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DEPARTMENT OF ENVIRONMENTAL PROTECTION

Oil and Gas Management

Form C Well Integrity Training

October 29, 2014

DEP New Stanton District Office

PGCC
Pennsylvania Grade Crude Oil Coalition

PIOGA
Pennsylvania Independent Oil & Gas Association

PIPP
Pennsylvania Independent Petroleum Producers

Training Outline

Opening Remarks

- Streamlining the Process
- Intent of Section 78.88

Inspections

- Form C Layout
- Summary of Form C Features and Use
- Examples by Well Type

Reporting

- Development of Greenport/OGRE Well Integrity Reporting Webpage
- Data Management Tools and Online Resources

Discussion/Q&A

- Time with Subsurface and Data Management & Compliance Staff

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Opening Remarks

Streamlining the Process

- Keep it simple – take advantage of existing reporting options
- Avoid redundancy – don't ask for data you already have
- Be flexible – allow multiple reporting formats (e.g., paper and GreenPort), but make them all look similar for ease of use
- Assume Integrity – the starting point should be that the inspected well does not have any problems
- Consistent Documentation – if potential problems are identified (fluids survey), a standard process allows these matters to be qualified immediately and consistently

Opening Remarks

Intent of Section 78.88

- To assemble records that verify operating wells are in compliance with the well construction and operating requirements of this chapter (78) and the act
- To ensure that wells are structurally sound and in compliance with Section 78.73(c)
- To annually indentify the compliance status of each operating well in the state
- To gather baseline data about a well so significant changes are evident

To accomplish these objectives, key inspection elements have been defined

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Form Layout

				Primary Production Pressure (psig)				Water Level or Other	
Permit #	Farm name	Unconventional	Inspection Date	Primary Production Pressure (psig)	Primary Production Vent Flow as Required per 78.83(a)(1) or Other (cfpd)	Annular Production Pressure (psig)	Maximum Allowable Pressure Exceeded per 78.73(c) (Y/N/U)	Measurement	Unit

Open Flow (cfpd) or Shut-in Pressure on Production Annulus (psig)		Fluids Survey (Gas, Oil, or Brine)							
Measurement	Unit	Any Fluids Noted (Y/N)	Gas Outside Freshwater Casing (cfpd)	Gas Outside Intermediate Casing (cfpd)	Surface Wellhead Equipment Gas Emissions (cfpd)	Any Liquids (Oil or Brine) to Surface or Outside Freshwater Casing (Y/N)	Corrosion Problems (Y/N)	No-inspection comments	Text comments

Summary of Form C Features and Use

PRE-POPULATED IN GREENPORT ENVIRONMENT

				ary Production Pressure (psig)				Water Level or Other	
Permit #	Farm name	Unconventional	Inspection Date	Primary Production Pressure (psig)	Primary Production Vent Flow as Required per 78.83(a)(1) or Other (cfpd)	Annular Production Pressure (psig)	Maximum Allowable Pressure Exceeded per 78.73(c) (Y/N/U)	Measurement	Unit

Open Flow (cfpd) or Shut-in Pressure on Production Annulus (psig)		Fluids Survey (Gas, Oil, or Brine)							
Measurement	Unit	Any Fluids Noted (Y/N)	Gas Outside Freshwater Casing (cfpd)	Gas Outside Intermediate Casing (cfpd)	Surface Wellhead Equipment Gas Emissions (cfpd)	Any Liquids (Oil or Brine) to Surface or Outside Freshwater Casing (Y/N)	Corrosion Problems (Y/N)	No-inspection comments	Text comments

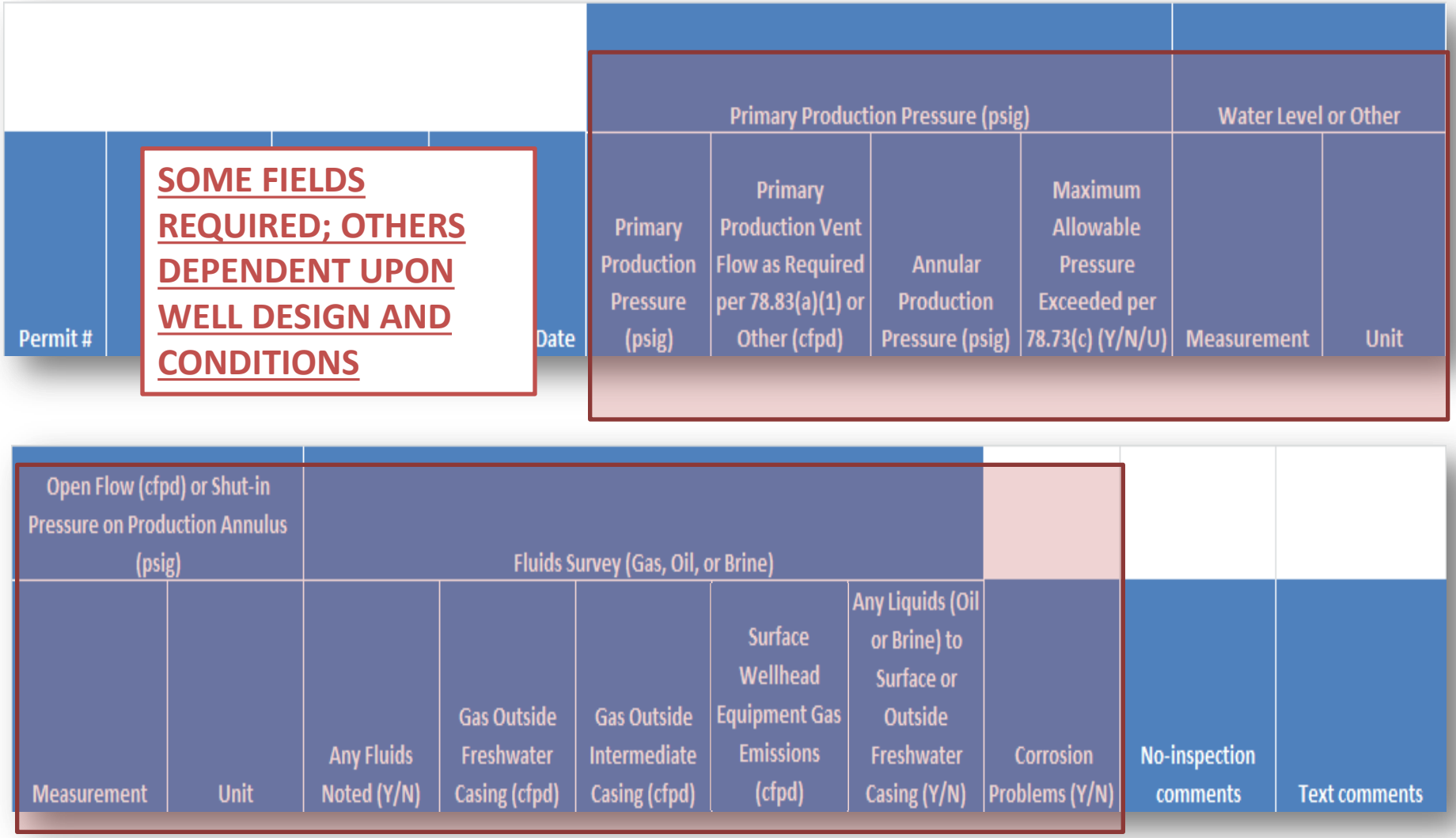
Summary of Form C Features and Use

4 LINES FOR UNCONVENTIONAL WELLS (DATE REQUIRED); 1 LINE FOR CONVENTIONAL WELLS (DATE ASSIGNED: CAN BE UPDATED WITH ACTUAL INSPECTION DATE)

	Inspection Date	Primary Production Pressure (psig)				Water Level or Other	
		Primary Production Pressure (psig)	Primary Production Vent Flow as Required per 78.83(a)(1) or Other (cfpd)	Annular Production Pressure (psig)	Maximum Allowable Pressure Exceeded per 78.73(c) (Y/N/U)	Measurement	Unit

Open Flow (cfpd) or Shut-in Pressure on Production Annulus (psig)		Fluids Survey (Gas, Oil, or Brine)							
Measurement	Unit	Any Fluids Noted (Y/N)	Gas Outside Freshwater Casing (cfpd)	Gas Outside Intermediate Casing (cfpd)	Surface Wellhead Equipment Gas Emissions (cfpd)	Any Liquids (Oil or Brine) to Surface or Outside Freshwater Casing (Y/N)	Corrosion Problems (Y/N)	No-inspection comments	Text comments

Summary of Form C Features and Use



Summary of Form C Features and Use

				Primary Production Pressure (psig)				Water Level or Other	
Permit #	Farm name	Unconventional	Inspection Date	Primary Production Pressure (psig)	Primary Production Vent Flow as Required per 78.83(a)(1) or Other (cfpd)	Annular Production Pressure (psig)	Maximum Allowable Pressure Exceeded per 78.73(c) (Y/N/U)	Measurement	Unit

Open Flow (cfpd) or Shut-in Pressure on Production Annulus (psig)		Fluids Survey (G							
Measurement	Unit	Any Fluids Noted (Y/N)	Gas Outside Freshwater Casing (cfpd)	Gas Ou Intermediate Casing (cfpd)	Emissions (cfpd)	Freshwater Casing (Y/N)	Corrosion Problems (Y/N)	No-inspection comments	Text comments

STANDARD COMMENT MUST BE PROVIDED FOR EACH WELL NOT INSPECTED; E.G., "THIS IS NOT OUR WELL"

Summary of Form C Features and Use

				Primary Production Pressure (psig)				Water Level or Other	
Permit #	Farm name	Unconventional	Inspection Date	Primary Production Pressure (psig)	Primary Production Vent Flow as Required per 78.83(a)(1) or Other (cfpd)	Annular Production Pressure (psig)	Maximum Allowable Pressure Exceeded per 78.73(c) (Y/N/U)	Measurement	Unit

Open Flow (cfpd) or Shut-in Pressure on Production Annulus (psig)		Fluids Survey (Gas, Oil, or Brine)							
Measurement	Unit	Any Fluids Noted (Y/N)	Gas Outside Freshwater Casing (cfpd)	Gas Outside Intermediate Casing (cfpd)	Surface Wellhead Equipment Gas Emissions (cfpd)	Outside Freshwater Casing (Y/N)	Corrosion Problems (Y/N)	No-inspection comments	Text comments

OPTIONAL COMMENTS UP TO 255 CHARACTERS INCLUDING SPACES

Summary of Form C Features and Use

Primary Production Pressure (psig)			
Primary Production Pressure (psig)	Primary Production Vent Flow as Required per 78.83(a)(1) or Other (cfpd)	Annular Production Pressure (psig)	Maximum Allowable Pressure Exceeded per 78.73(c) (Y/N/U)
Whole Number Starting at 0 OR blank	Whole Number Starting at 0 OR blank OR NRM	Whole Number Starting at 0 OR blank	Y, N, U, OR blank

NOTE: IF YOU ANSWER "Y" UNDER "THE MAXIMUM ALLOWABLE PRESSURE EXCEEDED" FIELD, YOU MUST REPORT THIS CONDITION TO DISTRICT OGI SUPERVISOR WITHIN 24 HOURS AND IMPLEMENT MEASURES TO LOWER THE PRESSURE ON THE CASING SEAT

Primary Production Pressure Section

- Leave field BLANK if it does not apply to your well design and/or operating environment
- NRM = Not Readily Measurable: this designates flows that can't be constrained for measurement or are too small to measure
- U = Unknown: this applies when gas is produced through surface/coal casing, but casing set depth is not known

Summary of Form C Features and Use

Water Level or Other	
Measurement	**Unit**
Positive Number with Two Decimals OR blank	ft, ppg, bbls/day, hrs/day, TDS, µS/cm, blank OR NPW

Water Level or Other

- Leave field BLANK if it does not apply to your well design and/or operating environment; e.g., any well equipped with separate production string
- Unit Descriptions:
  - ft: Feet (Water Level)
  - ppg: Pounds Per Gallon (Mud Scale Weight)
  - bbls/day: Barrels per Day (Avg. Daily Pumping Volume)
  - hrs/day: Hours per Day (Avg. Daily Pumping Rate)
  - TDS: Total Dissolved Solids (Produced Water Quality)
  - µS/cm: Microsiemens per Centimeter (Produced Water Quality)
  - NPW: No Produced Water (For wells that don't produce fluids)

Summary of Form C Features and Use

Open Flow (cfpd) or Shut-in Pressure on Production Annulus (psig)	
Measurement	**Unit**
Whole Number Starting at 0, I, NRM, OR blank	cfpd, psig, OR blank

Open Flow or Shut-in Pressure on Production Annulus

- Leave field BLANK if it does not apply to your well design and/or operating environment; e.g., annulus is produced
- I = Inaccessible: wells constructed in a way that prevent access to the production annulus
- Unit Description:
  - cfpd: Cubic Feet per Day
  - psig: Pounds per Square Inch Gauge

Summary of Form C Features and Use

Fluids Survey (Gas, Oil, or Brine)				
Any Fluids Noted (Y/N)	Gas Outside Freshwater Casing (cfpd)	Gas Outside Intermediate Casing (cfpd)	Surface Wellhead Equipment Gas Emissions (cfpd)	Any Liquids (Oil or Brine) to Surface or Outside Freshwater Casing (Y/N)
Y or N	Whole Number Starting at 0, I, NRM, OR blank	Whole Number Starting at 0, I, NRM, OR blank	Whole Number Starting at 0, NRM, OR blank	Y, N, OR blank

Fluids Survey

- "Any Fluids Noted" field MUST always be answered with Y or N, unless no inspection was completed and the appropriate no-inspection comment was selected
- If fluids are noted (Y), the other applicable fields MUST be completed in this section of the form
- **Surface equipment is WELLHEAD EQUIPMENT; not separators, compressors, gathering lines, etc.**

Summary of Form C Features and Use

Corrosion Problems (Y/N)
Y or N

Corrosion Problems

- This will ALWAYS be a Y or N, unless no inspection was completed and the appropriate no-inspection comment was selected.
- **Corrosion Problem**: Severe corrosion that will lead to an imminent environmental release if not addressed, i.e., mechanical failure may occur before next quarterly inspection. Surface equipment designed to contain pressure and/or fluids should be focused on as part of this inspection.
- **Enter Y** if any severe corrosion problems are noted that, unless repaired, will result in the imminent failure of well components intended to contain pressure and/or produced fluids.
- **Enter N** if there is no corrosion or only minor surface corrosion observed as part of this inspection, as the presence of some surface oxidation is actually beneficial to the integrity of operating wells.

