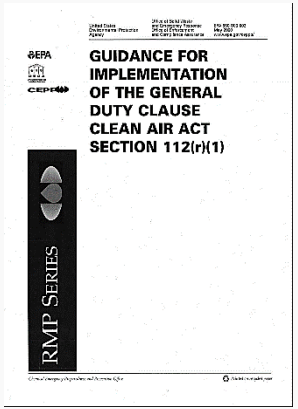
OIL & GAS INDUSTRY WORKSHOP
EPA GDC INSPECTIONS

Presentation Overview

- What is General Duty Clause (GDC)
- Upstream-Midstream-Downstream
- Hydraulic Fracturing & Flow Back
- GDC Inspections in R3
- Codes-Standards-Guidance
- Interim Chemical Accident Prevention Advisory
- FLIR Video

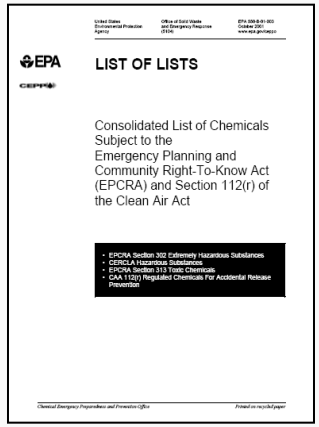
What is the General Duty Clause (GDC)

- Based on Industry Codes & Standards
- Part of Clean Air Act 112 (r)(1)
- Not limited to a specific list of chemicals or threshold quantities
- Makes the owners and operators of facilities that have regulated and other extremely hazardous substances responsible for ensuring that their chemicals and proceses are managed safely
- Facilities have been required to comply with GDC since November 1990.



What is the General Duty Clause (GDC)

- The GDC applies to **any** stationary source producing, processing, handling, or storing regulated substances or other extremely hazardous substances. “Other extremely hazardous substances” are any chemicals listed in 40 CFR part 68, or any other chemicals, which may be considered extremely hazardous.


EPA

LIST OF LISTS

Consolidated List of Chemicals Subject to the Emergency Planning and Community Right-To-Know Act (EPCRA) and Section 112(r) of the Clean Air Act

- EPCRA Section 302 Extremely Hazardous Substances
- CERCLA Hazardous Substances
- EPCRA Section 313 Toxic Chemicals
- CAA 112(r) Regulated Chemicals For Accidental Release Prevention

What is the General Duty Clause (GDC) 3 Pronged Approach

- Designing and maintaining a safe facility to prevent accidental releases

- Identify hazards associated with a potential accidental release of an “extremely hazardous substance” using appropriate hazard assessment techniques

- Minimizing the consequences of accidental releases that do occur.

Upstream, Midstream, Downstream

- **The Upstream Sector**

  Involves the exploration for and extraction of petroleum crude oil and natural gas. The upstream oil sector is also known as the ***exploration and production (E&P)*** sector. The upstream sector includes the searching for potential underground or underwater oil and gas fields, drilling of exploratory wells, and subsequently operating the wells that recover and bring the petroleum crude oil and/or raw natural gas to the surface

