



CRESTONE PEAK RESOURCES

WATKINS PIPELINE

HAZARDS & OPERABILITY STUDY (HAZOP)

June 23, 2020

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The accuracy of this study is limited to the process safety information provided and the participation of the analysis team. As such, this study may not fully capture all or every process or hazard circumstance or issue existing at the facility.



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STUDY METHODOLOGY

The specific study methodology used for this study was the Hazards and Operability study (HAZOP), Which was completed in accordance with the Occupational Safety and Health Administration (OSHA) Process Safety Management (PSM) Standard, as outlined in 29 CFR 1910.119(e). This method is a team approach which systematically identifies hazards resulting from deviations from the process design that could lead to undesirable consequences. Guidewords were applied at specific points called nodes and combined with process parameters to identify potential deviations from the intended operation.

The HAZOP was accomplished by reviewing process variables for each node that the project affected, for deviations from normal operating conditions (e.g., High Pressure, Low/No Flow, Low Temperature, Reverse/Misdirected Flow, etc.). Each deviation was discussed and all credible causes that would create that deviation were recorded. If the project did not affect the cause or consequence of the deviation, the scenario was not discussed further, and abbreviations were recorded. If the consequences identified had no significant safety or environmental impact, the scenario was not discussed further and abbreviations were recorded. In cases where safeguards were considered inadequate, the team recommended action.

If credible, each consequence was ranked as to overall risk taking into account the reasonably likely severity of the event and the likelihood of its occurrence. The likelihood aspect of risk was ranked by the PHA team taking into account safeguards designed to prevent or limit the hazard identified. Safeguards were not considered when ranking the severity aspect of risk. Team determined that all consequences found to be "Red" according to the risk matrix must have additional safeguards. Team determined that adding safeguards to "Yellow" risk consequences is optional and that any "Yellow" risk consequences for which additional safeguards are not assigned, existing safeguards were determined to be adequate by the PHA team for that particular consequence. *That risk matrix is included in the following section.*

When assessing the effectiveness of engineering and administrative safeguards, the study team made some assumptions, unless otherwise noted in the worksheets and checklists, which are detailed below.

- "Design Integrity" or "Design Specs" as a safeguard indicates that construction according to ASME B31.8 and API 1104 provides protection against the identified cause and consequence.
- "MI Program" as a safeguard indicates the equipment involved in the cause or consequence is subject to the facility mechanical integrity program.
- Alarms and shutdowns will be fully tested as necessary to ensure reliability before facility startup and subsequently during normal operations.
- Operators will be trained in the duties of their area, both initially and annually as refresher training once procedures are written for this specific plant. Otherwise company training standards assumed.
- Vehicular traffic is controlled throughout the facility. Lines are routed and equipment is located such that the potential for vehicle impact to piping and equipment is minimized.
- Equipment is fit for intended use.
- Emergency response plans will be written and communicated to all employees, including contractors. Evacuation signals will be communicated once the plant has them installed and evacuation routes will be established. Emergency drills will be held as appropriate.
 - This assumption is used only for mitigating general employee/contractor risk when doing the risk assessment. No credit for emergency plans taken as a safeguard.
- Piping and instrumentation diagrams will reflect actual field conditions once construction is complete.
- Fire protection and mitigation equipment that will be used at the site will be appropriately located, adequately sized, functional, and tested on a suitable frequency.
- Electrical area classification is understood, followed and updated accordingly.
- Pre-Startup Safety Review will be completed before the commissioning of any equipment on-site.
- Cause and Effect will be updated as more equipment is purchased and equipment specifications are provided.

The following abbreviations were utilized while scribing HAZOP meeting:

- *AOI – Adverse Operational Impact*
- *BLEVE – Boling liquid expansion valve explosion*
- *BV/CV/GV – Block valve/Control valve/Gate valve*
- *CSC – Car Seal Closed*
- *CSO – Car Seal Open*
- *DP – Pressure Differential*
- *LO – Locked Open*
- *N/A – Not Applicable*
- *NCC – No Credible Cause or Consequence*
- *NNCC – No New Credible Cause*
- *NOV – Notice of Violation*
- *NSC – No Safety Consequence*



Crestone Peak Resources EH&S Risk Matrix

Step 1: Impact Evaluation

SEVERITY

Risk Matrix Level	Severity Rating	People	Environment	Assets	Reputation	Financial & Business
CRITICAL	10	Fatality	Sever irreversible / long-term damage	Production and equipment loss of >\$10 MM	Widespread concerns with extensive adverse media coverage or action resulting in regulatory and / or legal prosecution or suspension of operations	Impact > 20% of project / team budget
	9	Long-term health impact or permanent disability	Widespread impacts to sensitive environments, air, or bodies of water	One month / facility / equipment damage	Prolonged operating region attention	Significant effect on company deliverables
	8	Evacuation of a facility and community	Severe reversible or short-term environmental damage	Terrorist attack / attempt	International or North American attention	Impact 20% - 10% of project / team budget
SERIOUS	7	Lost time incident (LTI)	Effect within Crestone operating field / block	Production and equipment loss > \$1MM	Prolonged local area region attention, or regulatory and / or legal action resulting in fines or punitive action	Minor effect on company deliverables
	6	Multiple injuries, or short-term health impact	Widespread impact to land / air / water	Once week facility / equipment outage	Brief operating area region attention, or regulatory and / or legal action resulting in fines or punitive action	Impact 9% - 5% of project / team budget
	5	Evacuation of facility and immediate area, or violent action from landowner / activist	Moderate environmental damage	Substantial loss from theft / vandalism	Company-wide attention	Significant effect on team deliverables
MODERATE	4	Medical injury	Localized off lease or offsite impacts	Production and equipment loss >\$100MM	Brief local area attention, or regulatory and / or legal action resulting in administrative response	Impact < 5% of project / team budget
	3	Restricted work, or evacuation of jobsite, or specific from landowner / activist	Release with immediate clean up	Major property crime	Localized concerns with no media attention	Small impact on budget
MINOR	2	Minor injury, or minor illness, or first aid, or implied threat from landowner / activist	Minor environmental damage with effect contained on lease	Production and equipment loss <\$100MM	Minimal impact on public, or interdepartmental attention	Noticed effect on team deliverables
	1	No threat of injury, or evacuation	No risk of environmental damage	Negligible production or equipment loss	No attention	No financial effect

Step 2: Probability Estimation

Step 3: Risk Level (Severity x Occurrence)

OCCURRENCE (Frequency)

Risk Matrix Level	Occurrence Rating	By Time of Occurrence
FREQUENT	10	More than once a day
	9	Once every week
	8	Once per month
	7	Once every 6 months
	6	Once every year
LIKELY	5	Once every 1-3 years
UNLIKELY	4	Once every 3-9 years
	3	Once every 10-20 years
REMOTE	2	Once every 20 years
	1	Once in a lifetime

EXTREME (100-8)	Stop activities. Work cannot proceed until risk is reduced to a lower level.
HIGH (36-8)	Extensive risk controls/mitigation measures must be implemented, and BU VP approval is required to allow work to proceed. Efforts to reduce risk to a MEDIUM or a LOW level should be undertaken.
MEDIUM (20-8)	Risk <u>controls/mitigation</u> measures must <u>be implemented</u> to allow work to proceed. Efforts to reduce risk to a LOW level should be undertaken.
LOW (8-1)	Some risk controls/mitigation measures may be justified. Represents an acceptable risk.

SEVERITY

OCCURRENCE (Frequency)		1	2	3	4	5	6	7	8	9	10
	1	1	2	3	4	5	6	7	8	9	10
	2	2	4	6	8	10	12	14	16	18	20
	3	3	6	9	12	15	18	21	24	27	30
	4	4	8	12	16	20	24	28	32	36	40
	5	5	10	15	20	25	30	35	40	45	50
	6	6	12	18	24	30	36	42	48	54	60
	7	7	14	21	28	35	42	49	56	63	70
	8	8	16	24	32	40	48	56	64	72	80
	9	9	18	27	36	45	54	63	72	81	90
	10	10	20	30	40	50	60	70	80	90	100

Step 4: Take Action

Ensure all risks are understood, controlled, and communicated prior to starting work.

This matrix and tables may not precisely describe all situations.

Deviations

Project Name: Watkins Pipeline
Company: Crestone Peak Resources
Location: Watkins/Aurora, CO

Page: 1 of 3

Name	Guideword	Parameter
No Flow	No	Flow
More Flow	More	Flow
Less Flow	Less	Flow
Chemical reaction	As Well As	Flow
Runaway reaction	As Well As	Flow
Reverse Flow	Reverse	Flow
Misdirected Flow	Other Than	Flow
Higher Temperature	More	Temperature
Lower Temperature	Less	Temperature
Higher Pressure	More	Pressure
Lower Pressure	Less	Pressure
No Composition	No	Composition
High Concentration	More	Composition
Low Concentration	Less	Composition
Contamination	As Well As	Composition
Liquid carryover	As Well As	Composition
Missing component	Part Of	Composition
Incorrect material	Other Than	Composition
Increase in number of phases	More	Phase
Decrease in number of phases	Less	Phase
Reverse Phase	Reverse	Phase
No Level	No	Level
Higher Level	More	Level
Lower Level	Less	Level
No Addition	No	Addition
More Addition	More	Addition
Less Addition	Less	Addition
As Well As Addition	As Well As	Addition
Part Of Addition	Part Of	Addition
Reverse Addition	Reverse	Addition
Other Than Addition	Other Than	Addition
No Reaction	No	Reaction
More Reaction	More	Reaction
Less Reaction	Less	Reaction
As Well As Reaction	As Well As	Reaction
Part Of Reaction	Part Of	Reaction
Reverse Reaction	Reverse	Reaction
Other Than Reaction	Other Than	Reaction
No Maintenance	No	Maintenance
More Maintenance	More	Maintenance

Deviations

Project Name: Watkins Pipeline
Company: Crestone Peak Resources
Location: Watkins/Aurora, CO

Page: 2 of 3

Name	Guideword	Parameter
Less Maintenance	Less	Maintenance
As Well As Maintenance	As Well As	Maintenance
Part Of Maintenance	Part Of	Maintenance
Reverse Maintenance	Reverse	Maintenance
Other Than Maintenance	Other Than	Maintenance
No Testing	No	Testing
More Testing	More	Testing
Less Testing	Less	Testing
As Well As Testing	As Well As	Testing
Part Of Testing	Part Of	Testing
Reverse Testing	Reverse	Testing
Other Than Testing	Other Than	Testing
No Instrumentation	No	Instrumentation
More Instrumentation	More	Instrumentation
Less Instrumentation	Less	Instrumentation
As Well As Instrumentation	As Well As	Instrumentation
Part Of Instrumentation	Part Of	Instrumentation
Reverse Instrumentation	Reverse	Instrumentation
Other Than Instrumentation	Other Than	Instrumentation
No Sampling	No	Sampling
More Sampling	More	Sampling
Less Sampling	Less	Sampling
As Well As Sampling	As Well As	Sampling
Part Of Sampling	Part Of	Sampling
Reverse Sampling	Reverse	Sampling
Other Than Sampling	Other Than	Sampling
No Relief	No	Relief
More Relief	More	Relief
Less Relief	Less	Relief
As Well As Relief	As Well As	Relief
Part Of Relief	Part Of	Relief
Reverse Relief	Reverse	Relief
Other Than Relief	Other Than	Relief
No Services / Utilities	No	Services / Utilities
More Services / Utilities	More	Services / Utilities
Less Services / Utilities	Less	Services / Utilities
As Well As Services / Utilities	As Well As	Services / Utilities
Part Of Services / Utilities	Part Of	Services / Utilities
Reverse Services / Utilities	Reverse	Services / Utilities
Other Than Services / Utilities	Other Than	Services / Utilities

Deviations

Project Name: Watkins Pipeline
Company: Crestone Peak Resources
Location: Watkins/Aurora, CO

Page: 3 of 3

Name	Guideword	Parameter
More Corrosion / Erosion	More	Corrosion / Erosion
Less Corrosion / Erosion	Less	Corrosion / Erosion
No Safety	No	Safety
More Safety	More	Safety
Less Safety	Less	Safety
No Purging / Inerting	No	Purging / Inerting
More Purging / Inerting	More	Purging / Inerting
Less Purging / Inerting	Less	Purging / Inerting
As Well As Purging / Inerting	As Well As	Purging / Inerting
Part Of Purging / Inerting	Part Of	Purging / Inerting
Reverse Purging / Inerting	Reverse	Purging / Inerting
Other Than Purging / Inerting	Other Than	Purging / Inerting

Note: Only deviations considered relevant, and or applicable were used in this Hazard and Operability study (HAZOP),

Parameters

Company: Crestone Peak Resources
Location: Watkins/Aurora, CO

Page: 1 of 3

Name	Guidewords
Pressure	More
	Less
Temperature	More
	Less
Flow	No
	More
	Less
	Reverse
Composition	More
Phase	More
	Less
	Reverse
What if	Human Factor
Level	No
	More
	Less
Addition	No
	More
	Less
	As Well As
	Part Of
	Reverse
	Other Than
Reaction	No
	More
	Less
	As Well As
	Part Of
	Reverse
	Other Than
Maintenance	No
	More
	Less
	As Well As
	Part Of
	Reverse
	Other Than
Testing	No
	More
	Less
	As Well As

Parameters

Company: Crestone Peak Resources
Location: Watkins/Aurora, CO

Page: 2 of 3

Name	Guidewords
Testing (<i>cont</i>)	Part Of
	Reverse
	Other Than
Instrumentation	No
	More
	Less
	As Well As
	Part Of
	Reverse
Sampling	Other Than
	No
	More
	Less
	As Well As
	Part Of
Relief	Reverse
	Other Than
	No
	More
	Less
	As Well As
Services / Utilities	Part Of
	Reverse
	Other Than
	No
	More
	Less
Corrosion / Erosion	As Well As
	Part Of
	Reverse
	Other Than
	More
	Less
Safety	No
	More
	Less
Purging / Inerting	No
	More
	Less
	As Well As
	Part Of

Parameters

Company: Crestone Peak Resources

Page: 3 of 3

Location: Watkins/Aurora, CO

Name	Guidewords
Purging / Inerting (<i>cont</i>)	Reverse
	Other Than

Note: Only parameters considered relevant, and or applicable were used in this Hazard and Operability study (HAZOP),

Worksheet

Project Name: Watkins Pipeline

Company: Crestone Peak Resources

Location: Watkins/Aurora, CO

Description: Pipeline Gathering

Chemicals: Raw natural gas

Comments: This HAZOP was initiated and concluded as a responsible commitment in a purchase, no new construction has taken place.

Purpose: Complete facility hazards and operability study, utilizing hazards and operability and the what if methodology

Scope: The scope of this HAZOP starts at the upstream block valve on the Meter Skid (typical), follows through to the Wet Gas Pig Launchers PV-6XXX (typical), and the Wet Gas Pig Receivers PV-7XXX (typical) ending at SDV-0230/1 prior to the Slug Catcher .

