From: DamascusCitizens
Sent: Friday, November 15, 2013 2:13 PM
To: ord.docket@epa.gov; Hanlon, Edward
Subject: Attention Docket ID No. EPA-HQ-ORD-2010-0674

Comment from:
On behalf of Damascus Citizens for Sustainability and NYH2O we are submitting the following information for consideration by the EPA Science Advisory Board and the researchers conducting the nationwide study of high volume hydraulic fracturing impacts.
B. Arrindell
Director
Damascus Citizens for Sustainability

This comment contains information on the US Army Core of Engineers warning on hydraulic fracturing within 3,000 feet of dams and levees - media and the US Army Core of Engineers' letter and USACE powerpoint on the subject are attached Citations for three of these articles are noted below:

Citations:

1. "USA Gas: Corps Feels that Fracking May Hurt Dams"; Randy Lee Loftis; *The Economist Intelligence Unit Limited*; August 1, 2011.
2. "USA Gas: Corps Feels that Fracking May Hurt Dams"; Randy Lee Loftis; *Dallas Morning News*; July 31, 2011 (Updated August 1, 2011). http://www.dallasnews.com/news/community-news/grand-prairie/headlines/20110731-corps-worries-that-fracking-gas-wells-might-hurt-dams.ece
3. "Grand Prairie Aids Corps of Engineers' Study of Drilling Near Dams"; Randy Lee Loftis; *Dallas Morning News*; September 16, 2011. http://www.dallasnews.com/news/community-news/grand-prairie/headlines/20110916-grand-prairie-aids-corps-of-engineers-study-of-drilling-near-dams.ece

C: Jim Cummings

DEPARTMENT OF THE ARMY
FORT WORTH DISTRICT, CORPS OF ENGINEERS
P. O. BOX 17300
FORT WORTH, TEXAS 76102-0300

REPLY TO
ATTENTION OF

Operations Division

FEB 25 2011

RECEIVED

JUL 29 REC'D
ENVIRONMENTAL
SERVICES DEPARTMENT

RECEIVED

MAR 01 2011

City Manager's Office
City of Grand Prairie

Mr. Tom Cox
Deputy City Manager
City of Grand Prairie
317 College Street
Grand Prairie, Texas 75053-4045

RE: Corn Valley Drill Site; wells 2H-30202; 1H-30196; 2H-30200; 3H-30201;1H-30195

Dear Mr. Cox:

Thank you for taking the time to meet with the U.S. Army Corps of Engineers, Fort Worth District (Corps) staff this past Wednesday to discuss our concerns with natural gas drilling in close proximity to Joe Pool Dam. We believe that drilling and associated hydrofracturing may present an increased risk of poor performance to our projects. Due to this risk, the Fort Worth District has placed a general restriction on any drilling activities within 3,000-feet of our dams and other critical structures.

Significant dam safety concerns have been identified at Joe Pool Dam. As a result, that project is currently considered to be high priority with respect to implementation of measures that will reduce risk to thousands of persons and properties located downstream. Our engineers believe that drilling and fracturing activities at Chesapeake Energy's Corn Valley drill site may increase the risk to the project, and possibly contribute to a catastrophic dam failure.

Due to the potential for grave and irreparable harm to the dam and, as a consequence, the public, it is necessary for our engineers to conduct studies to verify that drilling and fracing activities will not affect the integrity of the project, increase the hazard rating currently assigned to the dam, or cause the Corps to incur substantial costs to mitigate any increased risks to Joe Pool Dam. In order for the Fort Worth District to perform those studies, the Corps requests that the city of Grand Prairie immediately impose a 6-month moratorium on approval of any drilling and hydrofracturing activities within 3,000 feet of Joe Pool Dam. Since Joe Pool Dam is

partially located in the city of Dallas, we will also be pursuing this moratorium with that municipality.