NOTE: IF YOU ANSWER "Y," YOU MUST REPORT THIS CONDITION TO DISTRICT OGI SUPERVISOR WITHIN 24 HOURS

Summary of Form C Features and Use

No-inspection comments	Text comments

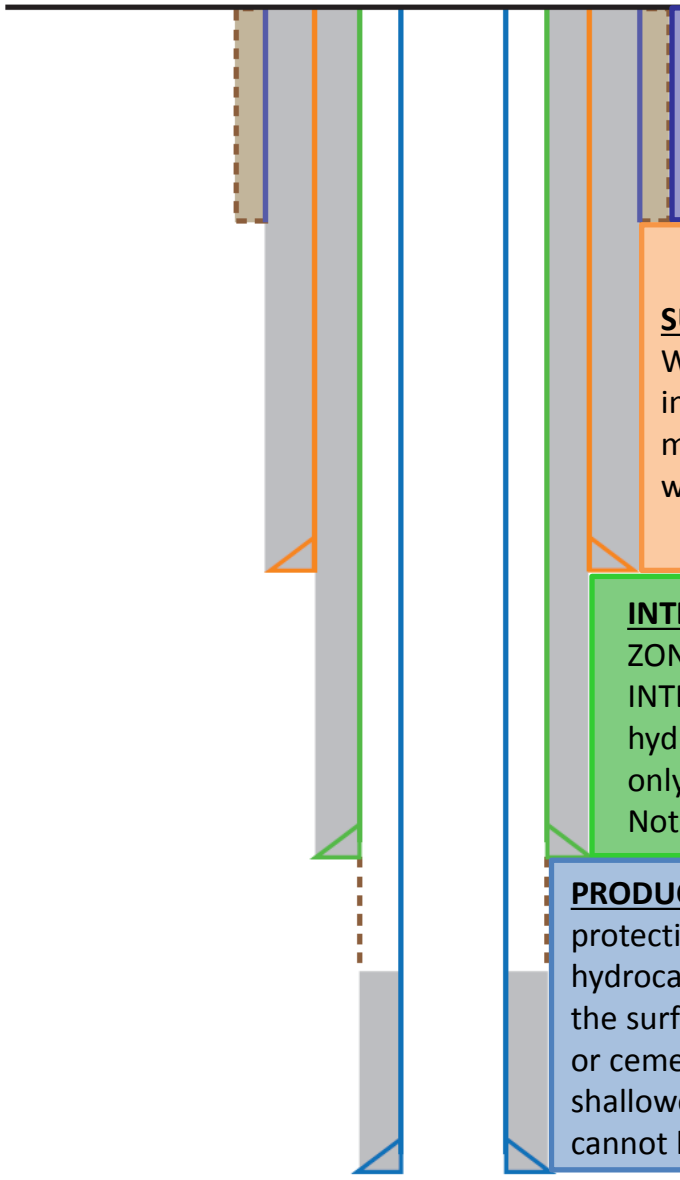
No-Inspection & Text Comments

- No-inspection comments:
  - Plugged Well
  - This is not our well
  - Gas storage well
  - Well spud, drilling not completed
  - Regulatory Inactive Well
  - Injection Well
  - Observation Well
- Status Validation Underway: any wells that aren't inspected on paper forms or Form A and Form B
- Abandoned wells must still be inspected if they have not yet been plugged
- Text Comments: should be used to note any significant observations during inspection: **don’t necessarily let DEP interpret data for you – CLARIFY**

Summary of Form C Features and Use

BREAK – QUESTIONS?

Casing Definitions: Wells Spud PRIOR TO February 5, 2011



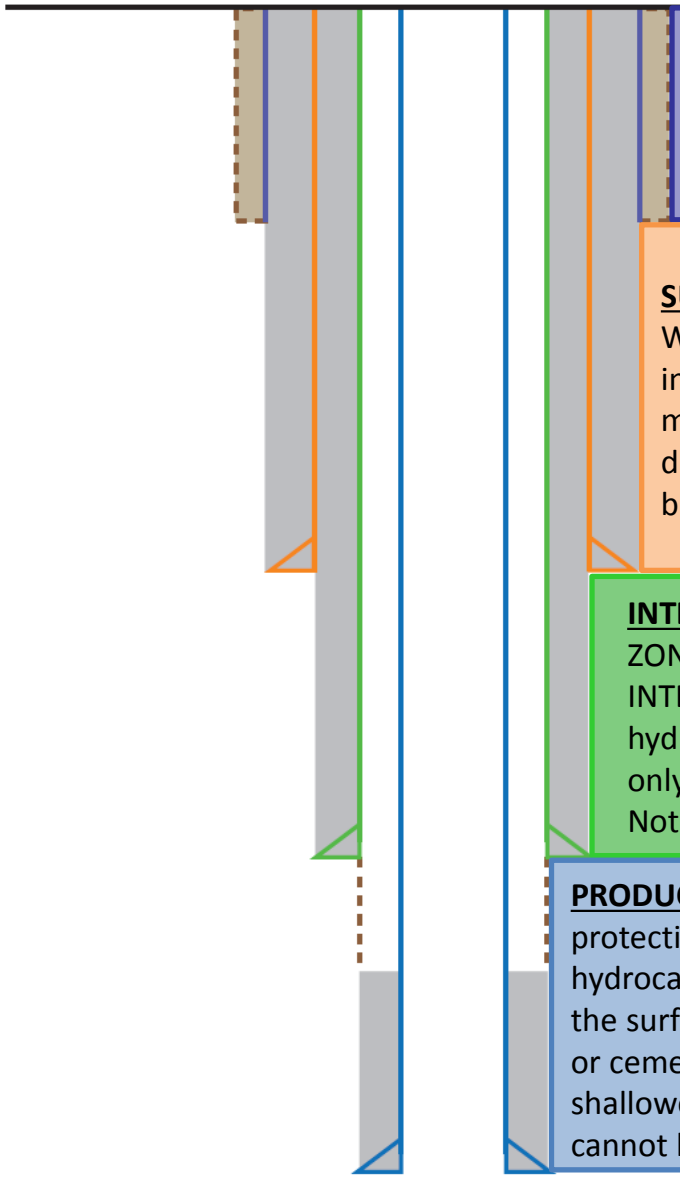
CONDUCTOR PIPE: A short string of large-diameter casing used to stabilize the top of the wellbore in shallow unconsolidated formations. It may be cemented, driven, or sanded in (this is not counted as a separate casing string if using Form A).

SURFACE/COAL CASING: In most cases, if **ANY** FRESHWATER ZONES or WORKABLE COAL SEAMS/MINE VOIDS are isolated over this depth interval, the casing is considered SURFACE/COAL CASING. Note that more than one surface or coal casing string may be used and brackish water/brine zones may also be isolated.

INTERMEDIATE CASING: In most cases, if **ONLY** BRACKISH WATER/BRINE ZONES are isolated over this depth interval, the casing is considered INTERMEDIATE CASING. This casing may also isolate non-target hydrocarbon zones. Intermediate casing is not used in every well and is only possible if separate coal/surface and production strings are present. Note that more than one intermediate string may be used.

PRODUCTION CASING: A string of pipe other than surface casing and coal protective casing which is run for the purpose of confining or conducting hydrocarbons and associated fluids from one or more producing horizons to the surface. Production casing may be anchored with cement or a packer, or cemented to surface, but MUST ISOLATE hydrocarbons from the next shallower casing string in the well completely to meet this definition, i.e., it cannot be free-hanging in the wellbore.

Casing Definitions: Wells Spud AFTER February 5, 2011



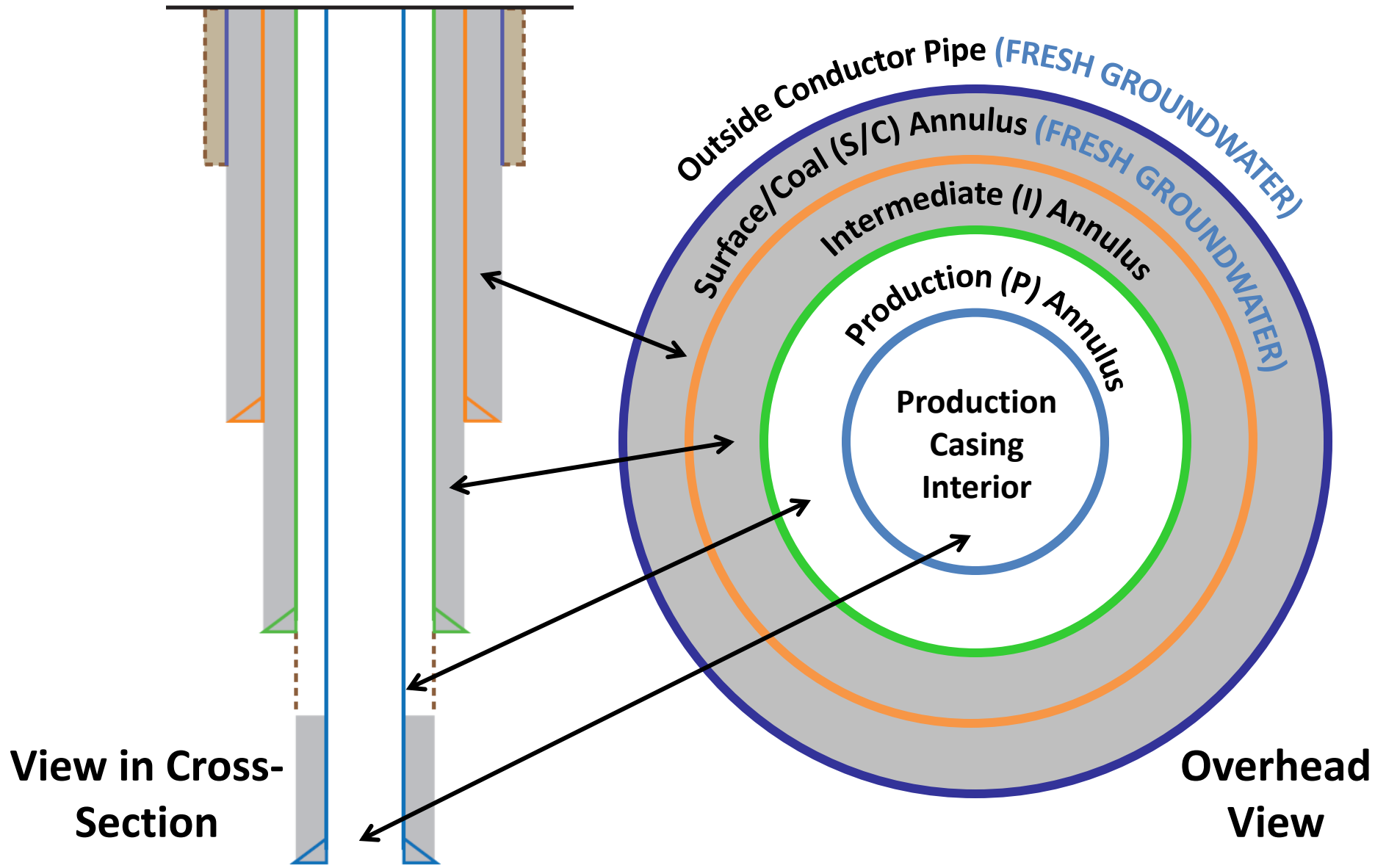
CONDUCTOR PIPE: A short string of large-diameter casing used to stabilize the top of the wellbore in shallow unconsolidated formations. It may be cemented or driven (this is not counted as a separate casing string if using Form A).

SURFACE/COAL CASING: In most cases, if **ONLY** FRESHWATER ZONES or WORKABLE COAL SEAMS/MINE VOIDS are isolated over this depth interval, the casing is considered SURFACE/COAL CASING. Note that more than one surface or coal casing string may be used and that the deepest fresh groundwater casing must be no more than 200 feet below the base of fresh groundwater.

