



Building a 10 MWe sCO₂ Power Plant: Design Considerations for the DOE STEP Pilot Plant Test Facility

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7th International sCO₂ Power Cycles Symposium
February 23, 2022



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10 MWe Pilot Scale sCO₂ Power Plant



Overview

Location/Infrastructure

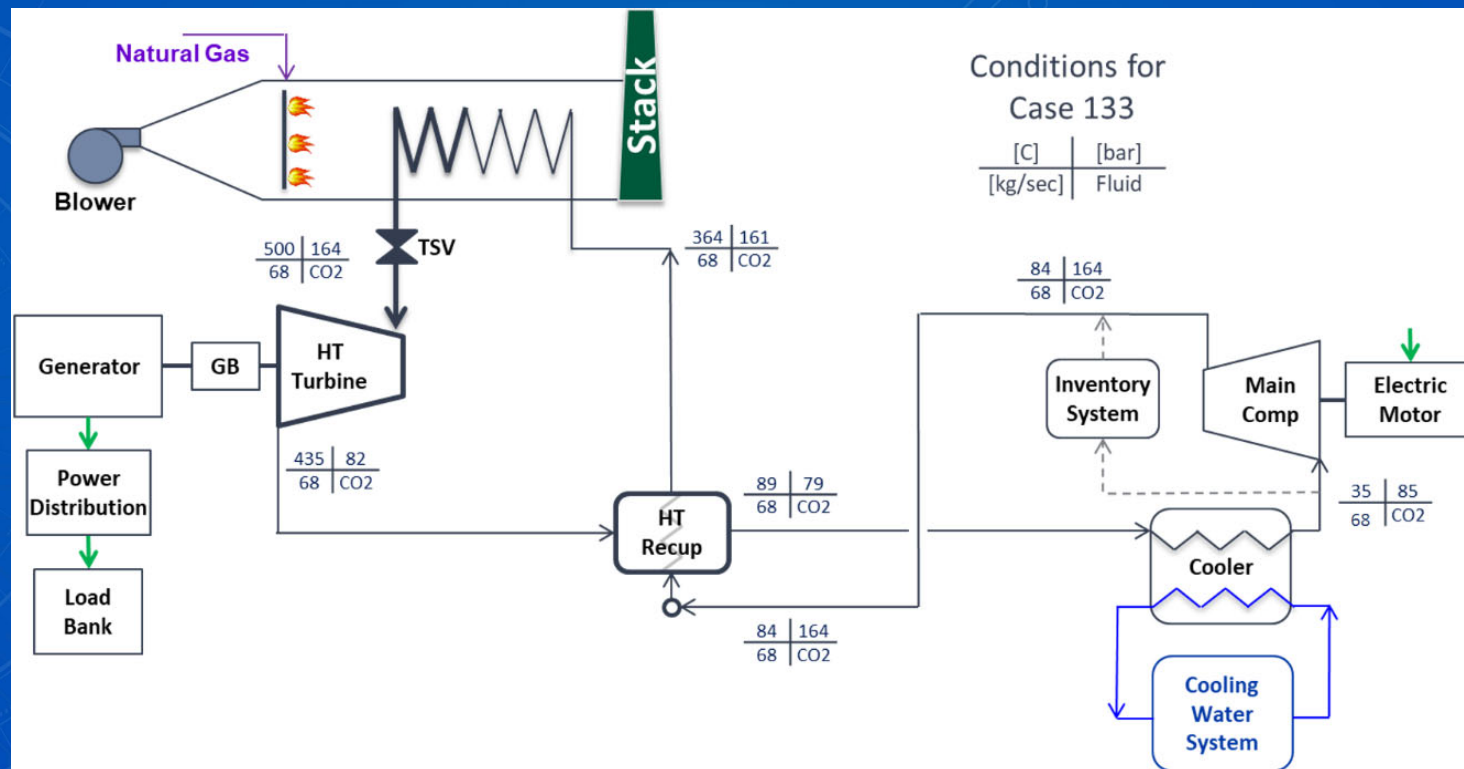
Site Layout

Building Layout

Equipment Requirements



First step: Simple Recuperated Brayton cycle



Overview

Location/Infrastructure

Site Layout

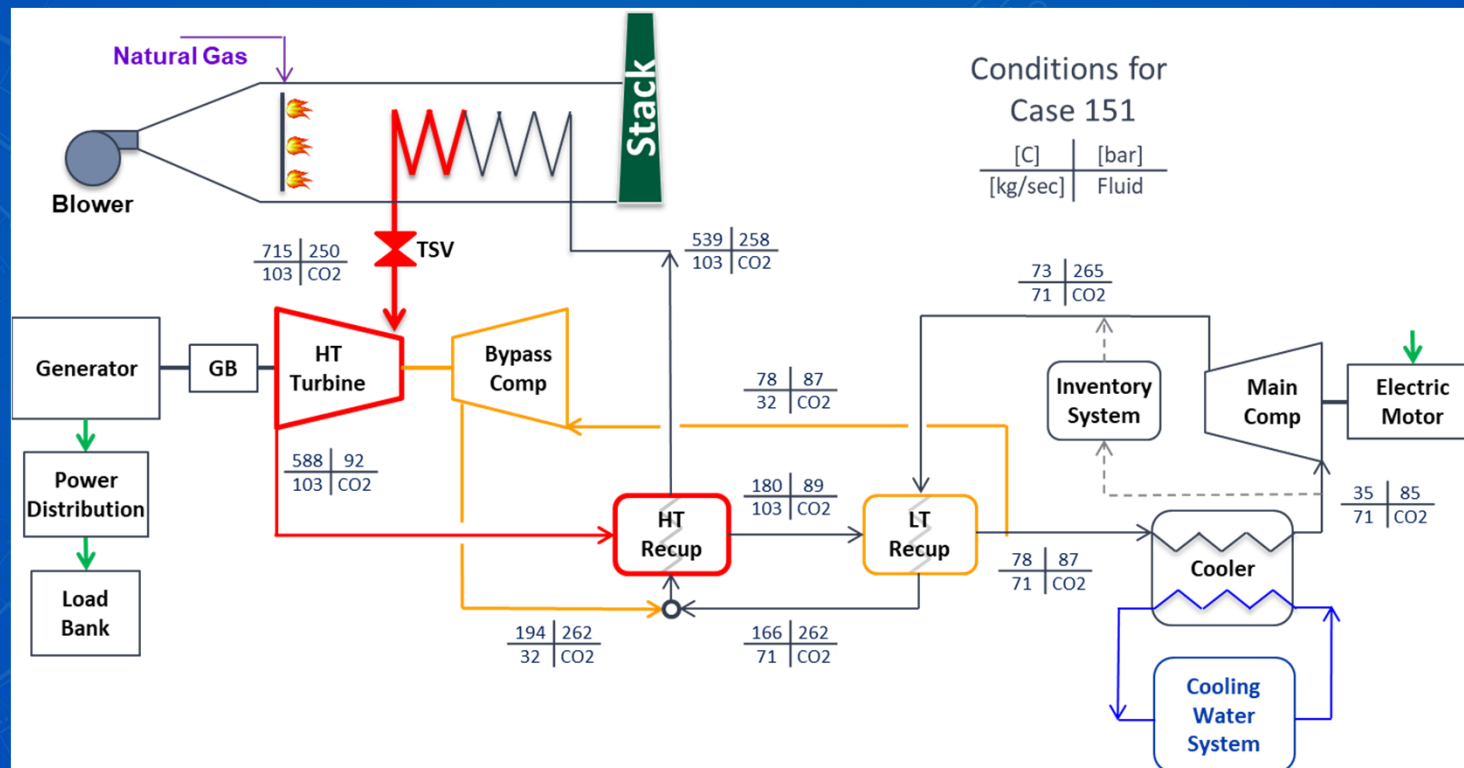
Building Layout

Equipment Requirements



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Second step: Recompression Brayton cycle



