

VERMONT 2018

This Syllabus will be slightly revised for 2019, but the course readings and content will be very similar to this 2018 Syllabus.

OIL AND GAS: PRODUCTION, PIPELINES AND THE ENVIRONMENT

by

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SYLLABUS 6-18-2018F]

Welcome to this course! Over the course of just 8 class days, we will survey the world of U.S. oil and gas production and pipeline regulation. We will look at the state conservation regulation that governs oil and gas extraction onshore and discuss local, state and federal regulations enacted to control the externalities of extraction. We will move offshore to look at the federal oil and gas leasing framework, the "cooperative federalism" of the Coastal Zone Management Act, and how safety and environmental issues are addressed offshore after the 2010 Deepwater Horizon disaster in the Gulf of Mexico. We will delve into FERC regulation of both oil and gas pipelines and the use of eminent domain to build new pipelines to serve the shale oil and gas fields. Pipeline permits granted by FERC have led to street protests against FERC in Washington DC.

Broadly stated, the objective of this course is that you gain an understanding of:

- The interplay among federal, state, local, industry, and NGO actors in the regulation of the US oil and gas industry.
- The role of the common law in US oil and gas production: private property rights, tort and contract law.
- Key technical terms used in the petroleum industry. Lots of short video clips on industry processes to watch!
- Key sources of information that can be used in future research, such as Resources for the Future (an excellent source of unbiased research), as well as industry and NGO websites engaged in public dialogue on oil and gas issues.
- Current policy issues that allow you to become a better educated citizen.
- The kind of work that employers may be offering in industry, in law firms, in NGOs, or in government.

Vermont is far removed from the sights or smells of an oil or gas field, but what happens at FERC and in U.S. oil and gas fields has impacts extending far beyond domestic wellheads and pipelines. Indeed, the effects are felt both nationally and globally. The class will begin with a global view of the energy industry and the role of U.S. oil and gas production in world geopolitics.

Readings are found in 3 sources: (1) the Coursepack on sale at Barristers; (2) on TWEN; and (3) on websites identified in the syllabus below.

(1) The Vermont Book Store Coursepack contains:

Chapter 4, titled "Oil and Gas Production" from the casebook by Eisen et al, *Energy, Economics and the Environment* (4th ed. 2015). This book is abbreviated as "EEE4" in the Syllabus. (125 pp.)

Chapter 9 of EEE4, titled "Oil & Gas Pipelines: Opening Markets" (85 pp).

This material from EEE4 is copyrighted and permission has been obtained from the publisher to use it for classroom use only. Please do not distribute outside this class.

(2) The VLS TWEN website and internet sources: Please secure access to the TWEN website for this course before the class begins. I have posted other readings to the VLS TWEN website for this course. The syllabus identifies all reading material posted on TWEN as numbered Items, like this: **TWEN Item 1-1; TWEN Item 1-2**, etc.

This 2018 Syllabus is posted on TWEN under the "Syllabus" link and as Item 0.

(3) Additional reading comes from sources available on the internet at the sites indicated in this syllabus. If the syllabus link does not work, copy the title of the document and paste it into your browser. The document should pop up.

In some places in the syllabus, I have noted items that are purely optional reading. All readings are required unless they are marked optional.

Class reading averages about 35 pages per day over the 8 days (not including visits to websites for information). I may not have accurately gauged the degree of difficulty or amount of discussion engendered by the reading each day. If we do not cover the reading assigned in one day, it will move to the next day. It won't be dropped unless I specifically tell you to delete certain pages.

Class assignment MEMOS to hand in. The syllabus notes when you should provide a short--no more than one typed page (single-spaced)--written memo to me. Put your name on the memo in the first line. These short assignments, called Memos, are based on the class readings. Failure to hand in these memos will decrease your grade by half a point. The memos are not meant to take more than 20 minutes to write. If you find they are taking more than 20 minutes, then stop work on the memo at the end of about 20 minutes and turn the memo into me with a note indicating this. I don't want you to forego doing the rest of the reading for the next class day because the memo is eating into your time. There is a Memo a day, except for Day 6, when you should prepare to do a scenario role play, as indicated in the Syllabus. Do not email me your memos or post them to TWEN. **Bring a hard copy to class** for me to collect and read. Note: the Memos do not substitute for doing all the readings for that day.