If you have any questions concerning the above, please contact Mr. Tim MacAllister,

Sincerely,

Richard J. Muřaski, Jr.
Colonel, US Army
Commanding

Potential Impacts of Hydrofracturing on Dam & Levee Safety

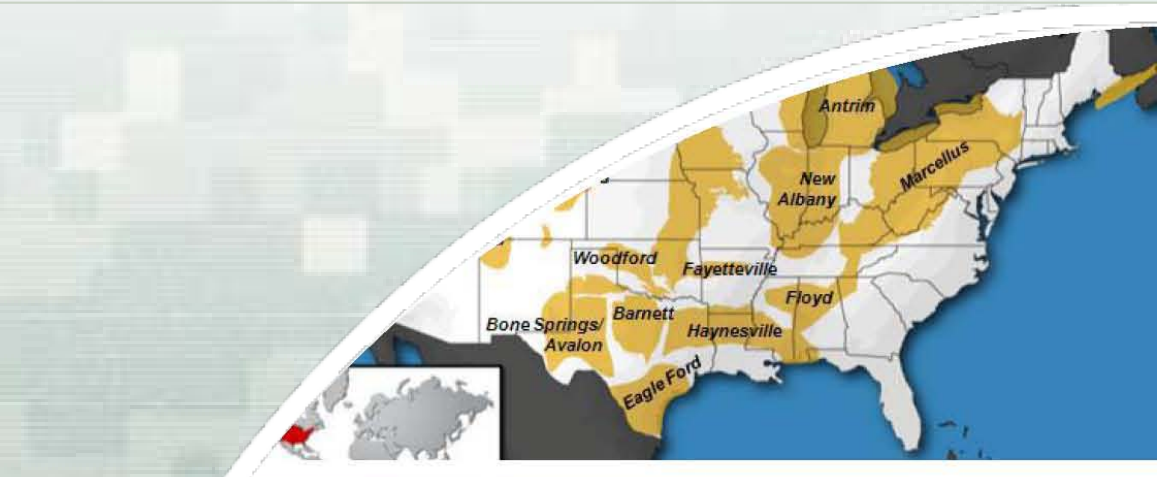
Anita Branch, P.E.

