Oklahoma Oil and Gas Floodplain Management for the Oil and Gas Industry

Oklahoma Floodplain Managers Association

The National Flood Insurance Program requires local governments to adopt and enforce floodplain regulations before flood insurance can be obtained in their community.

History of the National Flood Insurance Program (NFIP)

- Congress passed the National Flood Insurance Act in 1968 which created the NFIP.
- The NFIP was designed to
  - reduce future flood losses through local floodplain management and
  - provide protection for property owner against potential losses through flood insurance.

Basics of the NFIP

- As part of the agreement for making flood insurance available to people in a community, the NFIP requires the participating community to adopt floodplain management regulations/ordinances containing certain minimum requirements intended to reduce future flood losses.
- These minimum requirements can be found in the **Code of Federal Regulations Title 44 Sections 59-65**

Basics of the NFIP

- **All development in the floodplain must be regulated** according to 44CFR.
- Development is defined as any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or **drilling operations or storage of equipment or materials** (44CFR 59.1).

Basics of the NFIP

- The community is responsible for approving all proposed floodplain development.
- Community officials may set higher standards for construction.

FEMA manages the NFIP

Published **Interim Technical Guidance on Drilling Oil and Gas Wells in Special Flood Hazard Areas (SFHA)**

- This document states that a community floodplain permit is required for drilling oil and gas wells.
- The document gives brief, general guidelines which are included in this presentation.
- See the complete document at the end of this presentation.

Oklahoma's Floodplain Management Program

- The Oklahoma Floodplain Management Act, Title 82, O. S. 2001, §1601-1618, as amended, was passed by the State Legislature in 1980 and revised several times.
- The Act paved the way for each community to implement wise floodplain management and thereby participate in the National Flood Insurance Program.

Oklahoma

- The Oklahoma Water Resources Board and the Oklahoma Floodplain Managers Association are working toward standardizing oil and gas floodplain permitting across the state.
- **OWRB and OFMA recommend that communities in Oklahoma regulate the industry in an expedient manner, enforcing the minimum NFIP standards.**

Kingfisher, OK, August 19, 2007

Bartlesville OK, July 3, 2007

Canadian County, OK, May 9, 2007

Definitions

- **BASE FLOOD ELEVATION –** the elevation in mean sea level of the flood having a one percent chance of being equaled or exceeded in any given year (formerly known as a 100-year flood).
- **FLOOD INSURANCE RATE MAP (FIRM) -** an official map of a community, on which the Federal Emergency Management Agency has delineated both the areas of special flood hazards and the risk premium zones applicable to the community. Older maps were called Flood Hazard Boundary Maps (FHBM).
- **FLOOD INSURANCE STUDY -** is the official report provided by the Federal Emergency Management Agency. The report contains flood profiles, water surface elevation of the base flood and delineates the floodway if determined.

Definitions

- **FLOODPROOFING –** any combination of structural and non-structural additions, changes, or adjustments to structures which reduce or eliminate flood damage (ex: anchoring, flood debris protection fence).
- **FLOODWAY –** The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height.

Definitions

- **ZONE AE and A1-30 –** Areas subject to inundation by the 1-percent-annual-chance flood event determined by detailed methods. Base Flood Elevations (BFEs) are shown. Requires floodplain permit.
- **ZONE A –**Areas subject to inundation by the 1-percent-annual-chance flood event generally determined using approximate methodologies. Because detailed hydraulic analyses have not been performed, no Base Flood Elevations (BFEs) or flood depths are shown. Requires floodplain permit.
- **ZONE X (SHADED)** – Area of moderate flood hazard, usually the area between the limits of the 100-year and 500-year floods. Does not require floodplain permit.
- **ZONE X (UNSHADED)** - Area of minimal flood hazard, usually depicted on FIRMs as above the 500-year flood level. Does not require floodplain permit.

Floodway

- If the drilling and/or production site is in the floodway, the oil/gas company will have to demonstrate through an engineering study that there will be no increase in flood height during the discharge of the 1% chance flood.

Steps to compliance

- Determine if the proposed site is in a community that participates in the NFIP.
- **Only participating communities will require a floodplain permit.**
- Go to http://www.fema.gov/cis/OK.html
  for a list of NFIP Participating Communities in Oklahoma.

Steps to compliance

- Contact the community's Floodplain Administrator (FPA) to request a floodplain determination for your site and a floodplain permit application if the FPA determines your site to be in the floodplain.
- Webpage with contact information for Oklahoma Floodplain Administrators:

  http://www.owrb.ok.gov/hazard/fp/pdf_fp/fpa_list.pdf

Steps to compliance

You must:

- Get a floodplain permit before development (including pad construction) begins.
- Either floodproof, elevate, or relocate out of the floodplain all production equipment.
- Get a registered engineer or architect to certify the design of the floodproofing measures you propose.

Determine BFE at the proposed site

- If site is in an AE Zone, the BFE can be found on the FIRM.
- If site is in an A Zone, the BFE can be determined using the Simplified Method of Contour Interpolation, found in *FEMA 265: Managing Floodplain Development in Approximate A Zones* (a method of lining up the floodplain boundaries with the contours of a topo map).

Documents required for application

- Completed application form.
- Detailed plans and specs for the site including engineered and stamped floodproofing measures: anchoring, flood fence, or elevation drawings.
- Staking plat
- Spill Prevention and Counter Measure Plan
- Emergency Evacuation Plan (brief outline of steps to be taken at production site in case of eminent flood)
- Other applicable permits (404 permit, etc.)

