



Helium Raw Gas Processing

Helium Facility Construction

Presented by
Forrest Churchill

EXPERTS BEYOND BORDERS

GASWORLD HELIUM SUPER SUMMIT 2023





AGENDA

Site Selection and Assessment

Utilities

Skidded Equipment

Construction Standards

HELIUM PROCESSING

Capital Development

- Financial simulation delivering Net Present Value (NPV) and Return on Investment (ROI) metrics
- Capital and operating estimates for surface development
- Revenue models based on helium purity

Front End Engineering and Design

- Helium gathering plans for centralized processing
- Helium gas processing evaluation based on raw gas profiles
- Purification technology selection
- Utility planning for processing facilities

Facility Construction

- Construction design generation
- Procurement support services and vendor management
- Electrical package fabrication and site commissioning



MOST COMMON HELIUM CHALLENGES

**ECONOMIC
VIABILITY/
FINANCING**

**MANAGING RISK WITH
PRODUCTION AND
PURITY**

**TECHNOLOGY
SELECTION**

**REGULATORY
COMPLIANCE**

**DEVELOPING
INFRASTRUCTURE**

**TRANSPORT
OPTIONS**

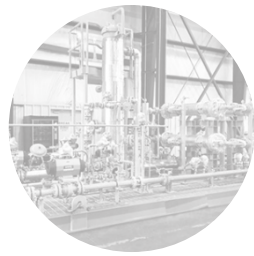
Construction Planning & Execution



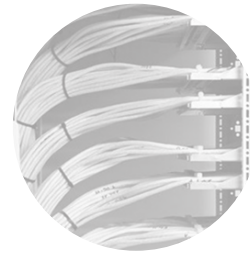
Site
Selection



Utility
Planning



Equipment
Mobilization



Mechanical/
Electrical



Startup



Hand-over

Environmental Considerations

Equipment Protection

Self-Contained Packages

Heat Trace & Insulation - Piping



Arizona, USA Temp. Range

Record Low	19°F (-7°C)
Record High	119°F (48°C)



Saskatchewan, CAN Temp. Range

Record Low	-38°F (-39°C)
Record High	110°F (43°C)