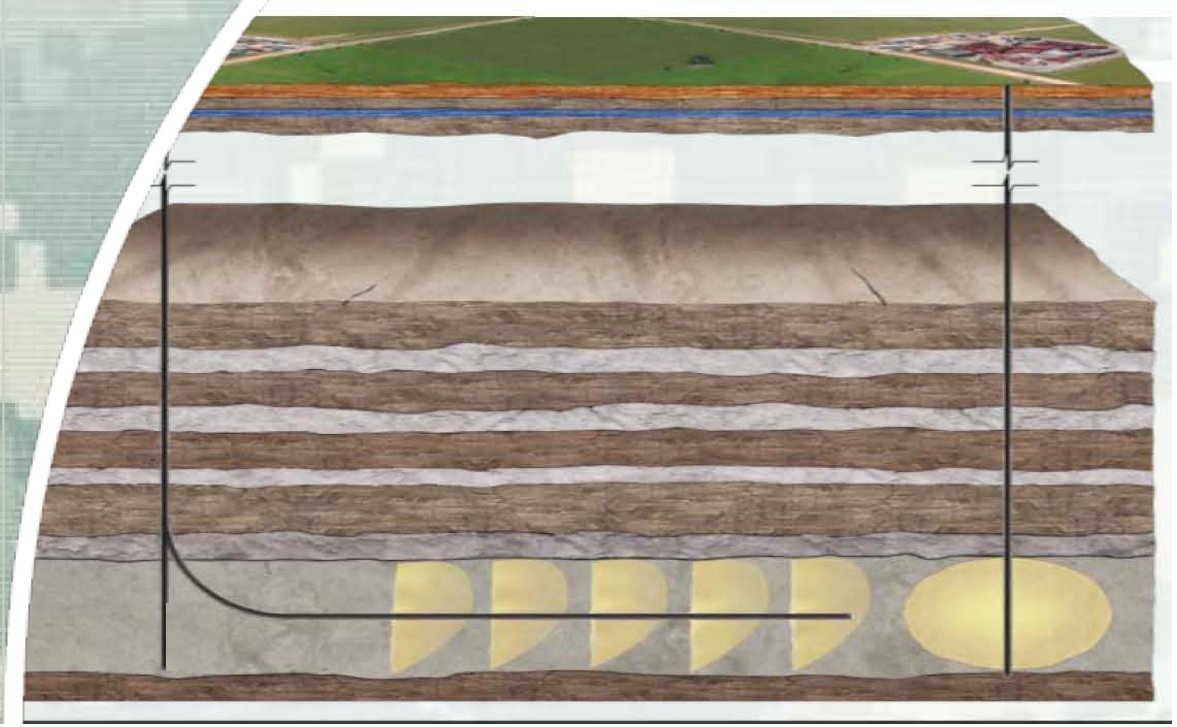
Senior Geotechnical Engineer

Dam Safety Production Center, Tulsa

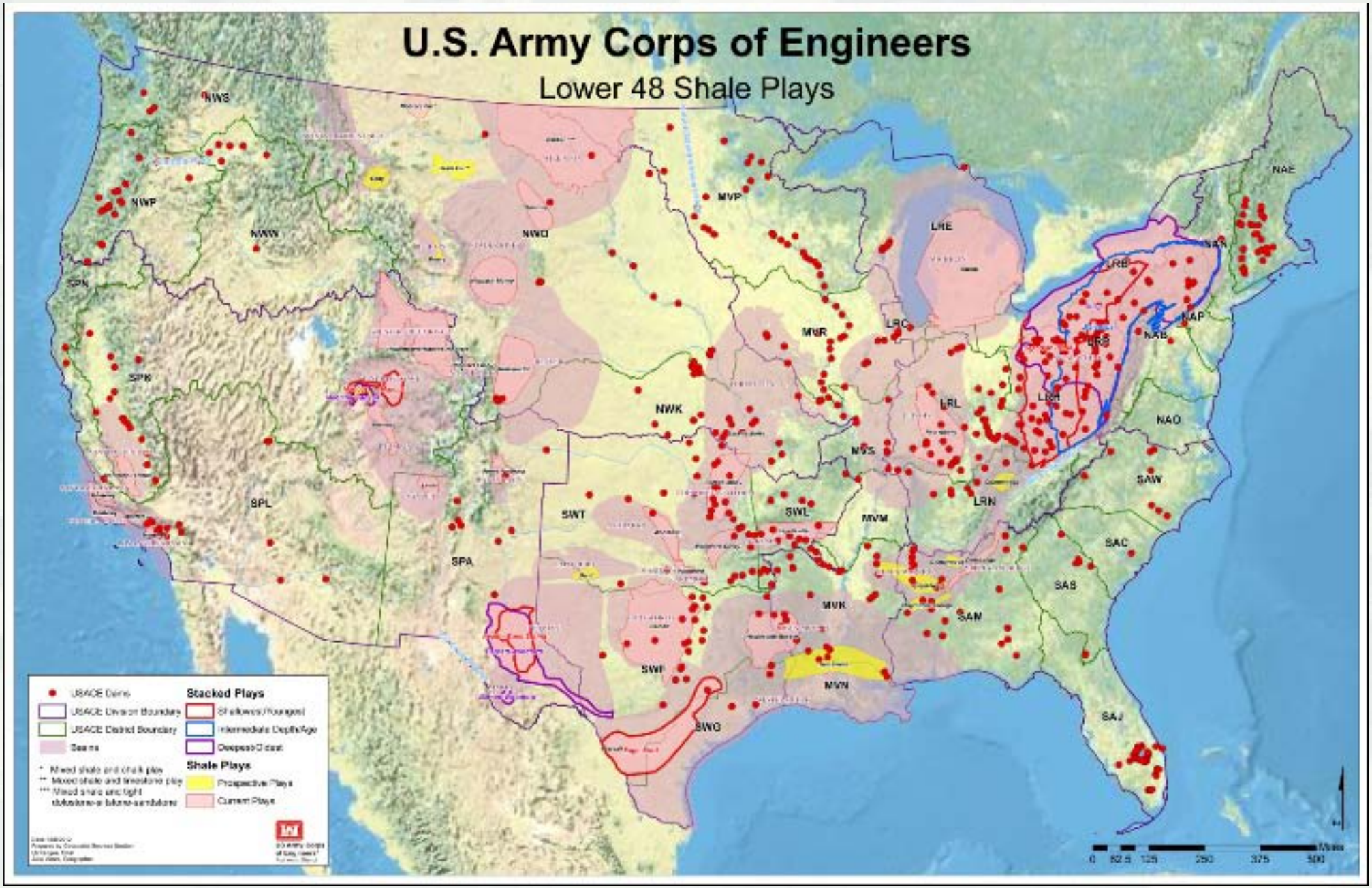
ASTM D18.26 Committee Meeting

29 January 2013





Source: Energy Information Administration based on data from various published studies.
Updated: May 9, 2011


U.S. Army Corps of Engineers
Lower 48 Shale Plays
NWS
NWP
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MVR
LRC
LRB
NAP
NAB
LRS
LRH
LRL
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MVS
SAW
SPL
SWT
SWL
MVM
LRN
SAC
SPA
SAS
MVK
SAM
SWF
MVN
SWG
SAJ
USACE Dams
USACE Division Boundary
USACE District Boundary
Basins
Stacked Plays
Shallowest/Youngest
Intermediate Depth/Age
Deepest/Oldest
Shale Plays
Prospective Plays
Current Plays
Miles

USACE Dam & Levee Safety Mission

U. S. ARMY CORPS of ENGINEERS DAMS ...

694 Dams *(USACE owned & operated)*

- *Protect 15 million people*
- *Provide $25B economic benefits / annually*

USACE Dam & Levee Safety Mission

U. S. ARMY CORPS of ENGINEERS LEVEES ...

USACE has oversight of approximately 10% of the Nation's levees

- *2,500 Levee Systems (most locally owned/operated)*
- *14,500 miles of levees*
- *10M people protected*
- *$120B damages prevented in 2011*

USACE Dam & Levee Safety Mission

Congressionally authorized purposes of these projects include:

- ***FLOOD RISK MANAGEMENT***
- ***NAVIGATION***
- ***HYDROPOWER***
- ***WATER SUPPLY***
- ***FISH and WILDLIFE CONSERVATION***
- ***RECREATION***

USACE Dam & Levee Safety Mission

Benefits Provided by USACE Dams ...

FLOOD RISK MANAGEMENT

- Protect 15 million people