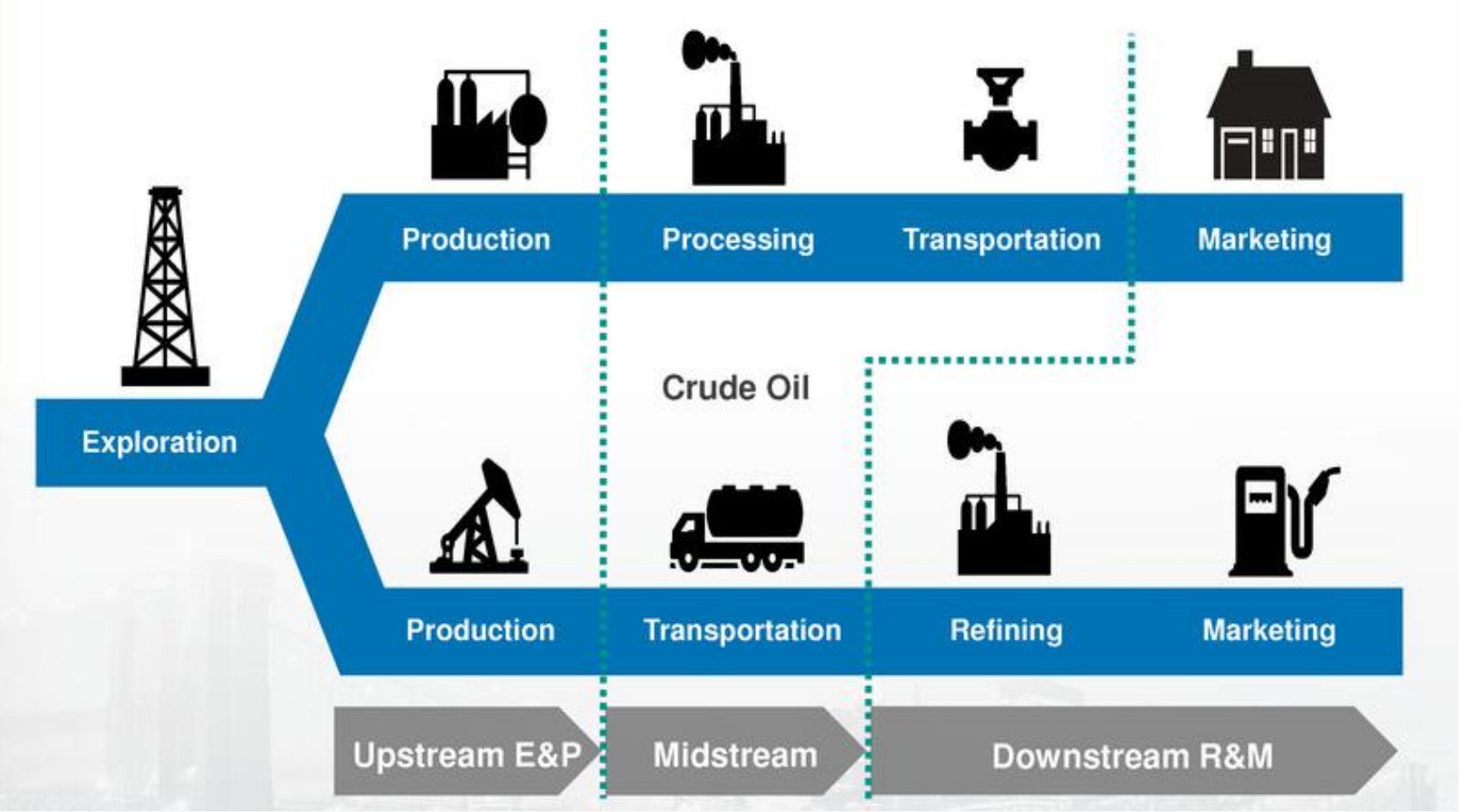
- **The Midstream Sector**

  The **midstream** involves storing, marketing and transporting petroleum crude oil, natural gas, natural gas liquids (mainly ethane, propane and butane, LPG's NGL's)

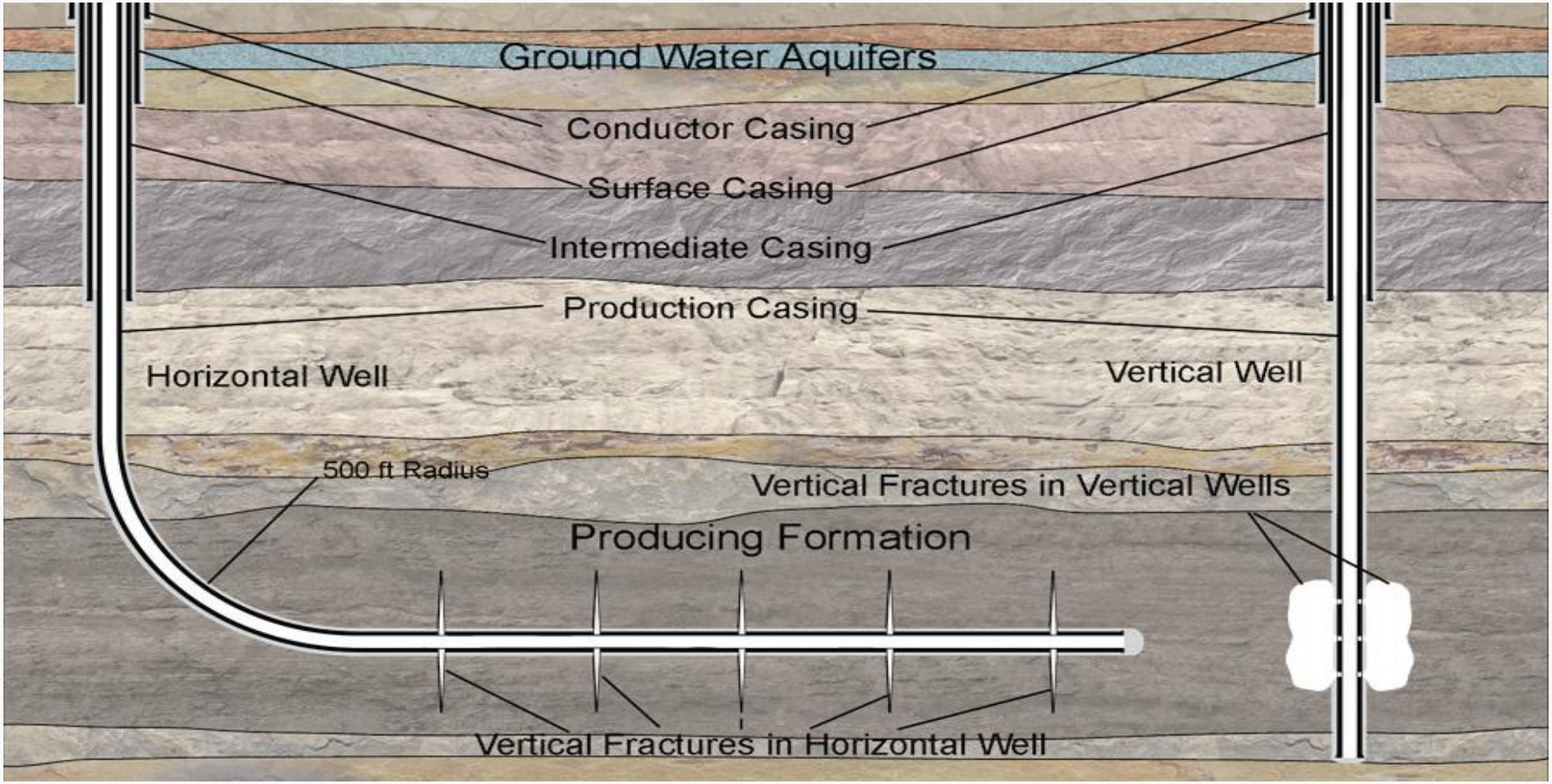
- **The Downstream Sector**

  The **downstream** sector involves the refining of petroleum crude oil and the processing of raw natural gas It includes the selling and distribution of processed natural gas and the products derived from petroleum crude oil such as liquefied petroleum gas (LPG), gasoline (or petrol), jet fuel, diesel oil other fuel oils, petroleum asphalt and petroleum coke.