Features of a Quality Site

Utility Access



Understanding Climate



Quality Geotechnical Report



Reasonable Permitting Requirements



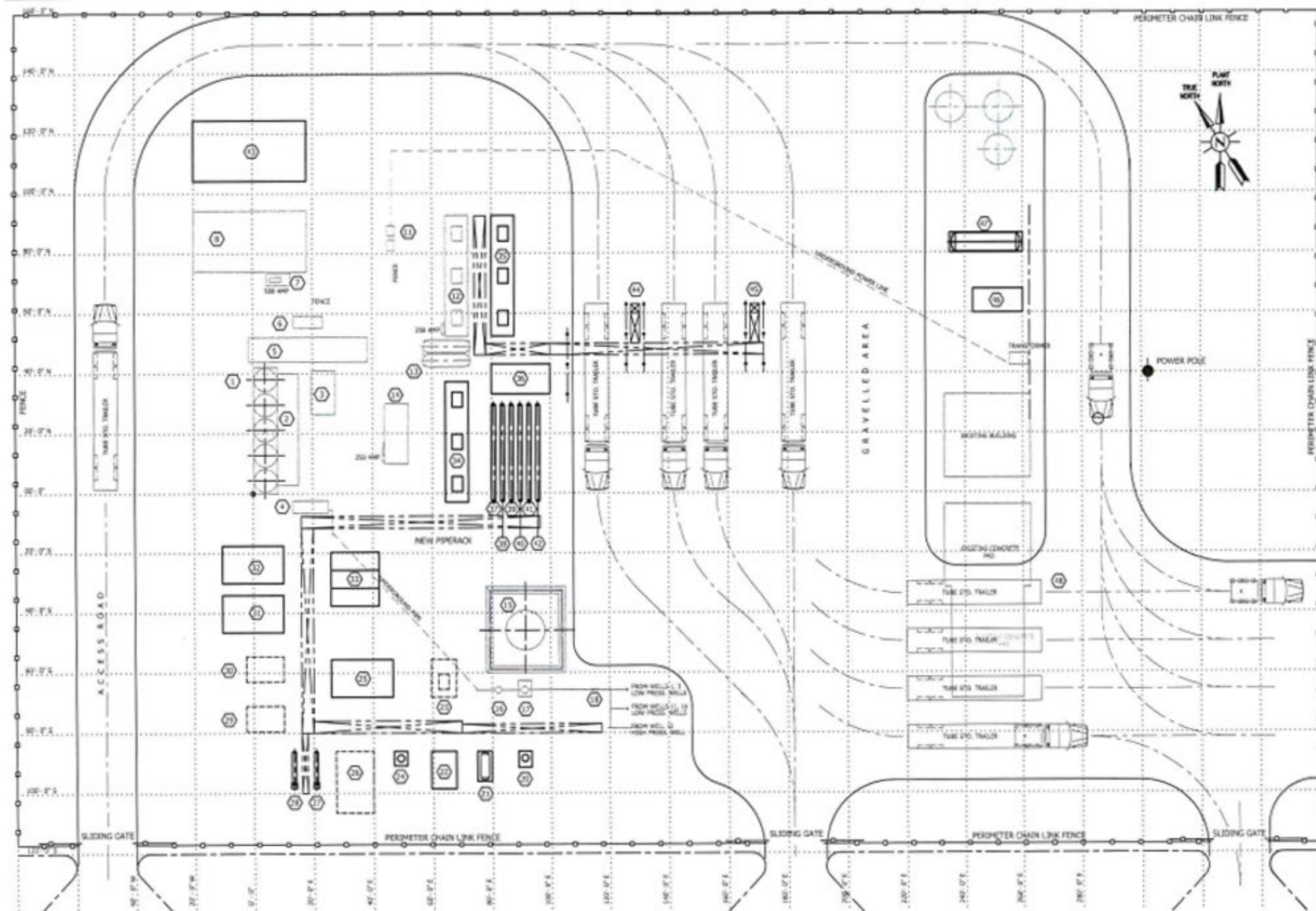
Reasonable Regulation/ Code Requirements



Easy Access for Trucking/Service



Planning Your Site Layout



Grading & compacted soil

Fencing

Access/pull through for truck loadout

Where will the gathering system come in?