Objectives: Evaluate the potential for negative worker and public impacts (Hazards) as well as for significant potential process impacts/upsets (operability) and recommend corrective actions based on risk.

Project Notes: This Hazard and operability study focused on the Wet Gas Pig Launchers, Wet Gas Pig Receivers, Meter Skids, and Pipeline as typical in manor.

Worksheet

Page: 1 of 8

Node: 1. Wet Gas Launcher

Drawings: (1) DEN-6004-11-730 (0) • (2) DEN-6004-11-027 (10) • (3) DEN-6004-11-019 (5) • (4) DEN-6004-11-021 (3) • (5) DEN-6004-11-023 (7) • (6) DEN-6004-11-634 (6) • (7) DEN-6004-11-698 (2) • (8) DEN-6004-11-037 (6)

Parameter: Pressure

Intention: MAWP= 700 psig

Sessions: (1) 6/23/2020

Guidewords	Deviations	Causes	Consequences	Safeguards	Risk After Safeguards			Recommendations	
					S	L	R	#	Recommendations
More	High Pressure	1. Manual block valve inadvertently open	1.1.1. Open pipeline through the launcher, possible personnel injury	Operating procedures	4	4	16		
				Double block and bleed					
				Weep hole before launcher door					
Less	Negative Pressure	3. Ambient temperature change	3.1.1. Potential to pull a vacuum, possible O2 ingress. Double jeopardy required for explosive mixture, AOI	Operating procedure					
				Purging					
				Low pressure-low volume of O2					

Node: 1. Wet Gas Launcher

Drawings: (1) DEN-6004-11-730 (0) • (2) DEN-6004-11-027 (10) • (3) DEN-6004-11-019 (5) • (4) DEN-6004-11-021 (3) • (5) DEN-6004-11-023 (7) • (6) DEN-6004-11-634 (6) • (7) DEN-6004-11-698 (2) • (8) DEN-6004-11-037 (6)

Parameter: Temperature

Intention: MAWT= -20 to 100 dF

Guidewords	Deviations	Causes	Consequences	Safeguards	Risk After Safeguards			Recommendations	
					S	L	R	#	Recommendations
More	Higher Temperature	1. NCC							
Less	Lower Temperature	2. See Low Pressure this Node							
		3. Low ambient	3.1.1. Low point (cracked valve) equipment damage, loss of containment, possible ignition	Most valves orientated up	4	3	12		
		4. Hydrate	4.1.1. NCC, pressure too low for hydrate formation						

Worksheet

Page: 2 of 8

Node: 1. Wet Gas Launcher

Drawings: (1) DEN-6004-11-730 (0) • (2) DEN-6004-11-027 (10) • (3) DEN-6004-11-019 (5) • (4) DEN-6004-11-021 (3) • (5) DEN-6004-11-023 (7) • (6) DEN-6004-11-634 (6) • (7) DEN-6004-11-698 (2) • (8) DEN-6004-11-037 (6)

Parameter: Flow

Guidewords	Deviations	Causes	Consequences	Safeguards	Risk After Safeguards			Recommendations	
					S	L	R	#	Recommendations
More	More Flow	1. NCC, system will equalize with pipeline pressure							
Less	Less Flow	2. See above							

Node: 1. Wet Gas Launcher

Drawings: (1) DEN-6004-11-730 (0) • (2) DEN-6004-11-027 (10) • (3) DEN-6004-11-019 (5) • (4) DEN-6004-11-021 (3) • (5) DEN-6004-11-023 (7) • (6) DEN-6004-11-634 (6) • (7) DEN-6004-11-698 (2) • (8) DEN-6004-11-037 (6)

Parameter: Composition

Guidewords	Deviations	Causes	Consequences	Safeguards	Risk After Safeguards			Recommendations	
					S	L	R	#	Recommendations
More	Corrosion	1. H2S in gas	1.1.1. Increased corrosion rate, equipment damage, loss of containment, potential for ignition	Historically low H2S concentrations in the system Additional wall thickness	4	3	12		

Node: 1. Wet Gas Launcher

Drawings: (1) DEN-6004-11-730 (0) • (2) DEN-6004-11-027 (10) • (3) DEN-6004-11-019 (5) • (4) DEN-6004-11-021 (3) • (5) DEN-6004-11-023 (7) • (6) DEN-6004-11-634 (6) • (7) DEN-6004-11-698 (2) • (8) DEN-6004-11-037 (6)

Parameter: What if

Sessions: (1) 6/23/2020

Guidewords	Deviations	Causes	Consequences	Safeguards	Risk After Safeguards			Recommendations	
					S	L	R	#	Recommendations
What if	Erosion	1. Excess erosion in pipeline bends	1.1.1. NCC, system designed for smart pig ability	Frequent pigging					
	Human factors	2. Walking and working surfaces can become slick	2.1.1. Operator slips during pigging operations, possible personnel injury	Operating procedures	7	4	28		
		3. Failure to drain pan	3.1.1. Loss of containment	Operating procedures Rain cap	4	3	12		
		4. Vehicle strike/line strike	4.1.1. Equipment damage, loss of containment, potential ignition	Operator training and intervention	4	2	8		
		5. Stuck pig	5.1.1. Process upset, ...						

Worksheet

Page: 3 of 8

Node: 1. Wet Gas Launcher

Drawings: (1) DEN-6004-11-730 (0) • (2) DEN-6004-11-027 (10) • (3) DEN-6004-11-019 (5) • (4) DEN-6004-11-021 (3) • (5) DEN-6004-11-023 (7) • (6) DEN-6004-11-634 (6) • (7) DEN-6004-11-698 (2) • (8) DEN-6004-11-037 (6)

Parameter: What if

Sessions: (1) 6/23/2020

Guidewords	Deviations	Causes	Consequences	Safeguards	Risk After Safeguards			Recommendations	
					S	L	R	#	Recommendations
What if <i>(cont)</i>	<i>(cont)</i>	5. Stuck pig <i>(cont)</i>	...restricted orifice area causing possible hydrates. See High Pressure Node 2						

Worksheet

Page: 4 of 8

Node: 2. Wet Gas Receiver

Drawings: (9) DEN-6004-11-020 (4) • (10) DEN-6004-11-024 (2) • (11) DEN-6004-11-028 (3) • (12) DEN-6004-11-038 (5) • (13) DEN-6004-11-050 (11) • (14) DEN-6004-11-635 (4) • (15) DEN-6004-11-681 (1) • (16) DEN-6004-11-699 (0)

Parameter: Pressure

Intention: MAWT= 700 psig

Sessions: (1) 6/23/2020

Guidewords	Deviations	Causes	Consequences	Safeguards	Risk After Safeguards			Recommendations	
					S	L	R	#	Recommendations
More	Higher Pressure	1. Stuck pig	1.1.1. Pig releases into the barrel, AOI						
		2. Hydrate formation/ line plugged/Paraffin build up	2.1.1. Hydrate formation (or buildup) releases into the open barrel, equipment damage, loss of containment, possible personnel injury	Operating procedures	10	1	10	2.1.1.1	Ensure the Watkins region is familiar with the Hydrate removal SOPs
				Hydrate removal procedure Pressure monitoring					
Less	Negative Pressure	3. Ambient temperature change	3.1.1. Potential to pull a vacuum, possible O2 ingress. Double jeopardy required for explosive mixture, AOI	Operating procedures					
				Purging					
				Low pressure-low volume of O2					

Node: 2. Wet Gas Receiver

Drawings: (9) DEN-6004-11-020 (4) • (10) DEN-6004-11-024 (2) • (11) DEN-6004-11-028 (3) • (12) DEN-6004-11-038 (5) • (13) DEN-6004-11-050 (11) • (14) DEN-6004-11-635 (4) • (15) DEN-6004-11-681 (1) • (16) DEN-6004-11-699 (0)

Parameter: Temperature

Intention: MAWT= -20 to 150 dF

Sessions: (1) 6/23/2020

Guidewords	Deviations	Causes	Consequences	Safeguards	Risk After Safeguards			Recommendations	
					S	L	R	#	Recommendations
More	Higher Temperature	1. NCC							
Less	Lower Temperature	2. See Low Pressure this Node							
		3. Low ambient	3.1.1. Low point freeze (cracked valve), equipment damage, loss of containment, possible ignition	Most valves orientated up	4	3	12		

Worksheet

Page: 5 of 8

Node: 2. Wet Gas Receiver

Drawings: (9) DEN-6004-11-020 (4) • (10) DEN-6004-11-024 (2) • (11) DEN-6004-11-028 (3) • (12) DEN-6004-11-038 (5) • (13) DEN-6004-11-050 (11) • (14) DEN-6004-11-635 (4) • (15) DEN-6004-11-681 (1) • (16) DEN-6004-11-699 (0)

Parameter: Composition

Sessions: (1) 6/23/2020

Guidewords	Deviations	Causes	Consequences	Safeguards	Risk After Safeguards			Recommendations	
					S	L	R	#	Recommendations
More	Corrosion	1. H2S in gas	1.1.1. Increased corrosion rate, equipment damage, loss of containment, potential for ignition	Historically low H2S concentrations in the system Additional wall thickness	4	3	12		

Node: 2. Wet Gas Receiver

Drawings: (9) DEN-6004-11-020 (4) • (10) DEN-6004-11-024 (2) • (11) DEN-6004-11-028 (3) • (12) DEN-6004-11-038 (5) • (13) DEN-6004-11-050 (11) • (14) DEN-6004-11-635 (4) • (15) DEN-6004-11-681 (1) • (16) DEN-6004-11-699 (0)

Parameter: What if

Sessions: (1) 6/23/2020

Guidewords	Deviations	Causes	Consequences	Safeguards	Risk After Safeguards			Recommendations	
					S	L	R	#	Recommendations
What if	Erosion	1. Excess erosion in pipeline bends	1.1.1. NCC, system built for smart pigs	Frequent pigging					
	Human factors	2. Walking and working surfaces can become slick	2.1.1. Operator spills during pigging operations, possible personnel injury	Operating procedures	7	4	28		
		3. Failure to drain pan	3.1.1. Loss of containment	Operating procedure Rain cap	4	3	12		
		4. Excess liquid in the barrel	4.1.1. Loss of containment	Operating procedure Drip Pan	3	5	15	4.1.1.1	Verify returning liquid to pipeline is detailed in the operating procedure
		5. Vehicle strike/line strike	5.1.1. Equipment damage, loss of containment, potential ignition	Operator training and intervention	4	2	8		

Worksheet

Page: 6 of 8

Node: 3. Meter Skid

Drawings: (17) DEN-6004-11-687 (0) • (18) DEN-6004-11-011 (2) • (19) DEN-6004-11-014 (14) • (20) DEN-6004-11-015 (6) • (21) DEN-6004-11-016 (7) • (22) DEN-6004-11-682 (62)

Parameter: Pressure

Intention: MAWP= 300 psi

Sessions: (1) 6/23/2020

Guidewords	Deviations	Causes	Consequences	Safeguards	Risk After Safeguards			Recommendations	
					S	L	R	#	Recommendations
More	Higher Pressure	1. NCC							
Less	Negative Pressure	2. Ambient temperature change	2.1.1. Potential to pull a vacuum, possible O2 ingress. Double jeopardy required for explosive mixture, AOI	O2 analyzer set at 10 ppm, shuts butterfly valves					

Node: 3. Meter Skid

Drawings: (17) DEN-6004-11-687 (0) • (18) DEN-6004-11-011 (2) • (19) DEN-6004-11-014 (14) • (20) DEN-6004-11-015 (6) • (21) DEN-6004-11-016 (7) • (22) DEN-6004-11-682 (62)

Parameter: Temperature

Intention: MAWT=-20 to 120 dF

Guidewords	Deviations	Causes	Consequences	Safeguards	Risk After Safeguards			Recommendations	
					S	L	R	#	Recommendations
More	Higher Temperature	1. NCC							
Less	Lower Temperature	2. See Low Pressure this Node							
		3. Low ambient or H-4060 fails to run	3.1.1. Low point freeze (cracked valve), equipment damage, loss of containment, possible ignition	Most valves orientated up	4	3	12		

Node: 3. Meter Skid

Drawings: (17) DEN-6004-11-687 (0) • (18) DEN-6004-11-011 (2) • (19) DEN-6004-11-014 (14) • (20) DEN-6004-11-015 (6) • (21) DEN-6004-11-016 (7) • (22) DEN-6004-11-682 (62)

Parameter: Flow

Guidewords	Deviations	Causes	Consequences	Safeguards	Risk After Safeguards			Recommendations	
					S	L	R	#	Recommendations
More	More Flow	1. NSC							
Less	Less Flow	2. NSC							

Worksheet

Page: 7 of 8

Node: 3. Meter Skid

Drawings: (17) DEN-6004-11-687 (0) • (18) DEN-6004-11-011 (2) • (19) DEN-6004-11-014 (14) • (20) DEN-6004-11-015 (6) • (21) DEN-6004-11-016 (7) • (22) DEN-6004-11-682 (62)

Parameter: Composition

Guidewords	Deviations	Causes	Consequences	Safeguards	Risk After Safeguards			Recommendations	
					S	L	R	#	Recommendations
More	Corrosion	1. H2S in gas	1.1.1. Increased corrosion rate, equipment damage, loss of containment, potential for ignition	Historically low H2S concentrations in the system	4	3	12		
			Additional wall thickness						

Node: 3. Meter Skid

Drawings: (17) DEN-6004-11-687 (0) • (18) DEN-6004-11-011 (2) • (19) DEN-6004-11-014 (14) • (20) DEN-6004-11-015 (6) • (21) DEN-6004-11-016 (7) • (22) DEN-6004-11-682 (62)

Parameter: What if

Sessions: (1) 6/23/2020

Guidewords	Deviations	Causes	Consequences	Safeguards	Risk After Safeguards			Recommendations	
					S	L	R	#	Recommendations
What if	Human factor	1. Vehicle strike	1.1.1. Equipment damage, loss of containment, potential ignition	Operator training and intervention	4	2	8		

Worksheet

Page: 8 of 8

Node: 4. Pipeline

Drawings: (1) DEN-6004-11-730 (0) • (2) DEN-6004-11-027 (10) • (3) DEN-6004-11-019 (5) • (4) DEN-6004-11-021 (3) • (5) DEN-6004-11-023 (7) • (6) DEN-6004-11-634 (6) • (7) DEN-6004-11-698 (2) • (8) DEN-6004-11-037 (6) • (9) DEN-6004-11-020 (4) • (10) DEN-6004-11-024 (2) • (11) DEN-6004-11-028 (3) • (12) DEN-6004-11-038 (5) • (13) DEN-6004-11-050 (11) • (14) DEN-6004-11-635 (4) • (15) DEN-6004-11-681 (1) • (16) DEN-6004-11-699 (0) • (17) DEN-6004-11-687 (0) • (18) DEN-6004-11-011 (2) • (19) DEN-6004-11-014 (14) • (20) DEN-6004-11-015 (6) • (21) DEN-6004-11-016 (7) • (22) DEN-6004-11-682 (62) • (23) DEN-6004-11-240 (7)

Parameter: What if

Sessions: (1) 6/23/2020

Guidewords	Deviations	Causes	Consequences	Safeguards	Risk After Safeguards			Recommendations	
					S	L	R	#	Recommendations
What if	Human Factor	1. 3rd party line strike/ failure organize One Calls	1.1.1. Equipment damage, loss of containment, potential for ignition, possible injury/fatality	Pressure monitoring/ remote shut-in of wellheads	10	2	20	1.1.1.1	Field verify pipeline markers, and replace as required
				Pipeline buried to a minimum of 4ft				1.1.1.2	Verify all pipelines are in Colorado 811
				Signage/flagging				1.1.1.3	Consider programming remote shut-down on Well Pads O2 Slam Valves
				Low pressure system, minimizing the release quantities					
				Pipelines are in Colorado 811					
	Pipeline fatigue	2. Corrosion	2.1.1. Underground leak, loss of containment	Operator rounds (dead vegetation)	4	2	8		
				Cathode protection					
				Pipe coating (FBE)					
	Mother Nature	3. Flash flood	3.1.1. Uncovered pipeline, potential pipeline stress, reputation concerns with exposed pipe	Situational awareness	4	3	12		
				Weather monitoring					
		4. Loss of power	4.1.1. NSC						

TEAM MEMBERS

A team knowledgeable in the process and a facilitator knowledgeable in the PHA/HAZOP methodology conducted the study. The HAZOP team meeting was recorded directly into a PHA software program (PHAWorks Lite) designed to facilitate the recording of HAZOP discussions.