Overview

Location/Infrastructure

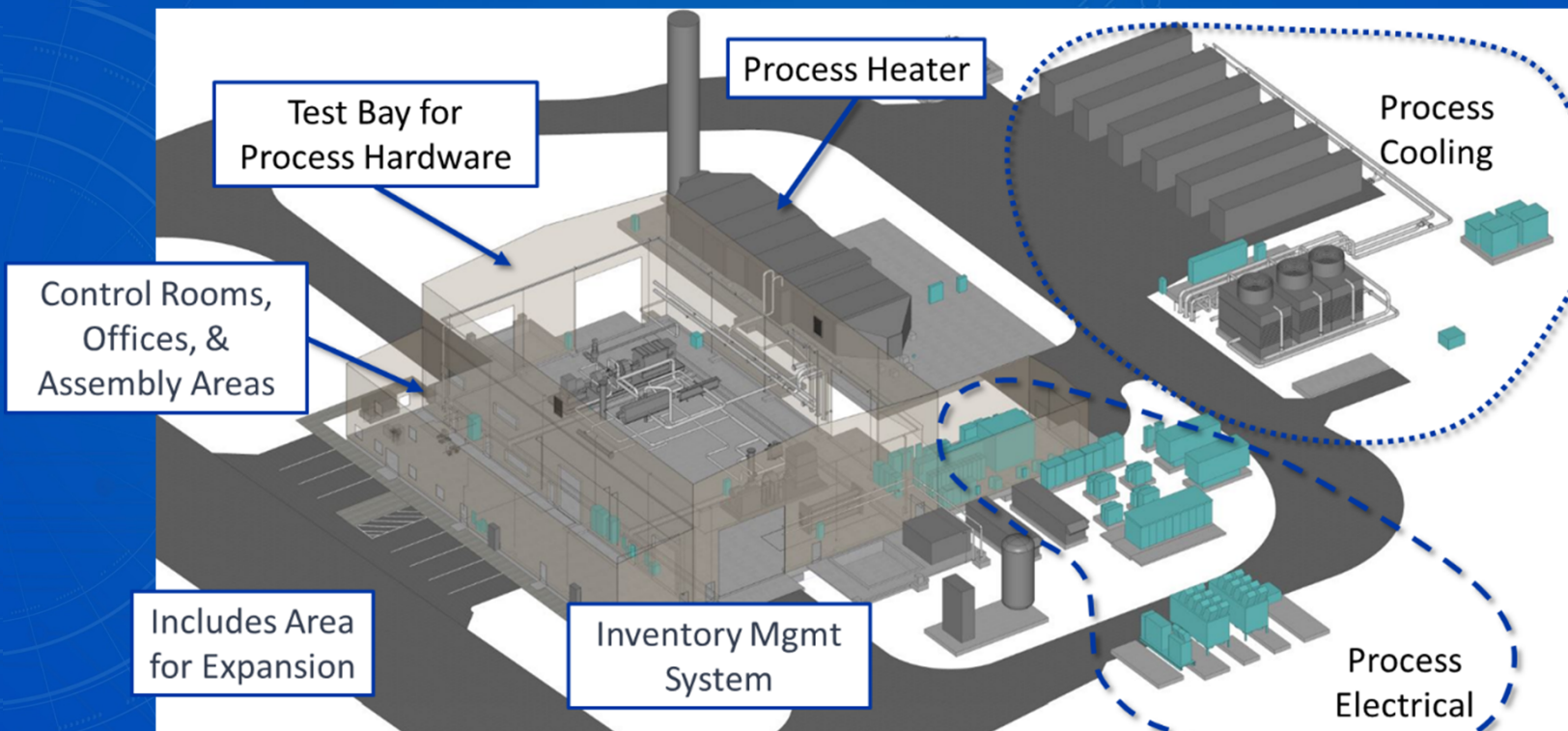
Site Layout

Building Layout

Equipment Requirements



10 Mwe sCO₂ Power Plant Test Facility



Overview

Location/Infrastructure

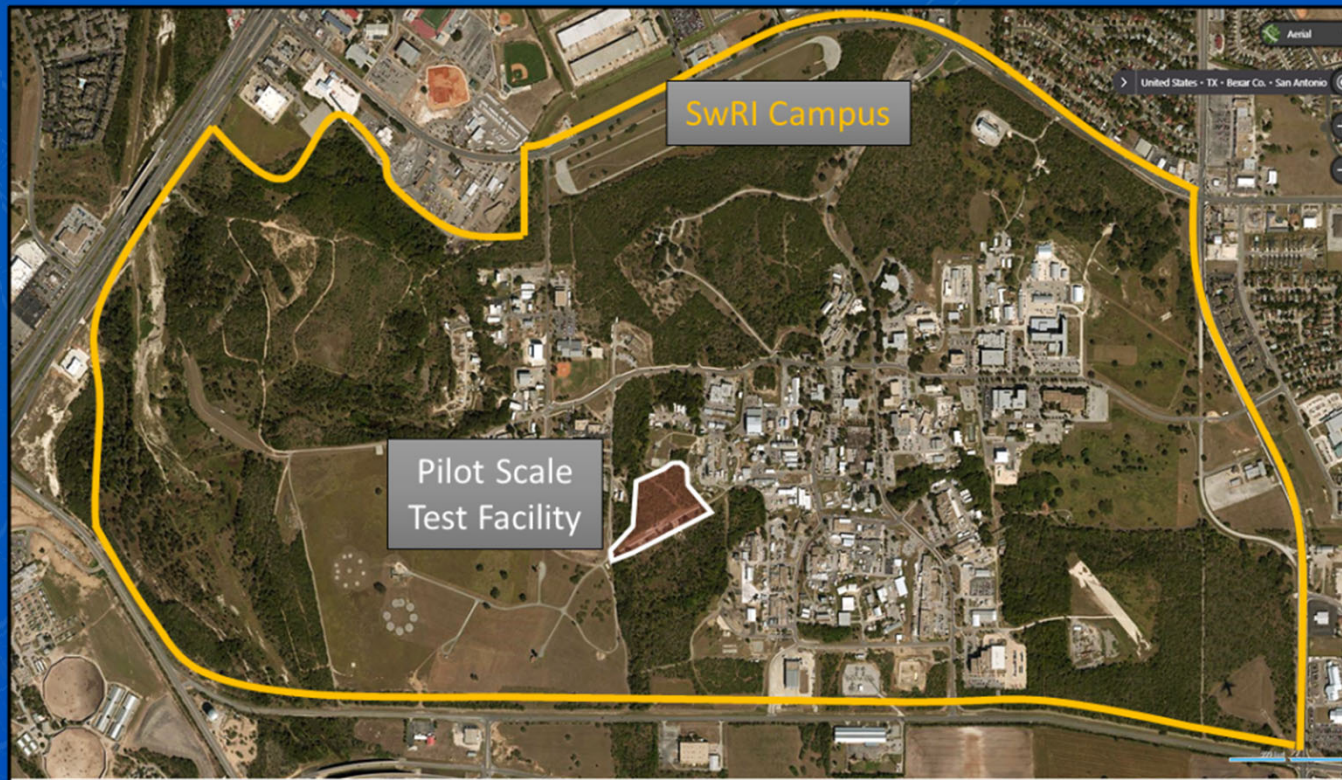
Site Layout

Building Layout

Equipment Requirements



Located on SwRI campus in San Antonio, Texas



Overview

Location/Infrastructure

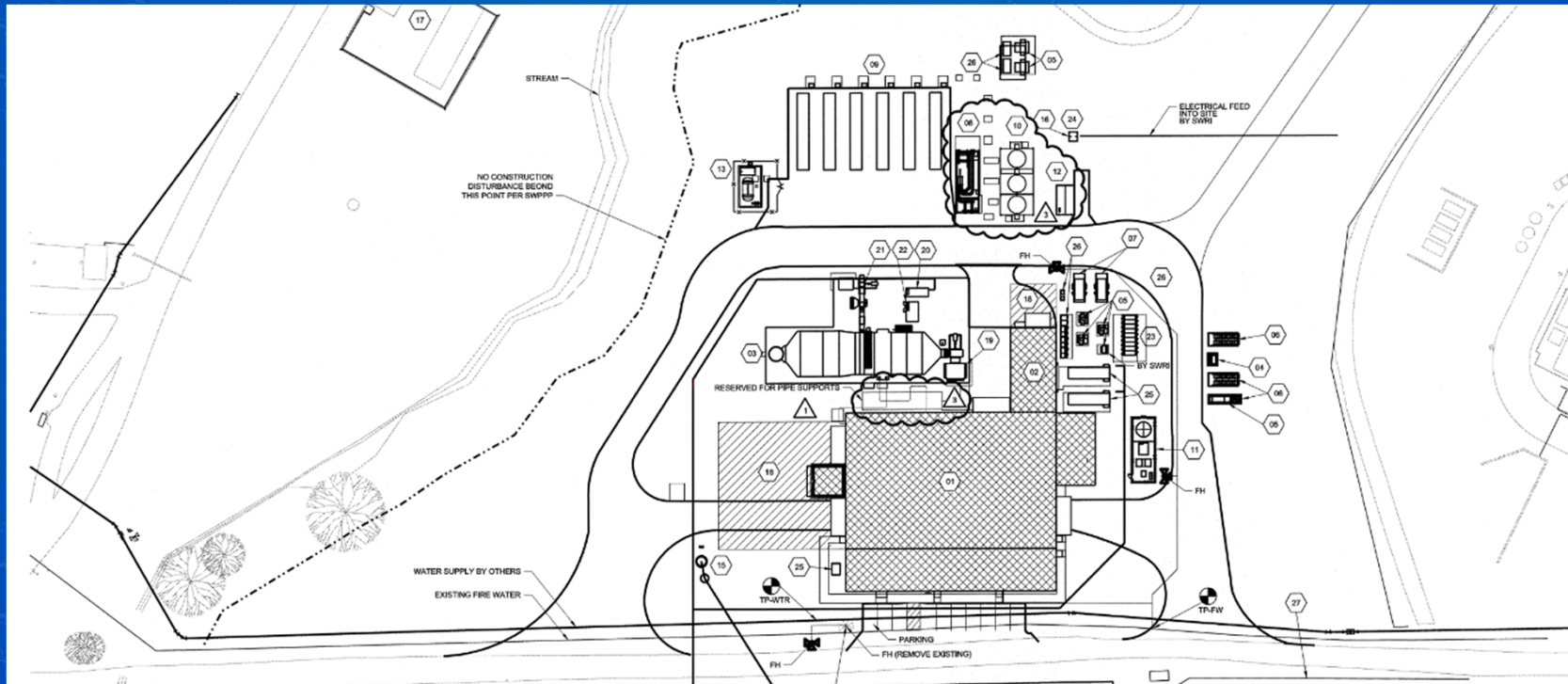