DAY 1:

Come to class with the following information, legibly written on an index card or piece of paper:

- *Your name, including any nickname you prefer to go by. Give first and last name only*
- *Your home state or country*
- *Your home law school*
- *Your career goal, if known already*
- *Your undergraduate university and degree(s) with your major field of study*
- *Any work or practice experience that you have had to date, in any field*
- *Any special goal that you have for this course or reason for taking it*

Topic 1: The Future of the Energy Industry in an Era of Globalization and Climate Change (first half of class).

In advance of class: Visit this BP link and listen to Spencer Dale, chief economist for BP, featured in the 6.30-minute video on BP's Energy Outlook through 2040 at the top of the opening page: <http://www.bp.com/en/global/corporate/energy-economics/energy-outlook.html>. Read the short text on this opening page.

After watching this video, scroll down and note that more detailed information is available at other links appearing as boxes labelled "Sectors, Regions, Fuels, Carbon Emissions, and Country and Regional Insights." Click on the link for Carbon Emissions and read its text. BP presents three scenarios in its Outlook: The "ET or Evolving Transition," the "FT or Faster Transition," and the "EFT or Even Faster Transition." BP's full Outlook is also available at this website link, as well as a data archive. The files are huge and you need not read the full Outlook.

The major oil companies' projections of future energy outlooks and those by gov't agencies, such as the US Energy Information Administration (EIA) and the Intl Energy Agency, may be considered "consensus forecasts," as they all project similar trends.

ExxonMobil (XOM) states in its Energy Outlooks that it uses its projections as the basis of its business decisions. After reading the selected pages of XOM's latest Outlook (indicated below), prepare the answer to this question as **MEMO 1**, due in hard copy on the first class day:

MEMO 1: *Some green investment analysts warn that citizens and pension funds should not invest in the stocks of oil companies because their assets (which consist largely of proved petroleum reserves in the ground that are economically profitable to recover and produce) will be "stranded" by 2040; that is, these assets will have no value because the world has moved beyond petroleum. XOM (and others) argue to the contrary.*

Question: Based on the 2018 Outlook, why does XOM think that its reserves will not be stranded in the ground because of climate change policies? Memo 1 is your answer to this question, due in hard copy at the start of Day 1.

Go to ExxonMobil's website and open its 2018 Outlook at:
<http://cdn.exxonmobil.com/~media/global/files/outlook-for-energy/2018/2018-outlook-for-energy.pdf>, also posted as **TWEN Item 1-1**. Look at the following pages that relate to your answer in Memo 1:

- P. 12: Has the world's electricity generation shifted away from coal by 2040? Do households still use wood and animal dung (biomass) for heating and cooking? In what countries? (See p.19) Where in the world does energy demand surge?
- P.13. How dependent is the world expected to be on oil, gas and coal in 2040?
- P. 26 on renewables in electricity generation. What is the difference between capacity and utilization? What game-changing technology could change this projection?
- Pp. 30-31. What is the main driver of increasing carbon emissions? What is the main driver decreasing such emissions? Imagine the demand for air conditioning among the burgeoning middle classes!
- P. 35. What are the projected sources of future world liquids supply? What is "tight oil?" What are "NGLs?" Note that "biofuels" is not the same as "biomass" in XOM's Outlook. Biofuels are fuels like ethanol or oil from algae. Are any other regions of the world expected to produce tight oil by 2040 to compete with North America?
- P. 36. Is the world running out of recoverable petroleum resources? If all investment in new drilling stopped, what happens to global liquids supplies by 2040?
- P. 39. What countries are most dependent on importing gas by pipeline or by LNG tanker? Is Europe likely to be free of gas imported from Russia? Geopolitics plays an important role here.
- Pp. 42-43: Are EVs (electric vehicles) a game changer by 2040 in this sensitivity analysis? What is EV impact on carbon emissions, electricity demand, and natgas demand?
- Pp. 44-48, 51-52. Energy and carbon emissions: pursuing a 2 degree pathway. Is the world likely to achieve the 2°C target? To do so, what energy sources would the world use by 2040? Would oil and gas still be in the mix? (see p. 48). What fuel source offers the most "practical path" to the 2°C? (p. 51). When will the breakthroughs on page 52 arrive and what will they be?

Most major oil companies have extensive website information. BP is famous for its Statistical Review of Energy, available at www.bp.com, under the link to "energy economics." BP's most famous statistical chart shows oil prices since 1861 and aptly depicts the many tumultuous events in petroleum geopolitics in addition to the workings of market forces.