Participants in the HAZOP consisted of representatives from the following organizations:

- Operations
- Process Safety
- Project Management
- Project Engineering
- Process, Mechanical, and Electrical Engineering
- Process Controls and Instrumentation Engineering

The signed attendance is included below along with a *Statement of Qualifications* for the PHA Leader.

Crestone Peak Resources: Niobrara Infrastructure

Session 1: June 23, 2020

[illegible]

STATEMENT OF QUALIFICATIONS

Dawn Keeler maintains a Professional Engineering, PEng., status in Alberta, Canada and is a board-certified Certified Safety Professional, CSP. She holds a bachelors' degree in Chemical Engineering and a Masters' degree in Applied Occupational Health.

Dawn has 10 years' experience in completions and drilling, and since 2017 she has been very active in the midstream industry, including facilitating for a variety of midstream facilities including but not limited to 3 Bear Libby, Crestone Peak Resources, Cureton Midstream, Discovery Midstream, Elevation Midstream, Evolution Midstream, Extraction Oil & Gas, Holly Energy Partners, Meritage Midstream, and Noble Midstream.

This is to certify that

Dann Keeler

has completed a special concentrated course on

Process Hazard Analysis Leadership

May 20 - 23, 2019

This 4-day course is approved for 2.6 Continuing Education Units



Donald K. Lorenzo

Donald K. Lorenzo
Director, Training Solutions



Recommendations

Project Name: Watkins Pipeline
Company: Crestone Peak Resources
Location: Watkins/Aurora, CO

Page: 1 of 2

Node: 2. Wet Gas Receiver

Drawings: (9) DEN-6004-11-020 (4) • (10) DEN-6004-11-024 (2) • (11) DEN-6004-11-028 (3) • (12) DEN-6004-11-038 (5) • (13) DEN-6004-11-050 (11) • (14) DEN-6004-11-635 (4) • (15) DEN-6004-11-681 (1) • (16) DEN-6004-11-699 (0)

Parameter: Pressure

Intention: MAWT= 700 psig

Deviations	R	Recommendations	
		#	Recommendations
Higher Pressure	10	2.1.1.1	Ensure the Watkins region is familiar with the Hydrate removal SOPs

Node: 2. Wet Gas Receiver

Drawings: (9) DEN-6004-11-020 (4) • (10) DEN-6004-11-024 (2) • (11) DEN-6004-11-028 (3) • (12) DEN-6004-11-038 (5) • (13) DEN-6004-11-050 (11) • (14) DEN-6004-11-635 (4) • (15) DEN-6004-11-681 (1) • (16) DEN-6004-11-699 (0)

Parameter: What if

Deviations	R	Recommendations	
		#	Recommendations
	15	4.1.1.1	Verify returning liquid to pipeline is detailed in the operating procedure

Recommendations

Project Name: Watkins Pipeline
Company: Crestone Peak Resources
Location: Watkins/Aurora, CO

Page: 2 of 2

Node: 4. Pipeline

Drawings: (1) DEN-6004-11-730 (0) • (2) DEN-6004-11-027 (10) • (3) DEN-6004-11-019 (5) • (4) DEN-6004-11-021 (3) • (5) DEN-6004-11-023 (7) • (6) DEN-6004-11-634 (6) • (7) DEN-6004-11-698 (2) • (8) DEN-6004-11-037 (6) • (9) DEN-6004-11-020 (4) • (10) DEN-6004-11-024 (2) • (11) DEN-6004-11-028 (3) • (12) DEN-6004-11-038 (5) • (13) DEN-6004-11-050 (11) • (14) DEN-6004-11-635 (4) • (15) DEN-6004-11-681 (1) • (16) DEN-6004-11-699 (0) • (17) DEN-6004-11-687 (0) • (18) DEN-6004-11-011 (2) • (19) DEN-6004-11-014 (14) • (20) DEN-6004-11-015 (6) • (21) DEN-6004-11-016 (7) • (22) DEN-6004-11-682 (62) • (23) DEN-6004-11-240 (7)

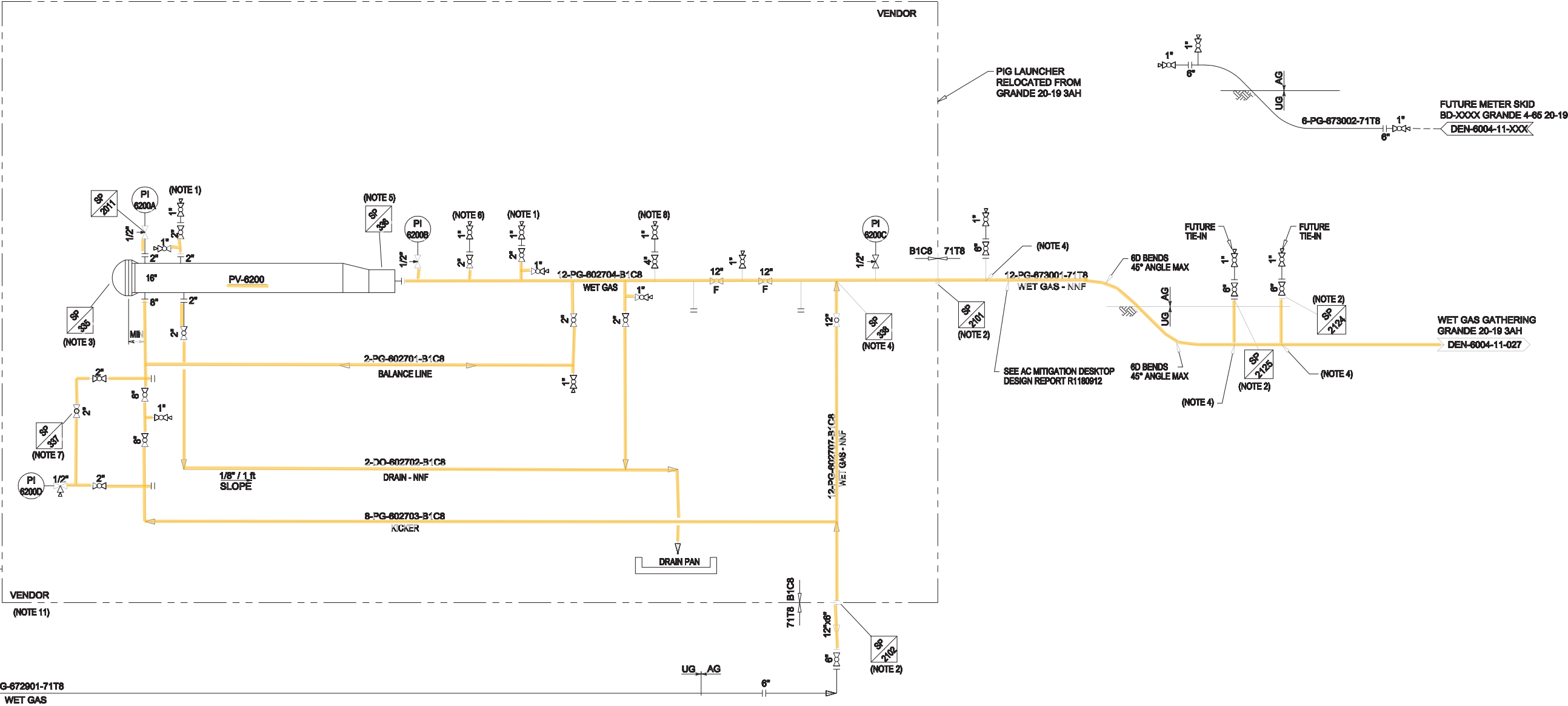
Parameter: What if

Deviations	R	Recommendations	
		#	Recommendations
Human Factor	20	1.1.1.1	Field verify pipeline markers, and replace as required
		1.1.1.2	Verify all pipelines are in Colorado 811
		1.1.1.3	Consider programming remote shut-down on Well Pads O2 Slam Valves

EQUIPMENT I.D.	PV-6200
DESCRIPTION	WET GAS PIG LAUNCHER EASTERN HILLS
SIZE	12" PIPE
DESIGN	700 PSIG @ -20° F/100° F
TRIM	B1C8
STANDARD AND CODE	ASME B31.8

SP-2011
PRESSURE LIMITING VALVE
MODEL: 200 "GAUGE MINDER"
SIZE: 1/2" FNPT x 1/2" FNPT
BODY MATERIAL: 316 S.S.
SEAL MATERIAL: BUNA-N & TEFLON
SHUT OFF POINT: 200 PSIG

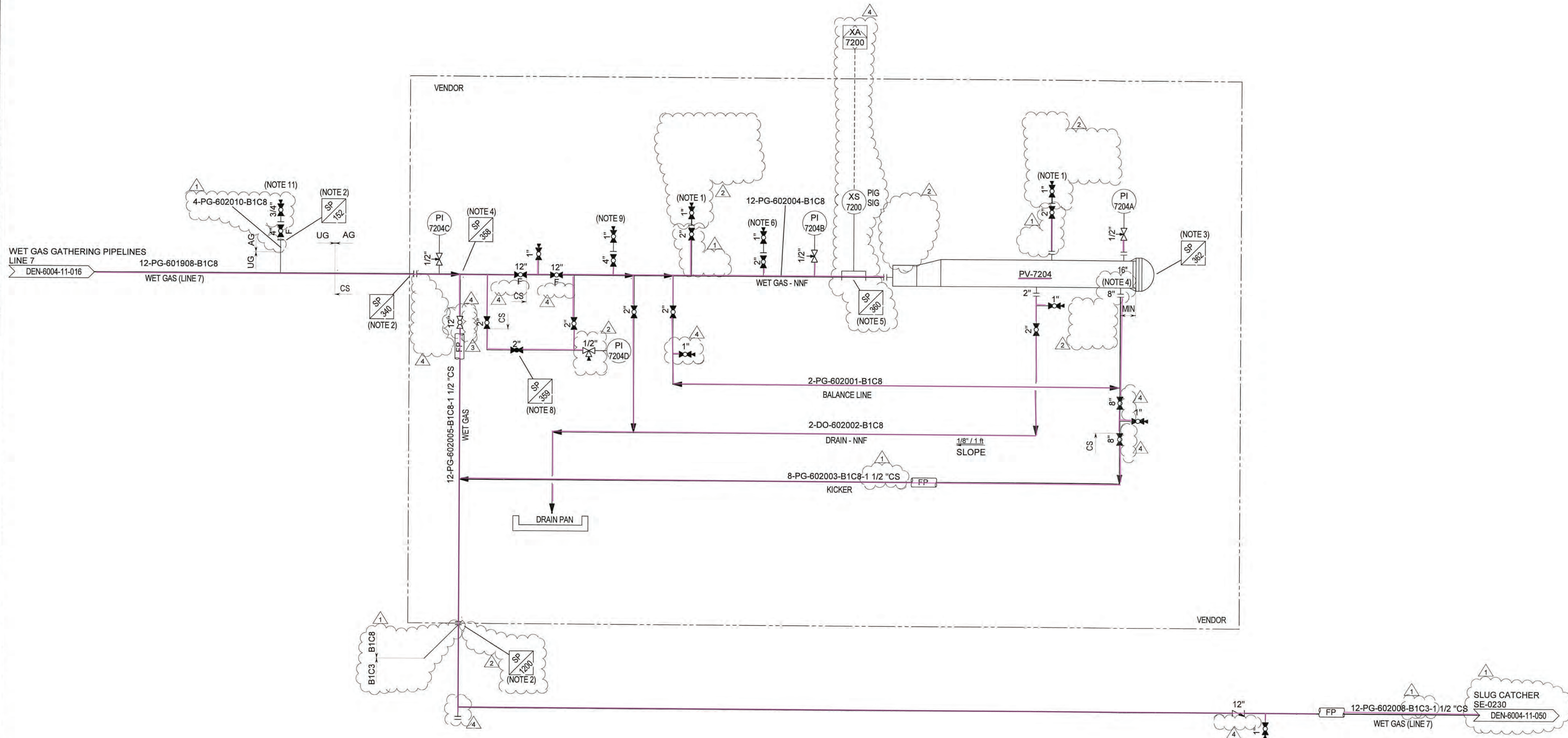
Node 1: Wet Gas Pig Launchers



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			0	10/16/18	ISSUED FOR CONSTRUCTION	DU	VN		JBN							

Node 2: Wet Gas Receiver

EQUIPMENT I.D	PV-7204
DESCRIPTION	WET GAS PIG RECEIVER LINE 7
SIZE	12" PIPE
DESIGN	700 PSIG @ -20°F / 150°F
TRIM	B1C8
STANDARD AND CODE	ASME B31.8