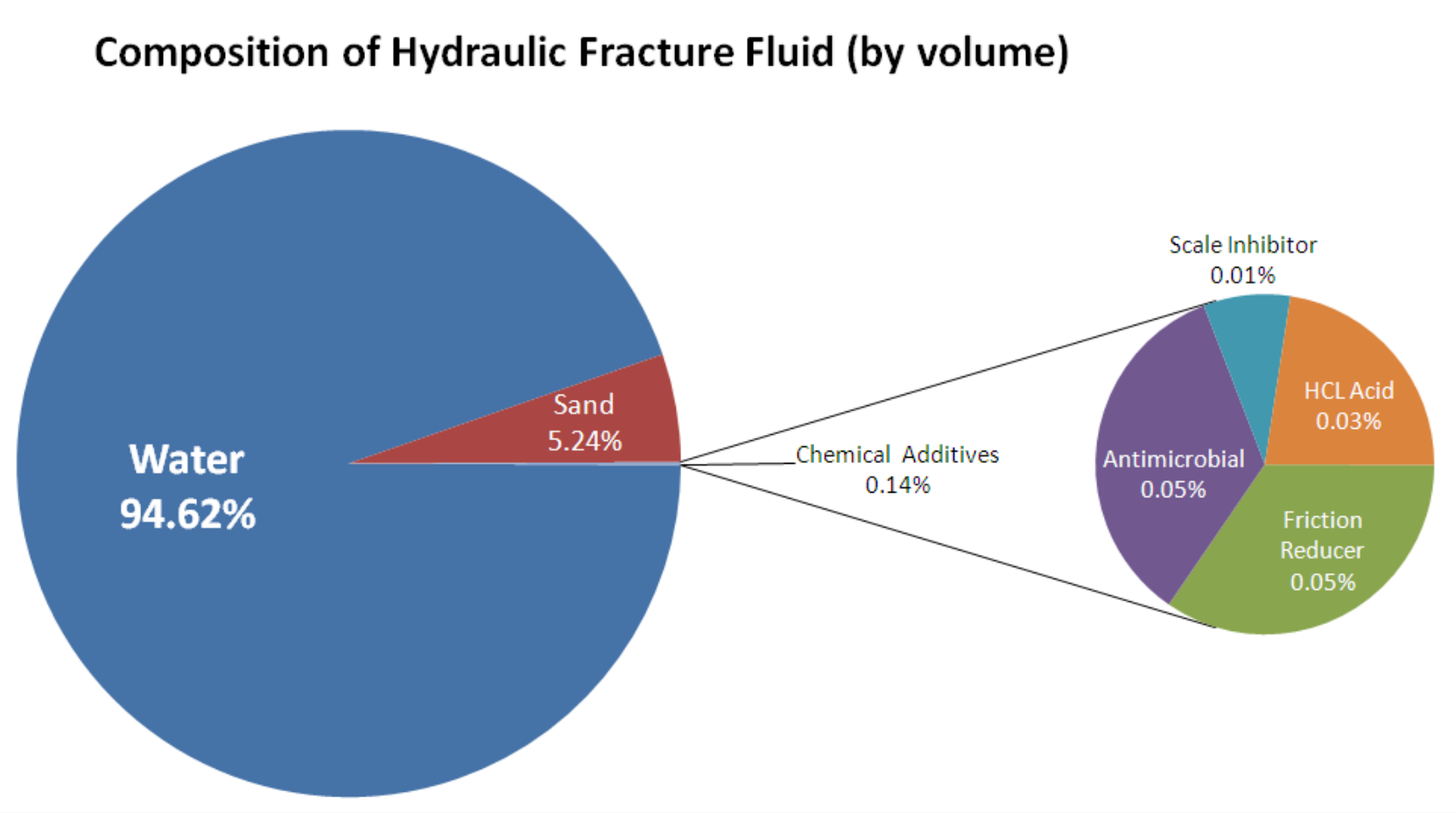
Upstream, Midstream, Downstream



Hydraulic Fracturing

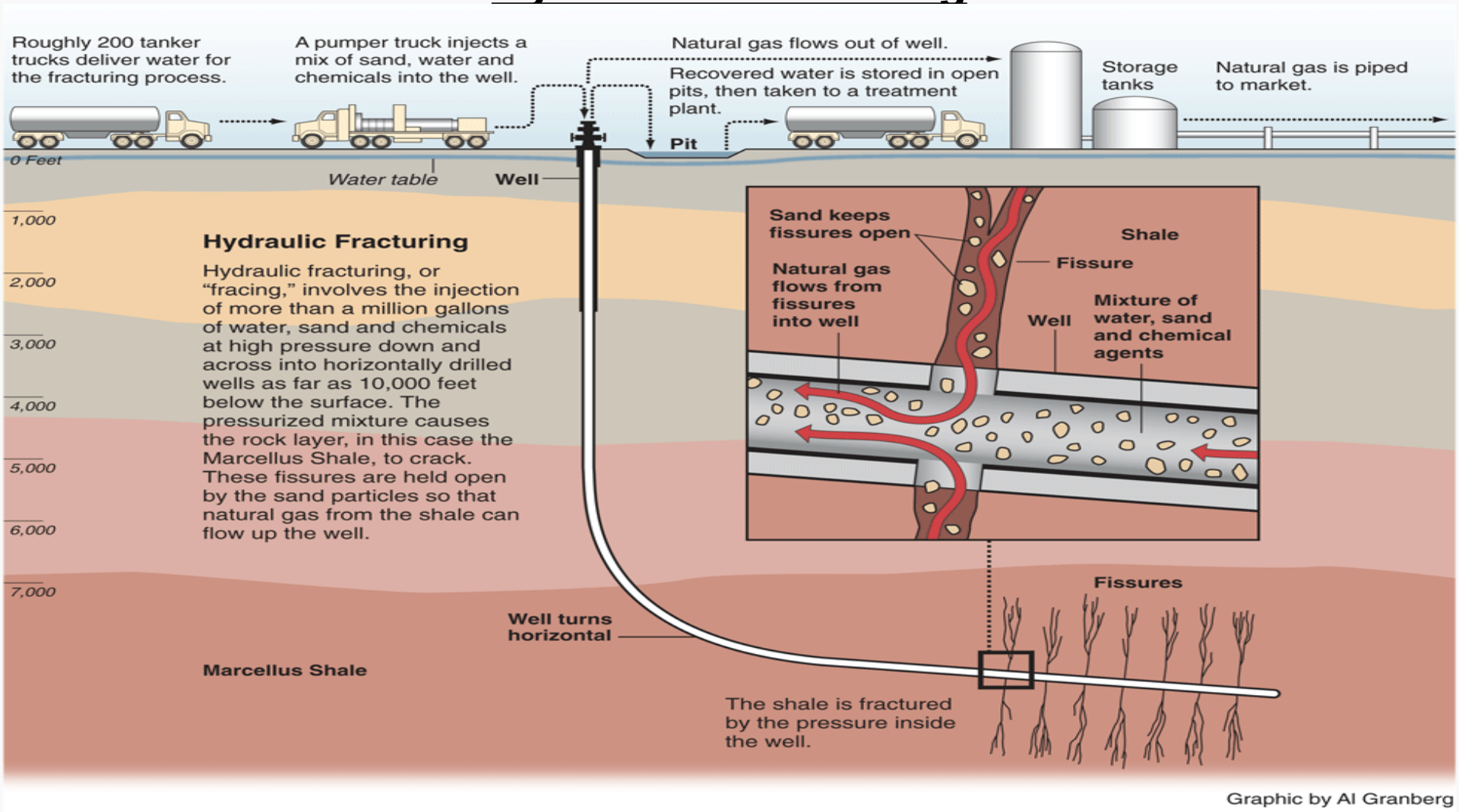


Hydraulic Fracturing "Frac Fluid"