Most energy projections, including those of XOM and BP and the US National Petroleum Council (advisory committee to US presidents) have been very poor. Indeed, they did not foresee the US shale revolution of the last decade. (The major oil companies were not the innovators that drove the shale revolution; smaller independents, like Mitchell Energy, cracked the code to developing shale efficiently.)

Shell Oil is famous for a different way of looking at energy futures: Energy Scenarios.

TWEN Item 1-2: Shell Energy Scenarios to 2050: Scramble v. Blueprints (selected pages only). Shell's energy scenarios are purposefully quite different from the typical energy outlooks written by other oil companies or by governments. Rather, the scenarios tell stories, presented as narratives, about possible future paths, based on input from many political schools of thought and from experts in the social sciences, world religions, climate change, and socio-economic trends around the globe (such as rising inequality). This Item 1-2 compares the Scramble path scenario with the Blueprint path. **Read only these pages of the report (citations are to page numbers at the bottom of the report): Foreword on p. 4; Introduction pp. 6-8; pp. 13-15; 20-22; and 25-37.**

This Shell report was written in 2008-2009, before the global financial crisis was in full effect. Oil prices were soaring and it seemed that the world would be short of oil forever. Shell's previous scenario had focused on the effect of 9/11 (the World Trade Center bombing) and the corporate financial scandals of Enron and other large corporations that had seriously tarnished the image of capitalism and free markets. This earlier scenario portrayed three global paths: (1) "Flags" (rising nationalism, closing borders to free flows of labor, capital and technology); (2) "Open Doors" (the opposite of Flags--an embrace of globalization and markets as bringing economic development); and (3) "Low-Trust Globalization" (globalization is inevitable, but is not trusted). The "Scramble" path in the Scenario you are reading represents a Flags approach to solving global energy issues, and the Blueprints path takes a collaborative "Open Doors" approach to such issues, especially climate change. Several organizations do scenario planning. The U.S. National Intelligence Council released its Global Trends through 2035 (NIC 2017-001) in January 2017 and it does not paint a pretty picture in any of its three scenarios.

Optional: A critical assessment by Carbon Tracker of ExxonMobil's argument that it can manage the risk of future carbon policies appears at <http://www.carbontracker.org/in-the-media/exxon-is-business-as-normal-the-right-strategy/>, titled "Response to Exxon: An Analytical Perspective (2014)." The authors think XOM is discounting the risks with an over-optimistic view of the future role of hydrocarbons. CarbonTracker has released a report "2 Degrees of Separation: Transition Risk for Upstream Oil and Gas in a Low Carbon World" that assesses the risks to 69 oil companies of stranded assets in a "2 degree" scenario world (that posits countries adopt policies to assure earth's temperature does not rise more than 2 degrees). Will governments actually implement policies that achieve this 2 degree goal? What do the XOM and BP outlooks imply?

I will show a Powerpoint that covers the broader geopolitical issues and trends in energy (including coal and renewables) that affect world energy markets today, using material from these three sources and others. We will then discuss in class:

- What implications do the ExxonMobil/BP and Shell future outlooks have for U.S. national energy policy, in your opinion? Do you strongly disagree with any of these projections? Why? What would alter the long-term trends?
- Do you think the forecast by ExxonMobil is BAU (Business as Usual) --an evolutionary change over the next 20+ years, or a revolutionary change?

- What geopolitical events have transpired in the past year or so that you would characterize as Scramble versus Blueprint? Even during the next days in class, tucked away in this peaceful corner of Vermont, there will probably be events that signal one path or the other and that will affect you through the globalization of energy supply and demand.

Day 1: (continued) 2d half of class

In the Coursepack: EEE4: “Oil and Gas Chapter 4.”

- **Pp. 132-151 (20 pp)** covering terminology, the oil and gas business, early history; and the oil and gas lease.
- Time permitting, we will answer the questions on page 151 (but no Memo required). Who knows what a DUC is?
- **TWEN Item 2** is a list of facts about the upstream oil industry. Have a guess at the number of wells drilled in the US/North America in the past 150 years before looking at this item.
- **There is no TWEN Item 3.**
- **TWEN Item 4A** is a typical oil and gas lease used for decades in the United States. Most case law precedent involving disputes between Lessees and Lessors derived from an oil and gas lease like this one. More recent leases used in shale plays often have different language for certain provisions, but the basic property right remains the same. For example, several months often pass between the time a well is drilled and the time it is completed (fractured). What if the primary term of a lease ends after the well is drilled, but not completed: what will happen to the lease, absent a modification?
- **TWEN Item 4B:** The federal OCS lease is even shorter (a mere 3 ½ pages), but it is also a fee simple determinable. Find the provisions that make it so.

