennessee
Chemical Plant	Process Hazard Analysis (PHA)	Tennessee
Chemical Plants (2)	MOC Process Hazard Analysis	Tennessee
Chemical Plants (2)	Process Hazard Analysis (PHA)	Oklahoma
Chemical Plants (2)	PSM Program Gap Analysis	Oklahoma
Chemical Plants (2)	PSM Program Development	Oklahoma
Coke Facility	Process Safety Information Development	Ohio
Pthalic Anhydride Unloading System	Process Hazard Analysis (PHA)	Canada
Tantalum Production Unit	Process Hazard Analysis (PHA)	Nevada
Acrolein Plant	SIL Verification / Functional Testing Documentation	California
Chemical Plant (6)	SIL Verification / Functional Testing Documentation	Oklahoma
Chemical Plant (5)	SIL Verification / Functional Testing Documentation	Texas
Chemical Plant (3)	SIL Verification / Functional Testing Documentation	Louisiana
Chemical Plant	SIL Verification / Functional Testing Documentation	Louisiana
Chemical Plant (8)	SIS/SIF Design	Oklahoma
Chemical Plant	SIS/SIF Design	Texas
Chemical Plant	SIS/SIF Design	Manitoba, Canada
Chemical Plant	Process Hazard Analysis (PHA)	Ohio
Chemical Plant	Process Safety Support	Iowa
Chemical Plant	Process Safety Support	Oklahoma
Chemical Plant - Ammonia Unit	PHA and LOPA	Iowa
Chemical Plant - Urea Melt	PHA and LOPA	Oklahoma
Chemical Plant - Package Boiler	PHA and LOPA	Oklahoma
Chemical Plant	Relief Valve PSI Consistency Check	South Carolina
Chemical Plant	Process Safety Support	Alabama
Chemical Plant - AAU/HRU	PHA and LOPA	Oklahoma
Chemical Plant	PSV Calculation Peer Review	Tennessee

Natural Gas Liquids (NGL) Plants

Type Facility	Service Provided	Location
Distillation Unit	Process Hazard Analysis (PHA)	Texas
Ethane Recovery Unit	Process Hazard Analysis (PHA)	Texas
Field Gas Gathering Unit	Process Hazard Analysis (PHA)	Texas
Front End Clean Up Unit	Process Hazard Analysis (PHA)	Texas
Liquid Gas Recovery Unit	Process Hazard Analysis (PHA)	Texas
NGL Consolidation Project	Process Hazard Analysis (PHA)	Texas
NGL Treaters	Process Hazard Analysis (PHA)	Texas

Petroleum Refineries

Type Facility	Service Provided	Location
Amine Unit	Process Hazard Analysis (PHA)	Indiana
Amine Units (4)	Process Hazard Analysis (PHA)	Montana
Amine Units (4)	Process Hazard Analysis (PHA)	Texas
Amine Units (3)	SIL Selection Analysis	Montana
Amine Unit	SIL Verification /Functional Testing Documentation	Texas
Ammonium Thiosulfate Unit	Process Hazard Analysis (PHA)	New Mexico
Aromex Unit	Process Hazard Analysis (PHA)	Texas
Atmospheric Storage Unit (Tank Farm)	Process Hazard Analysis (PHA)	Virginia
Benzene Reduction Project Layer of Protection Analysis (LOPA)		Texas
Benzene Reduction Project	MOC Process Hazard Analysis	Texas
Benzene Reduction Project	MOC Process Hazard Analysis	Montana
Boiler House	Process Hazard Analysis (PHA)	Montana
Boiler House	SIL Verification / Functional Testing Documentation	Texas
Butamer Unit	SIL Selection Analysis	Montana
Butamer Unit	Process Hazard Analysis (PHA)	Montana
Butamer Unit	SIL Verification / Functional Testing Documentation	Texas
Butamer Unit Revamp Project	MOC Process Hazard Analysis	Texas
Catalytic Reformer Unit	Process Hazard Analysis (PHA)	Texas
Catalytic Reformer Unit	SIL Verification / Functional Testing	Texas
Catalytic Reformer Units (3)	Process Hazard Analysis (PHA)	Montana
Caustic Scrubber Systems Project	MOC Process Hazard Analysis	Montana
Coker Vapor Recovery Unit	SIL Selection Analysis	Virginia