Hydraulic Fracturing Operations

Hydraulic Fracturing

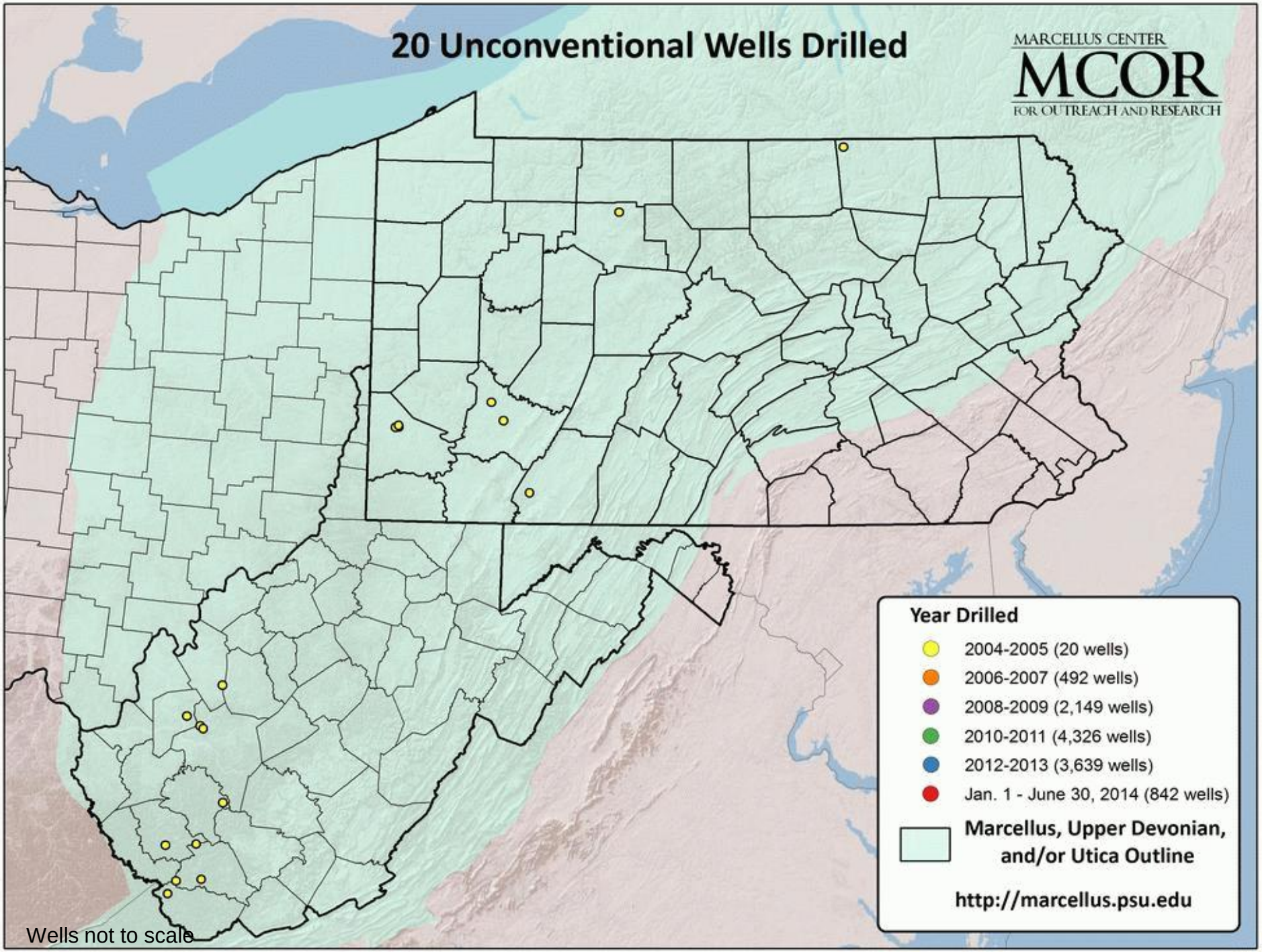


Flow Back

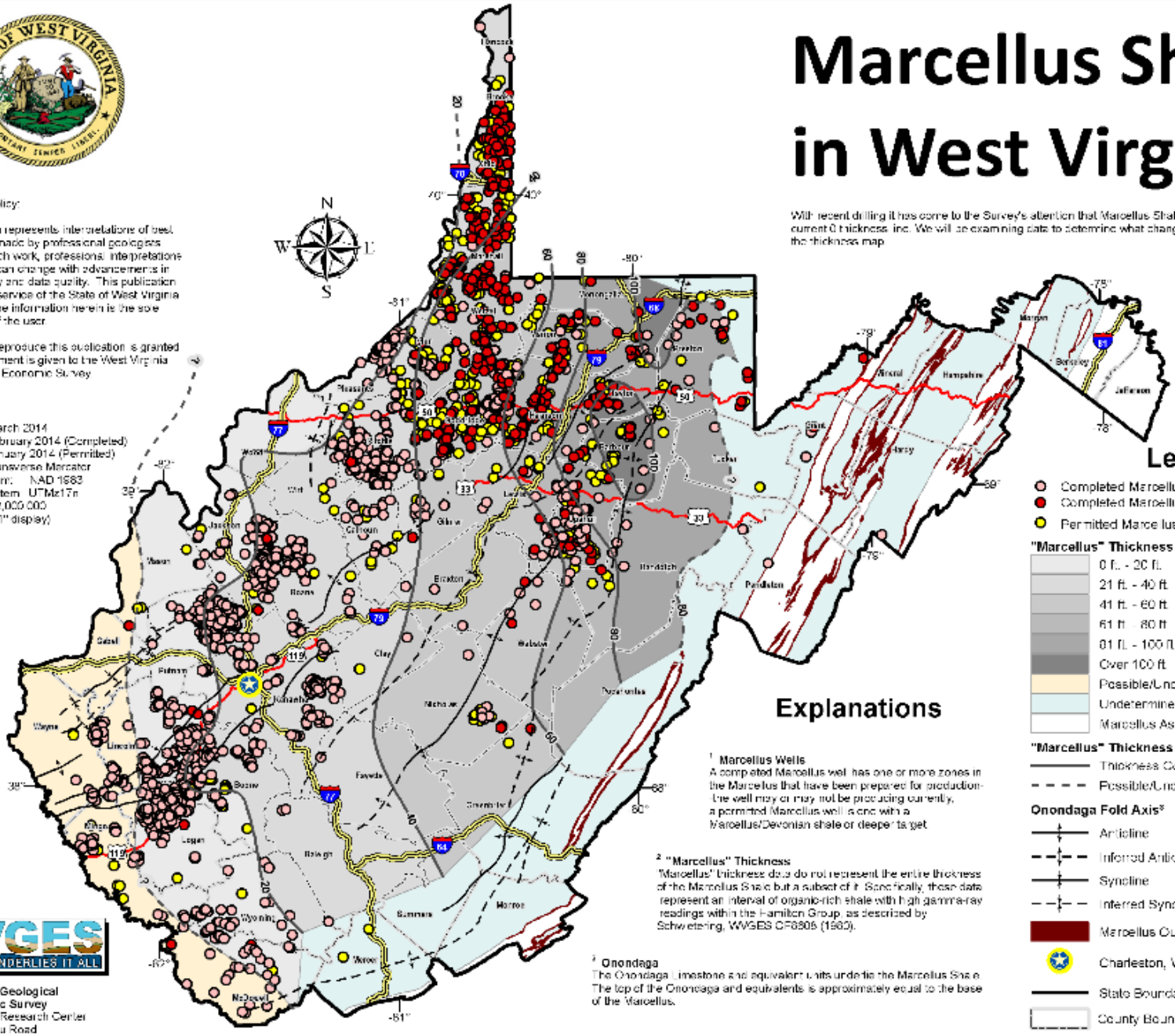
“Flowback" may contain the injected chemicals from fracturing plus naturally occurring materials such as brines, metals, radionuclides, and hydrocarbons

EPA GDC Inspections
Upstream & Midstream

- End of FY-11 conducted 10 compressor station inspections
- Beginning of FY-12 conducted 10 production well inspections
- FY-13 conducted 13 compressor station inspections
- FY-14 conducted mix of 12 compressor stations & wells


20 Unconventional Wells Drilled
MARCELLUS CENTER
MCOR
FOR OUTREACH AND RESEARCH
Year Drilled
2004-2005 (20 wells)
2006-2007 (492 wells)
2008-2009 (2,149 wells)
2010-2011 (4,326 wells)
2012-2013 (3,639 wells)
Jan. 1 - June 30, 2014 (842 wells)
Marcellus, Upper Devonian, and/or Utica Outline
http://marcellus.psu.edu
Wells not to scale