A good glossary of terms used in the oil and gas sector is available at: <http://www.eia.gov/tools/glossary/>. Look up terms that you do not understand as you do the reading. And, be sure to ask in class if I use a term that you do not understand.

DAY 2:

Finish the nature of the property right under a US oil and gas lease, if necessary, including questions on page 151.

- I will show a PPT on Geology that contrasts conventional and unconventional rocks.

EEE4 continued, pp 151-169 (28 pp) covering:

- **Pp 151-59.** Who owns the shale gas rock on split estates?
- **Pp 159-63.** Surface vs mineral estate. Read the lease in **TWEN Item 4A** and find provisions that protect the surface. You will have to look hard.

I will show a PPT of Surface accommodation/conflict photos.

- **TWEN Item 5.** After a town called Denton voted to ban fracking in the Barnett Shale near Dallas, the Texas legislature quickly passed H.B. 40, adding a section to the Texas Natural Resources Code. This section is posted as **TWEN Item 5.**

MEMO 2 due Day 2: ***Hand in MEMO 2 in class, answering the following questions:

1. *List the provisions in the Texas lease in Item 4A that protect the surface of the leased tract.*
 2. *Summarize the effect of H.B. 40 on the rights of cities to limit fracking operations.*
- Pp 163-169. The common law Rule of Capture.

DAY 3:

The maps in the link below are part of your class reading to do before coming to class on Day 3:

- **Maps of shale plays in the U.S.**

Go to this link, <https://www.eia.gov/maps/maps.htm#shaleplay>, to find "Summary Maps of Natural Gas in the Lower 48 States and North America" (at the top of the page; see the beige-colored box listing 6 maps). Open each of the 6 links and view the maps. One includes offshore gas production. Know where the Bakken, Eagle Ford and Marcellus basins are. Many more shale plays exist in the Permian Basin, Colorado, Ohio and Louisiana. The Permian Basin is the hottest play today.

Now--scroll down the list of maps available to the "**Shale play development history animations**" and click on the link to the **Eagle Ford Shale from 2006 to 2010**. It depicts how quickly hundreds of wells were drilled and how production ramped up steeply. Then click on the **Barnett Shale play animation** and watch the red and black dots grow, depicting the move from vertical wells to horizontal wells.

- **Watch the following YouTube video on technological change** in the productivity of shale drilling (about 2 minutes):

<https://www.youtube.com/watch?v=XCUVEoSV82A>.

You may want to stop the video in spots to look at the charts more closely. Our Energy Information Administration (EIA) produced this video.

*****Hand in Memo 3—first part.** Summarize this last EIA video in no more than one paragraph. See below for additional item in Memo 3.

- **Watch the YouTube video by Marathon Oil on fracturing (6.36 mins)** at <https://www.youtube.com/watch?v=VY34PQUiwOQ>.

*****Hand in Memo 3—second part--based on the Marathon video:** Answer these questions:

- *What is the kick off point?*
- *What is a perforating gun?*
- *What is casing?*
- *What percentage of the fluid pumped underground consists of water and sand? How many years might a horizontal, fractured well produce?*
- *Then, as a final question: Explain the factors in the well drilling/fracturing process that are designed to prevent groundwater pollution.*

If you want more details on well drilling, *at your option* watch the following (which are two out of a series of six videos produced by Chesapeake Energy) on the stages of drilling and fracking a well:

- The YouTube video by Chesapeake Energy on Hydraulic Fracturing: <https://www.youtube.com/watch?v=qjP-K1Va1Ik>

- The YouTube video by Chesapeake on Horizontal Drilling: <https://www.youtube.com/watch?v=fBQCQ6HL2Yw>.
Additional videos in the series include preparation of the well pad that will remain on the surface of the tract for many years if the wells are commercial. Under the Texas oil and gas lease that you read, did the lessor retain any control over where the well pad could be located?