ISSUED
8/28/2015
AS-BUILT

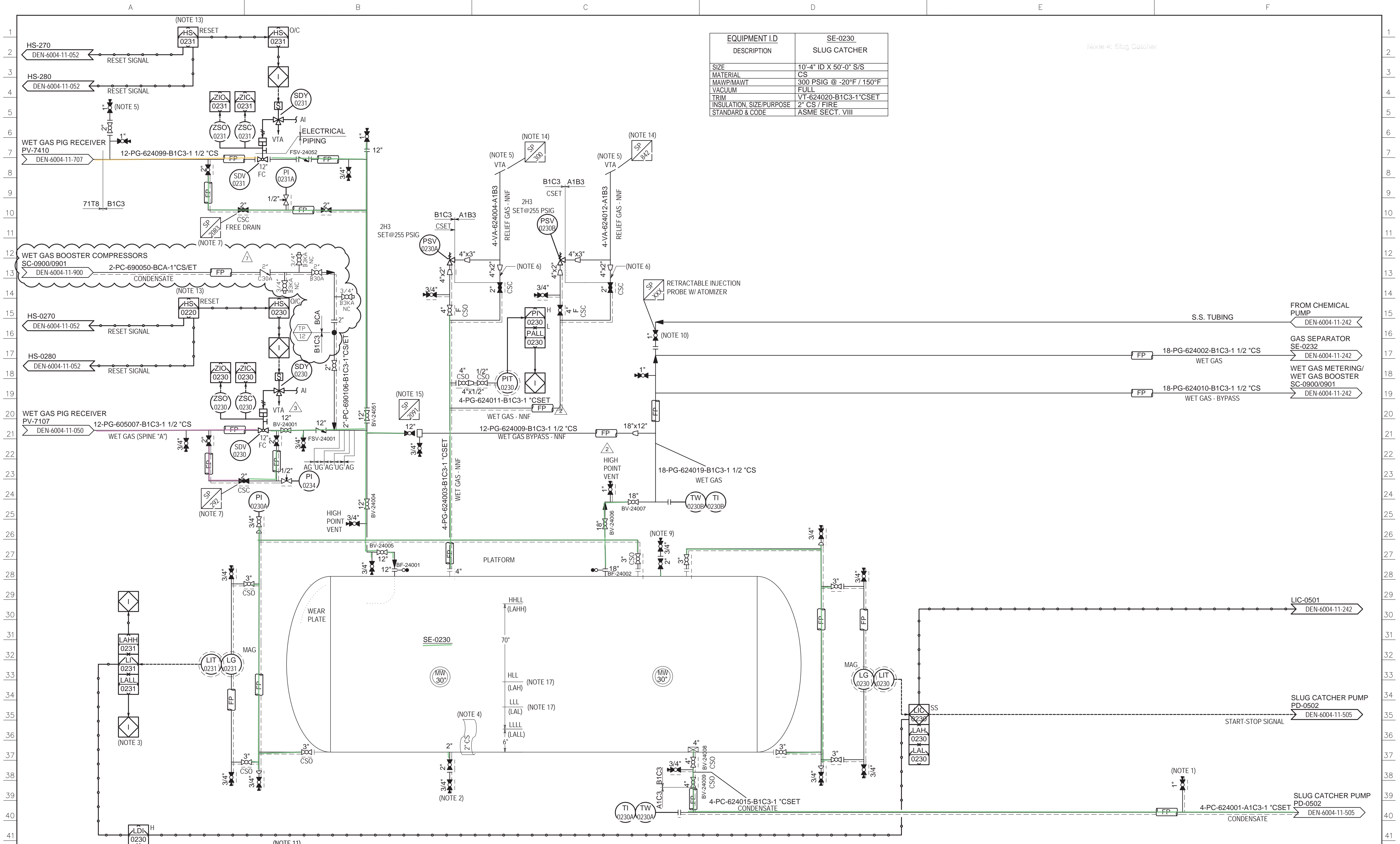
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DWG No.	REFERENCE DRAWINGS	No.	DATE	REVISIONS	BY	CKD	HAZOP DATE	APP	DATE	APP	DATE	NOTES	ENGINEERING RECORD	DATE	BRONCO PIPELINE COMPANY
		0	01/23/14	APPROVED FOR CONSTRUCTION	BJ							1. SAFE LOCATION.	DRN: BJ	10/09/13	WET GAS PIG RECEIVER
		1	05/21/14	APPROVED FOR CONSTRUCTION	BJ							2. INSULATION KIT.	CHK: FMW	8/18/15	LINE 7
		2	09/15/14	APPROVED FOR CONSTRUCTION - CONSTRUCTION SEQUENCE 3	BJ							3. ENCLOSURE.	APP: B.I.B.15		PIPING & INSTRUMENTATION DIAGRAM
		3	02/19/15	APPROVED FOR CONSTRUCTION - PONY STATION	BWW							4. BARRED TEE.			PLAN
		4	07/23/15	AS-BUILT	BJ	FMW			8/18/15	8/21/15		5. PIG SIG.	W.O. No.:		DWG. No.
												6. PURGE / FLUSH CONNECTION.	SCALE: NONE		DEN-6004-11-020
												7. DELETED.			CAD FILE:
												8. MERL CHOK VALVE.			REV
												9. TELL-TALE VALVE.			4
												10. DELETED.			
												11. CORROSION COUPON.			

SP-005
ISOLATION FLANGE KIT
COMPLETE W/ SLEEVES
AND WASHERS

**TO GRANDE WELL PAD BUY BACK
METER FOR LIFT GAS SUPPLY**

DWG No.	REFERENCE DRAWINGS	No.	DATE	REVISIONS	BY	CK'D	HAZOP DATE	APP	DATE	APP	DATE	NOTES	ENGINEERING RECORD	DATE							
		0	05/08/17	ISSUE FOR CONSTRUCTION	VAE	RFS		JBN				1. ISOLATION FLANGE KIT. 2. O2 ANALYZER WILL SHUT BUTTERFLY VALVES AT 10 PPM AND ALLOW RESET AT 5 PPM O2. 3. EARTHEN GROUND CABLE TO BE BONDED TO THE FACILITY GROUNDING SYSTEM.	DRN: GES CHK: RFS APP: JBN APP:	10/29/16 04/07/17 04/07/17	<div>  </div> <div> GRANDE 20-19 3AH 6" METER SKID P&ID </div>						
												W.O. No.: SCALE: NONE						DWG. No.	DEN-6004-11-687	CAD FILE: PLOT DATE:	REV 0



EQUIPMENT I.D.	SE-0230
DESCRIPTION	SLUG CATCHER
SIZE	10'-4" ID X 50'-0" S/S
MATERIAL	CS
MAWP/MAWT	300 PSIG @ -20°F / 150°F
VACUUM	FULL
TRIM	VT-624020-B1C3-1"CSET
INSULATION, SIZE/PURPOSE	2" CS / FIRE
STANDARD & CODE	ASME SECT. VIII

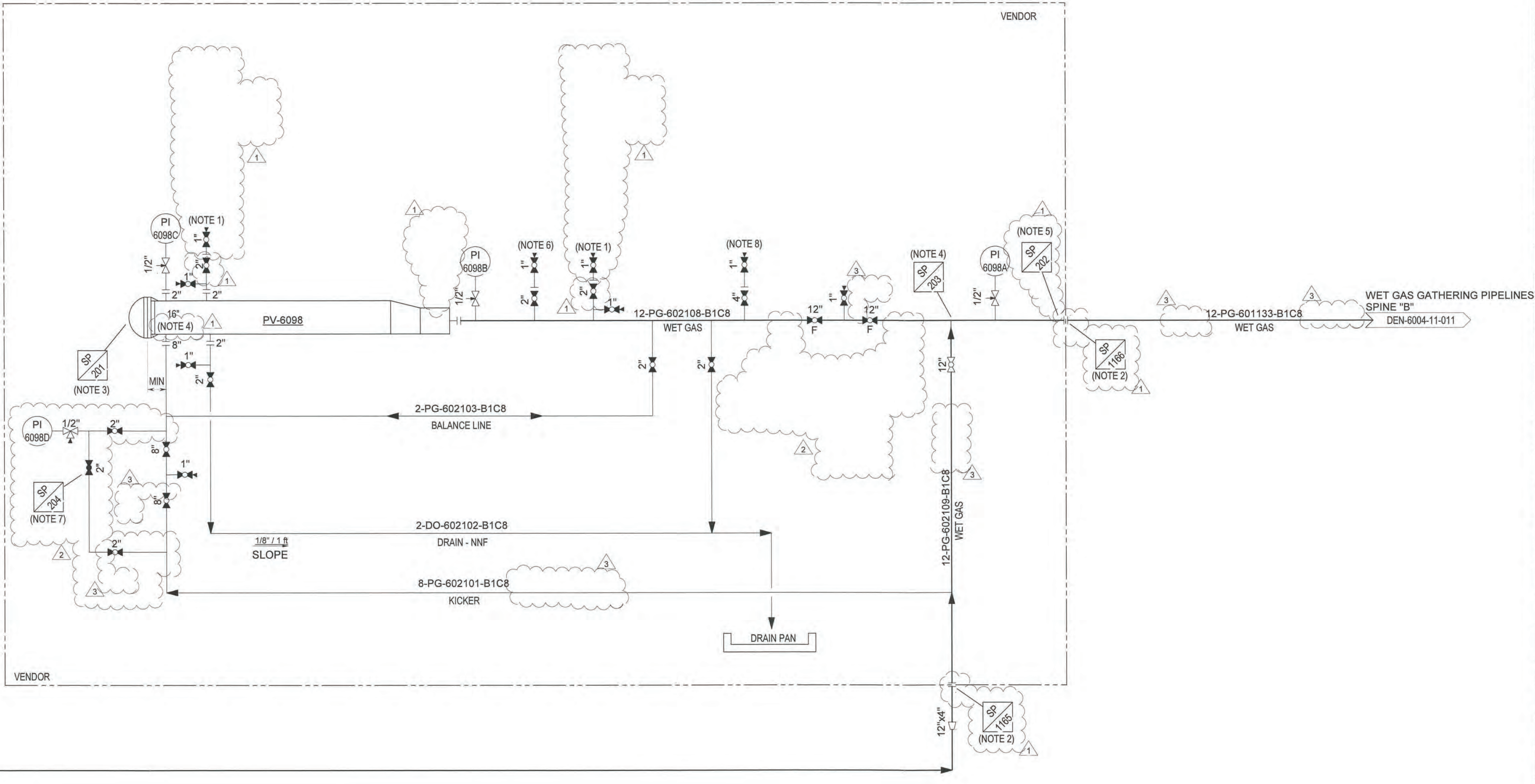
Note 4: Slug Catcher

NOTICE												ENGINEERING RECORD		DATE		BRONCO PIPELINE COMPANY	
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												CHK:	MB	02/07/19		PIPING & INSTRUMENTATION DIAGRAM	
												APP:	JL	02/07/19			
												W.O. No.:				DWG. No.	
												SCALE:	NONE			DEN-6004-11-240	
																CAD FILE:	REV
																PLOT DATE:	7

\\60DEN-6004-11-240.mxd
Johned31 @ 6/19/2015 12:38:57 PM
Last Accessed:

Node 1: Wet Gas Pig Launcher (Typical)

EQUIPMENT I.D	PV-6098
DESCRIPTION	WET GAS PIG LAUNCHER SPINE "B"
SIZE	12" PIPE
DESIGN	700 PSIG @ -20° F/150° F
TRIM	B1C8
STANDARD AND CODE	ASME B31.8



WET GAS GATHERING PIPELINES
SPINE "B"

4-PG-601136-B1C8-1 "CS
WET GAS

FP

ISSUED FOR
8/19/2015
AS-BUILT

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DWG No.	REFERENCE DRAWINGS	No.	DATE	REVISIONS	BY	CKD	HAZOP DATE	APP	DATE	APP	DATE
		0	10/31/13	APPROVED FOR CONSTRUCTION	JH						
		1	09/15/14	APPROVED FOR CONSTRUCTION - CONSTRUCTION SEQUENCE 3	BJ						
		2	11/24/14	APPROVED FOR CONSTRUCTION - CONSTRUCTION SEQUENCE 3	BJ						
		3	07/23/15	APPROVED FOR CONSTRUCTION - CONSTRUCTION SEQUENCE 3	BJ	EW			B.I.L. 15	08/12/2015	

- SAFE LOCATION.
- INSULATION KIT.
- ENCLOSURE.
- BARRED TEE.
- PIG SIG.
- CHEMICAL INJECTION.

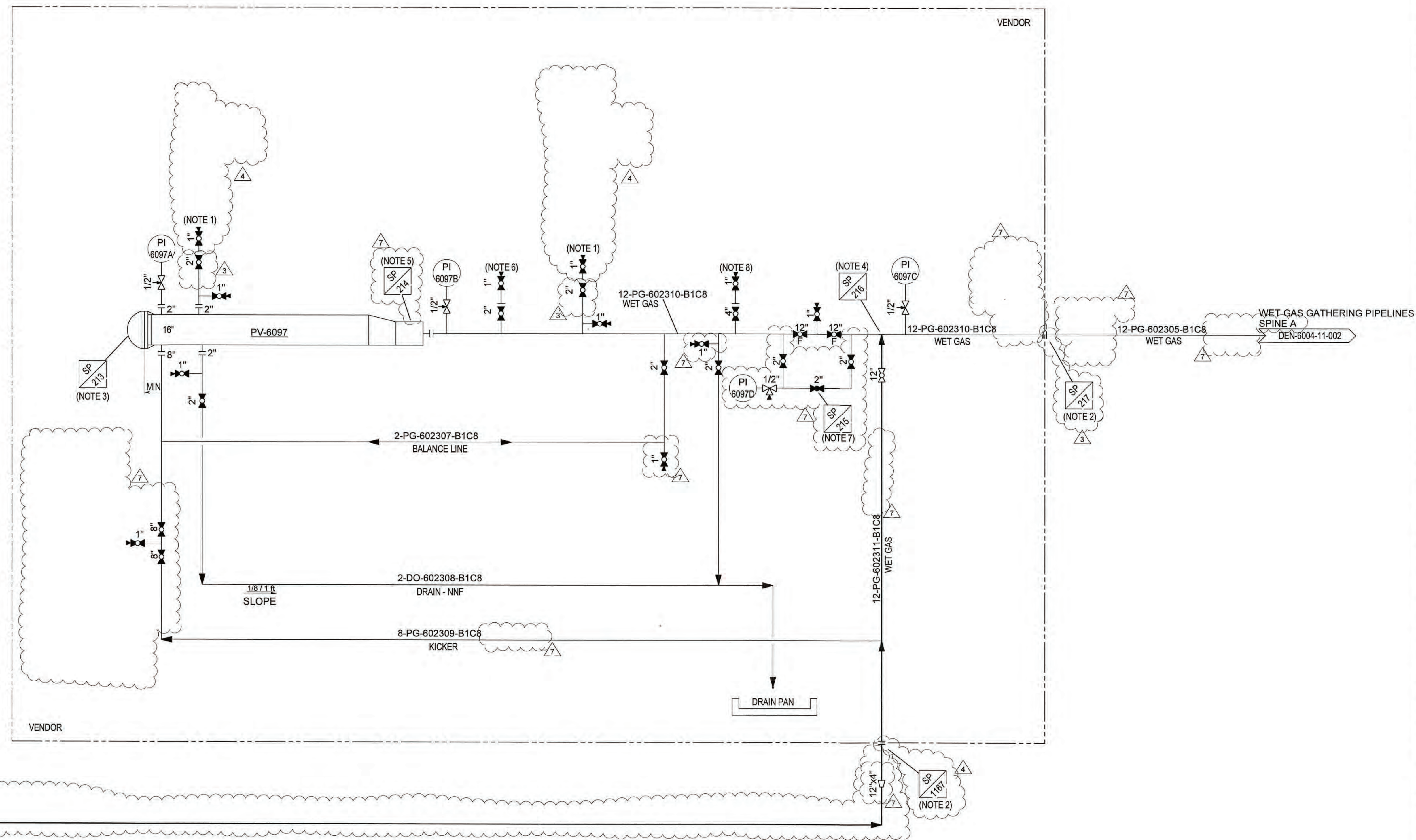
- MERLA CHOKE VALVE.
- TELL-TALE VALVE.
- DELETED.