FEMA guidance on anchoring fuel tanks

- *FEMA Publication 348 Protecting Building Utilities from Flood Damage*

Steps to compliance

- Depending on the level of risk at the site (proximity to fast-moving flood waters with debris or just low velocity backwater?), flood fencing may be required on vulnerable equipment such as the well head, meter run, and natural gas above-ground valves.

Steps to compliance

- Vulnerable utilities must be above the BFE.
- A closed drilling mud pit system must be used.
- The lease road must be constructed so it will not obstruct the flow of water.
- A culvert must be placed in the barrow ditch where lease road meets county road.
- Tree and brush debris may need to be removed from floodplain or burned if they could be washed downstream.

Approval of permit application

- The community FPA and/or Floodplain Board will authorize your permit.
- The FPA will follow up with an inspection when the production site is complete.
- The FPA will collect your final completion documents:
  - List of production equipment at the site
  - Engineered certification of floodproofing/anchoring/fence compliance
  - Elevation Certificate prepared by a licensed surveyor, engineer, or architect if elevation methods were used

Post-Construction Requirements

- Notify FPA if you
  - Add new equipment to the site (it will need to be permitted).
  - Sell the site to another company.

Pipelines

- Pipelines must be buried to the community's depth requirement (OFMA recommends 72" under creeks and rivers, 48" in other parts of the floodplain).
- You must sign a Statement of Burial Depth Compliance after construction is complete.
- Above ground valves and meter runs may have to have a flood protection fence.

Compliant Floodproofing

- Proper anchoring

- Proper anchoring on equipment other than tanks

Well Head Guard, points upstream, leaves room on open side to work on well head

Elevation of production site

Relocated production equipment

Not Compliant

Infringement on waterway

Inadequate well head guard

New unpermitted equipment added after final inspection

Partnership

- OFMA and OWRB are committed to partnering with the oil and gas industry to make floodplain permitting work for all parties.
- Please direct your comments, suggestions, and questions to us so that we can continue to create the best oil and gas floodplain management program in the nation.

Oklahoma Floodplain Managers Association

Amy Brandley, CFM
Canadian County FPA
200 N Choctaw Ave
El Reno, OK 73036
(405) 295-6260

Oklahoma Water Resources Board

Gavin Brady, CFM
NFIP State Coordinator
440 S Houston, Room #2
Tulsa, OK 74127
(918) 581-2924

FEMA
National Flood Insurance Program

Interim Technical Guidance on Drilling Oil and Gas Wells in Special Flood Hazard Areas (SFHA)

A floodplain development permit from the community is required for drilling oil and gas wells in a Special Flood Hazard Area (SFHA). The application for a permit should include a detailed set of plans and specifications. The following guidance is on National Flood Insurance Program (NFIP) minimum requirements. Some communities may have more restrictive requirements in their floodplain management ordinances.

If the site is in zones A or AE on the community's Flood Insurance Rate Map (FIRM), the community will review the application to determine if the development is compliant with their floodplain management ordinance. For areas designated as zone AE the Flood Insurance Rate Map (FIRM) base flood elevations (BFE) are provided and usually a floodway is mapped. The floodway includes the channel of the river or stream and the adjacent areas of the floodplain, which must be left unobstructed to carry floodwaters. For areas designated as zone A on the FIRM only a floodplain boundary is provided and the community will use whatever flood information is available to determine an elevation to use as the BFE.

Floodways: If the drilling site is in the floodway portion of the floodplain, the developer (i.e. petroleum company) will have to demonstrate through an engineering study that there will be no increase in flood stages during the discharge of the 100-year flood caused by the development. Sometimes actions can be taken to compensate for an increase if one does occur.

Buildings and other Structures: Any buildings and other structures (including fuel storage tanks) in the floodplain will either have to be elevated to above the BFE or floodproofed (made watertight) to that elevation. If the building is floodproofed, a registered engineer or architect will have to certify the design of the floodproofing measures. Any storage tanks and any equipment at the site that could be damaged by floodwaters will have to elevated above the BFE or made watertight and anchored to resist floatation, collapse and lateral movement. One of the biggest problems after most floods has been the finding and retrieving fuel storage tanks that have been dislodged and floated away during the flood. FEMA guidance on anchoring fuel storage tanks and protecting other mechanical and utility equipment can be found in FEMA 348 *Protecting Building Utilities from Flood Damage* which is available on the FEMA website at www.FEMA.GOV.

Electrical and Mechanical Equipment: Any electrical and mechanical equipment mustbe elevated or floodproofed to the BFE or movable from the site in case of an imminent flood event.

Hazardous and Explosive Materials: Any material stored on the site that is highly volatile, flammable, explosive, toxic or water reactive should be protected to at least the level of the 500-year flood. If the site will have a slush pit, the berm should be at least 1foot above BFE, have 3 to 1 side slopes, and be compacted. To determine what maybe hazardous and explosive compared to a propane tank, the local fire marshal's office may need to be contacted.

Other Permits: The community must also ensure that the developer has obtained any other required Federal, state and local permits prior to issuance of a floodplain development permit. This includes a permit from the state agency that regulates oil and gas activities and a Spill Prevention and Counter Measure Plan. The developer may need a Section 404 permit from the U.S. Army Corps of Engineers if the development impacts on a wetland.

Emergency Plan: If a drilling site is located in the floodplain, the developer should have an emergency action plan in place to move all vehicles and movable equipment out of the floodplain and install any floodproofing measures in case of an imminent flood event. The plan should take into account the amount of warning time available prior to flood.