EEE4 reading (cont'd) (20 pp total):

- State Conservation Regulation: Prorationing, pooling, unitization. Pp 169-186.
- Fracking and Trespass pp. 186-91. In 2018, a PA. appellate court refused to follow the Texas precedent on tres-frac in *Coastal v. Garza*.
- **Optional: TWEN Item 6.** "Shale Gas: Applying Technology to Solve America's Energy Challenges," by the NETL, with photos of actual operations (7 pp). Note the role of the DOE's R&D in the 1970s. Was this federal money spent wisely? Why did the DOE do this research in the late 1970s?

DAY 4:

- **Regulating Externalities, pp. 191-201.**
- **TWEN Item 7A.** RFF (Resources for the Future), Natural Gas Revolution: Critical Questions for a Sustainable Energy Future, **pp 1-5 only** (the list of 24 critical questions that need to be answered to assess the sustainability of the shale gas revolution). Read the 24 questions. How many do you think have been answered by good science? Be prepared in class to state which ones you think are most important to answer so that policymakers and citizens can vote rationally about shale and energy policies.
- **TWEN Item 7B.** Methane studies. Read this 4-page summary of the research that EDF has done jointly with many universities on methane emissions from oil and gas sites. Emissions appear to be significantly underestimated; note the "super-emitters" findings. The Obama administration sought to regulate methane emissions more tightly under the Clean Air Act (by revising the Quad 0 NSPS standard for new wells and starting the process of collecting data to regulate existing wells). The Trump administration has stopped or slowed many such initiatives.
- **TWEN Item 7C,** Summary of frack-tort litigation by Prof. Blake Watson, updated through May 22, 2018, formally titled "Hydraulic Fracturing Tort Litigation Summary." Read **pp 36-39** only. Also available at https://udayton.edu/directory/law/documents/watson/blake_watson_hydraulic_fracturing_primer.pdf.

The first few pages of the Blake Watson document list key books and articles related to shale development. The book by Daniel Raimi, "The Fracking Debate: The Risks, Benefits and Uncertainties in the Shale Revolution," is especially good in terms of readability. It summarizes a large amount of data and analysis on the externalities of fracking, separating fact from fiction and exaggeration from reasoned analysis. Raimi works at RFF and you will read short Issue Briefs on key issues in his book, as noted in Item 7E below.

Professor Blake Watson lists the cases by state, notes the case disposition (decided, settled, dismissed, pending) and also notes whether the litigation relates to earthquakes (generally caused by injection wells, not by the fracking process). Case Summaries are posted after the lists. **Pages 36-39** follow the claims of the Ely plaintiffs in Dimock, PA, filed in 2009 and resulting in a trial and jury verdict of \$4.24 million in March 2016, which was then overturned by a motion granting a new trial. The case finally closed in late 2017 with a settlement. Few families have the resources to engage in prolonged litigation like this. Note that of the 44 original plaintiffs only four remained to the (bitter-sweet?) end.

Optional website view: The law firm of Arnold Porter has a “Frack chart” that lists all the lawsuits filed that involve hydraulic fracturing as of December 2015, by type. Put “Arnold & Porter frack chart” in your browser. The first page in this link classifies the types of lawsuits into categories, ranging from tort actions, oil and gas lease and other contract disputes, constitutional claims, challenges to agency actions, municipal ordinances and state and federal laws, and even SLAPP lawsuits. There is much work for attorneys here! The law firm no longer updates the cases. Here is the link: <https://files.arnoldporter.com/hydraulic%20fracturing%20case%20chart.pdf>

Much litigation is ongoing on public lands, challenging the Pruitt/Zinke initiatives to roll back regulations and increase energy development. A website called “Law of the Land,” at <https://lawofthelandproject.org/> organizes and updates the major cases.

- **TWEN Item 7D:** Websites of note on Shale Impacts on Communities including background on Broomfield’s Agreement in **Item 7E** and on RFF’s WHIMBY Project (What’s Happening in My Backyard) in **Item 7F**. Two class reading assignments totalling about 15 pages total are defined in Item 7D.
- **TWEN Item 7E. City of Broomfield’s Comprehensive Development Plan** signed with Extraction O&G, Executive Summary (20 pp; read selected pages only as noted in **Item 7D**).
- **TWEN Item 7F:** After asking the critical questions in TWEN Item 7A, RFF initiated a research program seeking to answer the key questions. **Item 7F** is a 15-page summary of RFF’s research on WHIMBY and its “Community Risk-Benefit Matrix of Unconventional Oil and Gas Development.” The matrix identifies issues of concern, such as local health effects, seismicity, traffic impacts, etc. and then reviews and assesses the quality of all the research literature surrounding that topic to date (selected pages, as noted in Item 7D).

