

§ 146.32 Construction requirements.

(a) All new Class III wells shall be cased and cemented to prevent the migration of fluids into or between underground sources of drinking water. The Director may waive the cementing requirement for new wells in existing projects or portions of existing projects where he has substantial evidence that no contamination of underground sources of drinking water would result. The casing and cement used in the construction of each newly drilled well shall be designed for the life expectancy of the well. In determining and specifying casing and cementing requirements, the following factors shall be considered:

- (1) Depth to the injection zone;
- (2) Injection pressure, external pressure, internal pressure, axial loading, etc.;
- (3) Hole size;
- (4) Size and grade of all casing strings (wall thickness, diameter, nominal weight, length, joint specification, and construction material);
- (5) Corrosiveness of injected fluids and formation fluids;
- (6) Lithology of injection and confining zones; and
- (7) Type and grade of cement.

(b) Appropriate logs and other tests shall be conducted during the drilling and construction of new Class III wells. A descriptive report interpreting the results of such logs and tests shall be prepared by a knowledgeable log analyst and submitted to the Director. The logs and tests appropriate to each type of Class III well shall be determined based on the intended function, depth, construction and other characteristics of the well, availability of similar data in the area of the drilling site and the need for additional information that may arise from time to time as the construction of the well progresses. Deviation checks shall be conducted on all holes where pilot holes and reaming are used, unless the hole will be cased and cemented by circulating cement to the surface. Where deviation checks are necessary they shall be conducted at sufficiently frequent intervals to assure that vertical avenues for fluid migration in the form of diverging holes are not created during drillings.

(c) Where the injection zone is a formation which is naturally water-bearing the following information concerning the injection zone shall be determined or calculated for new Class III wells or projects:

- (1) Fluid pressure;
- (2) Fracture pressure; and
- (3) Physical and chemical characteristics of the formation fluids.

(d) Where the injection formation is not a water-bearing formation, the information in paragraph (c)(2) of this section must be submitted.

(e) Where injection is into a formation which contains water with less than 10,000 mg/l TDS monitoring wells shall be completed into the injection zone and into any underground sources of drinking water above the injection zone which could be affected by the mining operation. These wells shall be located in such a fashion as to detect any excursion of injection fluids, process by-products, or formation fluids outside the mining area or zone. If the operation may be affected by subsidence or catastrophic collapse the monitoring wells shall be located so that they will not be physically affected.

(f) Where injection is into a formation which does not contain water with less than 10,000 mg/l TDS, no monitoring wells are necessary in the injection stratum.

(g) Where the injection wells penetrate an USDW in an area subject to subsidence or catastrophic collapse an adequate number of monitoring wells shall be completed into the USDW to detect any movement of injected fluids, process by-products or formation fluids into the USDW. The monitoring wells shall be located outside the physical influence of the subsidence or catastrophic collapse.

(h) In determining the number, location, construction and frequency of monitoring of the monitoring wells the following criteria shall be considered:

- (1) The population relying on the USDW affected or potentially affected by the injection operation;
- (2) The proximity of the injection operation to points of withdrawal of drinking water;
- (3) The local geology and hydrology;

Environmental Protection Agency

§ 146.34

(4) The operating pressures and whether a negative pressure gradient is being maintained;

(5) The nature and volume of the injected fluid, the formation water, and the process by-products; and

(6) The injection well density.

[45 FR 42500, June 24, 1980, as amended at 46 FR 43163, Aug. 27, 1981; 47 FR 5000, Feb. 3, 1982]

§ 146.33 Operating, monitoring, and reporting requirements.

(a) *Operating requirements.* Operating requirements prescribed shall, at a minimum, specify that:

(1) Except during well stimulation injection pressure at the wellhead shall be calculated so as to assure that the pressure in the injection zone during injection does not initiate new fractures or propagate existing fractures in the injection zone. In no case, shall injection pressure initiate fractures in the confining zone or cause the migration of injection or formation fluids into an underground source of drinking water.

(2) Injection between the outermost casing protecting underground sources of drinking water and the well bore is prohibited.

(b) *Monitoring requirements.* Monitoring requirements shall, at a minimum, specify:

(1) Monitoring of the nature of injected fluids with sufficient frequency to yield representative data on its characteristics. Whenever the injection fluid is modified to the extent that the analysis required by § 146.34(a)(7)(iii) is incorrect or incomplete, a new analysis as required by § 146.34(a)(7)(iii) shall be provided to the Director.

(2) Monitoring of injection pressure and either flow rate or volume semi-monthly, or metering and daily recording of injected and produced fluid volumes as appropriate.

(3) Demonstration of mechanical integrity pursuant to § 146.08 at least once every five years during the life of the well for salt solution mining.

(4) Monitoring of the fluid level in the injection zone semi-monthly, where appropriate and monitoring of the parameters chosen to measure water quality in the monitoring wells required by § 146.32(e), semi-monthly.

(5) Quarterly monitoring of wells required by § 146.32(g).

(6) All Class III wells may be monitored on a field or project basis rather than an individual well basis by manifold monitoring. Manifold monitoring may be used in cases of facilities consisting of more than one injection well, operating with a common manifold. Separate monitoring systems for each well are not required provided the owner/operator demonstrates that manifold monitoring is comparable to individual well monitoring.

(c) *Reporting requirements.* Reporting requirements shall, at a minimum, include:

(1) Quarterly reporting to the Director on required monitoring;

(2) Results of mechanical integrity and any other periodic test required by the Director reported with the first regular quarterly report after the completion of the test; and

(3) Monitoring may be reported on a project or field basis rather than individual well basis where manifold monitoring is used.

[45 FR 42500, June 24, 1980, as amended at 46 FR 43163, Aug. 27, 1981; 46 FR 5001, Feb. 3, 1982; 48 FR 31404, July 8, 1983]

§ 146.34 Information to be considered by the Director.

This section sets forth the information which must be considered by the Director in authorizing Class III wells. Certain maps, cross sections, tabulations of wells within the area of review, and other data may be included in the application by reference provided they are current, readily available to the Director (for example, in the permitting agency's files) and sufficiently identified to be retrieved. In cases where EPA issues the permit, all the information in this section must be submitted to the Administrator.

(a) Prior to the issuance of a permit for an existing Class III well or area to operate or the construction of a new Class III well the Director shall consider the following:

(1) Information required in 40 CFR 144.31 and 144.31(g);

(2) A map showing the injection well or project area for which a permit is sought and the applicable area of review. Within the area of review, the