ENGINEERING RECORD	DATE
DRN: BJ	10/29/13
CHK: EW	8/10/15
APP: BJ	B.I.L. 15
W.O. No.:	
SCALE: NONE	

BRONCO PIPELINE COMPANY	
WET GAS PIG LAUNCHER SPINE "B"	
PIPING & INSTRUMENTATION DIAGRAM	
PLAN DWG. No. DEN-6004-11-021	REV 3

Node 1: Wet Gas Pig Launcher (Typical)

<u>EQUIPMENT I.D</u>	PV-6097
DESCRIPTION	WET GAS PIG LAUNCHER SPINE A A
SIZE	12" PIPE
DESIGN	700 PSIG @ -20° F/1500° F
TRIM	B1C8
STANDARD AND CODE	ASME B31.8



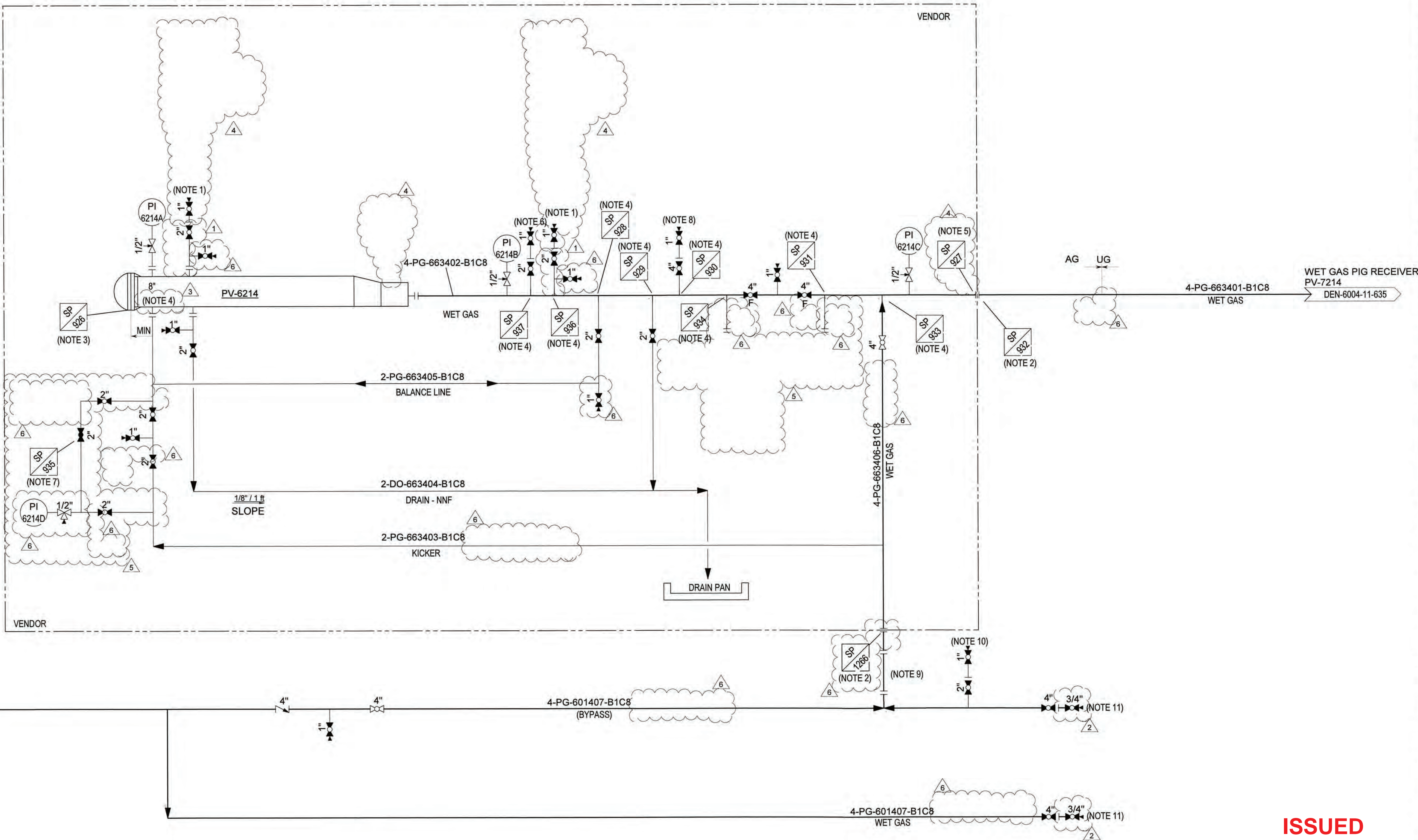
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				6	11/21/14	APPROVED FOR CONSTRUCTION - CONSTRUCTION SEQUENCE 3	BJ						1. SAFE LOCATION. 2. INSULATION KIT. 3. ENCLOSURE. 4. BARRED TEE. 5. PIG SIG. 6. CHEMICAL INJECTION.	DRN: DMW CHK: FAW APP: [Signature]	10/28/13 8/18/15 8.18.15	
				7	07/23/15	AS-BUILT	BJ						7. MERLA CHOKE VALVE. 8. TELL-TALE VALVE. 9. DELETED.			
				2	03/03/14	APPROVED FOR CONSTRUCTION - CONSTRUCTION SEQUENCE 2	BJ									
				3	09/15/14	APPROVED FOR CONSTRUCTION - CONSTRUCTION SEQUENCE 2	BJ									
				4	09/29/14	APPROVED FOR CONSTRUCTION - CONSTRUCTION SEQUENCE 2	BJ									
				5	10/16/14	APPROVED FOR CONSTRUCTION - CONSTRUCTION SEQUENCE 3	SPB									

00000-00000-00000

Node 1: Wet Gas Pig Launcher (Typical)

EQUIPMENT I.D.	PV-6214
DESCRIPTION	WET GAS PIG LAUNCHER COTTONWOOD CREEK WELL SITE
SIZE	4" PIPE
DESIGN	700 PSIG @ -20° F/150° F
TRIM	B1C8
STANDARD AND CODE	ASME B31.8



COTTONWOOD CREEK 4-65 26-27 1H
WELL SITE
DEN-6004-11-014

4-PG-601407-B1C8
WET GAS

4-PG-601407-B1C8
(BYPASS)

4-PG-601407-B1C8
WET GAS

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9/8/2015
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DWG No.

REFERENCE DRAWINGS

No.