INTERMEDIATE CASING: In most cases, if **ONLY** BRACKISH WATER/BRINE ZONES are isolated over this depth interval, the casing is considered INTERMEDIATE CASING. This casing may also isolate non-target hydrocarbon zones. Intermediate casing is not used in every well and is only possible if separate coal/surface and production strings are present. Note that more than one intermediate string may be used.

PRODUCTION CASING: A string of pipe other than surface casing and coal protective casing which is run for the purpose of confining or conducting hydrocarbons and associated fluids from one or more producing horizons to the surface. Production casing may be anchored with cement or a packer, or cemented to surface, but MUST ISOLATE hydrocarbons from the next shallower casing string in the well completely to meet this definition, i.e., it cannot be free-hanging in the wellbore.

Annulus Definitions



Examples by Well Type

- Single-String* Vented Oil Well
- Single-String* Combo Well
- Single-String* Gas Well
- Multi-String Oil Well
- Multi-String Gas Well
- Multi-String Combo Well
- Multi-String Gas Well, Annular Production
- Multi-String Combo Well, Annular Production

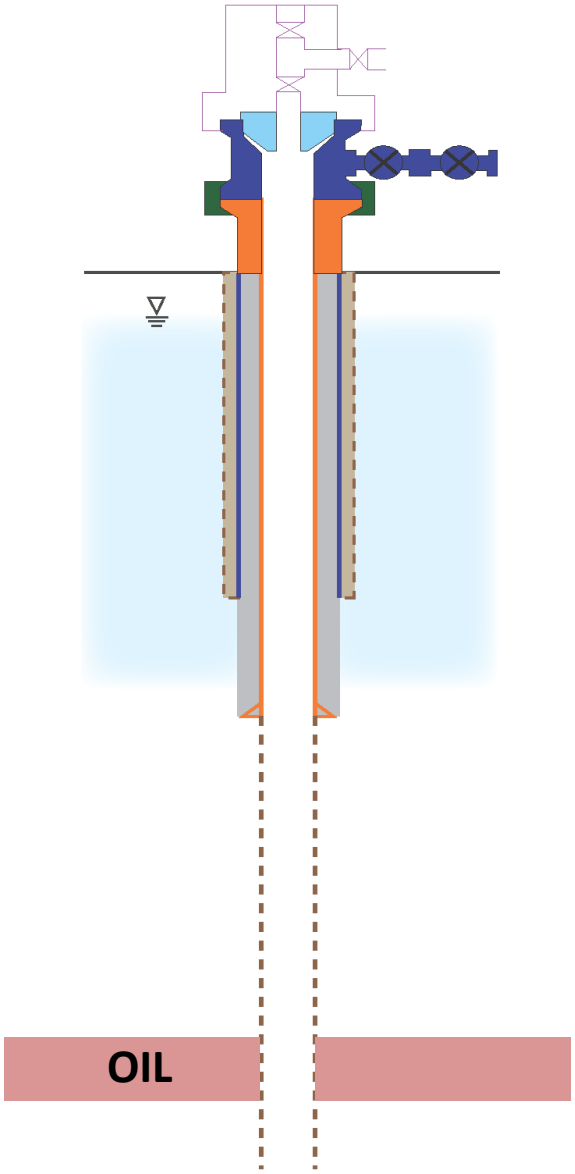
Each example will include a well with no leaks and one with identified leaks

Assume no lost circulation issues at wells with annular production inside surface casing

***Indicates well with only "freshwater" casing**

Single-String Vented Oil Well Example

- Oil well (open-hole completion) equipped with surface casing (orange) and conductor pipe (dark blue) only
- Tubing used to recover oil, but not depicted
- Casing head gas is vented to the atmosphere to keep back pressure off of producing formation and casing seat
- The water level is not accessible

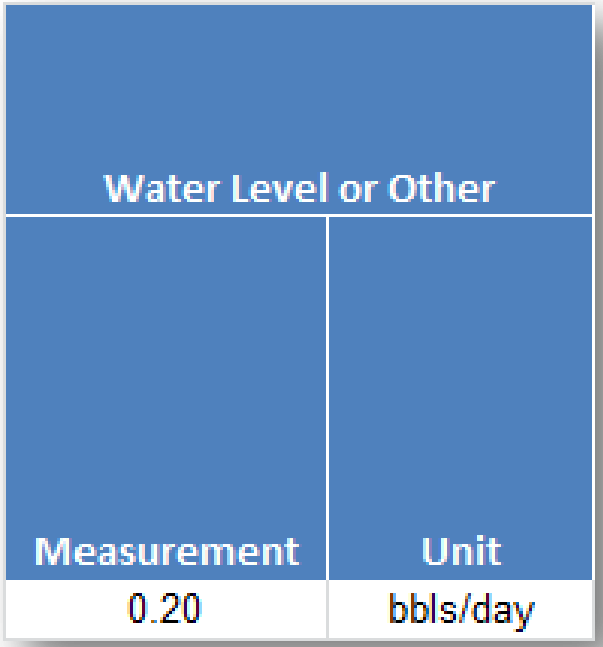


Single-String Vented Oil Well Example

Primary Production Pressure (psig)			
Primary Production Pressure (psig)	Primary Production Vent Flow as Required per 78.83(a)(1) or Other (cfpd)	Annular Production Pressure (psig)	Maximum Allowable Pressure Exceeded per 78.73(c) (Y/N/U)
	100		

- Notes
  - For this well design, only the Primary Production Vent Flow in cfpd needs to be reported
  - All other fields are left BLANK in this section of the inspection report

Single-String Vented Oil Well Example



Water Level or Other	
Measurement	Unit
0.20	bbls/day

- Notes
  - To monitor for leaks in the surface casing, which is serving as production casing, the operator has chosen to monitor the produced water volume in bbls/day instead of measuring the water level

Single-String Vented Oil Well Example

Open Flow (cfpd) or Shut-in Pressure on Production Annulus (psig)	
Measurement	Unit
0	cfpd

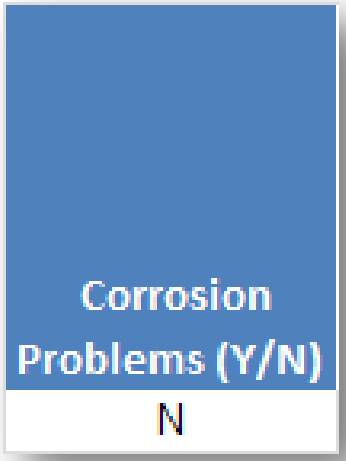
- Notes
  - The annular space between the surface casing and conductor pipe is inspected for the presence of escaping gas (downhole leak), which is reported in cfpd since this space is open to the atmosphere

Single-String Vented Oil Well Example

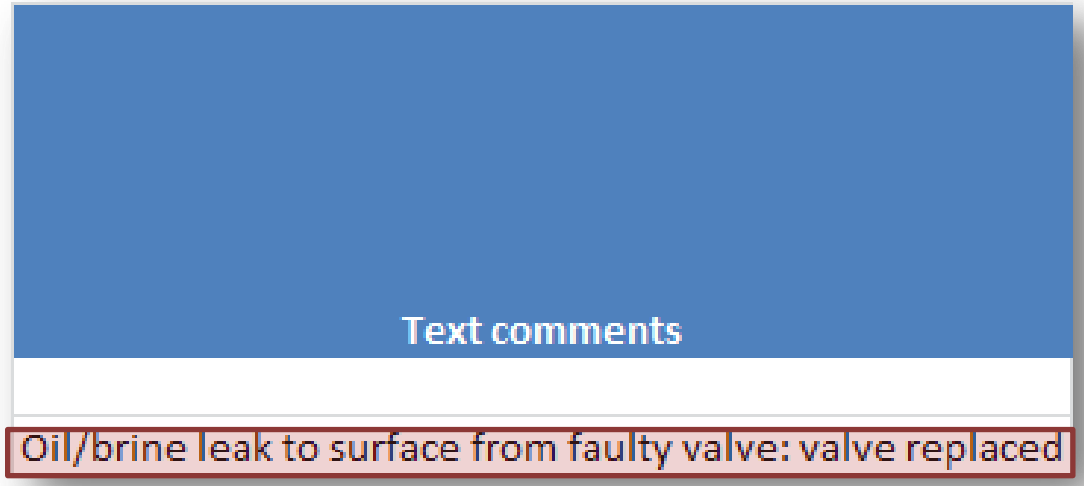
Fluids Survey (Gas, Oil, or Brine)				
Any Fluids Noted (Y/N)	Gas Outside Freshwater Casing (cfpd)	Gas Outside Intermediate Casing (cfpd)	Surface Wellhead Equipment Gas Emissions (cfpd)	Any Liquids (Oil or Brine) to Surface or Outside Freshwater Casing (Y/N)
N				
Y	0		0	Y

- Notes
  - If no fluids (gas, oil, or brine) are noted, "N" is entered and all other fields in the Fluids Survey section are left BLANK
  - When fluids are noted, first two columns to right of "Y" indicate downhole casing leaks, third column indicates any surface wellhead equipment leaks, and last column indicates discharges of oil or brine to surface from wellhead equipment or flowing to surface outside of freshwater casing
  - In the red-shaded example, a faulty valve has allowed a small volume of oil/brine to discharge to the surface and all other applicable portions of the Fluids Survey section must be completed: note that "Gas Outside Freshwater Casing" refers to outside the conductor pipe for this design

Single-String Vented Oil Well Example



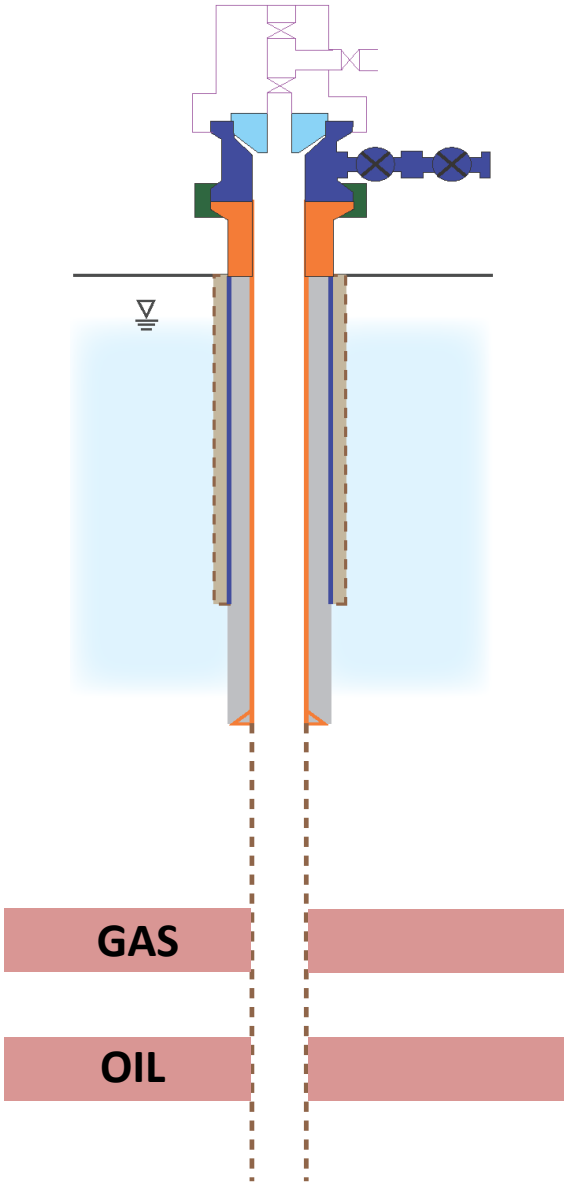
- Notes
  - No corrosion problems are noted



- Notes
  - The reason for the leak and the repair is documented in the comments field for the red-shaded example

Single-String Combo Well Example

- Combo well (open-hole completion) equipped with surface casing (orange) and conductor pipe (dark blue) only
- Tubing is used to recover oil, but not depicted
- Gas is produced inside of the surface casing
- The water level is not accessible



Single-String Combo Well Example

Primary Production Pressure (psig)			
Primary Production Pressure (psig)	Primary Production Vent Flow as Required per 78.83(a)(1) or Other (cfpd)	Annular Production Pressure (psig)	Maximum Allowable Pressure Exceeded per 78.73(c) (Y/N/U)
150			N

- Notes
  - For this well design, the Primary Production Pressure in psig needs to be reported
  - The pressure, whether shut-in or flowing, is compared to 80% x 0.433 psi/ft x surface casing set depth (ft) – it is below this benchmark
  - All other fields are left BLANK in this section of the inspection report

Single-String Combo Well Example

Water Level or Other	
Measurement	**Unit**
100,000	TDS

- Notes
  - To monitor for leaks in the surface casing, which is serving as production casing, the operator has chosen to monitor the produced water quality in Total Dissolved Solids (TDS) instead of measuring the water level

Single-String Combo Well Example

Open Flow (cfpd) or Shut-in Pressure on Production Annulus (psig)	
Measurement	Unit
0	cfpd