Marcellus Shale in West Virginia

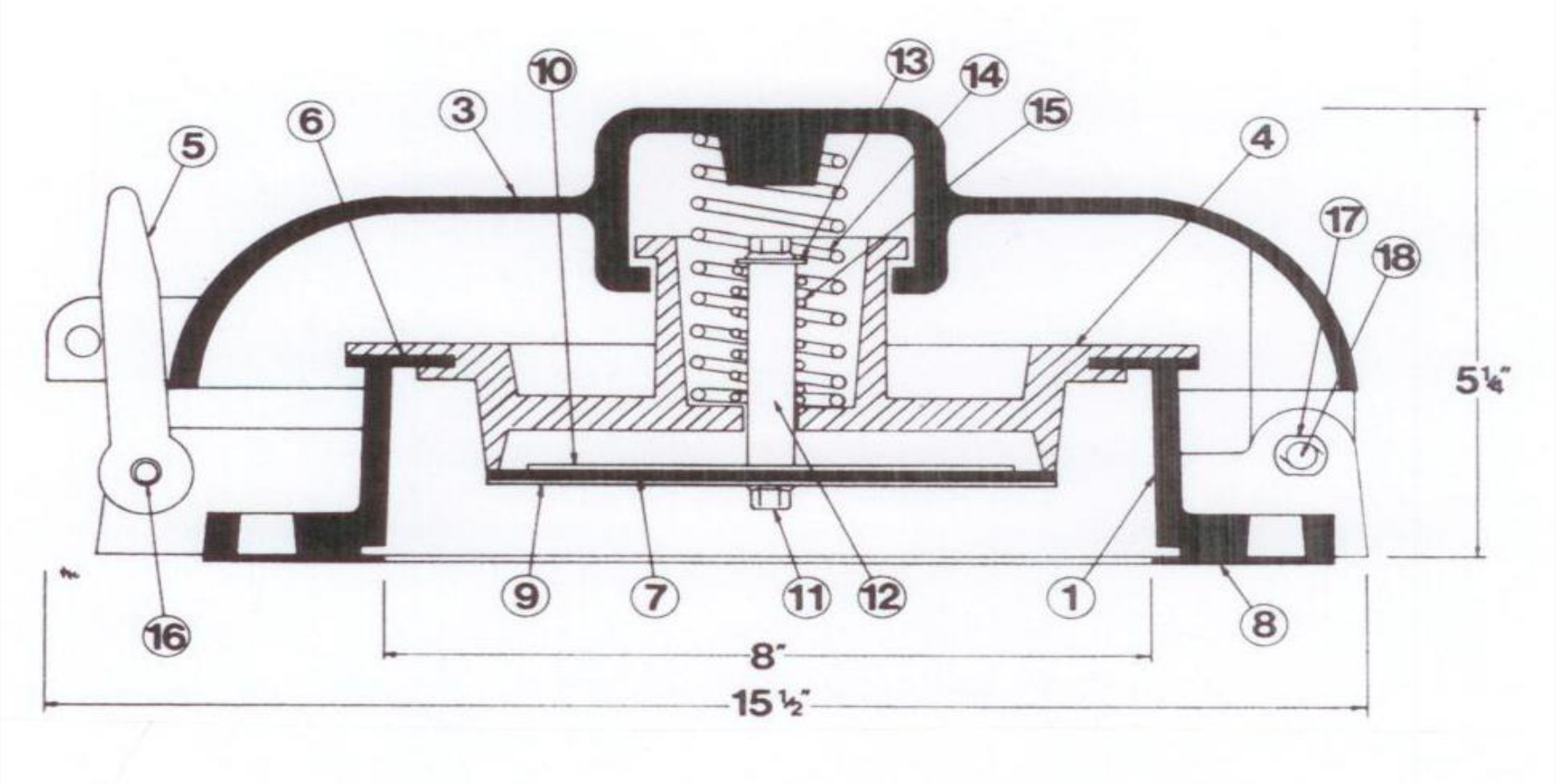


Inspection Findings

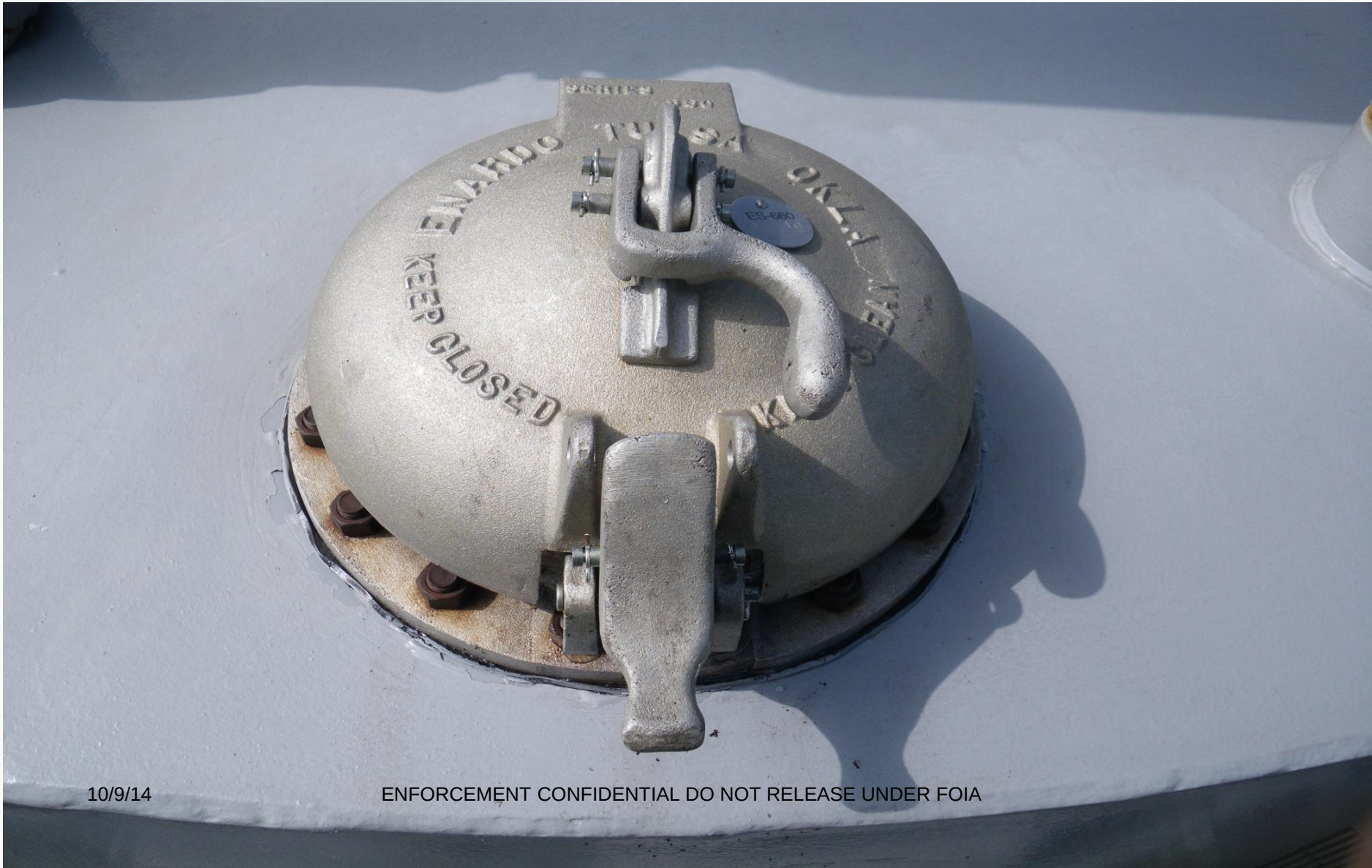
Actions

- **Respondent did not assess the risk posed by the location of the Motor Control Center (MCC) building, a potential source of ignition, within an electrical classification area designated as Class I, Division 2. (NFPA 30)**
- **GDC violations issued order for proper venting of tanks at well sites. (NFPA 30, API 12F)**
- **Respondent failed to document that the fire protection system of its propane and B-G mix storage tanks at the Facility complied with recognized and generally accepted good engineering practices, in accordance with 40 C.F.R. § 68.65(d)(2). Respondent failed to have minimum horizontal distance between the shells of the pressurized horizontal vessels or to provide appropriate alternative fire protection, in accordance with API Standards 2510 and 2510A. Respondent also failed to provide locks/seals on gate valves.**
- **Respondent failed to compile design standards pertaining to the equipment in the process per 40 C.F.R. § 68.65(d)((1)9vi) or to document that the facility's equipment complied with RAGAGEPs per 40 C.F.R. § 68.65(d)(2). Order required facility to conduct Safety Analysis and provide recommendations of the Safety Analysis. (API 2510, 2510A)**