DATE

REVISIONS

BY

CKD

HAZOP DATE

APP

DATE

APP

DATE

NOTES

ENGINEERING RECORD

DATE

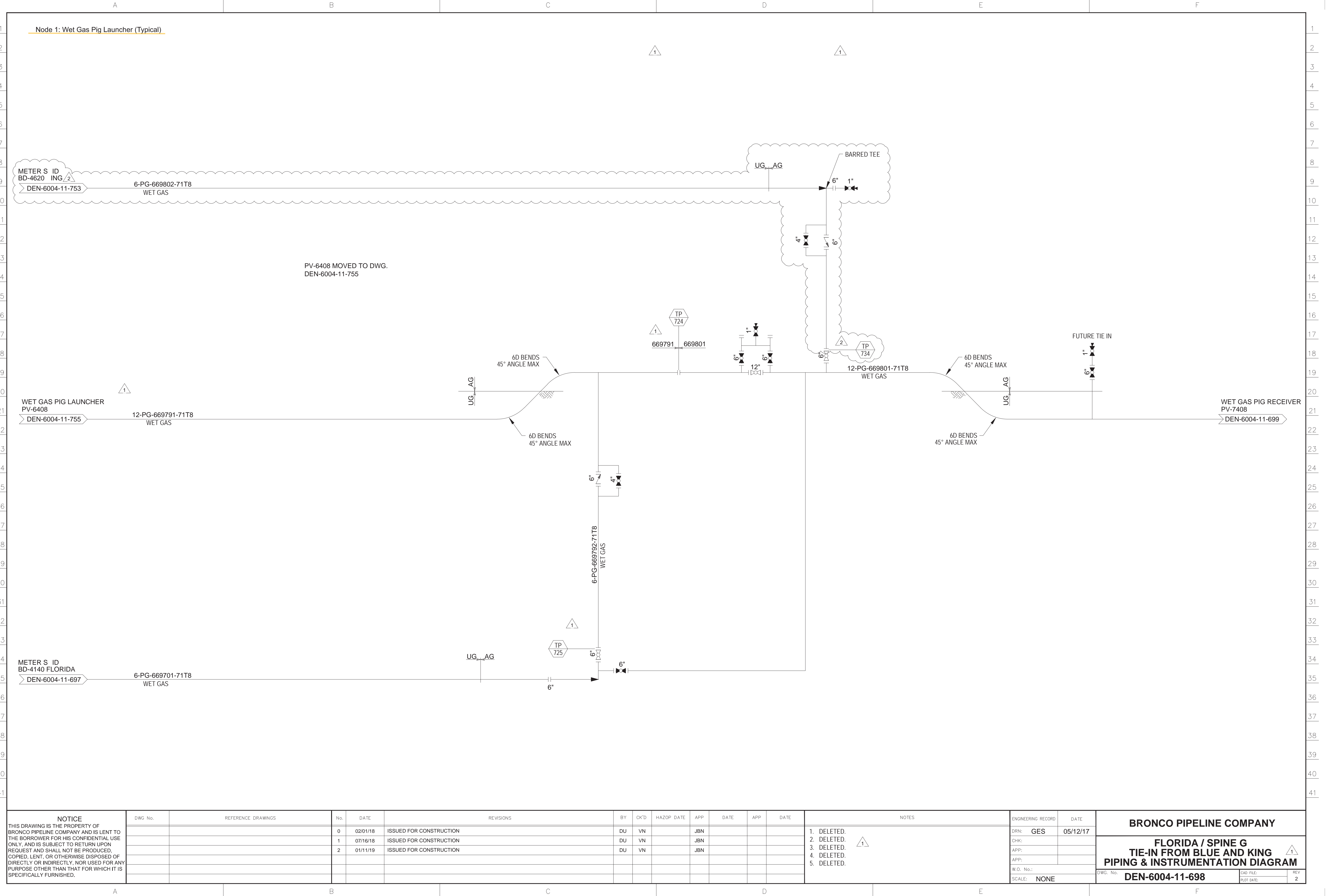
BRONCO PIPELINE COMPANY

WET GAS PIG LAUNCHER
COTTONWOOD CREEK WELL SITE
PIPING & INSTRUMENTATION DIAGRAM

DEN-6004-11-634

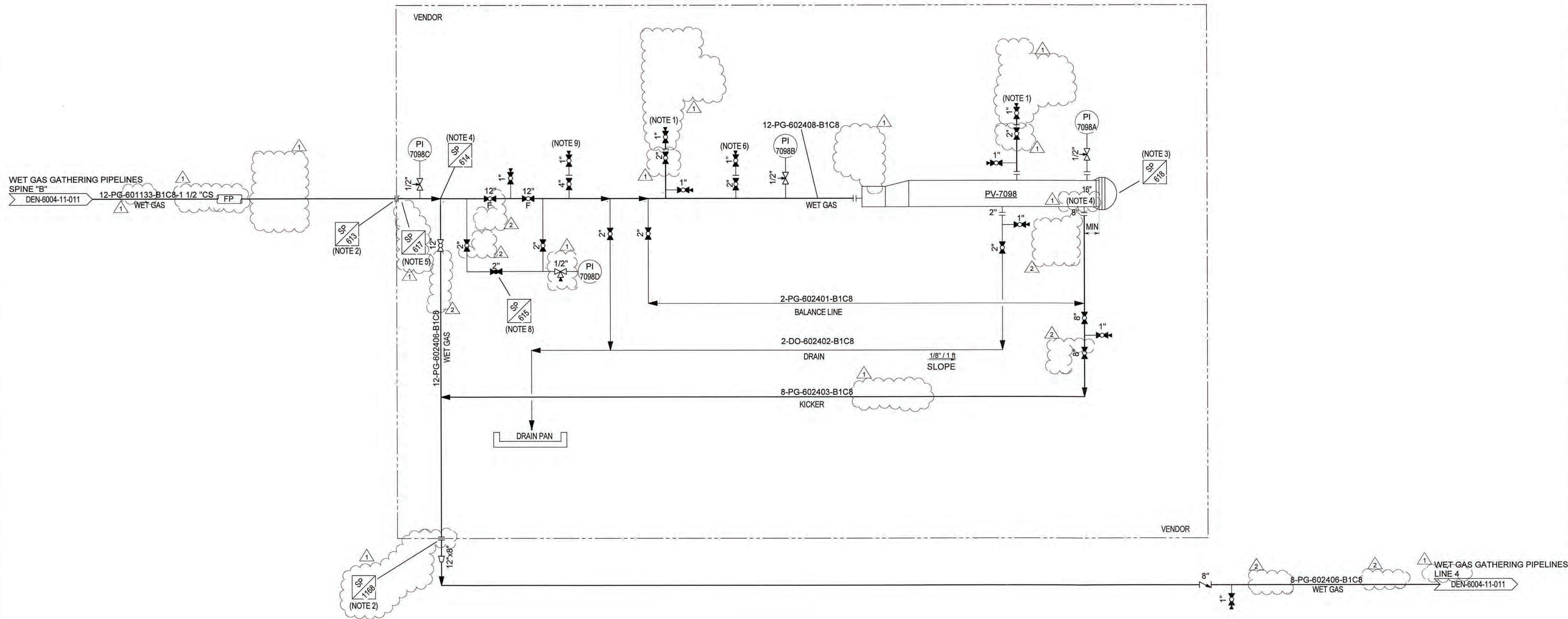
REV

6



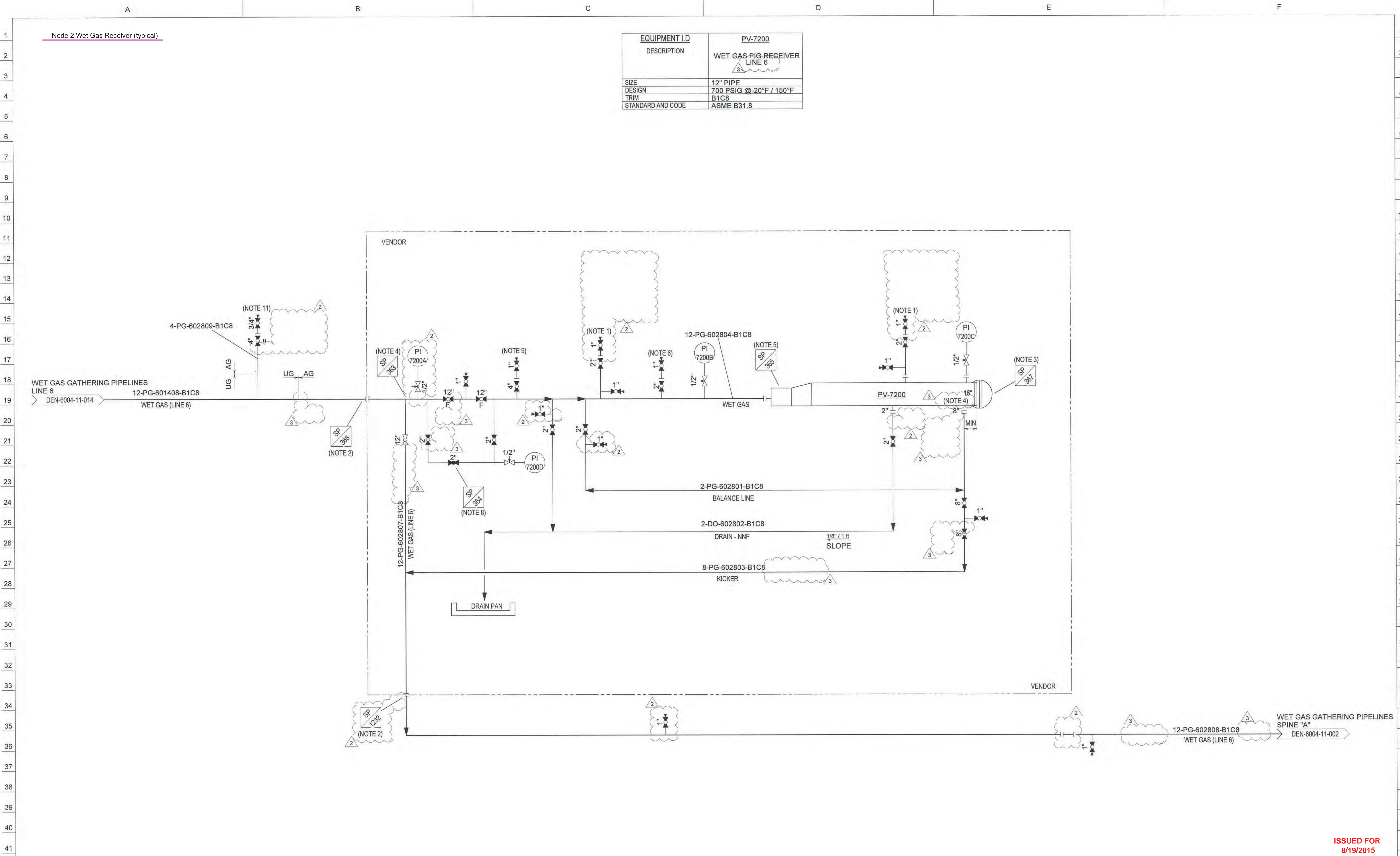
Node 2 Wet Gas Receiver (typical)

EQUIPMENT I.D.	PV-7098
DESCRIPTION	WET GAS PIG RECEIVER SPINE "B"
SIZE	12" PIPE
DESIGN	700 PSIG @ -20°F / 150°F
TRIM	B1C8
STANDARD AND CODE	ASME B31.8



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9/4/2015
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			0	10/31/13	APPROVED FOR CONSTRUCTION	JH							1. SAFE LOCATION.	DRN: NAH	10/29/13	
			1	09/15/14	APPROVED FOR CONSTRUCTION - CONSTRUCTION SEQUENCE 3	BJ							2. INSULATION KIT.	CHK: FMW	8/13/15	
			2	07/23/15	APPROVED FOR CONSTRUCTION - CONSTRUCTION SEQUENCE 3	BJ	FMW			8.17.15	8/23/15		3. ENCLOSURE.	APP: [Signature]	8.17.15	
													4. BARRED TEE.	APP:		
													5. PIG SIG.	W.O. No.:		
													6. PURGE / FLUSH CONNECTION.	SCALE: NONE		



EQUIPMENT I.D.	PV-7200
DESCRIPTION	WET GAS PIG RECEIVER LINE 6
SIZE	12" PIPE
DESIGN	700 PSIG @-20°F / 150°F
TRIM	B1C8
STANDARD AND CODE	ASME B31.8

NOTICE	DWG No.	REFERENCE DRAWINGS	No.	DATE	REVISIONS	BY	CKD	HAZOP DATE	APP	DATE	APP	DATE	NOTES	ENGINEERING RECORD	DATE	BRONCO PIPELINE COMPANY
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			1	07/03/14	APPROVED FOR CONSTRUCTION - CONSTRUCTION SEQUENCE 1	BJ							2. INSULATION KIT.	CHK: FWD	8/15/15	
			2	10/30/14	AS-BUILT	BJ							3. ENCLOSURE.	APP: BJA	8/12/15	
			3	07/23/15	AS-BUILT	BJ							4. BARRED TEE.	W.D. No.: NONE		
													5. PIG SIG.	SCALE: NONE		
													6. PURGE / FLUSH CONNECTION.			
													7. DELETED.			
													8. MERLA CHOKE VALVE.			
													9. TELL-TALE VALVE.			
													10. DELETED.			
													11. CORROSION COUPON.			

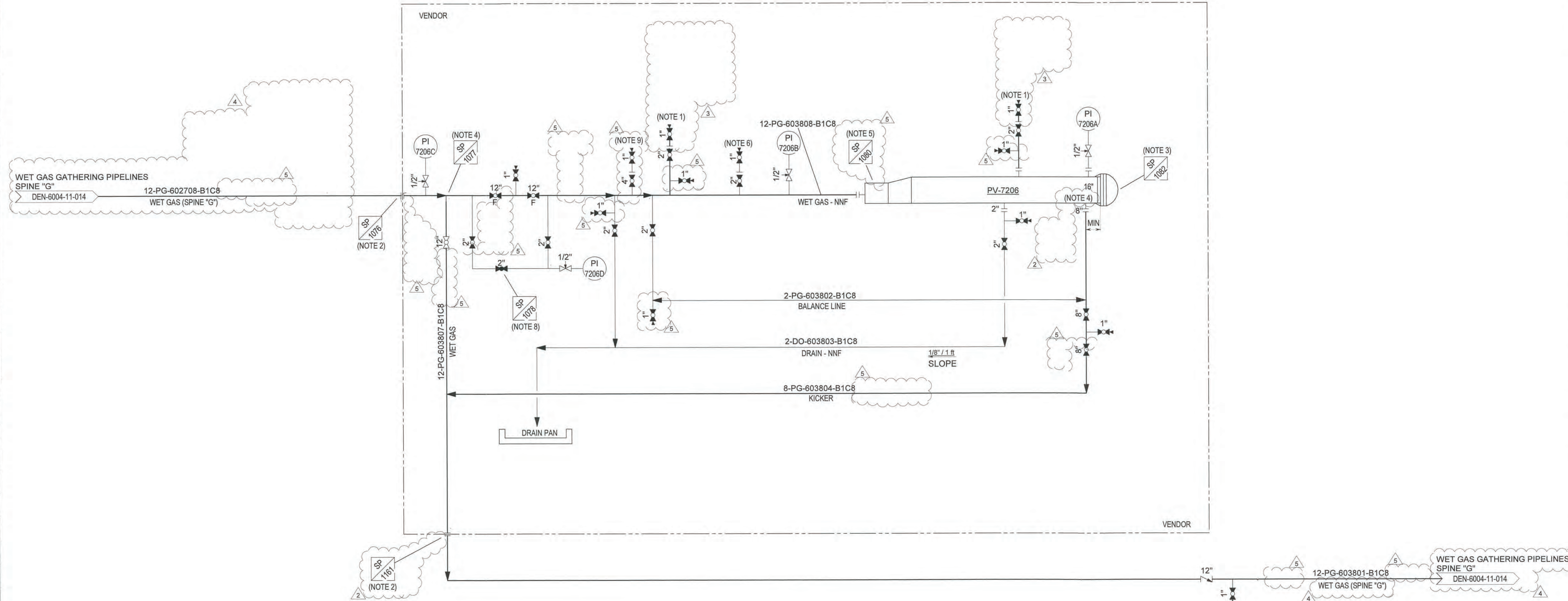
ISSUED FOR
8/19/2015
AS-BUILT

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Node 2 Wet Gas Receiver (typical)

EQUIPMENT I.D.	PV-7206
DESCRIPTION	WET GAS PIG RECEIVER SPINE "G" SOUTH
SIZE	12" PIPE
DESIGN	700 PSIG @ -20°F / 150°F
TRIM	B1C8
STANDARD AND CODE	ASME B31.8



ISSUED FOR
8/19/2015
AS-BUILT

NOTICE
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COPIED, LENT, OR OTHERWISE DISPOSED OF
DIRECTLY OR INDIRECTLY, NOR USED FOR ANY
PURPOSE OTHER THAN THAT FOR WHICH IT IS
SPECIFICALLY FURNISHED.

DWG No.	REFERENCE DRAWINGS	No.	DATE	REVISIONS	BY	CKD	HAZOP DATE	APP	DATE	APP	DATE
		0	05/21/14	APPROVED FOR CONSTRUCTION - CONSTRUCTION SEQUENCE 2	BJ						
		1	06/05/14	APPROVED FOR CONSTRUCTION - CONSTRUCTION SEQUENCE 2	BJ						
		2	09/08/14	APPROVED FOR CONSTRUCTION - CONSTRUCTION SEQUENCE 2	BJ						
		3	10/02/14	APPROVED FOR CONSTRUCTION - CONSTRUCTION SEQUENCE 2	BJ						
		4	10/30/14	APPROVED FOR CONSTRUCTION - CONSTRUCTION SEQUENCE 2	BJ						
		5	07/23/15	AS-BUILT	BJ	FWW		FWW	8.13.15	CST	08/18/2015

- NOTES
- SAFE LOCATION.
 - INSULATION KIT.
 - ENCLOSURE.
 - BARRED TEE.
 - PIG SIG.
 - PURGE / FLUSH CONNECTION.
 7. DELETED.
 - MERCA CHOKE VALVE.
 - TELL-TALE VALVE.
 10. DELETED.
 11. DELETED.

ENGINEERING RECORD	DATE
DRN: BJ	05/13/14
CHK: FFW	8/13/15
APP: [Signature]	8.13.15
APP: [Signature]	
W.O. No.:	
SCALE: NONE	

BRONCO PIPELINE COMPANY

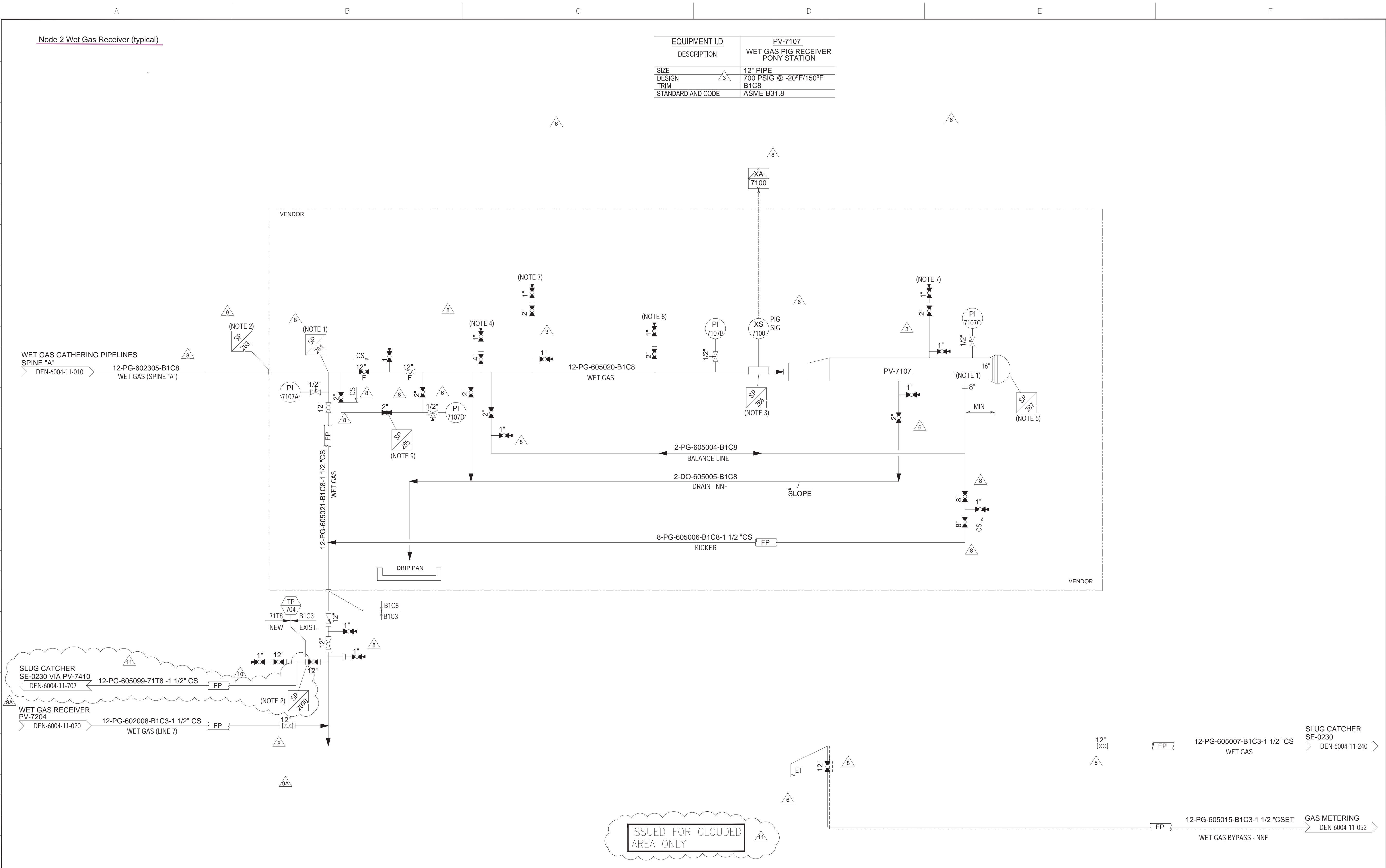
**WET GAS PIG RECEIVER
SPINE "G" SOUTH**