- **Memo 4 for Day 4 is as follows:**

Visit the Center for Responsible Shale Gas Development (CRSD), originally called the Center for Sustainable Shale Gas Development (CSSD) at <http://www.responsibleshaledevelopment.org>. This Center developed 15 performance standards for shale development in the Appalachian basin that are often higher than the state or federal regulations that exist in this basin. A company that operates under the CRSD standards can earn a certificate if third-party auditors find that the company is in compliance with all the CRSD standards. A PDF of the standards (19 pp) can be

accessed at: <http://www.responsibledevelopment.org/what-we-do/performance-standards>. Or go directly to:

<http://www.responsibledevelopment.org/wp-content/uploads/2018/01/Performance-Standards-v.1.5.pdf>. They are also posted as **TWEN Item 8A**. A Comparison Table of the CRSD standards with the standards used by regulators in Pennsylvania, West Virginia and Ohio also appears at this link and is posted as **TWEN Item 8B**. Why do you think the member companies of CSSD voluntarily agreed to these higher standards? Hint: have you watched the movie *Gasland*?

*****Hand in Memo 4:** *Read two of the 15 performance standards set by the CRSD. Choose the standards based on what you are most interested in: air quality, water quality, impoundment pits, or groundwater. Then answer these two questions:*

- *Summarize your two performance standards and then check the Comparison Table and note how your selected standards compare with the state regulations. Do they require more than the state requires?*
- *Do you feel comfortable assessing whether the CRSD standards are the best and most sustainable possible? Explain why or why not.*

We will discuss your memos for a few minutes at the start of the class.

Under Trump's EPA director Pruitt and DOI Secretary Zinke, federal efforts to limit methane emissions from oil and gas operations on both private and public lands have been stopped. Eight oil companies signed a set of Guiding Principles (GPs) to reduce methane emissions voluntarily; the GPs were developed collaboratively with NGOs (like EDF), academics and int'l institutions. The short document is posted as **optional TWEN Item 8C**. Individual companies have committed to significant methane reduction goals. Some companies have set specific % targets for methane reduction and are replacing pneumatic valves (that bleed methane) with no-bleed valves. Again, why are firms doing this?

RFF conducted a data-intensive, cost-benefit analysis of whether the methane rule should stay or go. Here is its conclusion: "Using our baseline calculation, repealing EPA's methane rule would yield net costs to society in 2020 and 2025. The benefits forgone, however, are highly sensitive to the choice of the social cost of methane. When the social cost of methane is significantly lowered, as it is for the Trump administration's domestic estimate, from the global estimate used in the original RIA [Regulatory Impact Analysis], there are net benefits to society of repeal." See <http://www.rff.org/research/publications/epa-s-2016-methane-rule-should-it-stay-or-should-it-go>.

Start Offshore Oil and Gas in EEE4:

- **Pp 201-22 Offshore Oil and Gas** (21 pp). The federal leasing process and NEPA and the CZMA.
- **TWEN Item 9:** Graphic on OCS leasing procedures (1 slide).
- **TWEN Item 9A.** Powerpoint on Recent Developments in federal offshore leasing under Trump/Zinke administration.

DAY 5:

Optional: Watch this video of an offshore drillship, also called a MODU (Mobil Offshore Drilling Unit) (7.50 mins): <https://www.youtube.com/watch?v=9PNMDV2v9oA>. The video is produced by JAMSTEC, the Japan Agency for Marine-Earth Science and Technology and is called "Deep-sea Drilling Vessel Chikyu." This drillship is doing scientific research into the earth's mantle, not searching for oil, but the process of drilling is the same. There are new terms to learn here, like what a "riser" is. The offshore industry sees entire "cities" of subsea oil and gas facilities, manned by robots, in its future. This optional video is a good way to start our move to the offshore context. You may have already watched the *Deepwater Horizon* movie; the offshore facility used in the movie is quite realistic.

- **EEE4 Offshore oil (cont'd), pp. 222 -30.** Offshore wastes and the Clean Water Act.
- **EEE4 pp 230-56.** Spills, blowouts and SEMS. Also read the one-page Titanic scenario on page 16 of this Syllabus.