Site Layout

Building Layout

Equipment Requirements



Green field site required impact studies and infrastructure improvements



Overview

Location/Infrastructure

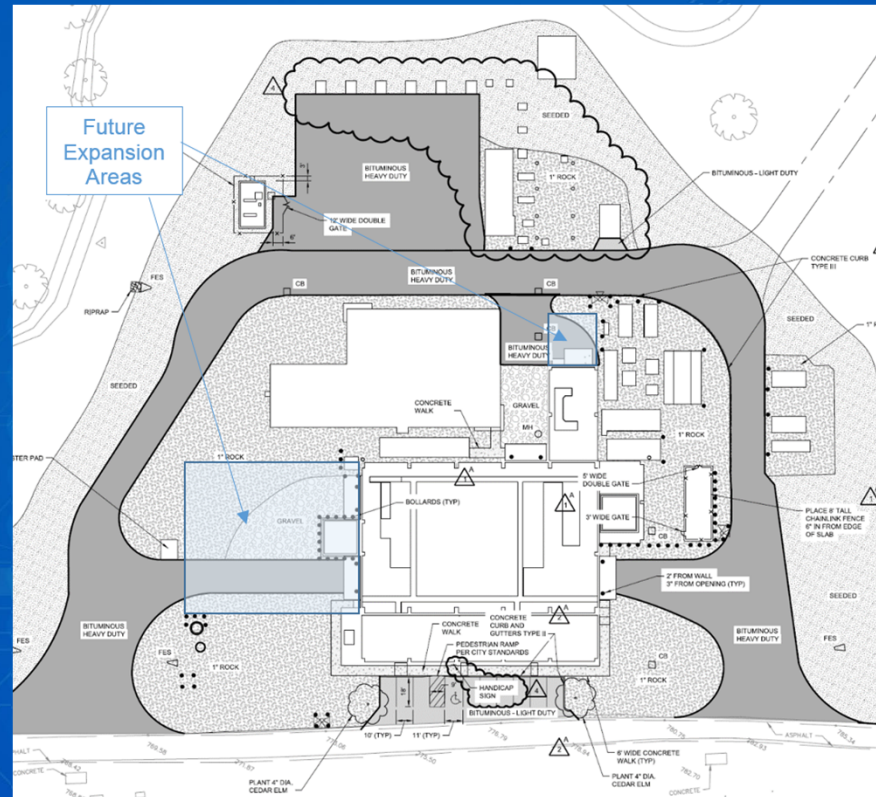
Site Layout

Building Layout

Equipment Requirements



Site accessibility and future expansion considered



Overview

Location/Infrastructure

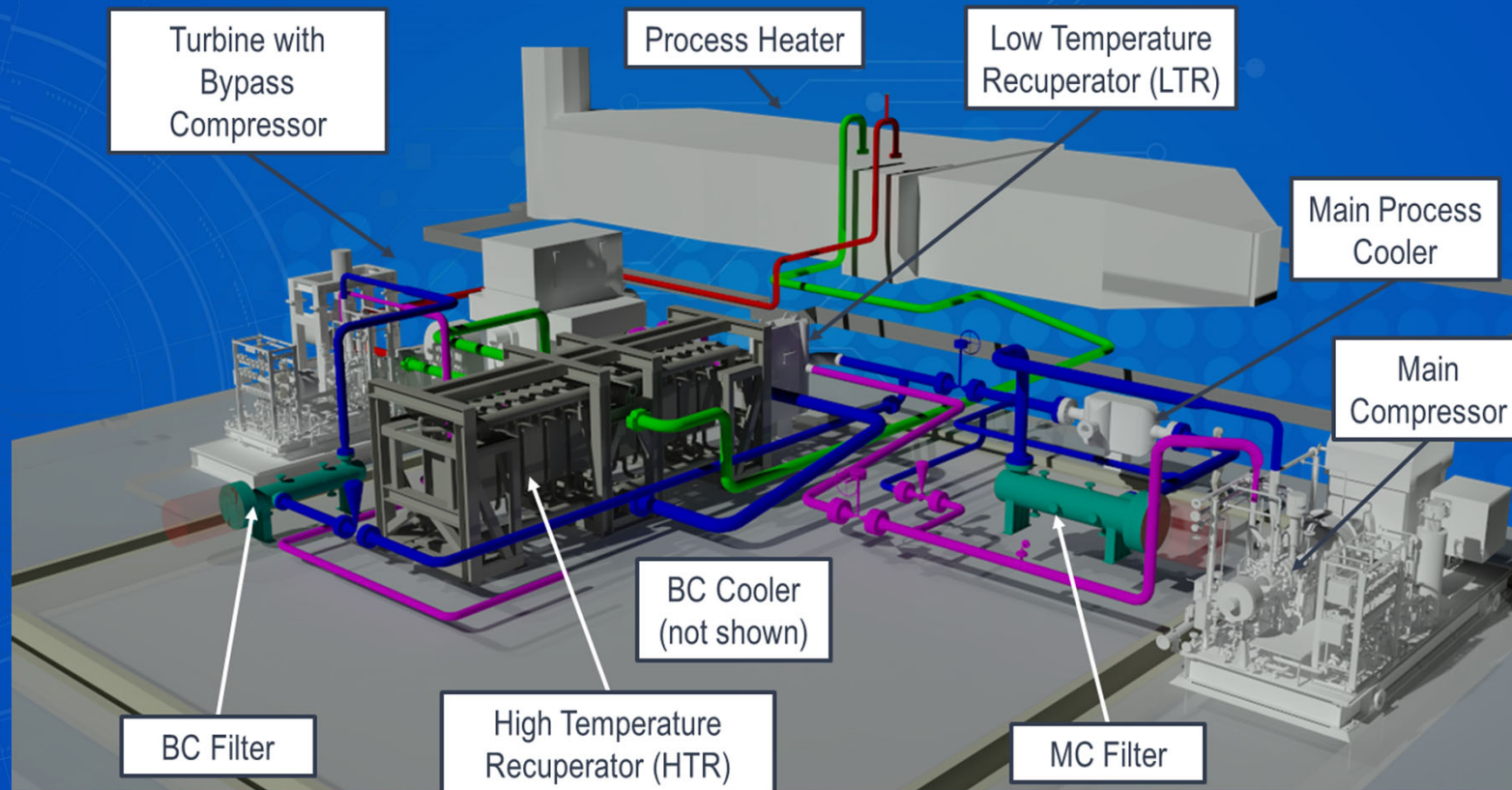
Site Layout

