

BIODIVERSITY CONSERVATION ALLIANCE \* CALIFORNIANS FOR WESTERN WILDERNESS \* COLORADO ENVIRONMENTAL COALITION \* EARTHJUSTICE \* ECOFLIGHT \* NATURAL RESOURCES DEFENSE COUNCIL \* NEW MEXICO SPORTSMEN \* SAN JUAN CITIZENS ALLIANCE \* UPPER GREEN RIVER ALLIANCE \* WESTERN ORGANIZATION OF RESOURCE COUNCILS \* WILDERNESS WORKSHOP

# CLEANING UP THE OIL AND GAS INDUSTRY EFFECTIVE REGULATION OF HYDRAULIC FRACTURING

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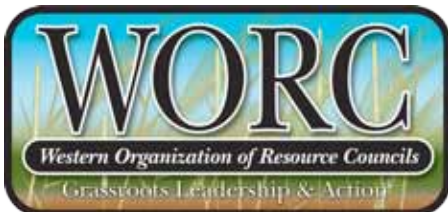
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Concerns about the effects of oil and gas exploration, development and production on public health, air, water and land are increasing with the expanded use of new drilling technologies and the spread of development into new areas. The public is demanding full and effective regulation of all aspects of exploration and production, particularly the controversial practice of hydraulic fracturing.

Local residents, environmental organizations and public health advocates see the effects of fracturing throughout the lifecycle of oil and gas production, from well-site selection to waste management. In addition to better regulation of well construction and the act of fracturing, we see the need for regulatory reforms that begin before chemicals and fluids are ordered and continue after the trucks have hauled off the waste. Effective regulation must begin with well-resourced, unbiased regulatory agencies with a clear mandate to protect public health and the environment, and also relies on good information; an active, informed public; frequent inspections; clear enforcement authority; and a strong commitment to prevention and remediation of spills, leaks and other accidents.

As more state regulatory agencies and local governments across the country move forward with regulations that attempt to address the public outcry around hydraulic fracturing, it will be critical for affected citizens to engage in these processes, to ensure that new regulations do the job. This paper sets out a series of minimum criteria that can be used to evaluate existing and proposed policies to regulate hydraulic fracturing and oil and gas development. Some states have already adopted and implemented some of these criteria, demonstrating their compatibility with oil and gas production.



## **OVERSIGHT AGENCIES AND COMMISSIONS:**

1. The makeup of regulatory agencies and commissions should ensure balance, and consist of representatives of impacted citizens as well as other stakeholders.
2. The mission statements of regulatory agencies and commissions should protect public health and the environment as they permit oil and gas production.
3. Agencies and commissions should have clear policies against conflicts of interest.
4. Regulatory agencies should have clear jurisdiction over each phase of the oil and gas exploration, development and production process, including management and disposal of exploration and production waste.
5. Regulatory agencies should have personnel with the expertise to evaluate public health and environmental risks and impacts, as well as the authority and resources needed to protect public health and the environment.
6. Agencies should conduct regular reviews of regulations by a multi-stakeholder group at least once every five years, or at any time new information suggests the need for new rules.

## **PERMITTING PROCESS:**

1. Permits should be required for all phases of oil and gas development, including drilling, re-drilling, workovers, conversions, treatment or stimulation (including fracturing), water use, waste management and disposal, stormwater discharges, air emissions and plugging.
2. All required permit applications, review documents and approvals should be written, not verbal.
3. All proposed permits should have an opportunity for public review and comment prior to issuance, and the agency should be required to respond to all comments
4. Permits should require review by experts where appropriate, such as geologists, engineers, hydrologists and biologists.
5. The following information should be submitted with an application for a permit to drill or similar proposal:
  - a. Site characterization and mapping of hydrologic, biological and physical features in the area of exploration, development and production and the area of influence, including:
    - i. Groundwater level, flow and chemistry;
    - ii. Surface water resources;
    - iii. Surface and groundwater uses;
    - iv. Geology, including the presence of an appropriate confining zone and absence of transmissive faults or fractures;
    - v. Geochemical baseline for formations, fluids and hydrocarbons;
    - vi. Soil characteristics;
    - vii. Agricultural uses, including irrigation and subirrigation;
    - viii. Any existing oil and gas wells, including idle, orphaned and abandoned wells, and the results of integrity tests of wells within one-half mile;
    - ix. Any existing oil and gas disposal sites, including active and inactive pits and injection wells; and
    - x. Any existing contamination.
  - b. Plan of operations, including:
    - i. Facilities and their locations;
    - ii. Anticipated well treatment or stimulation;
    - iii. Waste management and disposal plans, including disposal site(s) for all waste, including hydraulic fracturing fluids; and
    - iv. An emergency response plan.