The SEMS readings introduce you to a kind of “govt” regulation that uses accredited Third Party auditors, not govt inspectors, to assess safety practices in high-hazard industries. How effective are govt inspectors? The EPA Office of Special Counsel announced on June 14, 2018 that the lead paint inspection program in EPA's Southeast Region 4 "created a substantial and specific danger to public health and safety" because "none of the individuals conducting [the] inspections . . . met training or credentialing requirements, and so should not have been conducting inspections." EENewsPM, 6-14-2018.

I will show a PPT on the changes in regulation in the Gulf of Mexico after the BP/Deepwater Horizon/Macondo oil spill. It will focus on the SEMS rule and the Center for Offshore Safety (COS), discussed in this section of the EEE4 reading. A SEMS system is (or should be) an integral part of any industrial facility that operates with hazardous and combustible materials, such as petrochemical plants, refineries, and pipelines. COS has created a peer-to-peer learning mechanism among offshore operators and the credentialing standards used by the fed govt today to accredit third-party auditors to perform the now-required SEMS safety audits.

- ***Read the Titanic disaster scenario on page 16 of this Syllabus before coming to class.*** You will be asked to relate the lessons learned from the Macondo disaster to the Titanic disaster. Most disasters have the same root causes.
- Visit the home page of the Center for Offshore Safety (COS) at <http://www.centerforoffshoresafety.org>. Read the objectives of COS. COS was created after the Macondo disaster and is another example of an industry-led center, like the Center for Responsible Shale Gas Development, with voluntary membership. However, COS is a far more active player than CRSD and is integrally involved in offshore regulation.

*****Hand in Memo 5, which has parts (a) to (c) with 5 subparts in (c):**

(a) What are the COS's objectives?

(b) How many companies are members of COS and what kind of companies are they?

(c) Find the link to the COS Annual Performance Report for 2016 and open the report (also posted as TWEN Item 10). You will struggle with acronyms, but such is the world of technical standards in many industries. Page 4 of the 95 pages in the document lists the acronyms. We will focus on how COS uses a system to track deficiencies in safety practices among its members using SPIs (Safety Performance Indicators) and how it shares Learnings from Incidents (especially HVLEs, or High Value Learning Experiences) that could have led to very serious problems (rather than mere record reporting failures). The blanks in items 1-5 below indicate where you must write an answer to Memo 5 (sometimes only a few words).

1. Read the Executive Summary, page 9 and the graphic showing Tier 1 and Tier 2 PSE (Process Safety Events)—the events that had or could have had very serious consequences. What is the most dangerous operation offshore? _____ Refer to page 17 for the standardization of safety incidents; SPIs numbered 1-5 are the assessed major hazards confronted in the offshore industry; SPIs 6-9 are data collected by government for many years, but this data is not used to assess safety events/indicators that may not have resulted in injuries or spills, but could have done so. What is the definition of an SPI? _____ (See Appendix 1 of the report). Read the definition of HVLEs in the Appendix also.
2. Page 13: Read Fig. 3.5 and the text below it. The Figure is titled “Areas for Improvement” (AFIs) and shows whether People, Processes or Equipment Failures caused the safety incidents. What are the three leading areas that need improvement? _____ Have problems increased in some areas and, if so, name them? _____
3. Page 14: Read Fig. 3.6, the data showing deficiencies in practices found through the safety audits required by the SEMS rule. What is the leading area of deficiency? _____ Note that this data is from COS members only; BSEE has not released a report summarizing its findings from the audits that are required to be submitted to it by all offshore operators (but not contractors) rather than just COS members.
4. Now go to pp 34-35, the start of Section 5 on Learning from Incidents (pp 34-59). This section briefly describes safety incidents voluntarily reported by COS members and the lessons learned from them. Despite their dry, technical style, some describe hair-raising events that occurred in 2016. Dropped objects and mechanical lifting incidents on rigs and platforms appear at pp. 44-48. Read these and write a few sentences on what you learned from the Learnings found in this section. _____
5. Conclude Memo 5 with your personal assessment of the role of COS as a complement (or substitute?) to federal regulation in the quest to continuously improve offshore safety. _____ And revisit the Titanic scenario at the end of this Syllabus. As a shipper, what would you decide re: the number of lifeboats needed using a risk analysis?

Very optional but fun: YouTube video of subsea ROV working to release a chain....and a big whale appears: <https://www.youtube.com/watch?v=IWNP4Nb9WfM>.