Building Layout

Equipment Requirements



Not your typical power plant layout – R&D



Overview

Location/Infrastructure

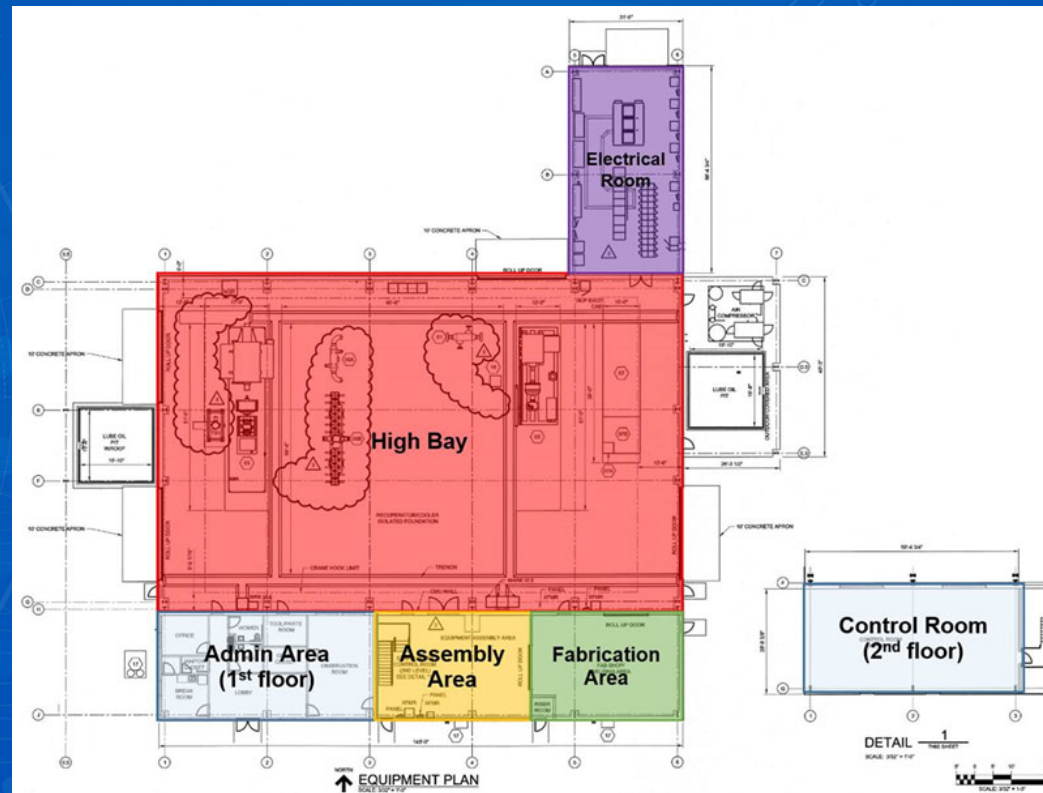
Site Layout

Building Layout

Equipment Requirements



Large open high bay with 2nd floor control room



Overview

Location/Infrastructure

Site Layout

Building Layout

Equipment Requirements



Bridge crane, ventilation, cable tray, and more...