- Prevent $236B direct damages
- Provide $25B economic benefits / annually

NAVIGATION

- 193 projects/293 chambers
- 554M tons commodities moved (2011)

HYDROPOWER

- USACE projects supply 24% of US electrical capacity

WATER SUPPLY

- 329.2M acre-feet of water storage
- 7,627 MGD (2009)

USACE Dam & Levee Safety Mission

Benefits Provided by USACE Dams, continued ...

FISH and WILDLIFE CONSERVATION

- *Threatened and endangered species*
- *Environmental restoration/enhancement*

RECREATION

Direct Benefits

- *365 million recreation visitors every year*
- *112,000 private sector jobs*
- *$3 billion in annual salaries*

Associated Economic Activity

- *$16 billion a year*
- *270,000 private sector jobs*

Dam & Levee Safety Implications of Hydrofracturing

Current USACE risk assessment is evaluating the potential impacts & risks associated with:

- ***Drilling***
- ***Injection***
- ***Extraction***
- ***Hydrofracturing***

Dam & Levee Safety Implications of Hydrofracturing

Hydraulic Fracturing Risks ...

INDUCED SEISMICITY

- *Oklahoma (Holland, 2011)*
- *Bowland Shale, United Kingdom (de Pater, 2011)*

TRANSMISSION OF FRACKING FLUIDS OUTSIDE TARGET ZONE VIA NATURAL FAULTS

- *Erosion of embankment in contact with faults could trigger failure*

DISPOSAL OF FLOWBACK WATER

- *Potential for contamination of ground and surface water*

Wells can be fractured multiple times, so project risk associated with frac'ing can occur over the life of the well …

Dam & Levee Safety Implications of Hydrofracturing

Potential Failure Modes associated with Hydrofracturing ...