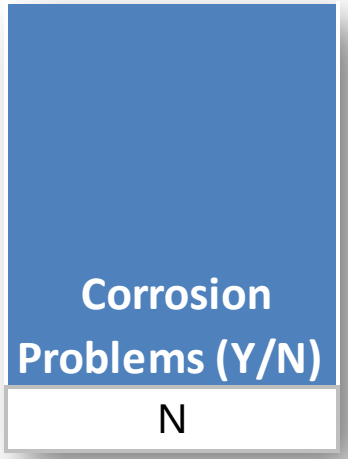
- Notes
  - The annular space between the surface casing and conductor pipe is inspected for the presence of escaping gas (downhole leak), which is reported in cfpd since this space is open to the atmosphere

Single-String Combo Well Example

Fluids Survey (Gas, Oil, or Brine)				
Any Fluids Noted (Y/N)	Gas Outside Freshwater Casing (cfpd)	Gas Outside Intermediate Casing (cfpd)	Surface Wellhead Equipment Gas Emissions (cfpd)	Any Liquids (Oil or Brine) to Surface or Outside Freshwater Casing (Y/N)
N				
Y	0		NRM	N

- Notes
  - If no fluids (gas, oil, or brine) are noted, “N” is entered and all other fields in the Fluids Survey section are left BLANK
  - When fluids are noted, first two columns to right of “Y” indicate downhole casing leaks, third column indicates any surface wellhead equipment leaks, and last column indicates discharges of oil or brine to surface from wellhead equipment or flowing to surface outside of freshwater casing
  - In the red-shaded example, a minor thread leak has allowed a small volume of gas to escape at the surface and all other applicable portions of the Fluids Survey section must be completed: please note - although a leak is noted, NRM (not readily measureable) is recorded in the “Surface Equipment Gas Emissions” because the amount could not be quantified

Single-String Combo Well Example

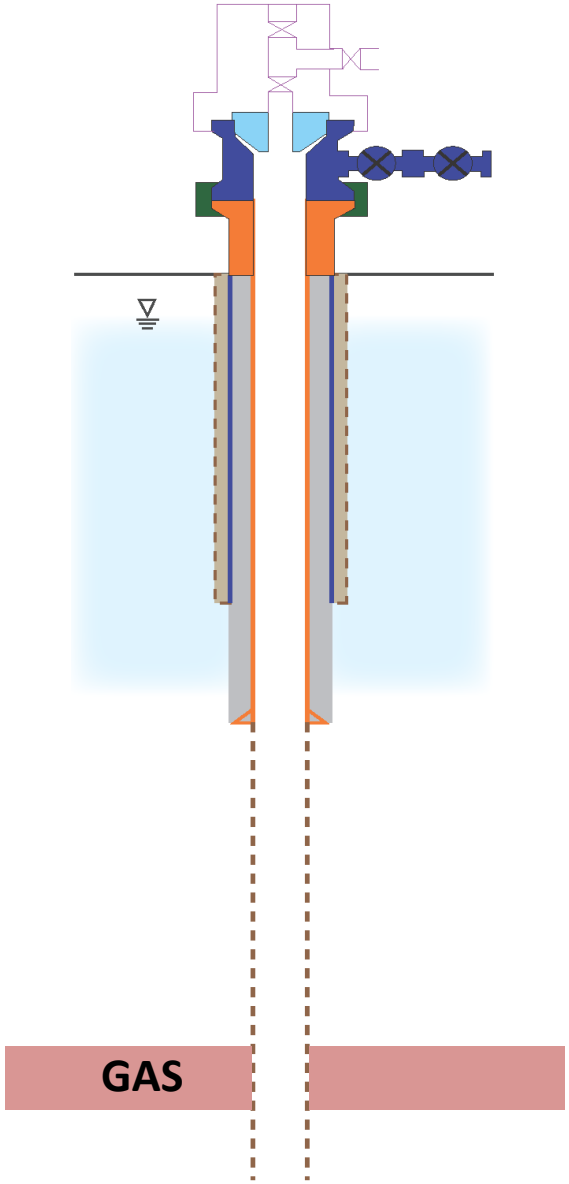


- Notes
  - No corrosion problems are noted

- Notes
  - The reason for the leak of gas at the surface is documented in the comments field for the red-shaded example

Single-String Gas Well Example

- Gas well (open-hole completion) equipped with surface casing (orange) and conductor pipe (dark blue) only
- Gas is produced inside of the surface casing

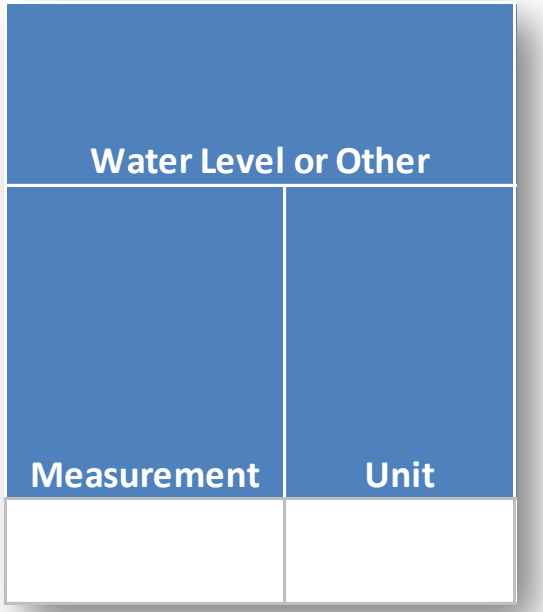


Single-String Gas Well Example

Primary Production Pressure (psig)			
Primary Production Pressure (psig)	Primary Production Vent Flow as Required per 78.83(a)(1) or Other (cfpd)	Annular Production Pressure (psig)	Maximum Allowable Pressure Exceeded per 78.73(c) (Y/N/U)
250			Y

- Notes
  - For this well design, the Primary Production Pressure in psig needs to be reported
  - The pressure, whether shut-in or flowing, is compared to 80% x 0.433 psi/ft x surface casing set depth (ft) – it is above this benchmark **(IMMEDIATE DEP REPORTING REQUIRED)**
  - All other fields are left BLANK in this section of the inspection report

Single-String Gas Well Example



- Notes
  - Nothing is recorded for this inspection element due to the fact that it is not required for gas wells – it is only required for oil or combo wells

Single-String Gas Well Example

Open Flow (cfpd) or Shut-in Pressure on Production Annulus (psig)	
Measurement	Unit
25	cfpd

- Notes
  - The annular space between the surface casing and conductor pipe is inspected for the presence of escaping gas (downhole leak), which is reported in cfpd since this space is open to the atmosphere

Single-String Gas Well Example

Fluids Survey (Gas, Oil, or Brine)				
Any Fluids Noted (Y/N)	Gas Outside Freshwater Casing (cfpd)	Gas Outside Intermediate Casing (cfpd)	Surface Wellhead Equipment Gas Emissions (cfpd)	Any Liquids (Oil or Brine) to Surface or Outside Freshwater Casing (Y/N)
N				
Y	NRM		0	N

- Notes
  - If no fluids (gas, oil, or brine) are noted, “N” is entered and all other fields in the Fluids Survey section are left BLANK
  - When fluids are noted, first two columns to right of “Y” indicate downhole casing leaks, third column indicates any surface wellhead equipment leaks, and last column indicates discharges of oil or brine to surface from wellhead equipment or flowing to surface outside of freshwater casing
  - In the red-shaded example, a small volume of gas was escaping outside the conductor casing and all other applicable portions of the Fluids Survey section must be completed: NRM is recorded in the “Gas Outside Freshwater Casing” because the amount could not be quantified

Single-String Gas Well Example

Corrosion Problems (Y/N)
N

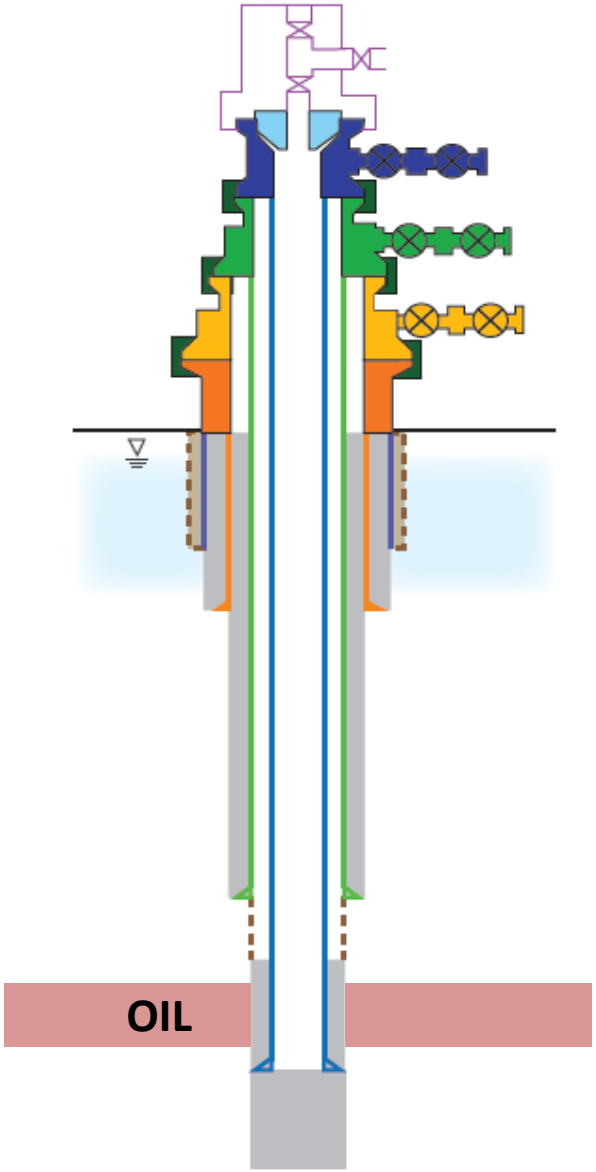
- Notes
  - No corrosion problems are noted

Text comments
Overpressuring casing seat; gas observed outside of surface (production) casing
Overpressuring casing seat; gas observed outside of surface (production) casing and conductor pipe

- Notes
  - Overpressuring of the casing seat and the observation of gas outside of freshwater casing are documented in the comments field for the example

Multi-String Oil Well Example

- Multi-string oil well (cased-hole completion) equipped with production casing (light blue), intermediate casing (green), surface casing (orange), and conductor pipe (dark blue)
- Tubing used to recover oil, but not depicted
- Casing head gas is vented to the atmosphere because no pipeline is available

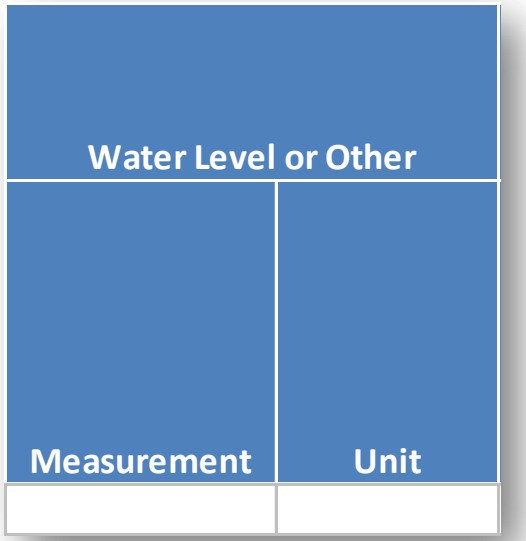


Multi-String Oil Well Example

Primary Production Pressure (psig)			
Primary Production Pressure (psig)	Primary Production Vent Flow as Required per 78.83(a)(1) or Other (cfpd)	Annular Production Pressure (psig)	Maximum Allowable Pressure Exceeded per 78.73(c) (Y/N/U)
	120		

- Notes
  - For this well design, only the Primary Production Vent Flow in cfpd needs to be reported
  - All other fields are left BLANK in this section of the inspection report

Multi-String Oil Well Example



- Notes
  - Nothing is recorded for this inspection element due to the fact that oil is not produced inside a surface or coal string (tubing is used to recover oil and the well is equipped with a separate, perforated production casing)

Multi-String Oil Well Example

Open Flow (cfpd) or Shut-in Pressure on Production Annulus (psig)	
Measurement	Unit
0	psig

- Notes
  - The annular space between the production casing and intermediate casing is inspected for the presence of escaping gas (downhole leak), which is reported in psig since this space is shut-in

Multi-String Oil Well Example

Fluids Survey (Gas, Oil, or Brine)				
Any Fluids Noted (Y/N)	Gas Outside Freshwater Casing (cfpd)	Gas Outside Intermediate Casing (cfpd)	Surface Wellhead Equipment Gas Emissions (cfpd)	Any Liquids (Oil or Brine) to Surface or Outside Freshwater Casing (Y/N)
N				
Y	0	25	0	N

- Notes
  - If no fluids (gas, oil, or brine) are noted, “N” is entered and all other fields in the Fluids Survey section are left BLANK
  - When fluids are noted, first two columns to right of “Y” indicate downhole casing leaks, third column indicates any surface wellhead equipment leaks, and last column indicates discharges of oil or brine to surface from wellhead equipment or flowing to surface outside of freshwater casing
  - In the red-shaded example, escaping gas was noted outside the intermediate casing. It was discovered that a shallow gas zone was not completely isolated in the intermediate hole section of the well.