Overview

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Equipment Requirements

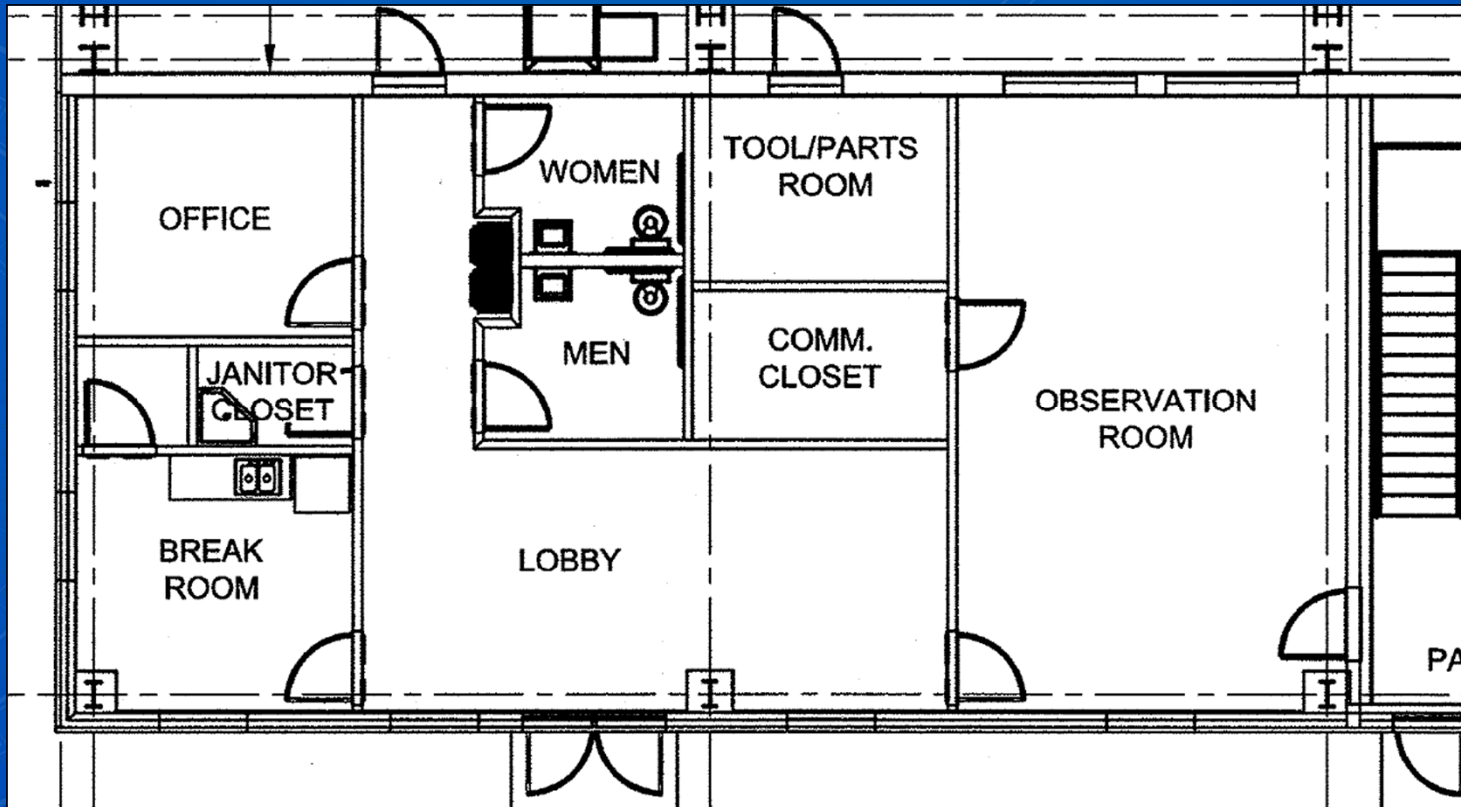


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Admin area



Overview

Location/Infrastructure

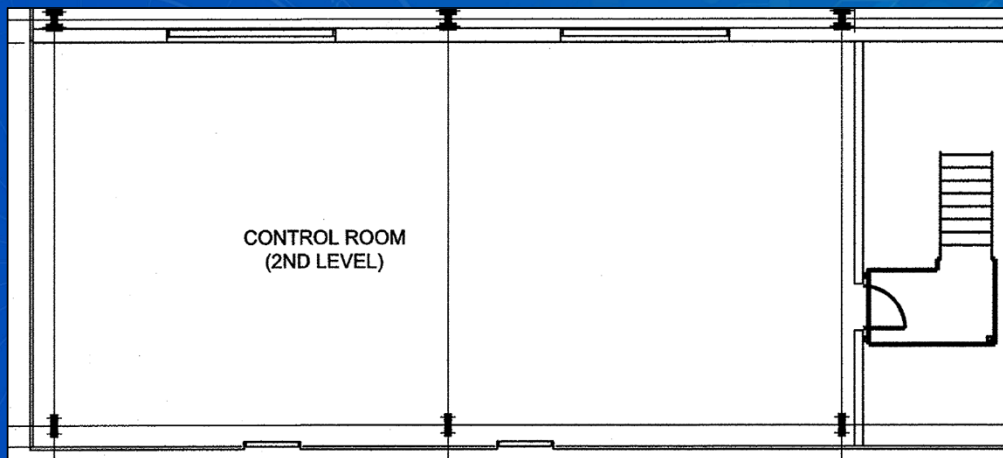
Site Layout

Building Layout

Equipment Requirements



2nd Floor Control Room



Overview

Location/Infrastructure

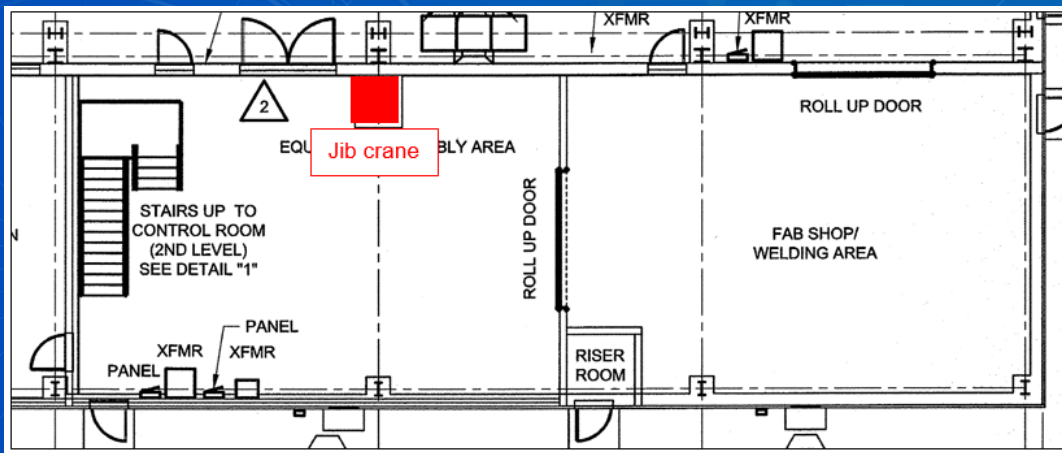
Site Layout

Building Layout

Equipment Requirements



Assembly and Fabrication Areas



Overview

Location/Infrastructure