POORLY CONTROLLED HYDROFRACTURING ("BREAKOUTS")

- *Erosion of the embankment along existing faults located in the foundation, abutments or outlet works could lead to project failure**

**Failure defined as an uncontrolled loss of pool or flood storage*

INDUCED SEISMICITY

- *Consolidation of granular drains*
- *Liquefaction*
- *Stability*
- *Cracking*
- *Displacement*

Dam & Levee Safety Implications of Hydrofracturing

Other Impacts on Congressionally Authorized Purposes ...

Impacts to mission due to water demand:

- *water quality/storage/supply*
- *navigation*
- *low flow augmentation*
- *environmental restoration*
- *fish & wildlife enhancement*
- *recreation*
- *regulatory permitting*

Dam & Levee Safety Implications of Hydrofracturing

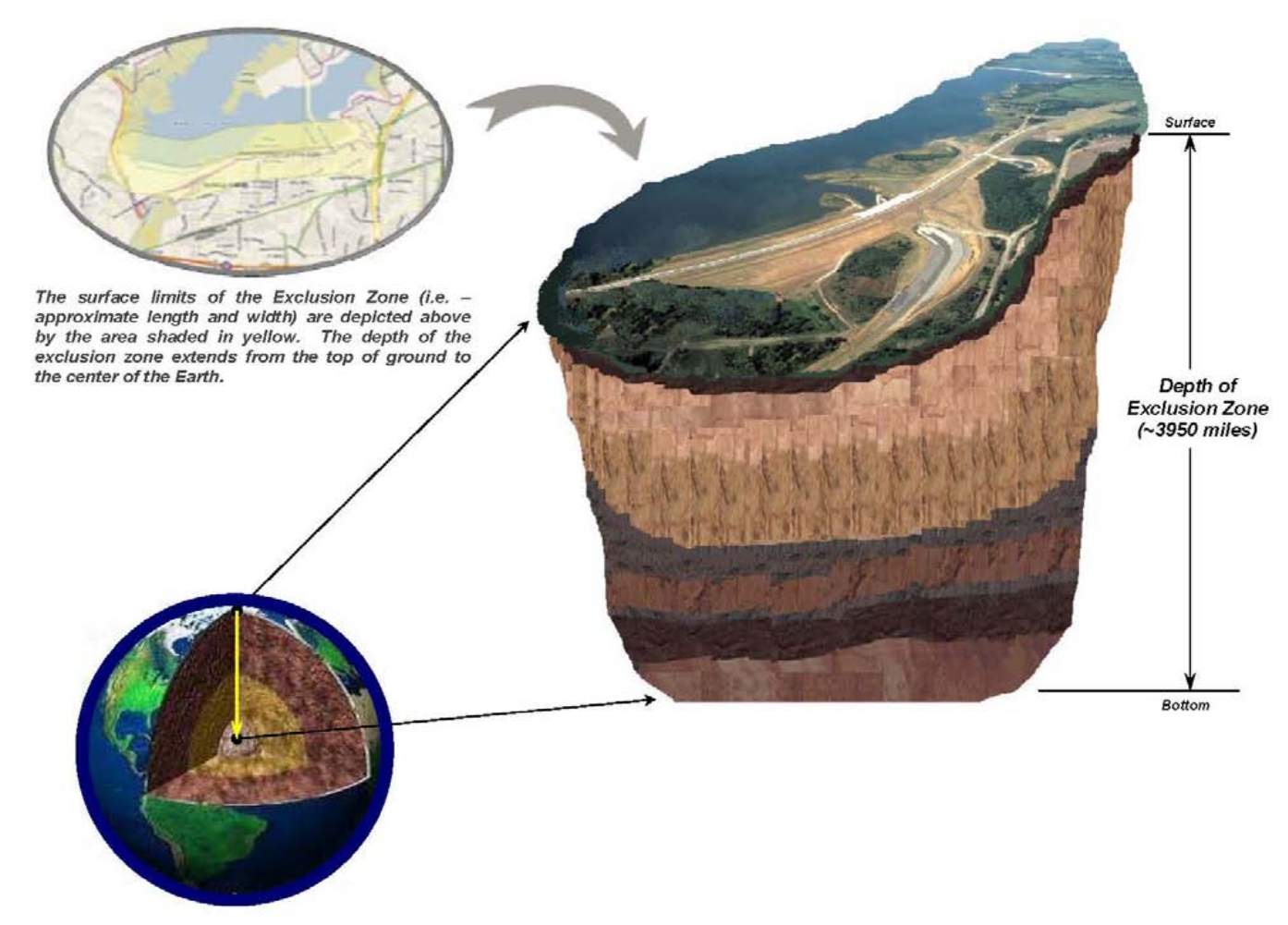
What do we need to include in this new standard for protection of dams & levees?