Construction Planning & Execution



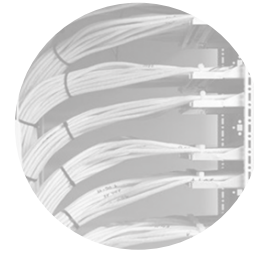
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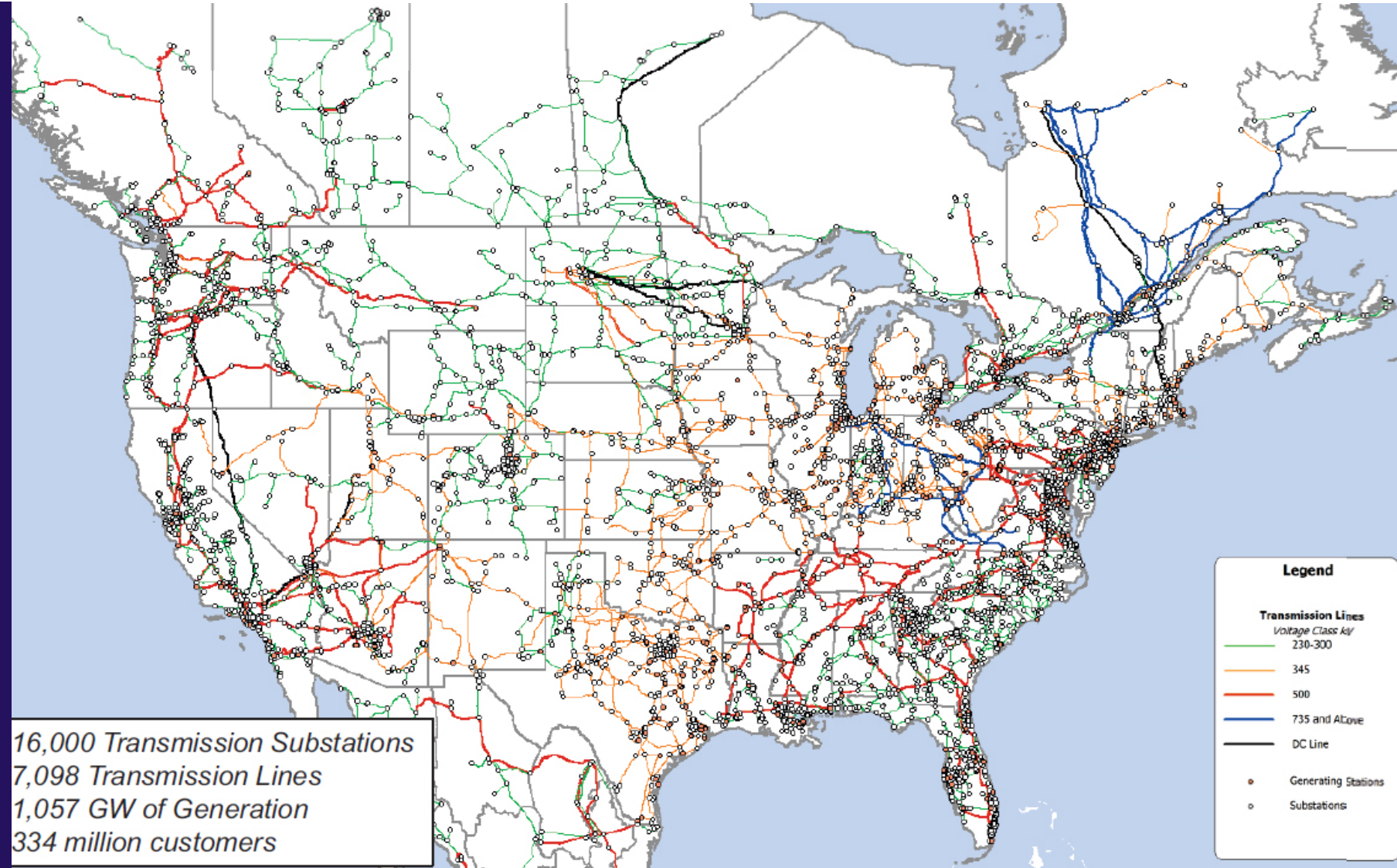
Evaluating Utility Plans

Typical site requires
~400 - 800 kW
of power
(Depends on compression)

Sparse grids

Development plan

Available fuel sources



Third Party Utility

- Timeline
- Rate & demand charge
- Right of way
- Power lines
- Secure meter & transformer
- Utility service agreement

Onsite Utility

ONSITE POWER OPTIONS

Emissions drive options for engines

Fuel drives the economics (NG or propane)

Renewables are becoming more attractive

Option to lease or own



Title V Emissions Requirements

Non-Attainment Area Designation	VOC or NOx	CO	PM-10
Marginal	100 tpy		
Moderate	100 tpy	100 tpy	100 tpy
Serious	50 tpy	50 tpy	70 tpy