Coker Vapor Recovery Unit	Process Hazard Analysis (PHA)	Virginia
Combination Vapor Recovery Unit	SIL Selection Analysis	Virginia
Combination Vapor Recovery Unit	Process Hazard Analysis (PHA)	Virginia
Control Rooms (2)	Process Hazard Analysis (PHA)	Montana
Cooling Towers	Process Hazard Analysis (PHA)	Montana
Crude Complex	SIL Selection Analysis	Texas
Crude Unit	Process Hazard Analysis (PHA)	Louisiana
Crude Unit	Process Hazard Analysis (PHA)	Indiana
Crude Units (2)	Process Hazard Analysis (PHA)	New Mexico
Crude Units (4)	Process Hazard Analysis (PHA)	Texas
Crude Unit	SIL Verification / Functional Testing Documentation	Texas
Crude Units (5)	Process Hazard Analysis (PHA)	Montana
Crude Units (2)	SIL Selection Analysis	Montana
Crude Unit	Process Hazard Analysis (PHA)	Wyoming
Crude Unit Revamp Project	MOC Process Hazard Analysis	Indiana
DCS	Process Hazard Analysis (PHA)	Montana
Delayed Coker Unit	Process Hazard Analysis (PHA)	Russia
Delayed Coker Unit	Process Hazard Analysis (PHA)	Oklahoma
Delayed Coker Unit	Process Hazard Analysis (PHA)	Montana
Delayed Coker Unit	SIL Selection Analysis	Montana
Demex Units (2)	Process Hazard Analysis (PHA)	Texas
Desulfurization Unit	Process Hazard Analysis (PHA)	Virginia
Diesel Desulfurization Unit	SIL Selection Analysis	Virginia
Disproportionation Unit	Process Hazard Analysis (PHA)	Texas
Distillate Hydrotreating (DHT) Unit	SIL Selection Analysis	Texas
Distillate Hydrotreating (DHT) Unit	Process Hazard Analysis (PHA)	Montana
Distillate Hydrotreating (DHT) Unit	Process Hazard Analysis (PHA)	New Mexico
Distillate Hydrotreating (DHT) Unit	Process Hazard Analysis (PHA)	Indiana
Distillate Hydrotreating (DHT) Units (3)	Process Hazard Analysis (PHA)	Texas
Distillate Hydrotreating (DHT) Unit	SIL Verification / Functional Testing	Texas
FCC Feed Desulfurizer Units (2)	SIL Selection Analysis	Montana
FCC Feed Desulfurizer Units (4)	Process Hazard Analysis (PHA)	Montana
FCC/Gas Concentration Unit	Process Hazard Analysis (PHA)	Montana
FCC/Gas Concentration Unit	SIL Selection Analysis	Montana

FCC/Gas Concentration Unit	Process Hazard Analysis (PHA)	Indiana
FCCU	SIL Selection Analysis	Texas
FCCU	Process Hazard Analysis (PHA)	New Mexico
FCCU (4)	Process Hazard Analysis (PHA)	Texas
FCCU	SIL Verification / SRS Development / Functional Testing	Texas
FCCU Light Ends Recovery Unit	Process Hazard Analysis (PHA)	Texas
Flare Systems (3)	Process Hazard Analysis (PHA)	Montana
Flare Systems (3)	Process Hazard Analysis (PHA)	Texas
Flare System	Process Safety Information Development	Montana
Flare System	SIL Selection Analysis	Texas
Fuel Gas Treater Modification Project	MOC Process Hazard Analysis	Texas
Fuel Gas Treating Unit	Process Hazard Analysis (PHA)	Texas
Gas Oil Hydrotreating (GOH) Unit	Process Hazard Analysis (PHA)	New Mexico
Gas Oil Hydrotreating (GOH) Unit	Process Hazard Analysis (PHA)	Texas
Gas Oil Hydrotreating (GOH) Unit	SIL Selection Analysis	Montana
Gas Oil Hydrotreating (GOH) Unit	MOC Process Hazard Analysis	Montana
Gasoline Rerun Unit	Process Hazard Analysis (PHA)	Texas
HDS/Platformer Units	Process Hazard Analysis (PHA)	Texas
HF Alkylation Unit	Process Hazard Analysis (PHA)	New Mexico
HF Alkylation Unit	Process Hazard Analysis (PHA)	Indiana
HF Alkylation Units (2)	Process Hazard Analysis (PHA)	Texas
HF Alkylation Units (4)	Process Hazard Analysis (PHA)	Montana
HF Alkylation Unit	SIL Selection Analysis	Montana
HF Alkylation Unit	SIL Selection Analysis	Texas
HF Alkylation Unit	Process Hazard Analysis (PHA)	Wyoming
Hydrocal Complex	Process Hazard Analysis (PHA)	Louisiana
Hydrocal Complex	SIL Verification / SRS Development	Louisiana
Hydrodesulfurization Unit	Process Hazard Analysis (PHA)	Montana
Hydrodesulfurization Unit	Process Hazard Analysis (PHA)	Wyoming
Hydrogen Plants (3)	SIL Selection Analysis	Montana
Hydrogen Plants (7)	Process Hazard Analysis (PHA)	Montana
Hydrogen Unit	Process Hazard Analysis (PHA)	Texas
Hydrogen Unit	SIL / SRS Development / Functional Testing	Texas
Hydrotreater Unit	SIL Selection Analysis	Montana