Multi-String Oil Well Example

Corrosion Problems (Y/N)
N

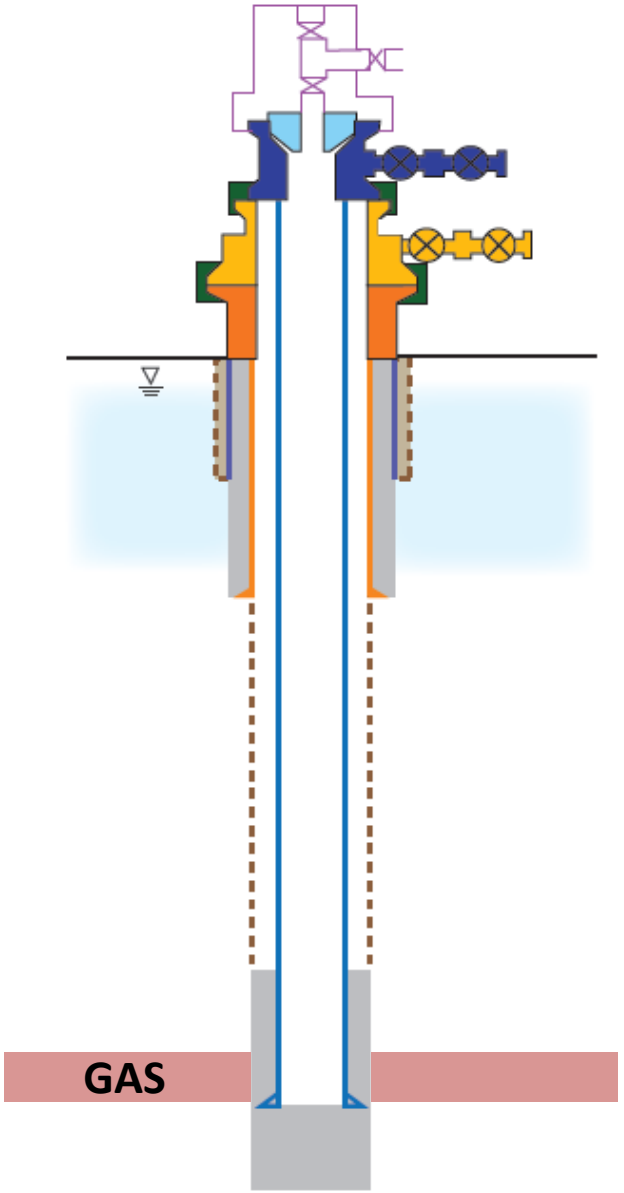
- Notes
  - No corrosion problems are noted

Text comments
Annular gas flow noted outside intermediate string estimated at 25 cfpd

- Notes
  - The observation and estimated flow of annular gas outside the intermediate casing are documented in the comments field for the red-shaded example

Multi-String Gas Well Example

- Gas well (cased-hole completion) equipped with production casing (light blue), surface casing (orange), and conductor pipe (dark blue)

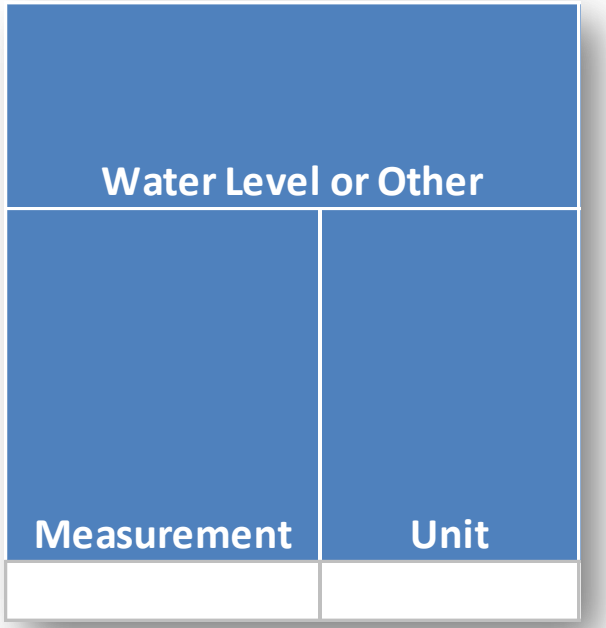


Multi-String Gas Well Example

Primary Production Pressure (psig)			
Primary Production Pressure (psig)	Primary Production Vent Flow as Required per 78.83(a)(1) or Other (cfpd)	Annular Production Pressure (psig)	Maximum Allowable Pressure Exceeded per 78.73(c) (Y/N/U)
500			

- Notes
  - For this well design, the Primary Production Pressure in psig needs to be reported
  - All other fields are left BLANK in this section of the inspection report

Multi-String Gas Well Example



- Notes
  - Nothing is recorded for this inspection element due to the fact that it is not required for gas wells – it is only required for single-string oil or combo wells

Multi-String Gas Well Example

Open Flow (cfpd) or Shut-in Pressure on Production Annulus (psig)	
Measurement	Unit
0	cfpd

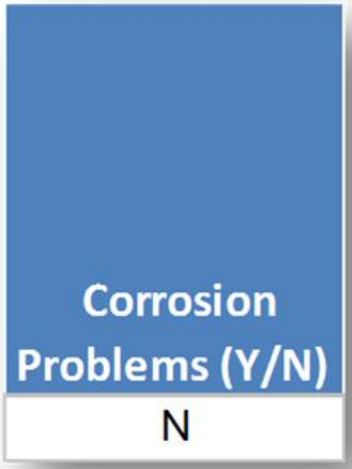
- Notes
  - The annular space between the production casing and surface casing is inspected for the presence of escaping gas (downhole leak), which is reported in cfpd since this space is open to the atmosphere

Multi-String Gas Well Example

Fluids Survey (Gas, Oil, or Brine)				
Any Fluids Noted (Y/N)	Gas Outside Freshwater Casing (cfpd)	Gas Outside Intermediate Casing (cfpd)	Surface Wellhead Equipment Gas Emissions (cfpd)	Any Liquids (Oil or Brine) to Surface or Outside Freshwater Casing (Y/N)
N				
Y	0		NRM	N

- Notes
  - If no fluids (gas, oil, or brine) are noted, “N” is entered and all other fields in the Fluids Survey section are left BLANK
  - When fluids are noted, first two columns to right of “Y” indicate downhole casing leaks, third column indicates any surface wellhead equipment leaks, and last column indicates discharges of oil or brine to surface from wellhead equipment or flowing to surface outside of freshwater casing
  - In the red-shaded example, a small volume of escaping gas was noted in association with the surface well equipment and all other applicable portions of the Fluids Survey section must be completed: although a leak is noted, NRM is recorded in the “Surface Equipment Gas Emissions” field because the amount could not be quantified

Multi-String Gas Well Example

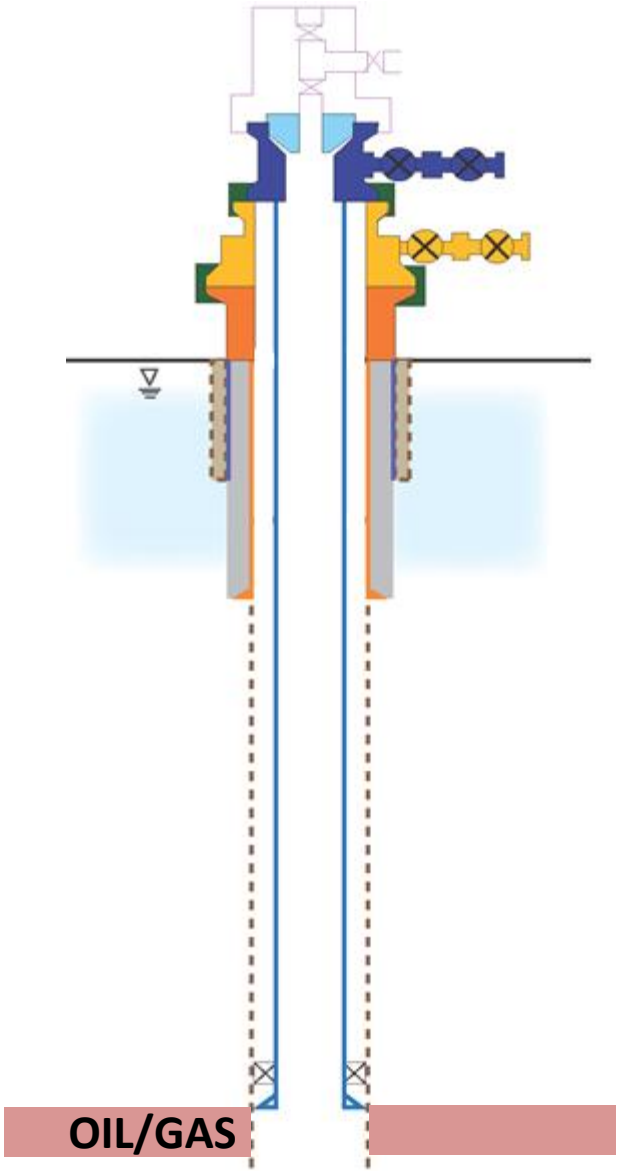


- Notes
  - No corrosion problems are noted

- Notes
  - The reason for the leak of gas at the surface is documented in the comments field for the red-shaded example

Multi-String Combo Well Example

- Combo well (open-hole completion) equipped with production casing (light blue), surface casing (orange), and conductor pipe (dark blue)
- Tubing is used to recover oil, but not depicted
- Frac pipe (production casing) has been left in the well to prevent overpressuring of the surface casing seat
- Associated gas is produced inside of the production casing

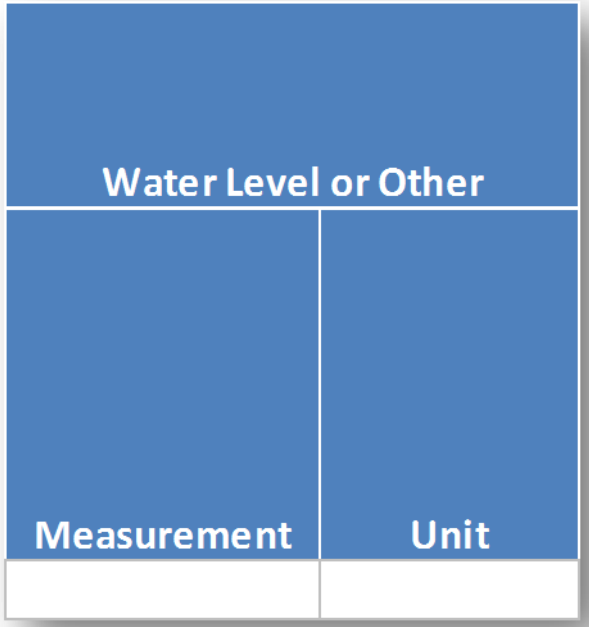


Multi-String Combo Well Example

Primary Production Pressure (psig)			
Primary Production Pressure (psig)	Primary Production Vent Flow as Required per 78.83(a)(1) or Other (cfpd)	Annular Production Pressure (psig)	Maximum Allowable Pressure Exceeded per 78.73(c) (Y/N/U)
300			

- Notes
  - For this well design, the Primary Production Pressure in psig needs to be reported
  - All other fields are left BLANK in this section of the inspection report

Multi-String Combo Well Example



- Notes
  - Nothing is recorded for inspection element due to production pipe being set on a packer, which effectively serves as a separate production casing

Multi-String Combo Well Example

Open Flow (cfpd) or Shut-in Pressure on Production Annulus (psig)	
Measurement	Unit
0	cfpd

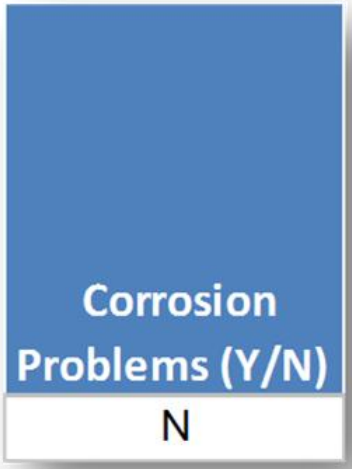
- Notes
  - The annular space between the frac pipe (production casing) and surface casing is inspected for the presence of escaping gas (downhole leak), which is reported in cfpd since this space is open to the atmosphere

Multi-String Combo Well Example

Fluids Survey (Gas, Oil, or Brine)				
Any Fluids Noted (Y/N)	Gas Outside Freshwater Casing (cfpd)	Gas Outside Intermediate Casing (cfpd)	Surface Wellhead Equipment Gas Emissions (cfpd)	Any Liquids (Oil or Brine) to Surface or Outside Freshwater Casing (Y/N)
N				
Y	0		NRM	N

- Notes
  - If no fluids (gas, oil, or brine) are noted, “N” is entered and all other fields in the Fluids Survey section are left BLANK
  - When fluids are noted, first two columns to right of “Y” indicate downhole casing leaks, third column indicates any surface wellhead equipment leaks, and last column indicates discharges of oil or brine to surface from wellhead equipment or flowing to surface outside of freshwater casing
  - In the red-shaded example, a small volume of escaping gas was noted during the inspection due to a thread leak and all other applicable portions of the Fluids Survey section must be completed: please note - NRM is recorded in the “Surface Equipment Gas Emissions” because the amount could not be quantified