Construction Planning & Execution



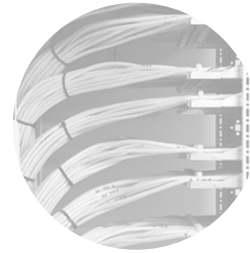
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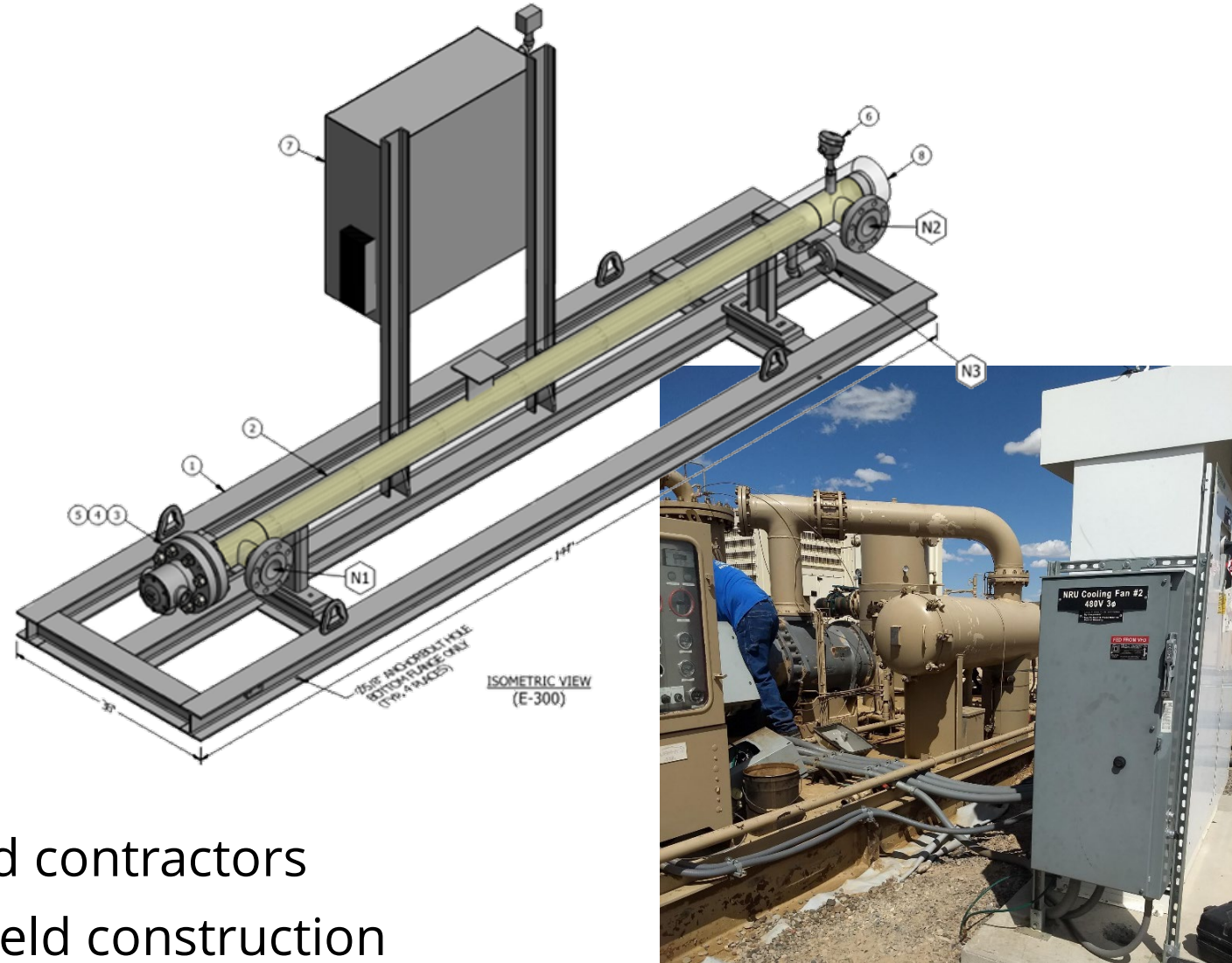


Hand-over

Approach to Skidded Equipment Deployment

Benefits

- Shop fabricated quality
- Integrated testing
- Lessens on-site costs & safety
- Portable and modular



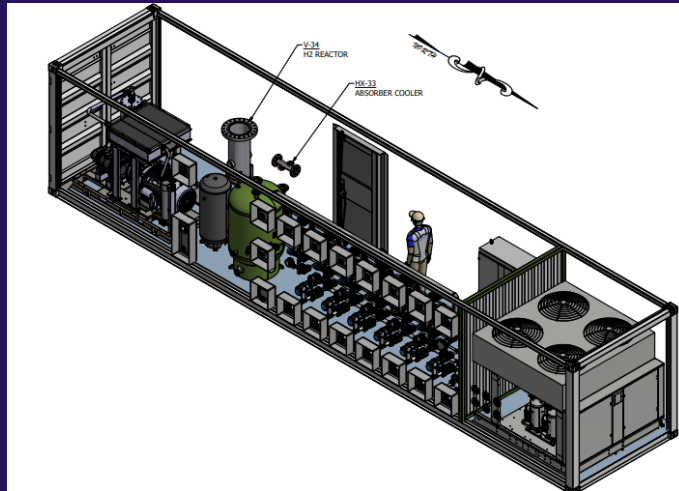
Challenges

- Planning for data handoffs
- Align construction execution and contractors
- Shifts costs to packagers from field construction

What *Should* Be Skid Based?