Site Layout

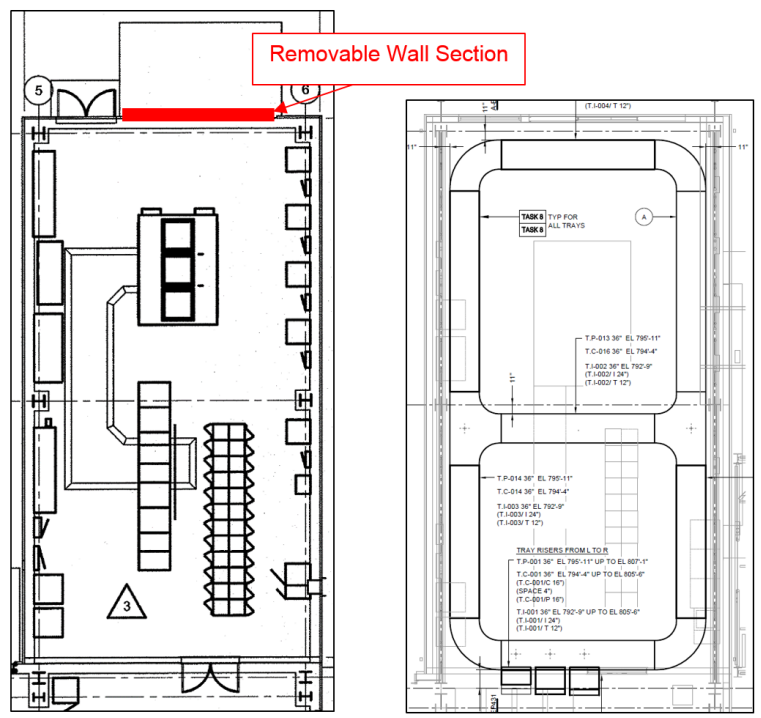
Building Layout

Equipment Requirements



Electrical room for indoor equipment

Electrical yard for large and/or MV equipment



Overview

Location/Infrastructure

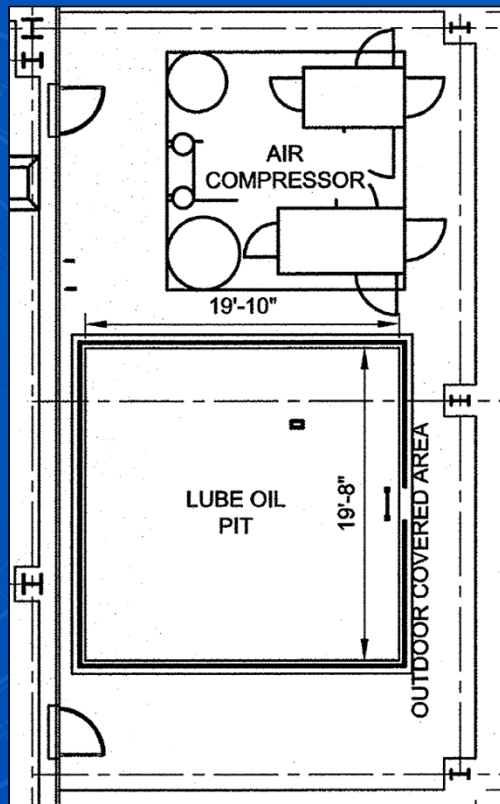
Site Layout

Building Layout

Equipment Requirements



Basins on both sides of building for lube oil skids



Overview

Location/Infrastructure

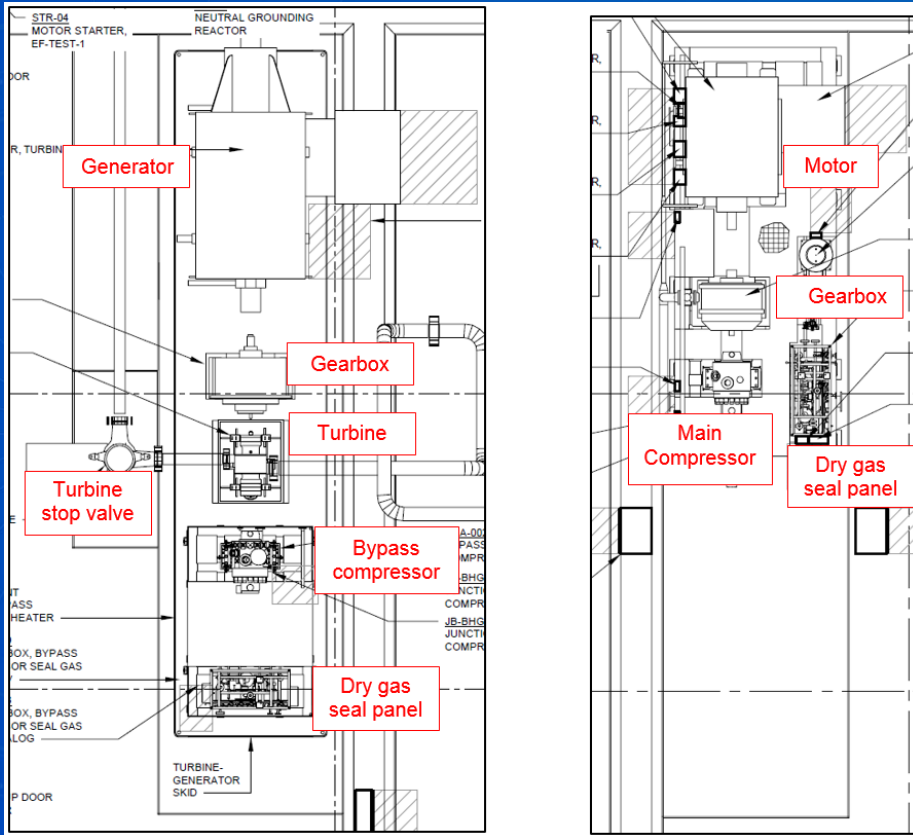
Site Layout

Building Layout

Equipment Requirements



Turbomachinery Skids



Overview