Multi-String Combo Well Example

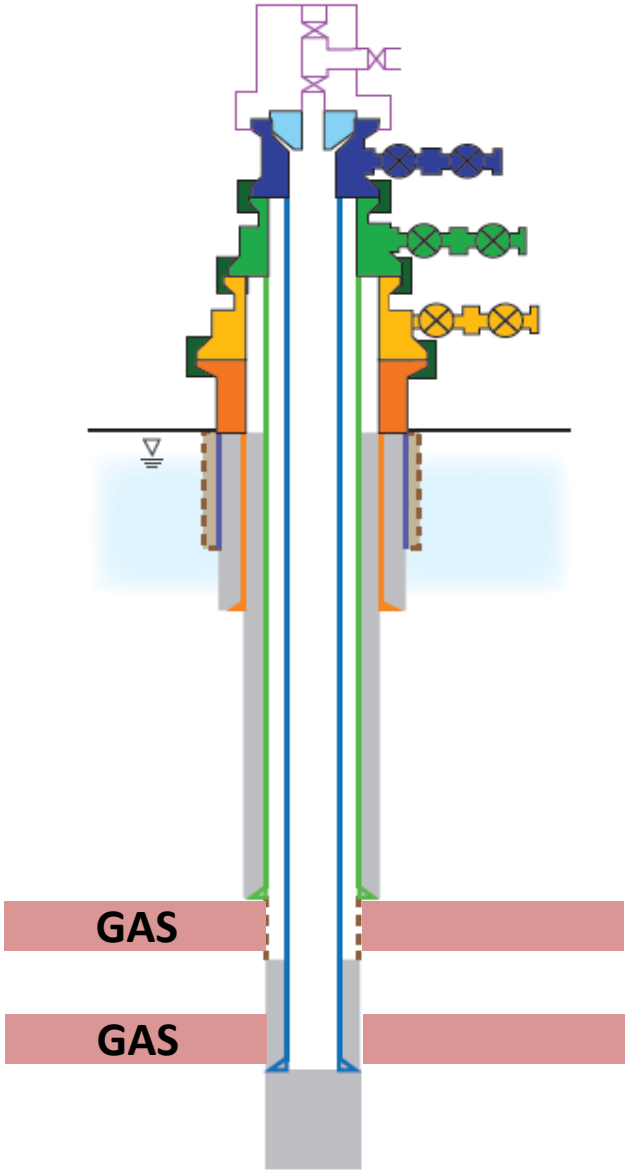


- Notes
  - No corrosion problems are noted

- Notes
  - The reason for the leak of gas at the surface is documented in the comments field for the red-shaded example

Multi-String Gas Well, Annular Production Example

- Gas well (cased-hole completion) equipped with production casing (light blue), intermediate casing (green), surface casing (orange), and conductor pipe (dark blue)
- Annular gas is produced inside of the intermediate casing

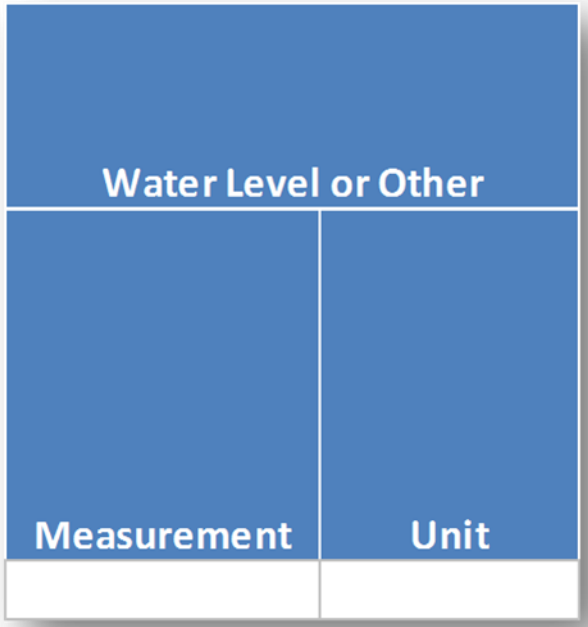


Multi-String Gas Well, Annular Production Example

Primary Production Pressure (psig)			
Primary Production Pressure (psig)	Primary Production Vent Flow as Required per 78.83(a)(1) or Other (cfpd)	Annular Production Pressure (psig)	Maximum Allowable Pressure Exceeded per 78.73(c) (Y/N/U)
600		100	

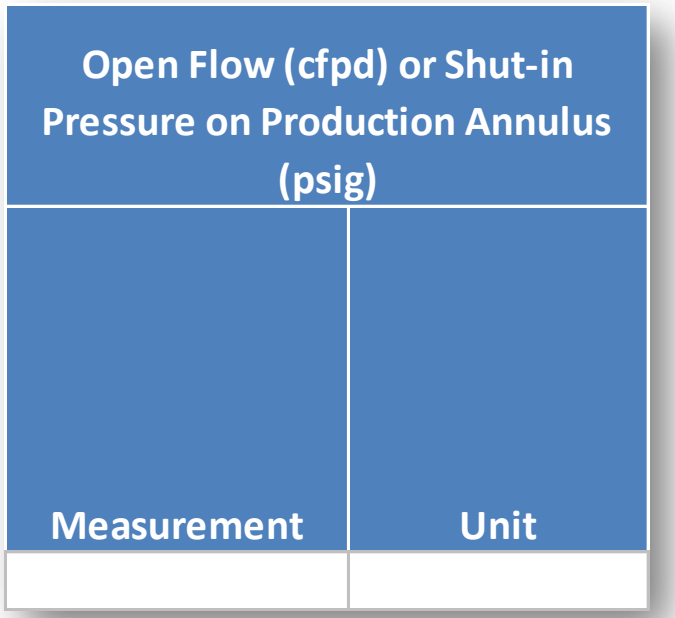
- Notes
  - For this well design, the Primary Production Pressure in psig needs to be reported
  - The Annular Production Pressure in psig also needs to be reported
  - All other fields are left BLANK in this section of the inspection report

Multi-String Gas Well, Annular Production Example



- Notes
  - Nothing is recorded for inspection element due to because it is not required for multi-string wells (it is only required for single-string oil or combo wells)

Multi-String Gas Well, Annular Production Example



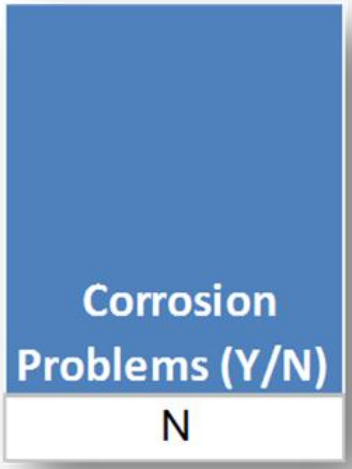
- Notes
  - This section is left blank as the production annulus is being produced and was reported in the primary production section of the form

Multi-String Gas Well, Annular Production Example

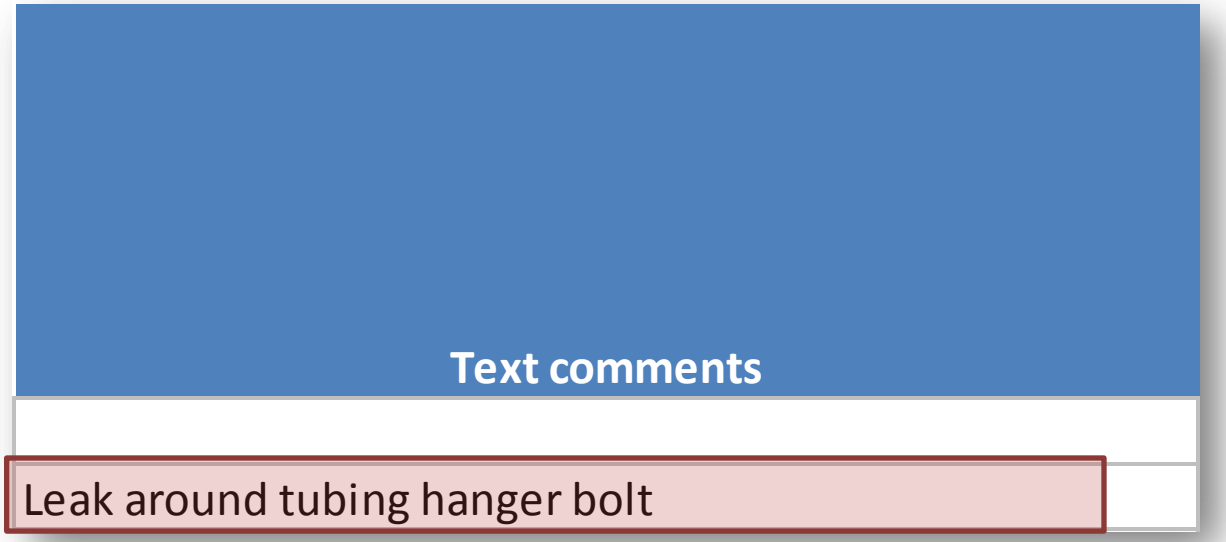
Fluids Survey (Gas, Oil, or Brine)				
Any Fluids Noted (Y/N)	Gas Outside Freshwater Casing (cfpd)	Gas Outside Intermediate Casing (cfpd)	Surface Wellhead Equipment Gas Emissions (cfpd)	Any Liquids (Oil or Brine) to Surface or Outside Freshwater Casing (Y/N)
N				
Y	0	0	NRM	N

- Notes
  - If no fluids (gas, oil, or brine) are noted, “N” is entered and all other fields in the Fluids Survey section are left BLANK
  - When fluids are noted, first two columns to right of “Y” indicate downhole casing leaks, third column indicates any surface wellhead equipment leaks, and last column indicates discharges of oil or brine to surface from wellhead equipment or flowing to surface outside of freshwater casing
  - In the red-shaded example, a small volume of escaping gas was noted at the wellhead and all other applicable portions of the Fluids Survey section must be completed: NRM is recorded in the “Surface Equipment Gas Emissions” because the amount could not be quantified

Multi-String Gas Well, Annular Production Example



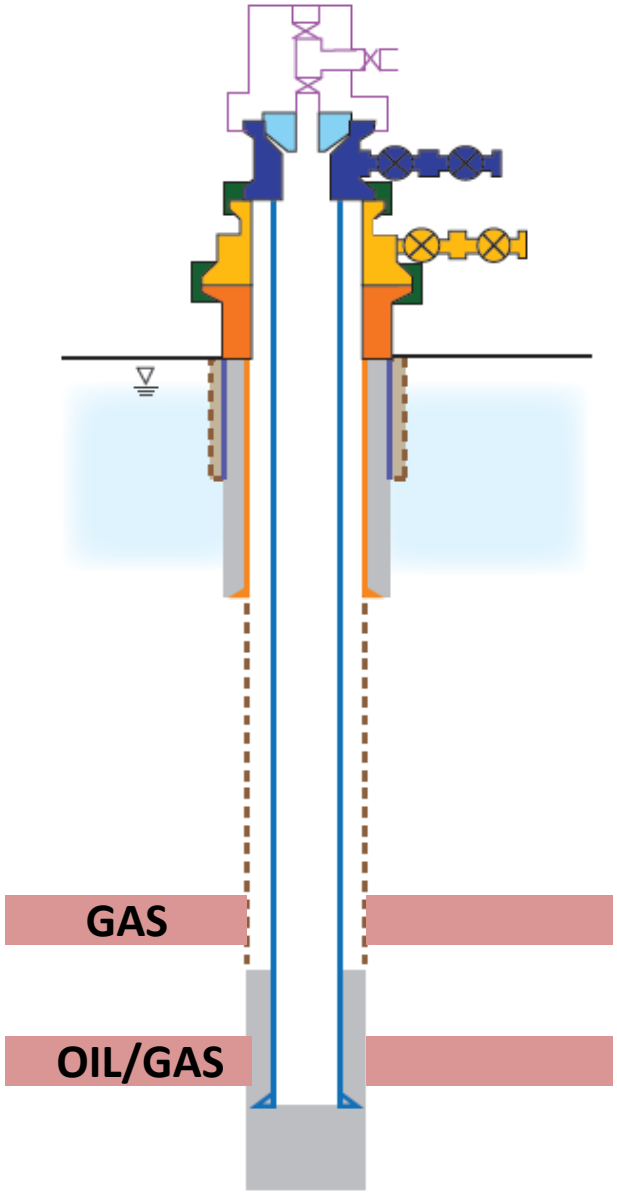
- Notes
  - No corrosion problems are noted



- Notes
  - The reason for the leak of gas at the surface is documented in the comments field for the red-shaded example

Multi-String Combo Well, Annular Production Example

- Combo well (cased-hole completion) equipped with production casing (light blue), surface casing (orange), and conductor pipe (dark blue)
- Tubing used to recover oil, but not depicted – associated gas is produced inside production casing
- Annular gas from a shallow zone is also produced inside of the surface casing