## **PERMITTING PROCESS (CONTINUED):**

6. Permits for new fields or groups of wells should:
  - a. Include analysis of potential cumulative public health and environmental impacts for the area of exploration, development and production, and the surrounding area; and
  - b. Be reviewed and evaluated by state environmental, land use and health agencies as well as by the state oil and gas agency or commission.
7. For treatment or stimulation permits, a description of any potential chemical interactions, between injected materials, native fluids and geologic formations, and a determination that the reactions will not compromise the integrity of the confining formation.
8. Permitting agencies should have the authority to deny, delay or revoke permits:
  - a. If the applicant or operator is currently not in compliance with applicable laws and regulations or permit conditions, or has significant past violations; or
  - b. If the proposed operations would jeopardize public health or the environment.
9. Financial assurance should be required, and should be based on the projected site-specific plugging and abandonment, reclamation, corrective action, emergency and remediation costs.
10. A fee covering the costs of the permitting program should be applied to all permit applications.

## **INSPECTIONS AND ENFORCEMENT:**

1. Agency inspection program budgets should be based on the anticipated number of inspections.
2. An annual inspection fee paid by the operator should cover the costs of the inspection program.
3. A full-time inspector should be on-site whenever any major activity is taking place to monitor operations and enforce all regulations and permit conditions
4. Inspections should be unannounced except when advance scheduling is required to observe a specific event.
5. Inspections should also be conducted:
  - a. When a citizen complaint is made;
  - b. During cementing and casing;
  - c. During pit construction, if pits are allowed;
  - d. During stimulation or treatment, including hydraulic fracturing;
  - e. To verify interim reclamation;
  - f. During workover operations;
  - g. During abandonment;
  - h. If any air, water or other sample shows possible contamination;
  - i. Immediately after a report of a spill, leak or contamination, or a health effect suspected to be linked to oil and gas development;
  - j. To certify final reclamation, and
  - k. At least annually.
6. Inspections should be conducted more frequently if:
  - a. The operator, drill rig, well and any contractors have a history of noncompliance; or
  - b. The operation is located in an environmentally sensitive area.
7. All inspectors should be trained, certified and authorized to take enforcement actions, including issuing Notices of Violation.

## **MONITORING:**

1. Before exploration and/or development begin, baseline sampling should be conducted within one-half mile of a well for surface water quality and quantity, groundwater quality and level, air quality and public health, including VOCs, hydrocarbons, major and trace element chemistry, heavy metals and NORM.
2. Ongoing sampling should be conducted within one-half mile of a well for surface water quality and quantity, groundwater quality and level, air quality and health impacts at new and existing sites, including VOCs, hydrocarbons, major and trace element chemistry, heavy metals and NORM.
3. The public should have the opportunity to request, and the regulatory agency should have the discretion to increase the sampling area if fractures are anticipated to extend farther than one-half mile, or for other site-specific considerations.
4. All samples and analysis should be paid for by the operator, and conducted and analyzed by a certified third party laboratory.

## **PUBLIC DISCLOSURE AND REVIEW:**

1. All required permit applications and review documents should be posted on a public website, sent directly to surface owners, and opened to public comment.
2. All monitoring and test results and enforcement actions should be posted on a public website, and sent directly to surface owners.
3. Chemical and fluid disclosure:
  - a. A report of chemicals planned to be used during drilling and stimulation should be made to the regulatory agency and sent directly to surface owners and water users within one mile of any portion of the well bore at least 30 days before operations. The report should include the additive type, compound name and Chemical Abstract Service number, and concentration or rate for all drilling and workover chemicals as well as those used in hydraulic fracturing and any other types of well stimulation, as well as the base fluid source.
  - b. A final report should be made within two weeks of conclusion of drilling or stimulation, and should include the additive type, compound name and Chemical Abstract Service number, concentration or rate, and amount of chemical constituents actually used; maximum pressures; fracture lengths and heights; the type, source and quantity of fluids used; and the quantity of fluid recovered.
  - c. All chemical reports should be made on a well-by-well basis.
  - d. All chemical reports should be posted on a public website, and sent directly to surface owners.
  - e. There should be a presumption that all chemicals used will be disclosed to the public, not just to the regulatory agency. Any waivers of disclosure for proprietary information should require a showing of specific economic damages that would be caused directly by public disclosure, include a transparent decision making process and standard of proof, and should provide for:
    - i. The release of any information related to adverse health effects of each chemical that is kept secret;
    - ii. The immediate release of proprietary information in the event of a medical necessity;
    - iii. The opportunity for appeal; and
    - iv. Regular review of proprietary designations.
  - f. Penalties for noncompliance with disclosure requirements should be sufficient to encourage compliance.

## **SITING:**

1. Areas that are unsuitable for oil and gas development and hydraulic fracturing should be defined, and minimum setbacks for wells, pits and other operations and facilities should be established, including for:
  - a. Surface water, including seasonal/intermittent/ephemeral waters, springs, stock ponds, flood zones;
  - b. Potential and actual drinking water supplies, including domestic, livestock, irrigation, and public wells and watersheds;

## **SITING (CONTINUED):**

- c. Occupied residences, including residential businesses and institutions, such as schools and health care facilities;
  - d. Steep slopes; and
  - e. Unstable soils.
2. Permitting agencies should have the authority to increase setbacks based on site-specific circumstances, including geologic conditions and hydrologic concerns.