Hydrotreater Units (2)	Process Hazard Analysis (PHA)	Texas
Hydrotreater Unit SIL Verification / Functional Testing Documentation		Texas
Isomerization Unit	Process Hazard Analysis (PHA)	Indiana
Isomerization Units (2)	Process Hazard Analysis (PHA)	Montana
Isomerization Units (2)	Process Hazard Analysis (PHA)	Texas
Kero HDS Units (2)	Process Hazard Analysis (PHA)	Montana
Light Distillate Hydrotreater (LDH) Units (2)	(PHA)	Texas
Light Ends Fractionation Unit	Process Hazard Analysis (PHA)	Texas
Loading Rack Incinerator	Process Hazard Analysis (PHA)	Montana
Low Pressure Vapor Recovery Unit	SIL Selection Analysis	Montana
Low Pressure Vapor Recovery Unit	Process Hazard Analysis (PHA)	Montana
LPG Loading Area	Process Hazard Analysis (PHA)	New Mexico
Methyl Mercaptan Units (2)	Process Hazard Analysis (PHA)	Texas
Mid-Distillate Unifier Unit	Process Hazard Analysis (PHA)	Montana
NaHS Units (2)	Process Hazard Analysis (PHA)	Montana
Naphtha Desulfurization Unit	Process Hazard Analysis (PHA)	Virginia
Naphtha Desulfurization Unit	SIL Selection Analysis	Virginia
Naphtha Hydrodesulfurization Unit	Process Hazard Analysis (PHA)	Texas
Naphtha Hydrotreating Unit	Process Hazard Analysis (PHA)	New Mexico
Naphtha Hydrotreating Unit	SIL Selection Analysis	Montana
Naphtha Hydrotreating Units (5)	Process Hazard Analysis (PHA)	Montana
Offgas Treating Unit	Process Hazard Analysis (PHA)	Texas
Olefin Splitter	SIL Selection Analysis	Montana
Olefin Splitter	MOC Process Hazard Analysis	Montana
Platformer Unit	Process Hazard Analysis (PHA)	New Mexico
Platformer Unit	SIL Selection Analysis	Montana
Platformer Unit	Process Hazard Analysis (PHA)	Indiana
Platformer Units (2)	Process Hazard Analysis (PHA)	Montana
Pressurized Storage Unit	SIL Selection Analysis	Texas
Pressurized Storage Unit	Process Hazard Analysis (PHA)	New Mexico
Pressurized Storage Units (2)	Process Hazard Analysis (PHA)	Montana
Pressurized Storage Units (2)	Process Hazard Analysis (PHA)	Texas
Pressurized Storage Units (4)	Process Hazard Analysis (PHA)	Virginia
Propane Deasphalting (PDA) Unit	Process Hazard Analysis (PHA)	Montana