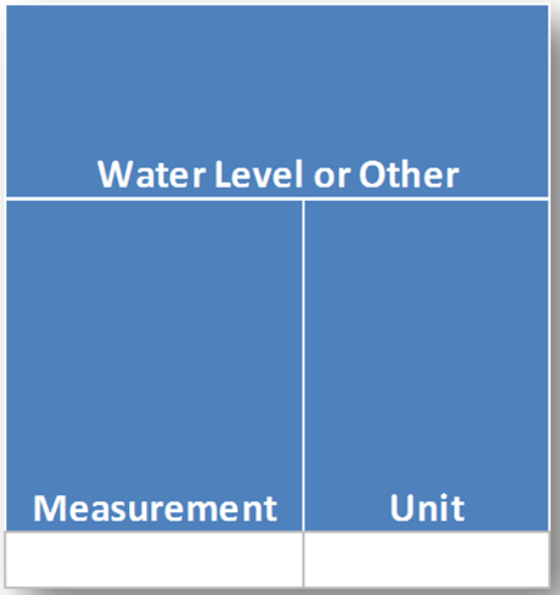


Multi-String Combo Well, Annular Production Example

Primary Production Pressure (psig)			
Primary Production Pressure (psig)	Primary Production Vent Flow as Required per 78.83(a)(1) or Other (cfpd)	Annular Production Pressure (psig)	Maximum Allowable Pressure Exceeded per 78.73(c) (Y/N/U)
150		50	N

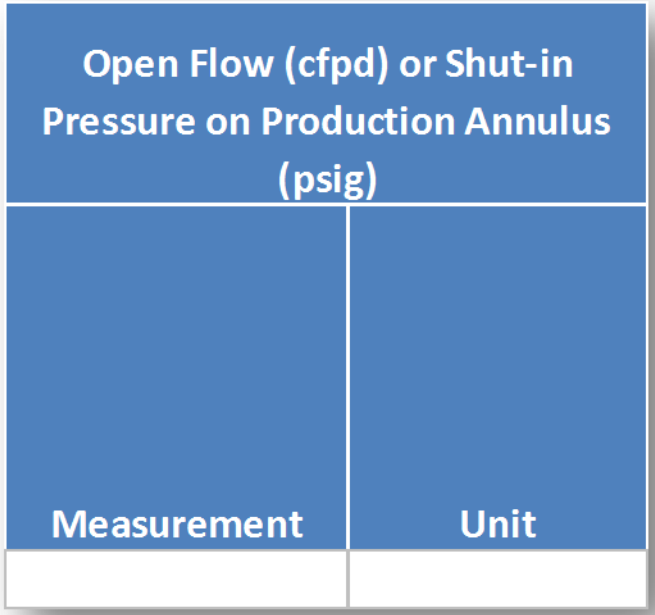
- Notes
  - For this well design, the Primary Production Pressure in psig needs to be reported
  - Annular Production Pressure in psig also needs to be reported
  - Since the annulus is produced inside of surface casing, the pressure is compared to 80% x 0.433 psi/ft x surface casing set depth (ft) – it is below this benchmark
  - The Primary Production Vent Flow field is left BLANK in this section of the inspection report

Multi-String Combo Well, Annular Production Example



- Notes
  - Nothing is recorded for this inspection element due to the fact that oil is not produced inside a surface or coal string (tubing is used to recover oil and the well is equipped with a separate, perforated production casing)

Multi-String Combo Well, Annular Production Example



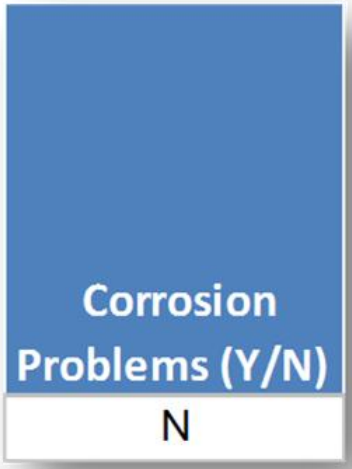
- Notes
  - This section is left blank as the production annulus is being produced and was reported in the primary production section of the form

Multi-String Combo Well, Annular Production Example

Fluids Survey (Gas, Oil, or Brine)				
Any Fluids Noted (Y/N)	Gas Outside Freshwater Casing (cfpd)	Gas Outside Intermediate Casing (cfpd)	Surface Wellhead Equipment Gas Emissions (cfpd)	Any Liquids (Oil or Brine) to Surface or Outside Freshwater Casing (Y/N)
N				
Y	0		NRM	N

- Notes
  - If no fluids (gas, oil, or brine) are noted, “N” is entered and all other fields in the Fluids Survey section are left BLANK
  - When fluids are noted, first two columns to right of “Y” indicate downhole casing leaks, third column indicates any surface wellhead equipment leaks, and last column indicates discharges of oil or brine to surface from wellhead equipment or flowing to surface outside of freshwater casing
  - In the red-shaded example, a small volume of escaping gas was noted at the wellhead and all other applicable portions of the Fluids Survey section must be completed: although a leak is noted, NRM is recorded in the “Surface Equipment Gas Emissions” because the amount could not be quantified

Multi-String Combo Well, Annular Production Example



- Notes
  - No corrosion problems are noted

- Notes
  - The reason for the leak of gas at the surface is documented in the comments field for the red-shaded example

Examples by Well Type

BREAK – QUESTIONS?

Reporting

Development of GreenPort/OGRE Well Integrity Reporting Webpage

- The reporting site will go live on January 1, 2015
- All inspection forms must be filed with the Department by February 15, 2015
- You may use either Form A, Form B, or Form C; but you MAY NOT use combinations of these forms
- This training module covers the Form C process

Reporting

Development of GreenPort/OGRE Well Integrity Reporting Webpage

- Electronic reporting is required for many operators
- For companies with 10 or fewer conventional wells in their inventories, paper forms may be completed and mailed to the Department

MAILING ADDRESS:
PA DEP
Bureau of Oil & Gas Planning & Program Management
PO Box 8765
Harrisburg, PA 17105-8765

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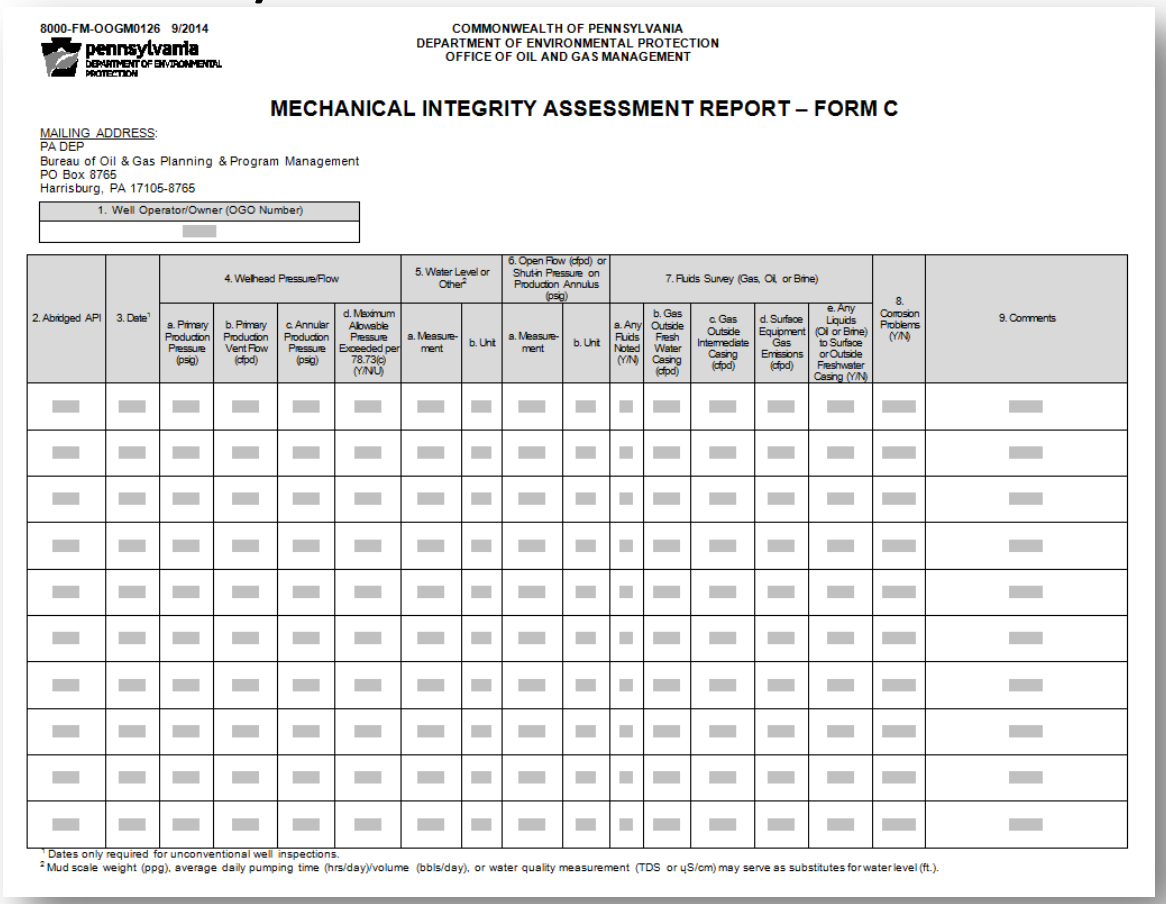
Reporting

Paper Form (OOGM126) and Instructions Now Available on E-Library



8000-FM-OOGM0126 9/2014

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OFFICE OF OIL AND GAS MANAGEMENT

MECHANICAL INTEGRITY ASSESSMENT REPORT – FORM C

MAILING ADDRESS:
PA DEP
Bureau of Oil & Gas Planning & Program Management
PO Box 8765
Harrisburg, PA 17105-8765

1. Well Operator/Owner (OGO Number)

2. Abridged API	3. Date[1]	4. Wellhead Pressure/Flow				5. Water Level or Other[2]		6. Open Flow (cfpd) or Shut-in Pressure on Production Annulus (psig)		7. Fluids Survey (Gas, Oil, or Brine)					8. Corrosion Problems (Y/N)	9. Comments
		a. Primary Production Pressure (psig)	b. Primary Production Vent Flow (cfpd)	c. Annular Production Pressure (psig)	d. Maximum Allowable Pressure Exceeded per 78.73(c) (Y/N/U)	a. Measure-ment	b. Unit	a. Measure-ment	b. Unit	a. Any Fluids Noted (Y/N)	b. Gas Outside Fresh Water Casing (cfpd)	c. Gas Outside Intermediate Casing (cfpd)	d. Surface Equipment Gas Emissions (cfpd)	e. Any Liquids (Oil or Brine) to Surface or Outside Freshwater Casing (Y/N)		

[1] Dates only required for unconventional well inspections.
[2] Mud scale weight (ppg), average daily pumping time (hrs/day)/volume (bbls/day), or water quality measurement (TDS or µS/cm) may serve as substitutes for water level (ft.).

http://www.elibrary.dep.state.pa.us/dsweb/HomePage

Select "Forms" → "Office of Oil and Gas Management" → "Mechanical Integrity Assessment Report-Form C"

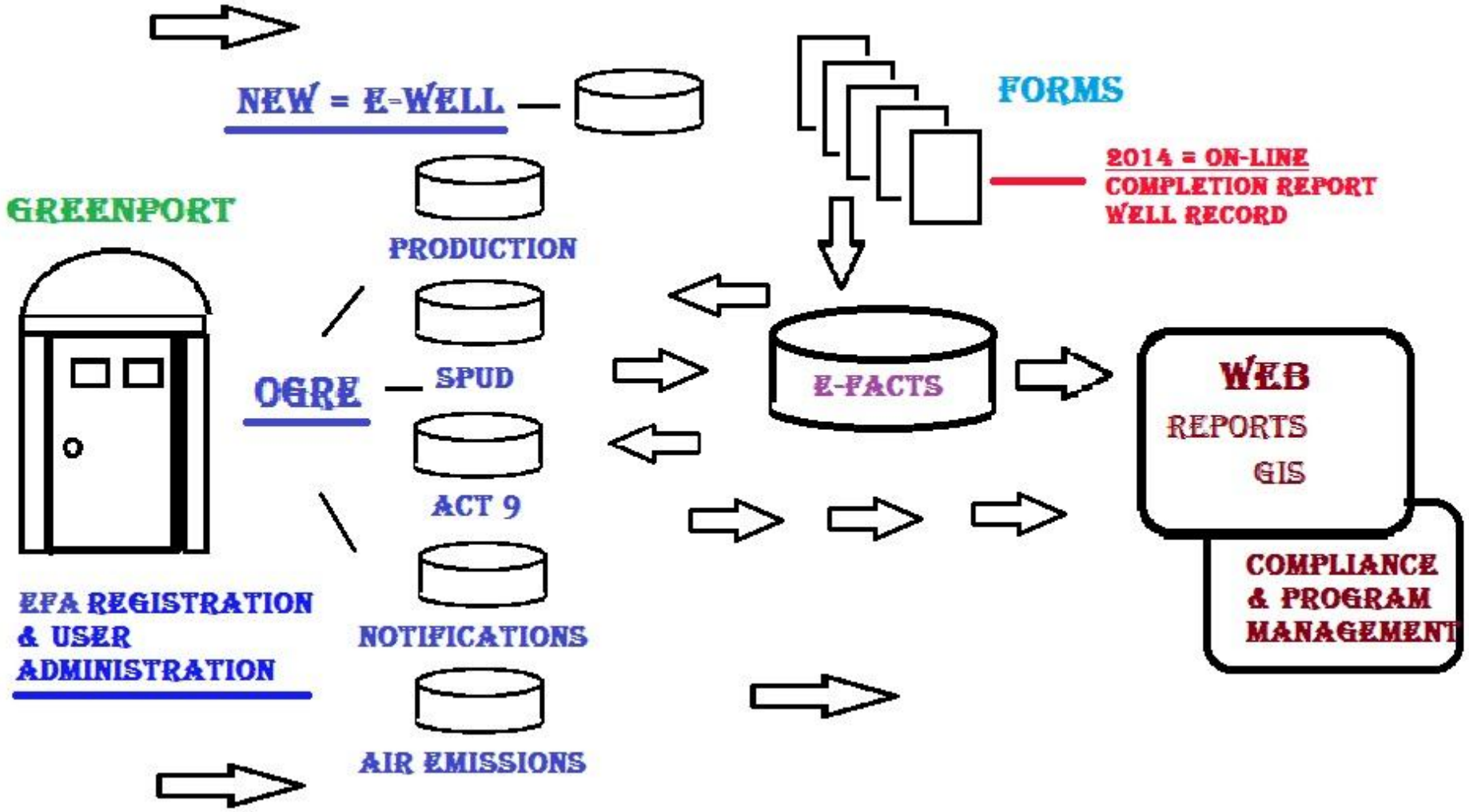
Reporting

Development of GreenPort/OGRE Well Integrity Reporting Webpage

- PADEP, Bureau of Information Technology will provide Well Integrity access to the users who have a role in OGRE for production/waste reporting
- The Electronic Filing Administrator (EFA) for the company can then provide additional access to people if they want other folks to submit their Integrity forms
- The only time a new registration will be required is if the operator in question is not registered currently in GreenPort (they will need to submit paperwork to become an EFA), or if someone new is reporting data for the company, in which case the EFA can give them access after they register for GreenPort