## **WELL CONSTRUCTION:**

1. Proper well drilling techniques must be defined and required.
2. Casing and cementing should be designed and constructed to withstand the anticipated stresses to which they will be subjected, including those exerted by hydraulic fracturing.
3. Surface casing should consist of only new pipe, and should be set shallower than any pressurized hydrocarbon-bearing zone and at least 100 feet below the deepest protected water. Surface casing should be fully cemented to the surface.
4. All surface, intermediate, and production casing strings should be pressure tested. Drilling should not be resumed until a satisfactory pressure test is obtained. Casing should be pressure tested to a minimum of 0.22 psi/foot of casing string length or 1500 psi, whichever is greater, but not to exceed 70% of the minimum internal yield. If the pressure declines more than 10% in a 30- minute test or if there are other indications of a leak, corrective action should be taken.
5. Cement compressive strength tests should be performed on all surface, intermediate, and production casing strings. Casing should be allowed to stand under pressure until the cement has reached a compressive strength of at least 500 psi. The cement mixture should have a 72-hour compressive strength of at least 1200 psi. Additionally, the API free water separation should average no more than six milliliters per 250 milliliters of cement, tested in accordance with API RP 10B-2.
6. Casing shoe tests should be performed immediately after drilling out of the surface or intermediate casing.
7. Advanced cement evaluation logs should be run after installing surface, intermediate, and production casing and cement to verify cement placement and integrity.
8. Inspector witnessing of well casing and cementing should be required.

## **TREATMENT, STIMULATION AND FRACTURING:**

1. Only non-toxic chemicals with Chemical Abstract Services numbers should be used.
2. Inspector witnessing of treatment or stimulation, including hydraulic fracturing, should be required.
3. In no case should the injection pressure exceed the fracture pressure of the confining zone.
4. Operations should be shut down immediately if it is suspected that the mechanical integrity or confining zone are compromised, or if there is any accident or unexpected activity that may jeopardize the safety and environmental protection of the site or surrounding area, and the regulatory agency and surface owner should be notified.

## **SURFACE MANAGEMENT OF CHEMICALS, FLUIDS AND WASTES:**

1. Closed loop systems should be required.
2. On-site disposal should be prohibited.
3. Road application of fluids should be prohibited.

## **PITS:**

We strongly oppose the use of pits. If pits are allowed, however, the following conditions should be required:

1. Construction requirements:
  - a. Bed preparation standards should require removal of all sharp rocks or any other material capable of puncturing a liner, and a minimum of 12 inches of compacted soil covering the bottom and sides of the pit.
  - b. Each pit should contain, at a minimum, primary and secondary liners, of a minimum thickness of 24 mils.
  - c. Liner seams should be minimized. All seams should be factory welded and oriented up and down.
  - d. Leak detection, drainage, collection and removal systems should be required between the primary and secondary liners. The regulatory agency should be notified of any leaks.
  - e. All pits should be required to maintain a minimum of 2 feet of freeboard at all times.
  - f. All pits should be fenced to prevent unauthorized access, and use netting or screening to prevent hazards to wildlife.
  - g. Inspector witnessing of bed preparation and liner competency should be required before use.
2. Maximum duration of use should be limited to no more than three years.
3. Closure requirements:
  - a. Prior authorization for pit closure should be required, with advance notification of the surface owner(s) and opportunity to comment.
  - b. Pit contents should be analyzed and samples preserved for later testing as necessary.
  - c. Pit contents and liners should not be disposed of on-site.
  - d. Soil and water sampling should be required to ensure compliance with soil and water standards, with mitigation required for any samples that exceed standards.
  - e. A closure report including the GPS location of the pit should be required and submitted to the regulatory agency and surface owner(s).

## **EMERGENCY AND REMEDIAL RESPONSE:**

1. The adequacy of local emergency responders should be evaluated and supplemented as necessary with training and equipment.
2. Local emergency responders; the state regulatory agency, environmental agency and Health Department; U.S. EPA; the National Response Center; surface owners and nearby landowners should be notified of any spills, leaks, dumping and contamination.
3. Operations should be shut down immediately when there is any accident or unexpected activity that may jeopardize the safety and environmental protection of the site or surrounding area, and the regulatory agency and surface owner should be notified.
4. Operations should remain shut down and corrective action performed until it is demonstrated that the site is safe and in compliance with all standards.
5. The operator should be required to conduct a post-spill review to identify specific steps to ensure a similar accident does not occur again.
6. Water replacement:
  - a. There should be a presumption that any contamination or diminution in quantity of water within one mile of an oil and gas well was caused by well operations, unless the operator has baseline monitoring data taken prior to operations that shows pre-existing presence of the contaminant in question, or water quantity levels.
  - b. Permanent replacement of such water should be required, at the operator's expense.
7. Fines should be appropriate to deter violations.
8. Financial assurance should be reviewed to ensure adequacy to remediate and reclaim the site, including water resources.