Propane Deasphalting (PDA) Unit	Process Hazard Analysis (PHA)	Texas
Propylene Fractionation Unit	Process Hazard Analysis (PHA)	Texas
Propylene Recovery Unit	Process Hazard Analysis (PHA)	Texas
Refining Company (3)	Process Safety Information Development	New Mexico
Refining Company	Process Safety Information / Relief Valve Design	Montana
Refining Company	Process Safety Information / Relief Valve Design	Oklahoma
Refining Company	PSM/RMP Compliance Audit	Louisiana
Refining Company	PSM/RMP Compliance Audit	Utah
Refining Company	PSM/RMP Compliance Audit	Virginia
Refining Company (2)	PSM/RMP Compliance Audit	New Mexico
Refining Company (4)	PSM/RMP Compliance Audit	Montana
Refining Company (5)	PSM/RMP Compliance Audit	Texas
Refining Company	PSM Gap Analysis	Wyoming
Reformer Unit	Process Hazard Analysis (PHA)	Texas
Reliability Enhancement Project	MOC Process Hazard Analysis	Texas
Saturate Light Ends Unit	Process Hazard Analysis (PHA)	Texas
Saturates Liquids Units	Process Hazard Analysis (PHA)	Montana
Saturates Liquids Units	SIL Selection Analysis	Montana
Saturates Liquids Units (2)	Process Hazard Analysis (PHA)	Texas
SCOT Unit	SIL Selection Analysis	Texas
SCOT Unit (2)	Process Hazard Analysis (PHA)	Texas
Sour Water Stripping (SWS) Unit	Process Hazard Analysis (PHA)	Indiana
Sour Water Stripping (SWS) Units (2)	Process Hazard Analysis (PHA)	New Mexico
Sour Water Stripping (SWS) Units (3)	Process Hazard Analysis (PHA)	Montana
Sour Water Stripping (SWS) Units (5)	Process Hazard Analysis (PHA)	Texas
Sour Water Stripping (SWS) Unit	SIL Selection Analysis	Texas
Sour Water Stripping (SWS) Units (2)	SIL Selection Analysis	Montana
Steam Boiler System (4)	Failure Modes Effects Analysis (FMEA)	Montana
Steam Boiler System (2)	Process Hazard Analysis (PHA)	Texas
Steam Boiler System (2)	SIL Selection Analysis	Texas
Sulfolane Units (2)	Process Hazard Analysis (PHA)	Texas
Sulfur Complex	Layer of Protection Analysis (LOPA)	Oklahoma
Sulfur Complex	Process Hazard Analysis (PHA)	Oklahoma
Sulfur Complex	PSM/RMP Compliance Audit	Montana

Sulfur Recovery Unit (SRU)	Process Hazard Analysis (PHA)	Louisiana
Sulfur Recovery Unit (SRU)	Process Hazard Analysis (PHA)	Indiana
Sulfur Recovery Units (SRU) (4)	Process Hazard Analysis (PHA)	Montana
Sulfur Recovery Unit (SRU)	SIL Selection Analysis	Texas
Sulfur Recovery Units (SRU) (3)	SIL Selection Analysis	Montana
Sulfur Recovery Units (SRU) (7)	Process Hazard Analysis (PHA)	Texas
Sulfuric Alkylation Units (2)	Process Hazard Analysis (PHA)	Texas
Sulfurox Unit	Process Hazard Analysis (PHA)	New Mexico
Tail Gas Treating Unit	Process Hazard Analysis (PHA)	Texas
Tail Gas Treating Units (4)	Process Hazard Analysis (PHA)	Montana
Tail Gas Treating Units (3)	SIL Selection Analysis	Montana
Tank Farm Cavern Storage	Process Hazard Analysis (PHA)	Texas
Treater Project	SIL Selection Analysis	Montana
Treater Project	MOC Process Hazard Analysis	Montana
Treater Unit (2)	Process Hazard Analysis (PHA)	Montana
Triconex Project	MOC Process Hazard Analysis	Texas
ULSD Unit	Process Hazard Analysis (PHA)	Texas
ULSD Unit	Process Hazard Analysis (PHA)	New Mexico
ULSD Units (2)	SIL Selection Analysis	Montana
ULSD Units (2)	Process Hazard Analysis (PHA)	Montana
ULSG Unit	Process Hazard Analysis (PHA)	Texas
ULSG Unit	SIL Selection Analysis	Texas
Ultraformer Unit	Process Hazard Analysis (PHA)	Virginia
Ultraformer Unit	SIL Selection Analysis	Virginia
Unibon Units (2)	Process Hazard Analysis (PHA)	Texas
Utility Systems (2)	Process Hazard Analysis (PHA)	Montana

Petrochemical Facilities

Type Facility	Service Provided	Location
Aromax Unit	Process Hazard Analysis (PHA)	Puerto Rico
BTX	Process Hazard Analysis (PHA)	Texas
Liquid Hydrogen Unloading System	Process Hazard Analysis (PHA)	Texas
Liquid Hydrogen Unloading System	Process Hazard Analysis (PHA)	Tennessee