PIPING & INSTRUMENTATION DIAGRAM

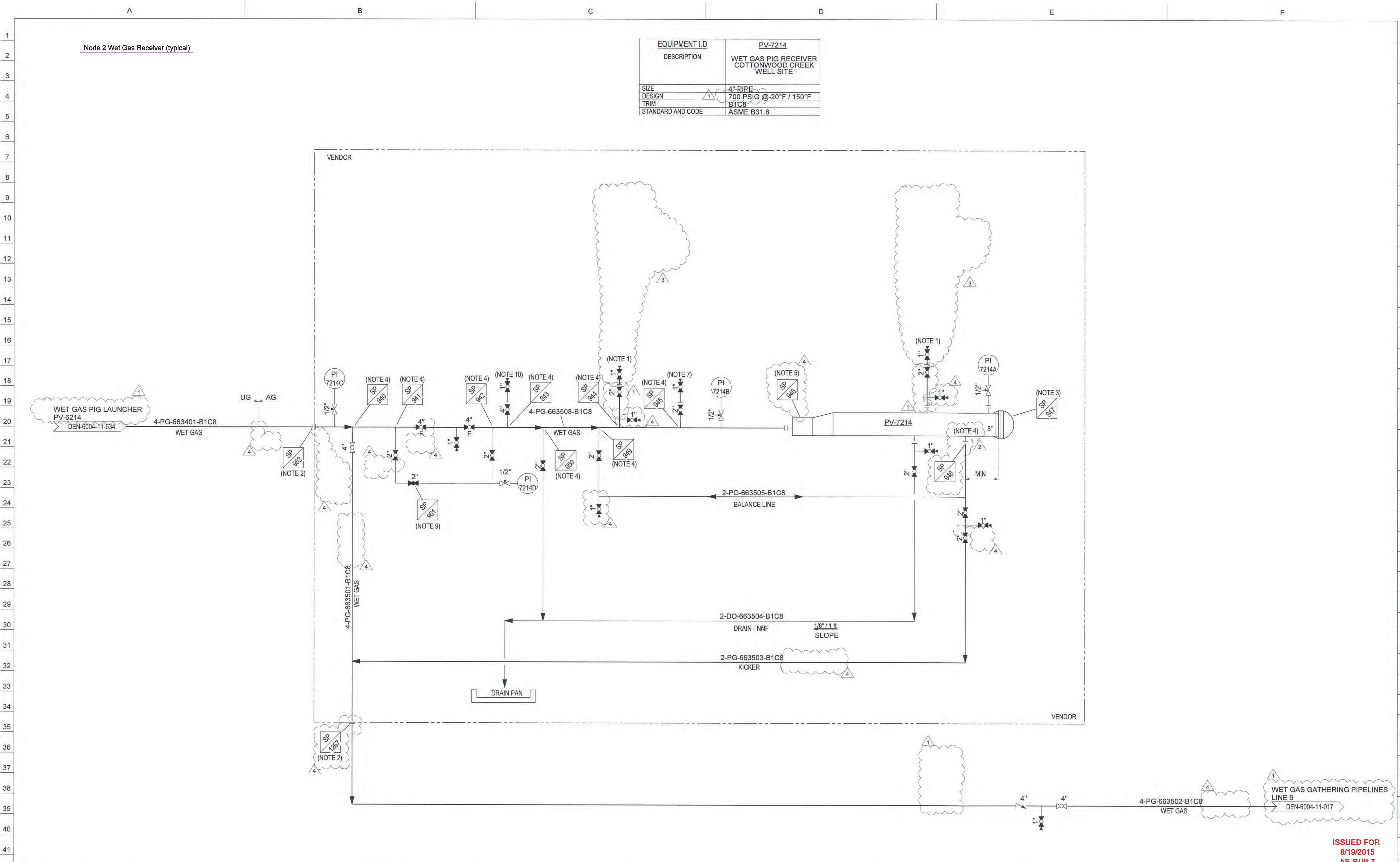
DEN-6004-11-038

PLAN DWG. No. CAD FILE: REV 5

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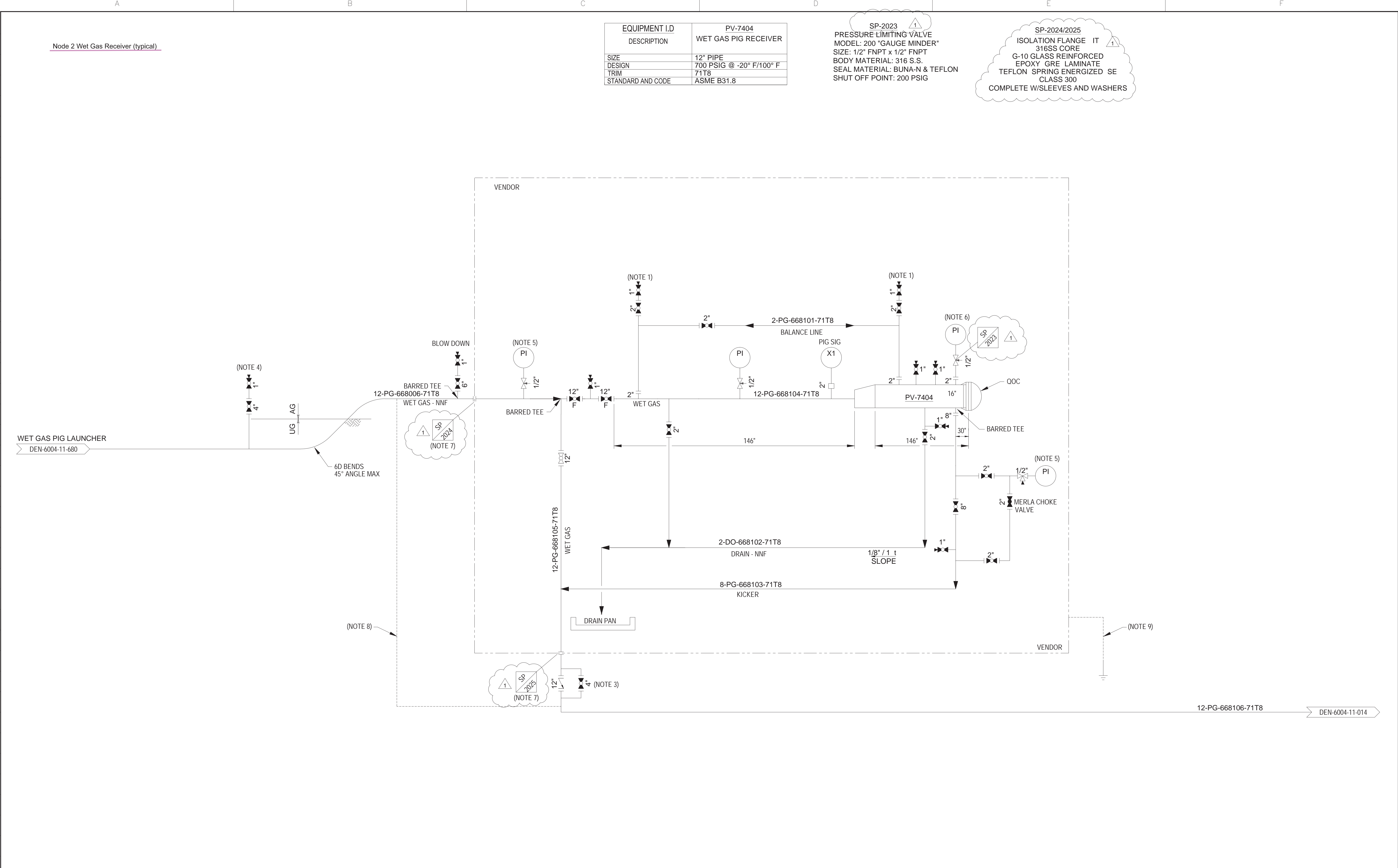


NOTICE												ENGINEERING RECORD		DATE		BRONCO PIPELINE COMPANY	
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												CHK:					
												APP:					
												APP:					
												W.O. No.:				DWG. No.	DEN-6004-11-050
												SCALE:	NONE			CAD FILE:	
																PLOT DATE:	11

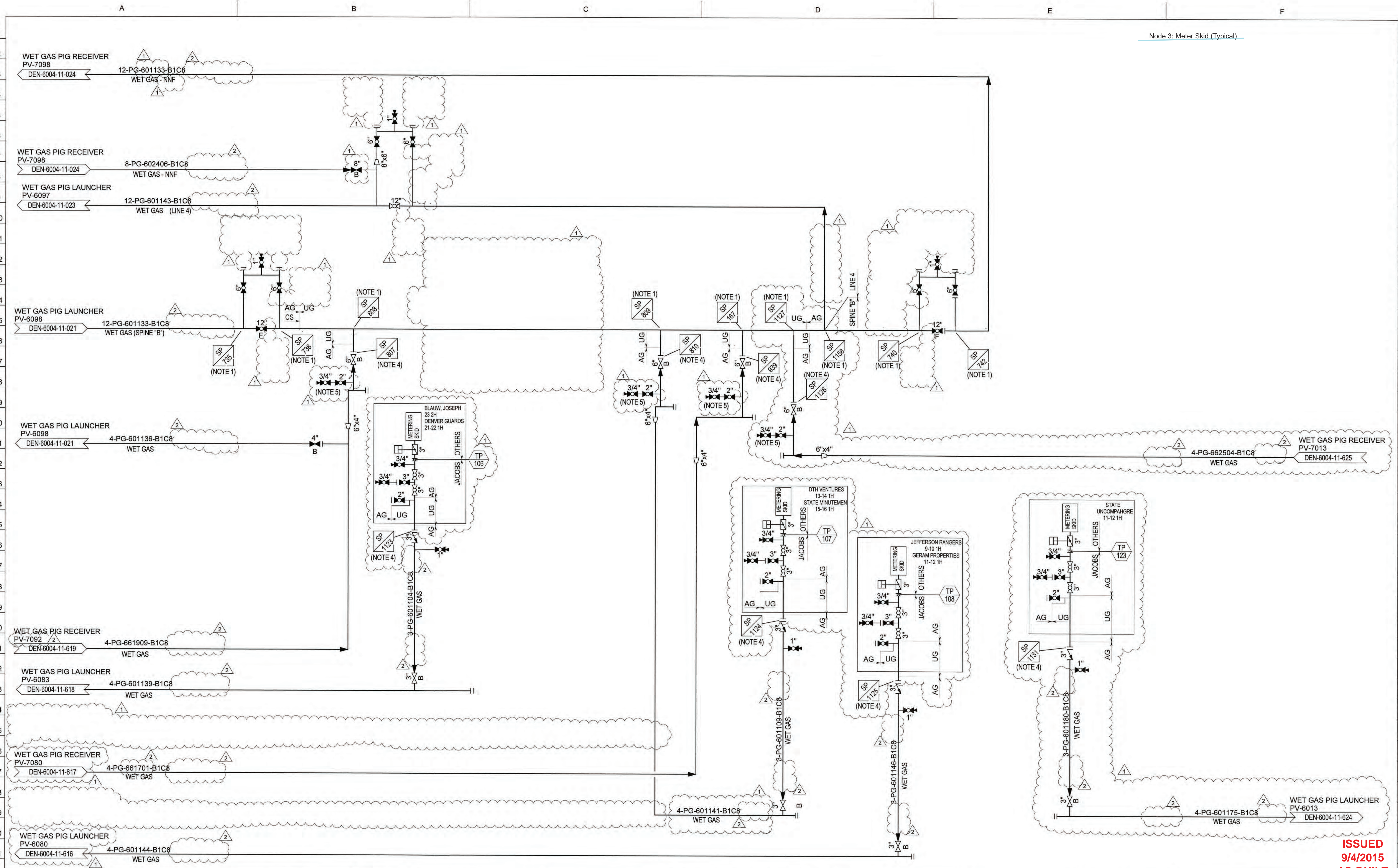


EQUIPMENT I.D.	PV-7214
DESCRIPTION	WET GAS PIG RECEIVER COTTONWOOD CREEK WELL SITE
SIZE	4" PIPE
DESIGN	700 PSIG @ -20°F / 150°F
TRIM	B1C8
STANDARD AND CODE	ASME B31.8