- **Respondent failed to design and maintain a safe facility. The violations include lack of emergency venting, no documentation designating hazardous classification areas, and no coordination with local response agencies. (NFPA30, API RP 500, NEC 70)**
- **Respondents failure of FSA and Fire Protection (API 2510)**
- **Respondents failure to: conduct a safety analysis and/or fire protection system for storage vessels; maintain minimum distance from tank to pump ; and conduct analysis for determination of adequate ventilation for compressor building. Order will be for all three compressor stations. (API 2510, API RP 500)**

Issues With Atmospheric Tanks
Inner Workings of Tank Thief Hatch




JAYCO
2012/01/24 03:24PM

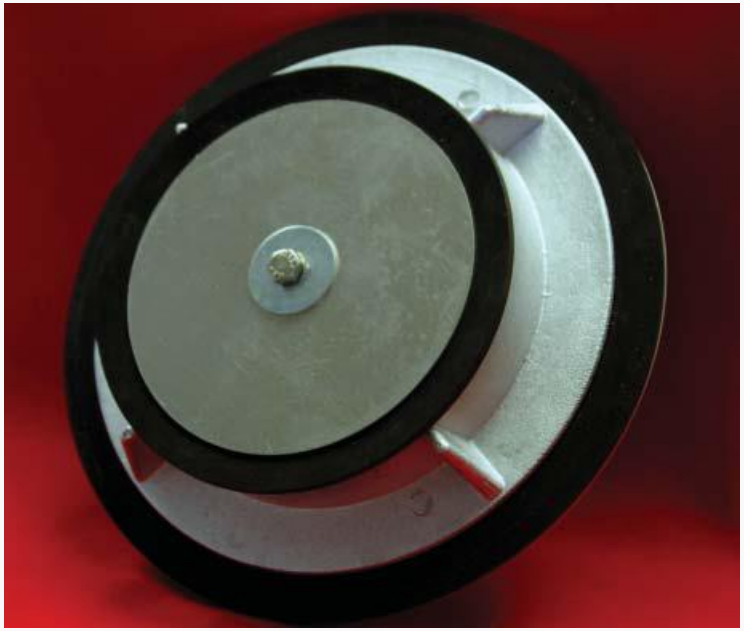

KEEP CLOSED

IDENTIFING THE ORIGINAL STYLE PLUNGER VERSE THE NEW STYLE PLUNGER

Original Jayco Plunger

The lower (6”) washer covers the whole vacuum gasket and the aluminum casing no guides

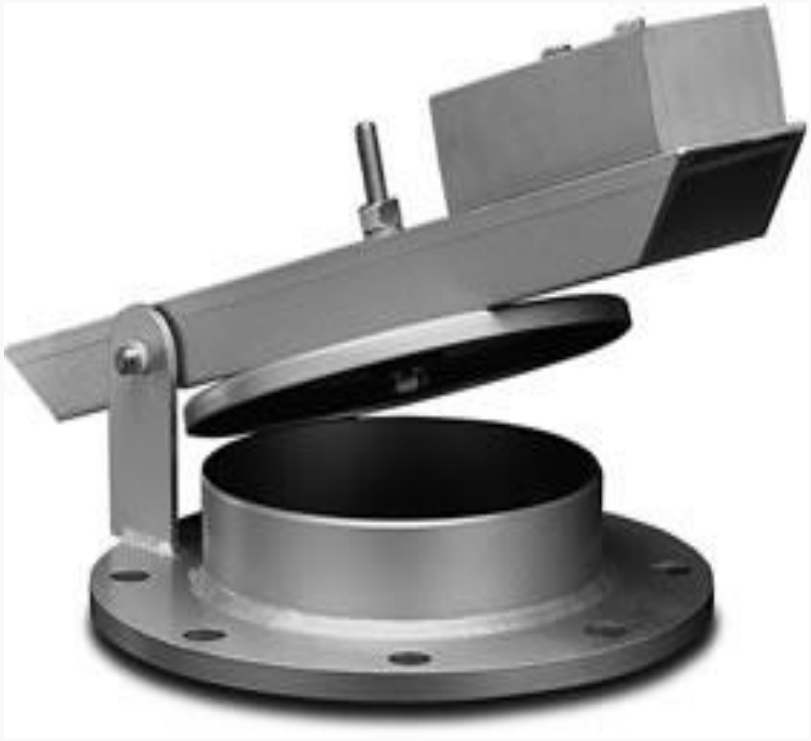
New Jayco Plunger



Guides on the aluminum casing and smaller lower 5” washer shows more of the vacuum gasket

Enardo Emergency Vent Models 2000 & 2500

When properly sized, these vents provide the capacity to meet API Standard 2000, NFPA 30 and OSHA (29 CFR 1910.106) for emergency venting due to fire exposure.