OIL & GAS DATA MANAGENT

www.depweb.state.pa.us



Reporting

Screenshot of the OGRE Environment

DEP Oil and Gas Reporting - Electronic

Welcome

Logged in as **FLANAGANJ** using operator ID **39315** Switch Operator | Back to GreenPort

Site Menu
- Welcome
- Online Reporting
  - Production/Waste Reporting
  - Production Reporting Guide
- Spreadsheet Reporting
  - Download and Validation
  - Spreadsheet Reporting Guide
  - Current Waste Facility List
  - Request to Add Waste Facility
- Act 9 Well Site Information
- Act 9 Emergency Response Plans
- Act 9 ERP Renewals
- Air Emissions Reporting
- SPUD Notification
- Well Integrity Reporting
- DEP Notifications
- Contact Us
- What's New

Welcome to the Pennsylvania DEP Oil & Gas website for Operators to electronically report production, waste and provide DEP with notification information. Unconventional well production and waste is required to be reported electronically to DEP using this website by February 15th and August 15th of each year. All other Conventional well production and waste is required to be reported annually by February 15th.

Production/Waste Reporting: allows Operators to select a reporting period to create a production report, and/or to make modifications to unsubmitted reports for production and waste data. A status is noted for each created report.

SPUD Notification: Section 201(f) of the Pennsylvania Oil and Gas Act requires well operators to provide the Department with a least 24 hours notice of the date on which drilling of a permitted well will commence. In addition, each Well Permit issued by the Department specifically requires the well operator to notify the DEP Oil and Gas inspector identified on the permit at least 24 hours prior to commencement of drilling activities for that well. Operators should submit the required notification to the assigned DEP Oil and Gas inspector for a permitted well prior to commencement of drilling activities.

DEP Notifications: As of April 13, 2012, the Site Menu link, *DEP Notifications*, passes control over to the DEP Notification system where operators can submit various notifications to DEP. Your user context is preserved, and you can freely move between this well production reporting site and the notification system without the need to login separately. See also the *What's New* release notes.

10.0.5388.22401

Reporting

Screenshot of the OGRE Environment

DEP Oil and Gas Reporting - Electronic

Welcome

Logged in as **FLANAGANJ** using operator ID **39315** Switch Operator | Back to GreenPort

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10.0.5388.22401

Reporting

Reporting Template Within the OGRE Environment

				Primary Production Pressure (psig)				Water Level or Other	
Permit #	Farm name	Unconventional	Inspection Date	Primary Production Pressure (psig)	Primary Production Vent Flow as Required per 78.83(a)(1) or Other (cfpd)	Annular Production Pressure (psig)	Maximum Allowable Pressure Exceeded per 78.73(c) (Y/N/U)	Measurement	Unit

Open Flow (cfpd) or Shut-in Pressure on Production Annulus (psig)		Fluids Survey (Gas, Oil, or Brine)							
Measurement	Unit	Any Fluids Noted (Y/N)	Gas Outside Freshwater Casing (cfpd)	Gas Outside Intermediate Casing (cfpd)	Surface Wellhead Equipment Gas Emissions (cfpd)	Any Liquids (Oil or Brine) to Surface or Outside Freshwater Casing (Y/N)	Corrosion Problems (Y/N)	No-inspection comments	Text comments

Reporting

Development of GreenPort/OGRE Well Integrity Reporting Webpage

- Permit (API) Number, Farm Name, and Unconventional indicator will be pre-populated
- 4 lines for all Unconventional assets (date MUST be provided by operator) and 1 line for each Conventional asset (a default inspection date of 1/1/INSPECTION YEAR will be pre-populated in form)
- For conventional wells, recommended that default date be replaced with actual inspection date, although this is NOT REQUIRED

Reporting

Development of GreenPort/OGRE Well Integrity Reporting Webpage

- If a well appears in your inventory, but you did not inspect it, you MUST select one of the No-Inspection Standard Comments THIS YEAR (next year these will be pre-populated):
  - Plugged well
  - This is not our well
  - Gas storage well
  - Observation well
  - Well spud, drilling not completed
  - Regulatory Inactive Well
  - Injection Well
- Note that abandoned wells must still be inspected up until the quarter in which they are plugged

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Reporting

Development of GreenPort/OGRE Well Integrity Reporting Webpage

- If you have inspected a well but that API Number does not appear in the template downloaded at GreenPort, it is important that you take steps to help PADEP update our records:
  - Contact the District Oil and Gas Operations Office to correct any paperwork issues regarding well ownership
  - Retain all integrity inspection records at your office for the required timeframe
- For well transfers, please note that the operator who owns the well on January 1st is responsible for reporting well integrity data for the year

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Reporting

Development of GreenPort/OGRE Well Integrity Reporting Webpage

- After the spreadsheet template form is populated, you will upload it through OGRE
- Data validation will take place overnight as part of a batch process: **make sure you fill out form correctly!**
- Note that there are some drop-down boxes (e.g., standard measurement units) to assist with validation, but most operators will be copying and pasting their data directly into the template instead of entering it well-by-well
- If the form was not filled out correctly, errors will be flagged and you will have to correct them and resubmit the form it in its entirety

Reporting

Coming Next Year

- If you used Form C to report in 2015, the spreadsheet template will be pre-populated with inspection data from the previous year when you download it to report inspection results in 2016, so only information that has changed will need to be updated
- A web-based form reporting option will also be developed by 2016: this will be useful for operators who have small well inventories and have access to the web, but do not own Microsoft Excel

DATA MANAGENT ISSUES

Greenport Log-In Issues

- Operator must self-register and must submit the Electronic Filing Administrator (EFA) agreement for access to the application before access is granted.
- EFA for the operator in turn grants access for the Users. The user agreement must be submitted for those Users for the department to grant access.
- Each User in a company that needs to access OGRE or other applications should have their own Greenport account. If not, it makes it difficult to diagnose and address the problems the users are having.
- OOGM is drafting guidance for the Greenport registration / access process.
- If Greenport or an application are "down," call the PA DEP Help Desk: **717.705.3768**

DATA MANAGENT ISSUES

Notification Submissions

Users are having trouble selecting a specific well from their inventory for notification purposes. This is due to an MS Internet Explorer compatibility issue. BIT is addressing this problem, and should be fixed in a week or so.

Well Inventory Inaccurate or Incomplete

An operator's well inventory in any of these applications is based upon the data in the PA DEP database (e-Facts). That data is based on various paper and/or electronic submissions made by the operator: Oil & Gas Well permit application, Well Record, Completion Report, Requests for Transfer, Request for Inactive Status, Plugging Certificates, etc. If the inventory is inaccurate or incomplete, it means that one of the needed submissions was not made, still in process or was not properly logged, and entered into e-Facts.

If you have a problem with missing wells, a group of wells or a report list,
Call: Myron Suchodolski: **717.772.2199**

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Oil and Gas Reports

The Department of Environmental Protection is committed to providing information in an accessible and user-friendly format. In order to do so more effectively, the department has created interactive reports that allow the user to select specific criteria for the desired information. In addition, the report data can easily be downloaded for further analysis. The report links on this page provide oil and gas production information, permits issued, drilling commence date (SPUD date), county data, operator specific data, as well as inspections, violations and enforcement actions. For questions or problems with any of these reports, contact the Office of Oil and Gas Manangement, Bureau of Compliance and Data Administration at 717-772-2199 or by email at RA-EP-BOGMOGRE@pa.gov

Interactive Map

Oil and Gas Mapping

Interactive Reports

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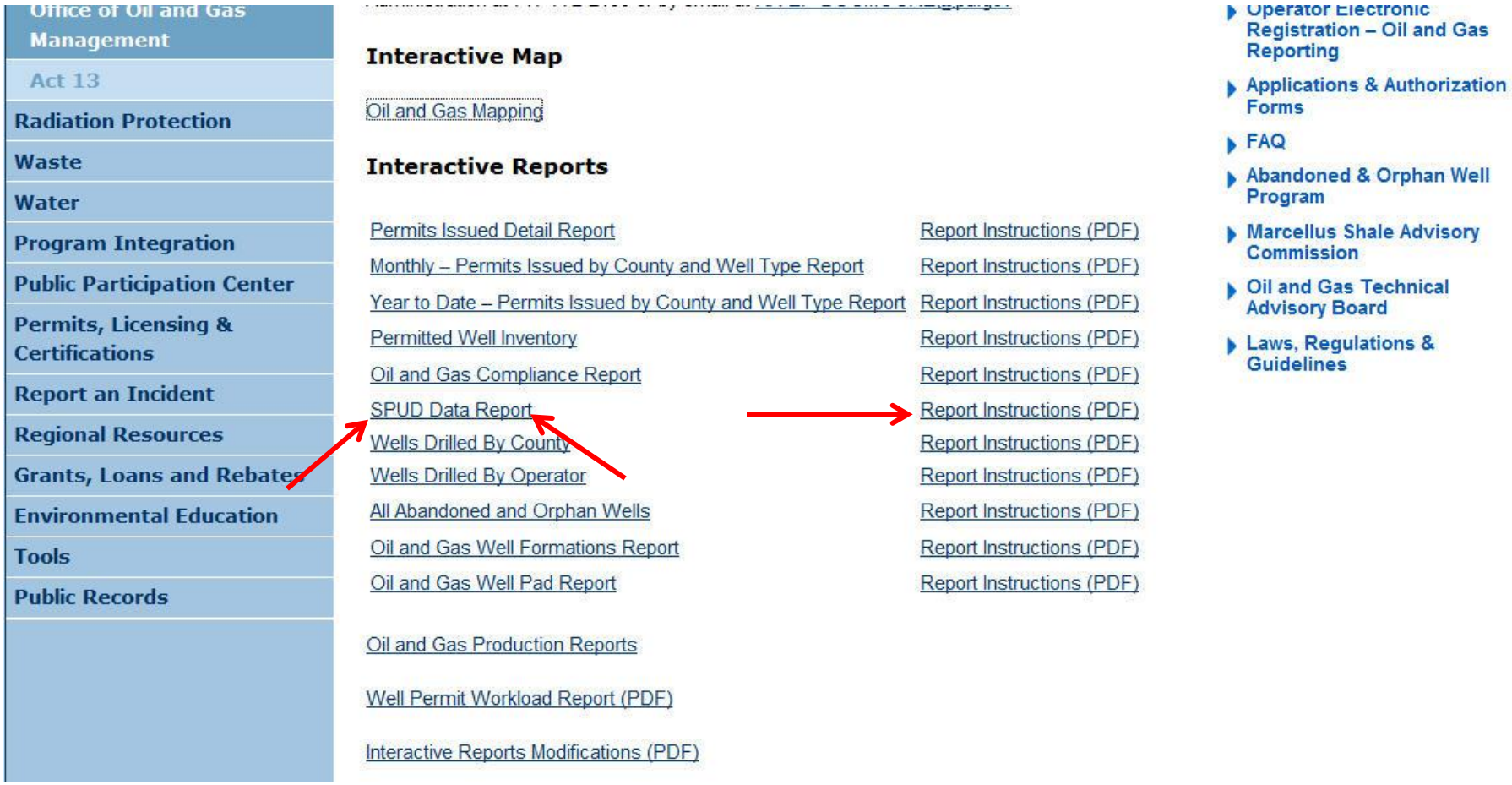

Discussion/Q&A

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

Oil and Gas Management

Thanks!
Questions?

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