Location/Infrastructure

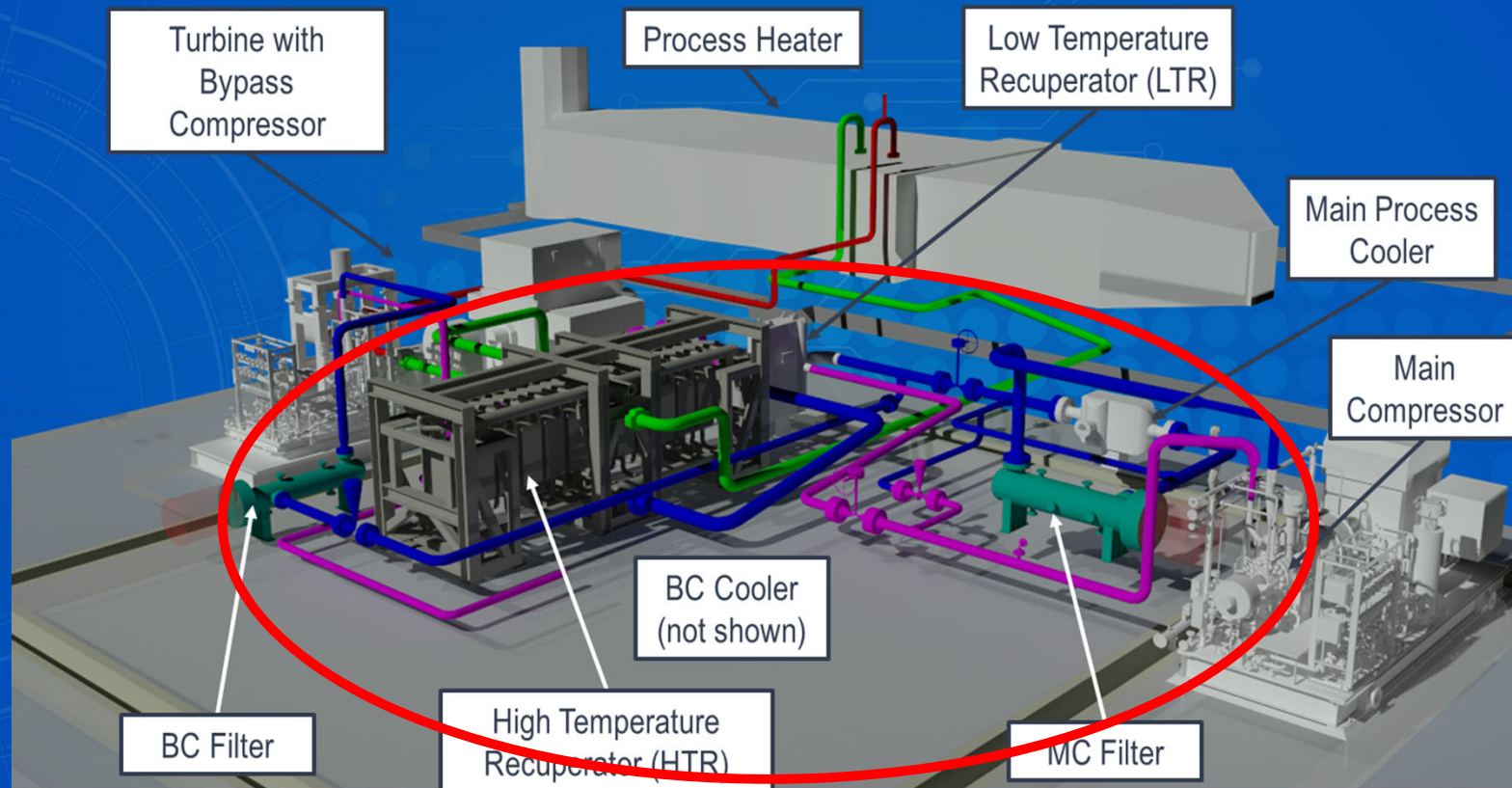
Site Layout

Building Layout

Equipment Requirements



Piping, Recuperators, Coolers, and Filters



Overview

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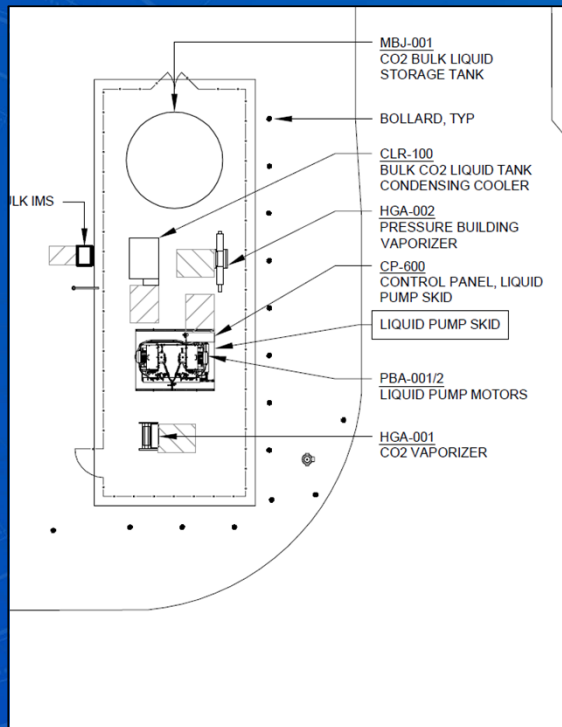
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Equipment Requirements



Inventory Management System – Outdoor liquid CO₂ storage and indoor gaseous storage



Overview

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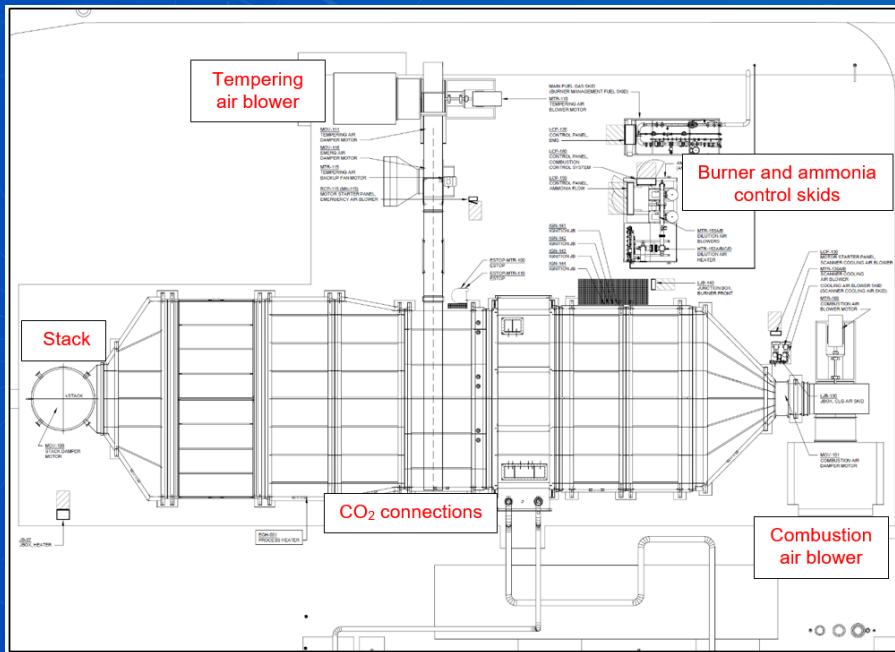
Site Layout