Skidded Equipment

Electrical building
Compressors
Membranes
PSA
Loadout Unit



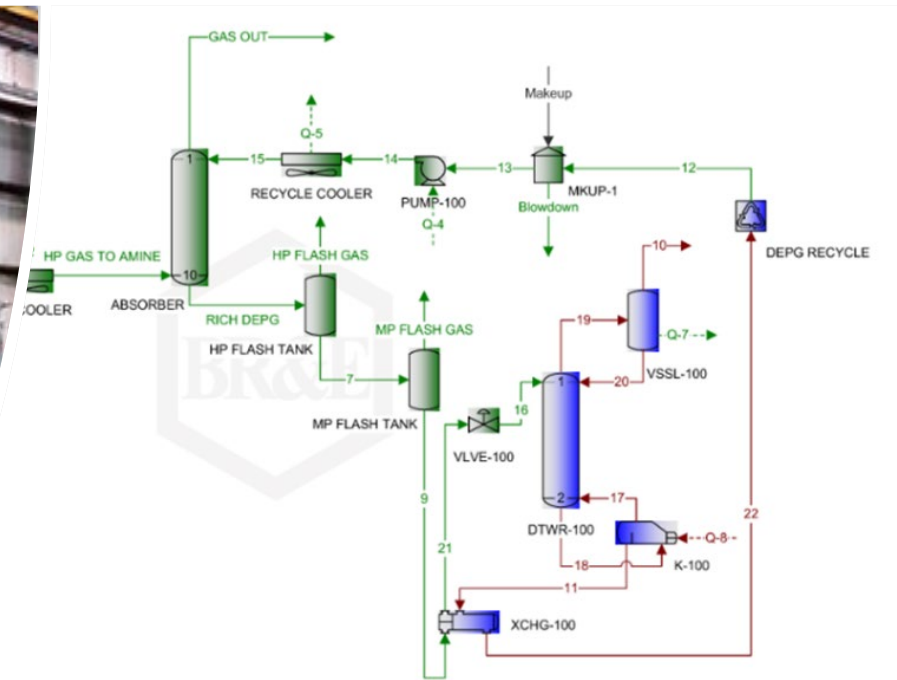
Site Constructed Equipment

Gathering risers
Valve stations
Headers
Interconnecting piping
Tubing
Filters & tanks



Keys to Success with Skidded Equipment

- Specifications
 - Setting standard quality for vendors
- Planning & Design Construction Execution
 - Determining what should be built on-site
 - Avoiding modifications in the field
- Transport