API 12F Normal Venting

Table C.2—Calculated Venting Capacity of 8-in. Round Thief Hatch

(1)	(2)	(3)	(4)
Venting Pressure oz	Venting Capacity SCFH Q	Venting Pressure oz	Venting Capacity SCFH Q
1.5	59,783	18	207,097
3.0	84,547	24	239,135
4.5	103,548	32	386,000
6.0	119,567	40	434,000
12.0	169,094	48	471,000

NOTE Values in the above table are based on the following equation:

$$Q = 1667\ C_f A \sqrt{P_t - P_a} \qquad \text{(C.1)}$$

where

Q is the venting capacity in standard cubic feet of free air per hour (SCFH);

C_f is 0.5 (the flow coefficient);

A is the hatch area in.^{2} (A = 44 in.^{2} for 8-in. round hatch);

P_t is the absolute pressure inside the tank in inches of water;

P_a is the absolute pressure outside the tank in inches of water.

API 12F Emergency Venting

Table C.1—Emergency Venting Requirements (See 6.2)

(1)	(2)	(3)	(4)	(5)		(6)
Nominal Capacity bbl	Diameter x Height ft, in.	Design Pressure oz/in.^{2} Pressure, Vacuum	Exposed Area ft^2	Emergency Venting Required SCFH With Drainage [a]	Emergency Venting Required SCFH Without Drainage	Max. Press. During Emergency Venting oz
90	7, 11 × 10, 0	16, 1/2	250	119,500	239,000	48
100	9, 6 × 8, 0	16, 1/2	240	116,500	233,000	48
150	9, 6 × 12, 0	16, 1/2	360	146,000	292,000	48
200	12, 0 × 10, 0	16, 1/2	378	150,700	301,000	24
210	10, 0 × 15, 0	16, 1/2	372	171,100	342,000	48
250	11, 0 × 15, 0	16, 1/2	520	180,000	361,000	24
300	12, 0 × 15, 0	16, 1/2	565	189,350	378,700	24
400	12, 0 × 20, 0	16, 1/2	755	223,350	446,350	24
500	12, 0 × 25, 0	16, 1/2	945	253,000	507,000	24
500	15, 6 × 16, 0	8, 1/2	780	227,600	455,200	12
750	15, 6 × 24, 0	8, 1/2	1,170	271,800	543,600	12

NOTE Normal vents (see 6.1 and Annex B) may satisfy all or part of these requirements.

[a] In applying recommended emergency venting required *with drainage* careful attention should be given to the provisions of 2.3.2 and 2.5.7, NFPA No. 30.

Codes -Standards-Guidance

American Petroleum Institute

National Fire Protection Association
The authority on fire, electrical, and building safety

American Society of Mechanical Engineers

International Organization for Standardization

API:

2510: Design & Construction of Liquefied Petroleum Gas Installations

2510A: Fire-Protection Considerations for the Design and Operation of Liquefied Petroleum Gas (LPG) Storage Facilities

12F: Specification for Shop Welded Tanks for Storage of Production Liquids

2000: Venting Atmospheric and Low-pressure Storage Tanks

6A: Specification for Wellhead and Christmas Tree Equipment

12GDU: Specification for Glycol-Type Gas Dehydration Units

618: Reciprocating Compressors for Petroleum, Chemical, and Gas Industry Services, Fifth Edition (Low Speed)

HF1: Hydraulic Fracturing Operations-Well Construction and Integrity Guidelines, First Edition/October 2009

RP 500: Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Division I and Division 2

NFPA:

30: Flammable and Combustible Liquids Code

58: Liquefied Petroleum Gas Code

780: Standard for the Installation of Lightning Protection Systems

497: Classification of Flammable Liquids, Gases or Vapors and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas

497A: Recommended Practice for Classification of Class I Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas

70: National Electrical Code

15: Standard for Water Spray Fixed Systems for Fire Protection

ASME:

Boiler & Pressure Vessel Code

B31. 3: Process Piping

B31.4: Pipeline Transportation Systems for Liquid Hydrocarbons and Other Liquids

B31.8: Gas Transmission and Distribution Piping Systems

ISO

13631: Petroleum and natural gas industries -- Packaged reciprocating gas compressors (High Speed)

Interim Chemical Accident Prevention Advisory
Design of LPG Installations at Natural Gas Processing Plants

- Scope of NFPA 58 “This code shall not apply to natural gas processing plants”

- Scope API 2510 “This standard covers (storage vessels, and associated loading/unloading transfer systems) at marine and pipeline terminals, natural gas processing plants, refineries, petrochemical plants, and tank farms.

- Other standards or guidance documents may be applicable to LPG installations, natural gas processing plants, wells and associated equipment

Interim Chemical Accident Prevention Advisory
Design of LPG Installations at Natural Gas Processing Plants

- Guidance can be found under “News & Highlights” at:

http://www.epa.gov/emergencies/

Forward Looking Infrared Video
YOU TUBE Video

http://www.youtube.com/watch?v=DECyAxDk88U

Accidents Do Happen !

QUESTIONS!

Contact Information

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