How about nuclear power plants, bridges or other critical infrastructure?

Dam & Levee Safety Implications of Hydrofracturing

Require minimum offsets from critical infrastructure within which no HF allowed

- ***Provide methodology for determining necessary offset distances, or***
- ***Specify absolute minimum offsets***



Dam & Levee Safety Implications of Hydrofracturing

Require minimum offsets from critical infrastructure within which no HF allowed

- *Provide methodology for determining necessary offset distances, or*
- *Specify absolute minimum offsets*

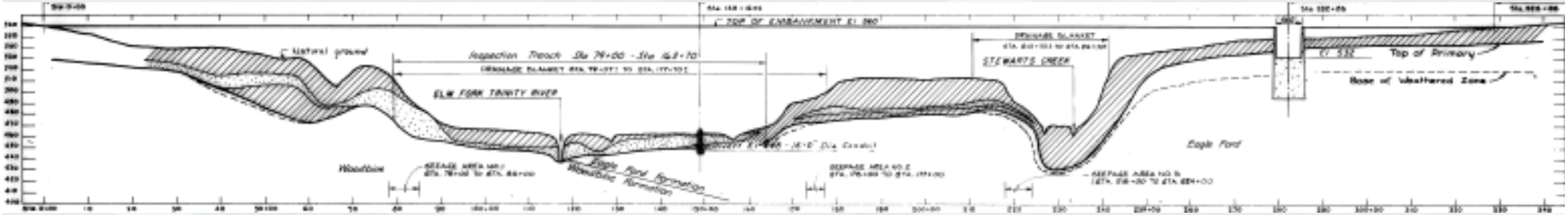
Required rigorous evaluation of site geology

- *From top of ground to bottom of target zone*
- *Identify faults, fractures, water bearing zones*
- *Obtain and test core samples of materials in each geologic unit*
- *Estimates of physical properties (Young's Modulus, Poisson's ratio, permeability, density, etc)*
- *3D Micro-Seismic surveys for each HF event*

Notification of any drilling and HF activities in close proximity to critical infrastructure

- *Notification prior to start of activity*
- *Provide map (ingress, egress, ponds/pits, tanks,*
- *Where/how will waste products be disposed (solid and liquid)*
- *Identify all parties and provide POCs*
- *Identify dates of activities*
- *Identify water source, quantity, chemicals, proppant*
- *Identify HF pressures (average, max)*
- *Well construction details (casing: material, wall thickness, location/limits; kickoff point, cement details; survey location of toe/heel)*
- *Identify site protection measures (erosion, spill prevention, etc)*

Dam & Levee Safety Implications of Hydrofracturing



Dams and Levees are often many miles long

Lots of different geology over those footprints

Mitigation for HF impacts was not incorporated into project design

Projects are only as strong as the weakest link

Life safety is paramount …

Anita Branch, US Army Corps of Engineers

Email: anita.branch@usace.army.mil

This presentation does not represent any position or policy of the U.S. Army Corps of Engineers, nor does it imply any official endorsement of the information presented.