DAY 6:

We will spend 15 minutes or so discussing Memo 5 and your view on how this peer-to-peer education or coaching can improve safety as a supplement/alternative to regulation, especially under the Trump administration. BSEE and the Coast Guard reported in December 2017 at a public meeting of the National Offshore Safety Advisory Committee that some crews were totally untrained and unprepared to operate fire suppression equipment; others didn't know how to evacuate the platform or whom to call in an emergency. One company's lifeboats had not been tested in over a year and the crew didn't know how to do the test. When BSEE and the Coast Guard tested one boat, it took on a foot of water in the engine compartment even when the engine wasn't running. EnergyWire, Dec. 14, 2017.

Start EEE4 Chapter 9 on pipelines in your Coursepack:

- First read the **Appendix** to this Syllabus on ratemaking (one page long--the last page of this Syllabus). Many of you may have had a full course on electricity ratemaking by public utilities. The concepts are very similar for pipelines.

EEE4 Ch 9, pp 539-572 (33 pp). FERC regulation of natural gas pipelines through 2005: price controls on gas, and the use of take-or-pay and long-term gas supply contracts; FERC restructuring of gas pipelines in Order 636 on Open Access; rate design; shortages. If you have had a course on regulated industries or on electricity, this material will be familiar because the NGA of 1938 was modeled on the earlier Federal Power Act that regulates interstate electricity transmission and sales.

There is no MEMO due on Day 6, but we will role play the scenario described on pp. 552-53 of EEE4 (with Transco, SpotCo, pipelines that have TOP contracts with Transco, and FERC as key players), so be prepared to participate in this. Why is each player unhappy? Think about why each player has an incentive to change the old regulatory regime and what they will propose to FERC. If you are asked to take the role of FERC, be prepared to grant or disapprove the proposals that come to you from the industry players. The roleplaying should be guided by what FERC actually did implement, as explained in the EEE4 reading.

DAY 7:

- **Pp. 572-88.** FERC regulation today (16 pp). Pages 577-83 cover the 9th Circuit opinion holding that the states are not preempted by FERC jurisdiction from bringing state antitrust claims against market manipulators. The US Supreme Court granted cert and decided the *Oneok v. Learjet* case after the casebook went to the printer. The Court's edited opinion is posted as **TWEN Item 11 (8 pp)**. A nice (and short!) summary of the decision, written by Robert Ballentine, an LLM graduate of UHLC, appears in **TWEN Item 11A** (4 pp).

- Pp. 588- 606. Oil Pipelines. Ratemaking (18 pp).
*****Hand in Memo 7--the answers to questions in Note 2 (a) and (b) on page 603.**
We will discuss the answers to (c) and (d) also, in class.

DAY 8: We will make up or review any material that we did not cover adequately in the past two days on pipelines before starting Day 8.

Finish EEE4 Chapter 9 (18 pp):

- Pp 606-624. Siting pipelines; eminent domain; crude by rail. (18 pp).
- **TWEN Item 12.** It is not often that FERC denies a certificate for a gas pipeline, but FERC did so in 154 FERC Para. 61,190 (March 11, 2016), Jordan Cove Energy Project L.P and Pacific Connector Gas Pipeline L.P., Docket Nos. CP 13-483-000 and CP 13-492-000.
***** Hand in Memo 8:** *Read only the following paragraphs of this docket case and write a memo summarizing why FERC did not approve this proposed gas pipeline connected with the proposed Jordan Cove LNG terminal planned in Oregon. Read Paragraphs (not page numbers): 1-7 (the facts); 23, 28-29, 38-41, and 45-47. Side note on Jordan Cove: In June, 2018, at a public hearing in Colorado, Congressional representatives and industry promoted opening up the western Piceance Basin to drilling as a way to support the rejected Jordan Cove LNG terminal in Oregon. EnergyWire 6-4-2018.*
- **TWEN Item 13.** Update of FERC/pipeline issues and the 2018 NOI on pipeline certification. (25 pp)
- **Item 13A.** The East Coast Pipeline “Cheat Sheet” with a map of 10 pipelines and a summary of legal issues confronting each (8 pp).
- **Item 13B.** FERC’s 2018 NOI on pipeline certification policy (select provisions as noted in Item 13).
- **Optional TWEN Item 13X** are maps of the US-Canadian pipelines that have been much in the news recently: the Keystone XL pipeline and the Dakota Access P/L (showing where Standing Rock is, the site of a long protest by Native Americans).