Construction Planning & Execution



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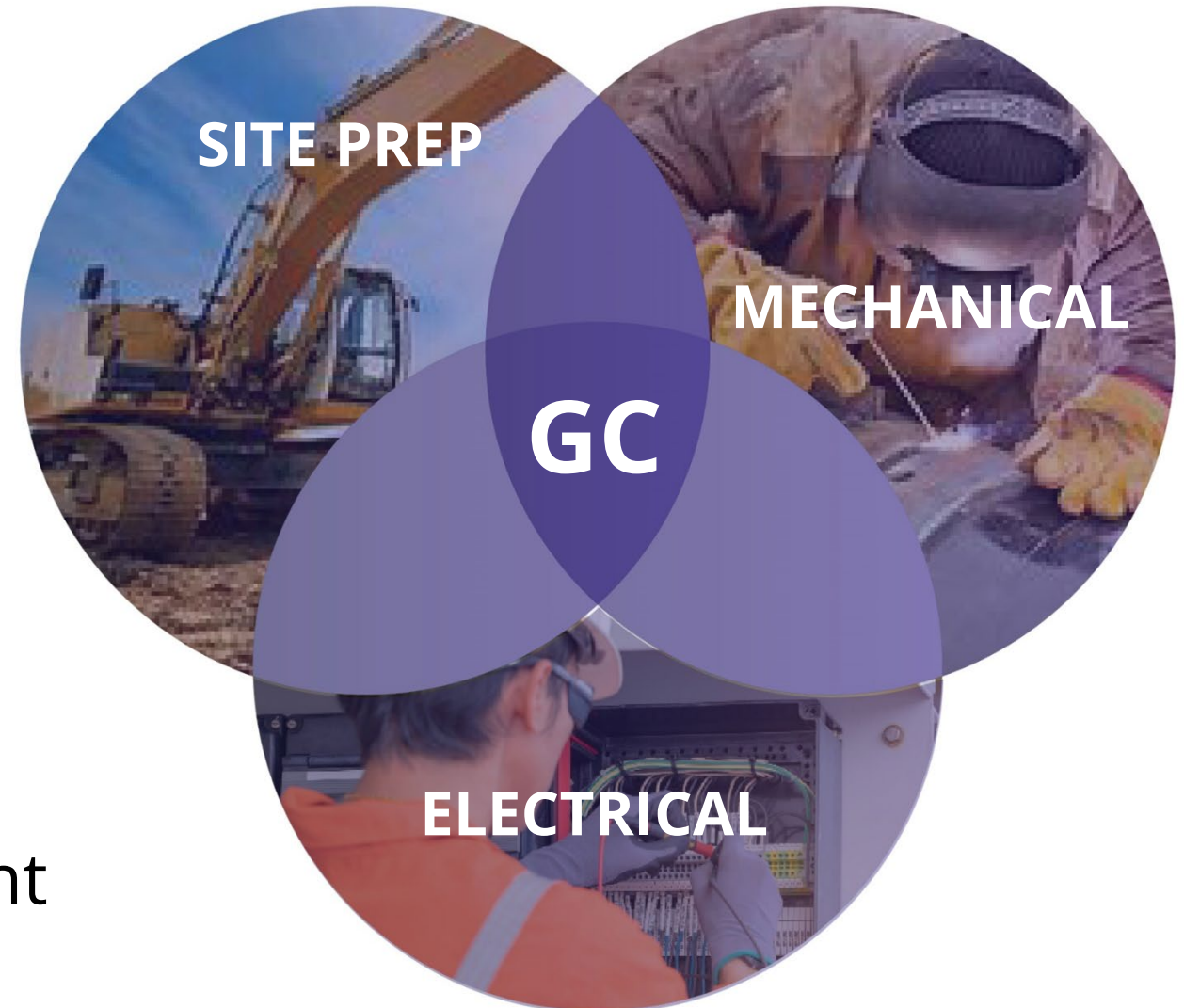
Integrating the Equipment

Contracting approach

Is the client going to manage the disciplines?

- Mechanical / Structural
- Electrical / Automation
- Vendor Communication

GC vs Construction Management



Mechanical/ Electrical Approaches

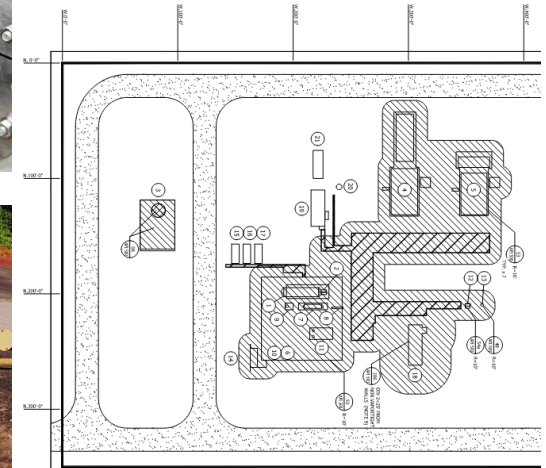
Typical Codes/Standards



- Tubing / Piping / Hoses

- Area Classification

- What are cost-effective solutions in non-classified areas?



PORTABLE PURIFICATION

Packaged 2.5 MMSCFD Nitrogen-Based Purification Facility

- Scalable
- Modular

Target Purity of 98% Product

- 95% Recovery

Total Installed Cost ~\$6.8 Million USD

- Process Package Cost ~\$4.3 Million USD
- Delivery of 40 weeks
- Financing options with 3rd party

CANUSAEPCCOM/HELIUM-PROCESSING

HELIUM FACILITY WEBINAR WITH ARJAE & CANUSA EPC