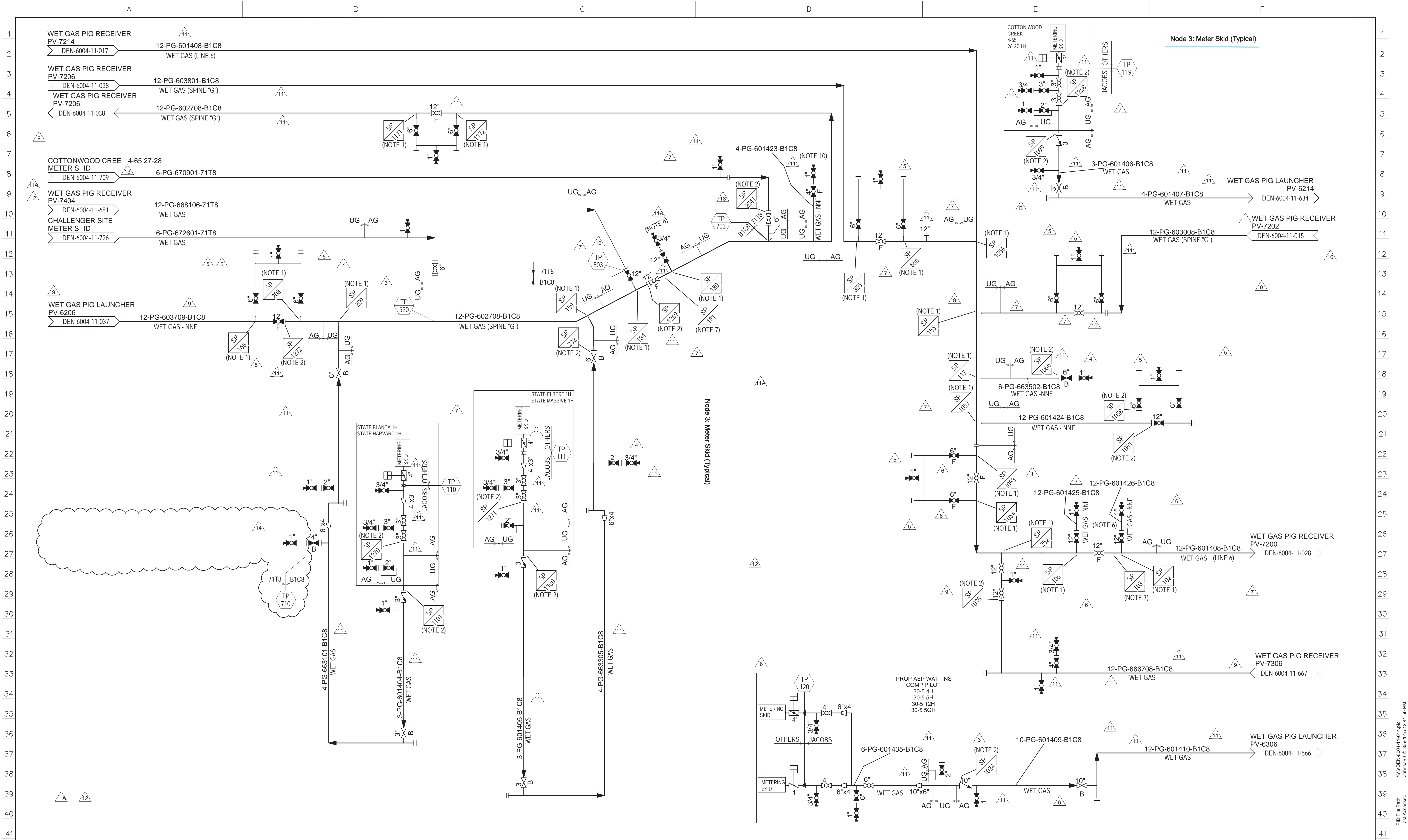
THIS DRAWING IS THE PROPERTY OF BRONCO PIPELINE COMPANY AND IS LENT TO THE BORROWER FOR HIS CONFIDENTIAL USE ONLY, AND IS SUBJECT TO RETURN UPON REQUEST AND SHALL NOT BE PRODUCED, COPIED, LENT, OR OTHERWISE DISPOSED OF DIRECTLY OR INDIRECTLY, NOR USED FOR ANY PURPOSE OTHER THAN THAT FOR WHICH IT IS SPECIFICALLY FURNISHED.	DWG No.	REFERENCE DRAWINGS		No.	DATE	REVISIONS		BY	CKD	HAZOP DATE	APP	DATE	APP	DATE	NOTES		ENGINEERING RECORD		DATE		BRONCO PIPELINE COMPANY WET GAS PIG RECEIVER COTTONWOOD CREEK WELL SITE PIPING & INSTRUMENTATION DIAGRAM																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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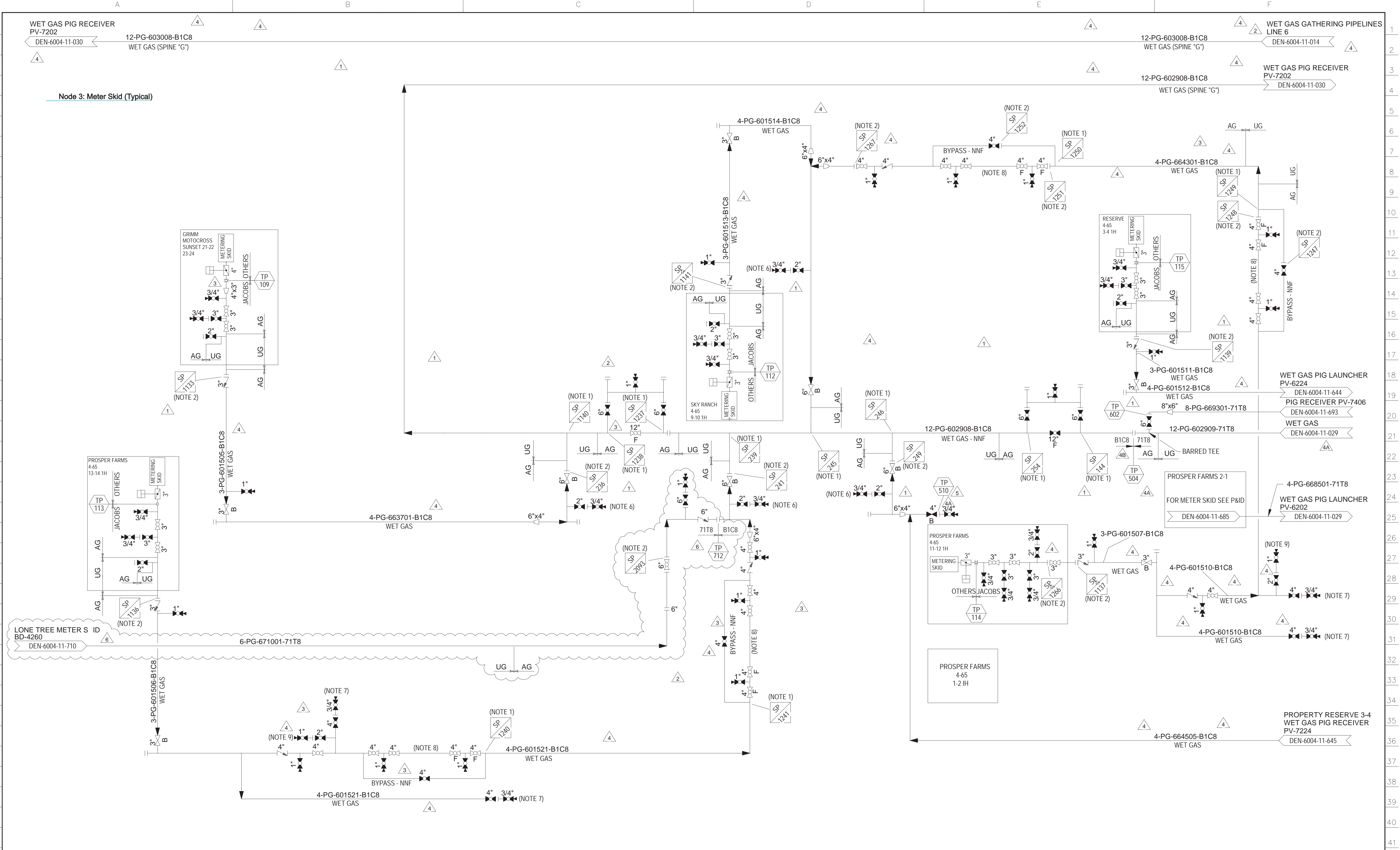
NOTICE THIS DRAWING IS THE PROPERTY OF BRONCO PIPELINE COMPANY AND IS LENT TO THE BORROWER FOR HIS CONFIDENTIAL USE ONLY, AND IS SUBJECT TO RETURN UPON REQUEST AND SHALL NOT BE PRODUCED, COPIED, LENT, OR OTHERWISE DISPOSED OF DIRECTLY OR INDIRECTLY, NOR USED FOR ANY PURPOSE OTHER THAN THAT FOR WHICH IT IS SPECIFICALLY FURNISHED.	DWG No.	REFERENCE DRAWINGS	No.	DATE	REVISIONS	BY	CK'D	HAZOP DATE	APP	DATE	APP	DATE	NOTES	ENGINEERING RECORD	DATE	<div>BRONCO PIPELINE COMPANY</div> <div>12" WET GAS PIG RECEIVER STATE BIERSTADT PIPING & INSTRUMENTATION DIAGRAM</div>		
			0	06/01/2017	ISSUE FOR CONSTRUCTION	JPF	VN		JBN				1. SAFE LOCATION. 2. CHEMICAL INJECTION. 3. BYPASS TO BUY BACK GAS FOR GAS LIFT PURPOSES. 4. CORROSION PROBE (RETRACTABLE). 5. PI 0-800 PSIG 6. PI 0-200 PSIG 7. ISOLATION GASKET KIT. 8. CP BOND CABLE. 9. EARTHEN GROUND CABLE.	DRN: GES	11/11/16			
			1	06/23/2017	REVISED SPECIALTY ITEM NUMBER	JPF	VN		JBN					CHK: VN	05/31/17			
														APP: JBN	05/31/17			
														W.O. No.: SCALE: NONE		DWG. No. DEN-6004-11-681	CAD FILE: PLOT DATE:	REV 1



AS-BUILT																						
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				0	10/31/13	APPROVED FOR CONSTRUCTION		DMW								1. BARRED TEE	DRN: PWJ	5/16/13				
				1	09/15/14	APPROVED FOR CONSTRUCTION - CONSTRUCTION SEQUENCE 3		BJ								2. DELETED.	CHK: FMW	8/18/15				
				2	07/23/15	APPROVED FOR CONSTRUCTION - CONSTRUCTION SEQUENCE 3		BJ	FMW			8/18/15	8/27/15			3. DELETED.	APP: BJ	8/18/15				
																4. INSULATION KIT.	APP: _____					
																5. LATERAL VENT.	W.O. No.:					
																	SCALE:	NONE				
A		B				C				D				E				F				

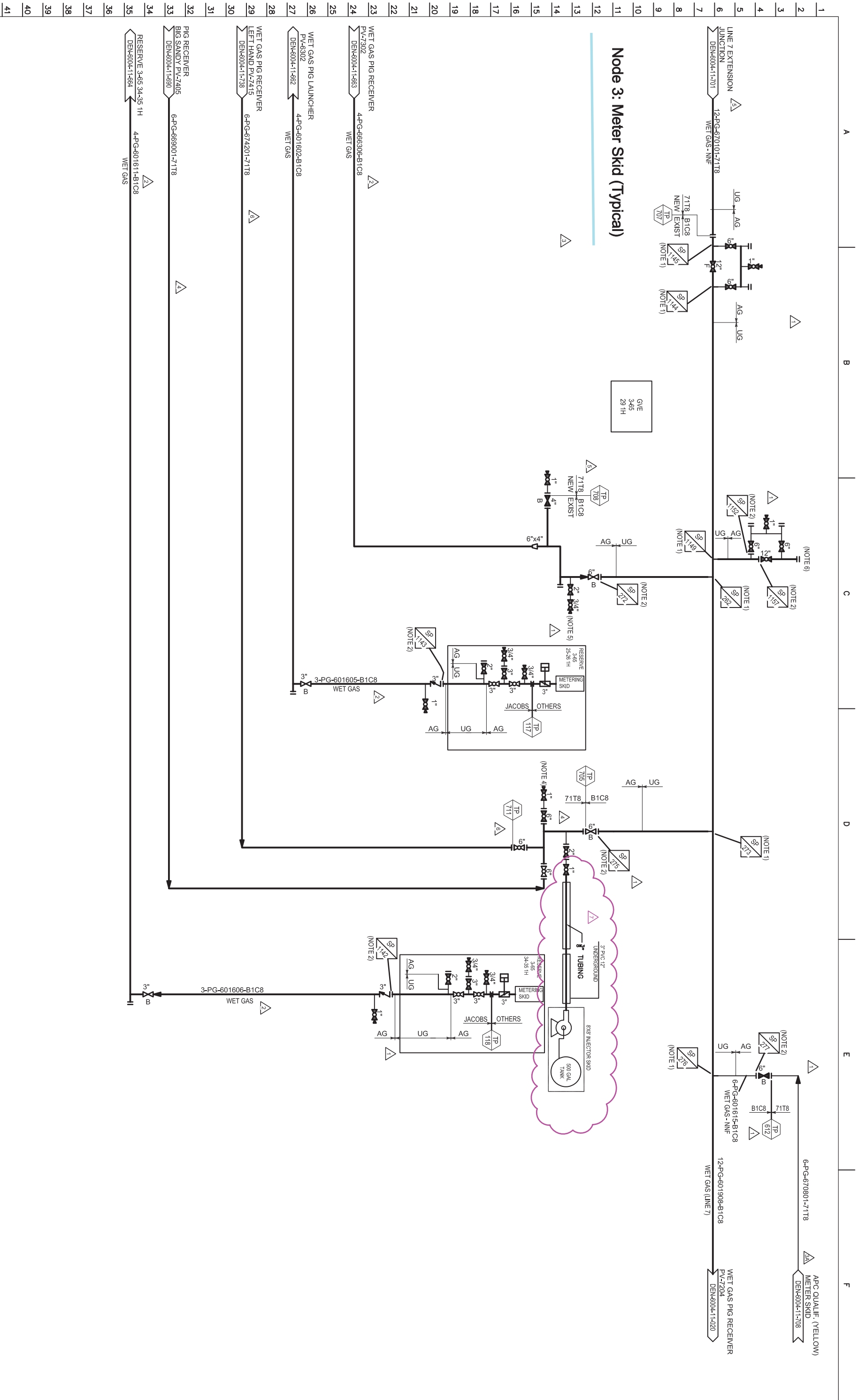


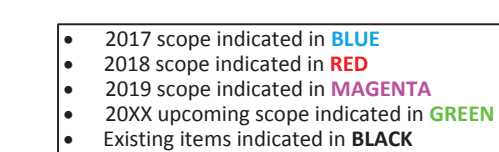
<div>NOTICE</div> <div>THIS DRAWING IS THE PROPERTY OF BRONCO PIPELINE COMPANY AND IS LENT TO THE BORROWER FOR HIS CONFIDENTIAL USE ONLY, AND IS SUBJECT TO RETURN UPON REQUEST AND SHALL NOT BE PRODUCED, COPIED, LENT, OR OTHERWISE DISPOSED OF DIRECTLY OR INDIRECTLY, NOR USED FOR ANY PURPOSE OTHER THAN THAT FOR WHICH IT IS SPECIFICALLY FURNISHED.</div>	DWG No.	REFERENCE DRAWINGS	No.	DATE	REVISIONS	BY	CK'D	HAZOP DATE	APP	DATE	APP	DATE	NOTES	ENGINEERING RECORD	DATE	<div><div></div><div>WET GAS GATHERING PIPELINES SPINE "G" SOUTH PIPING & INSTRUMENTATION DIAGRAM</div></div>					
			11	07/23/15	AS-BUILT	BJ							1. BARRED TEE.  13	7. PIG SIG.	DRN: DMW				10/29/13		
	11A	11/30/16	FOR REVIEW AND COMMENT	GES									2. ISOLATION GASKET KIT AND INSTALL BONDING CABLE WHERE APPLICABLE.	8. DELETED.	CHK: VN	05/31/17					
	11B	01/25/17	REVISED PIPE SPEC	GES									3. DELETED.	9. PORTABLE COMPRESSOR.	APP: JBN	05/31/17					
	12	06/01/2017	ISSUE FOR CONSTRUCTION	JPF	VN		JBN						4. DELETED.	10. CORROSION COUPON.	APP:						
	13	11/21/2017	ISSUE FOR CONSTRUCTION	DU	VN		JBN						5. DELETED.		W.O. No.:						
	14	02/19/2018	ISSUE FOR CONSTRUCTION	DU	VN		JBN						6. BOOSTER COMPRESSOR.		SCALE: NONE		DWG. No.	DEN-6004-11-014	CAD FILE:	REV	
																PLOT DATE:		14			
A		B			C				D				E				F				



NOTICE										NOTES		ENGINEERING RECORD		BRONCO PIPELINE COMPANY	
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												CHK:		SPINE "G" NORTH	
												APP:		PIPING & INSTRUMENTATION DIAGRAM	
												W.O. No.:		DEN-6004-11-015	
												SCALE: NONE		CAD FILE:	
												PLOT DATE:		REV 6	
DWG No.	REFERENCE DRAWINGS	No.	DATE	REVISIONS	BY	CK'D	HAZOP DATE	APP	DATE	APP	DATE	DATE		DATE	
		4	07/23/15	AS-BUILT	BJ										
		4A	12/05/16	FOR REVIEW AND COMMENT	GES										
		4B	01/25/17	REVISED PIPE SPEC	GES										
		5	03/29/17	ISSUED FOR CONSTRUCTION	VAE	RFB		JBN							
		6	04/05/18	ISSUED FOR CONSTRUCTION	DU	VN		JBN							

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PID File Path:
Last Access:





BRONCO PIPELINE

NIOBRARA INFRASTRUCTURE PFD
EXISTING & PLANNED EGDS

EXISTING & PLANNED SCOPES ADAMS & ARAPAHOE COUNTIES			
DRAWN BY:	CHECKED BY:	APPROVED BY:	SCALE:

DATE:	CHECKING NO:	SHEET	OF
03-206 (2018)	NON-21090 00 010 001		