Pipeline and Terminal Facilities

Type Facility	Service Provided	Location
Ammonia Pipeline System	Process Safety Management Audit	Missouri
Ammonia Terminal	Process Safety Information Audit	Texas
Ammonia Terminals (2)	Process Safety Information Audit	Nebraska
Ammonia Terminals (2)	Process Safety Information Audit	Minnesota
Ammonia Terminals (2)	Process Safety Information Audit	Illinois
Ammonia Terminals (5)	Process Safety Information Audit	Iowa
Ammonia Terminal	Process Safety Information Development	Kansas
Ammonia Terminal	Process Safety Information Development	Texas
Ammonia Terminals (2)	Process Safety Information Development	Minnesota
Ammonia Terminals (2)	Process Safety Information Development	Indiana
Ammonia Terminals (2)	Process Safety Information Development	Nebraska
Ammonia Terminals (3)	Process Safety Information Development	Illinois
Ammonia Terminals (5)	Process Safety Information Development	Iowa
Refined Products Terminal	Process Hazard Analysis (PHA)	Texas
Refined Products Terminal	Process Hazard Analysis (PHA)	Indiana
Refined Products Terminal	Process Hazard Analysis (PHA)	Colorado
Refined Products Terminals (2)	Process Hazard Analysis (PHA)	Kansas
Refined Products Terminals (2)	Process Hazard Analysis (PHA)	Illinois
Natural Gas Pipeline Compressor Station (2)	(PHA)	Pennsylvania
Midstream Pipeline Company	Process Hazard Analysis (PHA)	Texas

Explosives Manufacturing Facilities

Type Facility	Service Provided	Location
Explosives Manufacturing Plant	PSM Program Gap Analysis	Texas
Explosives Manufacturing Plant	PSM Program Gap Analysis	Arkansas
Explosives Manufacturing Plant	Process Hazard Analysis (PHA)	Arkansas
Explosives Manufacturing Plant (13)	Process Hazard Analysis (PHA)	Virginia
Explosives Manufacturing Plant	Process Hazard Analysis (PHA)	Tennessee
Explosives Manufacturing Plant	PSM Program Development	Arkansas

Miscellaneous Types of Facilities

Type Facility	Service Provided	Location
Electron Beam Heavy Oil Upgrading System	Process Hazard Analysis (PHA)	New York
Feed Preparation System	Hazard and Operability (HAZOP) Analysis	Tennessee
Hazardous Waste Thermal Treatment Unit	Process Safety Information	Tennessee
Uranium Downblending Process	Process Safety Information Development	Tennessee
Metal Melt Radioactive Waste Transfer Process	Process Hazard Analysis	Tennessee
Nuclear Facility (2)	Process Safety Information	Tennessee
Nuclear Research Reactor	Regulatory Assessment	Georgia
Oven Fire Suppression System	MOC Process Hazard Analysis	California
Personal Products Manufacturer	Process Safety Management Audit	Connecticut
Waste Water Treatment Plant	Process Hazard Analysis (PHA)	Tennessee
Caustic Scrubber Systems	Hazard and Operability (HAZOP) Analysis	Pennsylvania
Radioactive Waste Processing & Packaging Facility	(PHA)	Tennessee

Training Courses

Type Facility	Service Provided	Location
Chemical Plant - Management of Change	Hazard Review Leader Training	Alberta, Canada
Chemical Plant (2) Management of Change	Hazard Review Leader Training	Oklahoma
Chemical Plant (2) Management of Change	Hazard Review Leader Training	Texas
Chemical Plant	Management of Change Hazard Review Leader Training	Louisiana
Chemical Plant	Management of Change Hazard Review Leader Training	California
Refining Company	Management of Change Hazard Review Leader Training	Texas
Refining Company	Management of Change Hazard Review Leader Training	New Mexico
Refining Company	Management of Change Hazard Review Leader Training	Virginia
Refining Company	Management of Change Hazard Review Leader Training	Louisiana
Refining Company	Root Cause Failure Analysis Training Course	Virginia
Explosives Manufacturing Plant	Incident Investigation Training Course	Virginia
Explosives Manufacturing Plant (2)	Process Hazard Analysis Training	Virginia
Refining Company	Root Cause Failure Analysis Training Course	Louisiana