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Equipment Requirements



Process heater has its own outdoor foundation



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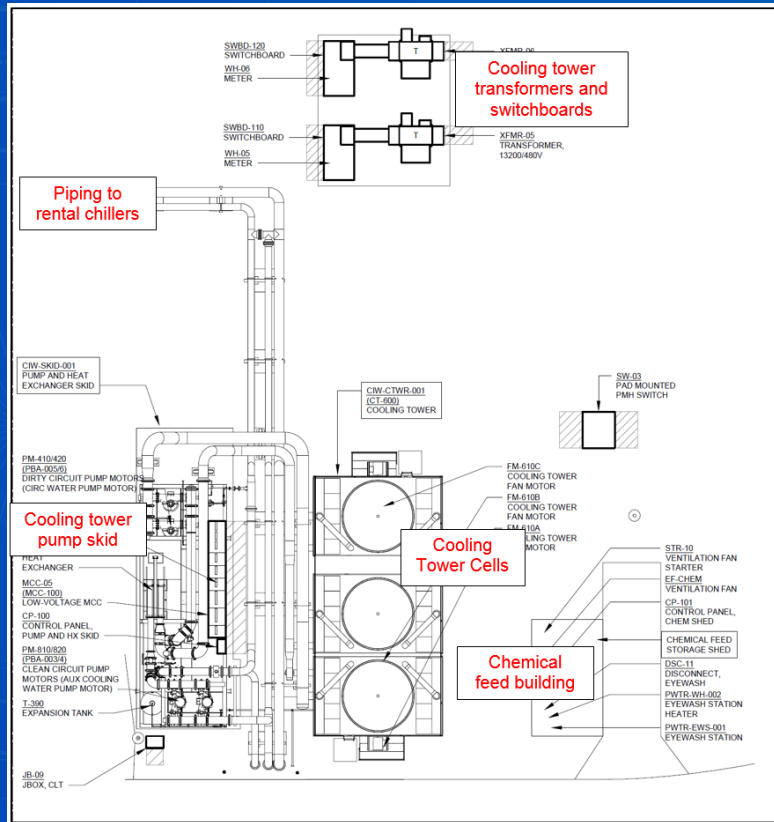
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Equipment Requirements



Cooling Tower System



Overview

Location/Infrastructure

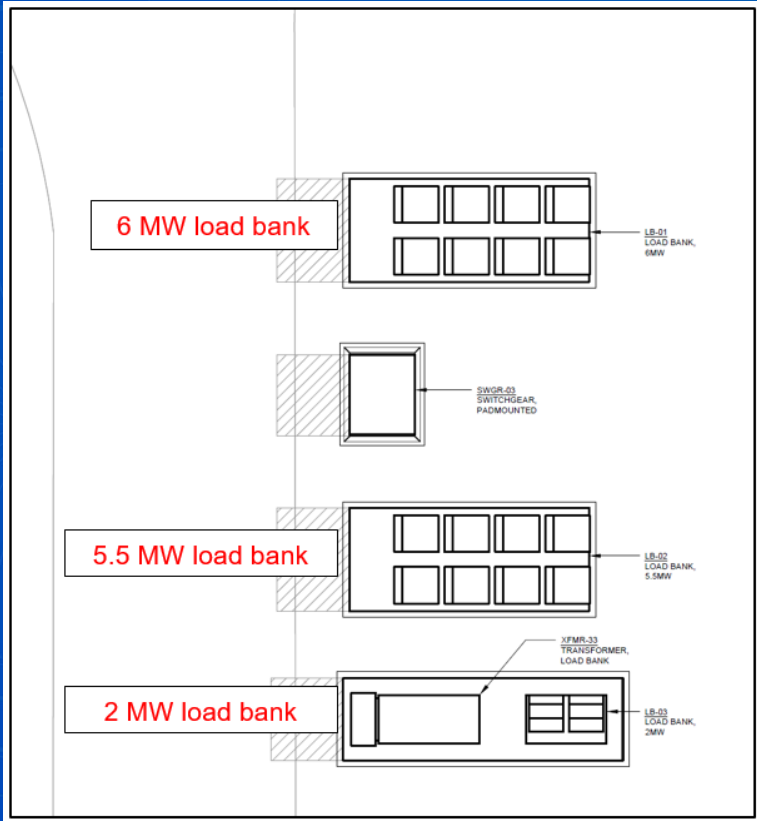
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Equipment Requirements



Load Banks



Overview

Location/Infrastructure

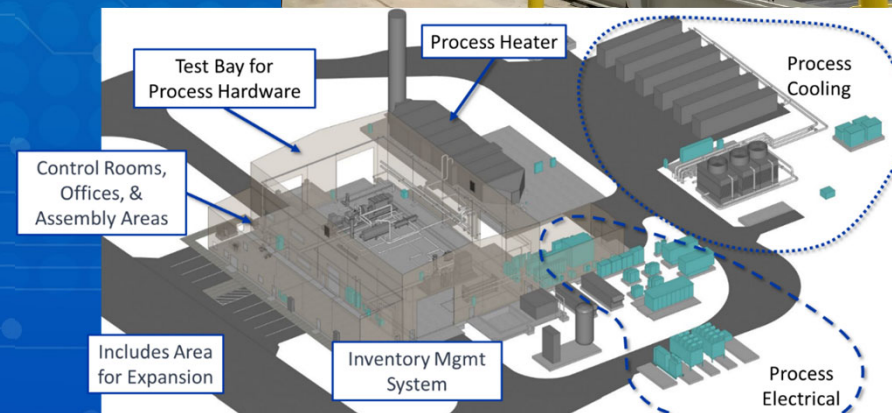
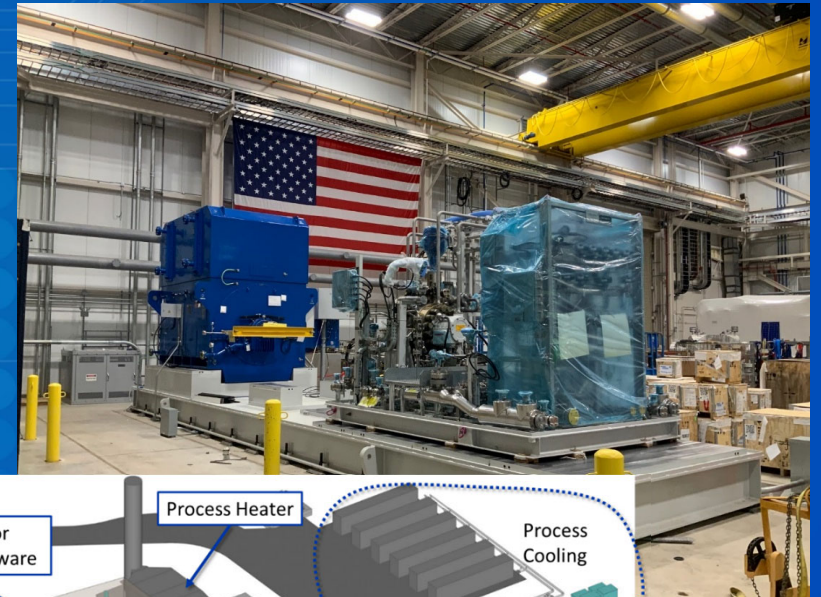
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Equipment Requirements



Thank you!



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