

ANALYSIS OF THE EXPECTED ECONOMIC IMPACTS OF  
THE PROPOSED UIC REGULATIONS

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Introduction

In May and June of 1980 EPA promulgated Underground Injection Control (UIC) regulations under the authority of Part C of the Safe Drinking Water Act. Several major corporations individually and collectively through their trade associations and the State of Texas petitioned the D.C. Circuit Court of Appeals for review of the regulations. In all the plaintiffs filed petitions covering 93 issues. The Agency has discussed these issues with the petitioners and has reviewed studies on which it relied to draft the regulations. It has also reassessed comments received during rule making and has reevaluated the cost and production impacts of the regulations in the light of these discussions. As a result of this reevaluation the Agency issued additional guidance to the states, promulgated technical amendments and is proposing amendments to the regulations. This document assesses the economic effects of the proposed amendments largely on the basis of information previously generated by the Agency.

Section I of the analysis first determines that these proposed changes do not constitute a major rule under Executive Order 12291. Section II discusses broad regulatory alternatives as well as detailing some of the many technical alternatives considered when EPA promulgated the regulations in 1980. Section III describes the expected results of the proposed regulation including the reduction in paperwork burden, the increased flexibility of State directors and the attendant reductions in

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the cost of the regulation. Section IV assesses the impacts of the proposed regulations upon production and small businesses; the proposed regulations are not expected to have a significant impact on a substantial number of small entities.

When the UIC regulations were originally promulgated EPA included a provision for the State Directors to provide data to EPA so that EPA could evaluate the operation of the regulations. As shown in Section V this requirement remains.

#### **I. Determination As a Non-Major Regulation**

The proposed regulations would modify certain monitoring and reporting requirements, provide greater flexibility to owners or operators and to State enforcement agencies, and remove certain wells from coverage under Class III of the regulation. The changes are expected to result in a savings of approximately \$70 million over five years. As such they do not constitute a major rule under Executive Order 12291. However, in the spirit of the Order EPA has prepared this analysis of the proposed changes which includes many of the kinds of information which would be called for were the proposed regulation a major rule.

#### **II. Alternative Regulatory Approaches**

##### **A. Broad Alternative Regulatory Approaches**

The intent of the Executive Order is for regulatory agencies to

consider carefully the market failure which their action would correct and to investigate non-regulatory alternatives which could correct the problem. In light of these questions EPA examined (1) what would happen without regulation (i.e., is a regulation necessary) and; (2) could a restitution approach better deal with the problem than a regulatory approach?

1. No regulations. Part C of the Safe Drinking Water Act requires the Administrator to promulgate Underground Injection Control Regulations and includes some specific requirements for them. As part of its approach EPA posed the fundamental question, can existing market forces be relied upon as an alternative to national regulations? The Agency concluded that such forces cannot consistently provide the appropriate controls because there are insufficient incentives for the well owners or operators to prevent endangerment of drinking water sources. Since the well owner or operator will not realize the benefits from expenditures for the protection of underground sources of drinking water, he cannot be expected to incur the costs of proper injection practices voluntarily. The purpose of Part C of the Act, and of the UIC program, is to establish a Federal-State system of controls which will ensure that underground injection practices do not endanger drinking water sources.

2. Restitution approach. This alternative entails the creation of a fund, either through insurance premiums or other sources such as general tax revenues, which would be used to rectify any damage to an aquifer.

It should be noted that it is very expensive to restore an aquifer to an uncontaminated state. Therefore restitution would probably involve compensation rather than restoration. Compensation may involve a liability scheme or a "no fault" basis. Under a compensation plan insurance premiums for owners or operators would reflect the degree of risk for well failure. Rates would be inversely related to the care exercised by an owner or operator so that more careful owners or operators would pay less than those using less stringent measures. In order to qualify for coverage an operator would probably have to meet specific minimum requirements. It is likely that these requirements would not be substantially less than those required by the regulations. In addition since the insurer would be risk-averse and expect a profit from his endeavors, the rates would include these costs of doing business. The cost for well owners or operators could therefore be larger under a restitution scheme than under regulations. Moreover, under an insurance approach, intractable problems could arise over determining the party responsible for the contamination. To illustrate, in areas where large amounts of water are withdrawn and salt water intrudes it may not be possible to ascertain if it was the withdrawal or the injection associated with secondary recovery of oil which caused the contamination. Finally, the restitution approach was rejected because it is inconsistent with the preventive nature of the Safe Drinking Water Act, which requires EPA to promulgate regulations which contain minimum requirements for effective State programs to protect underground sources of drinking water.

#### B. Alternative Regulatory Provisions.

In the June 1980 preamble to the promulgation of the UIC regulations,

the Agency discussed several alternative regulatory provisions.<sup>1/</sup> For example, wells disposing of nuclear wastes below underground sources of drinking water were included under Class I at one time, rather than Class V. For Class II wells EPA examined: requiring casings to be cemented to the surface, differentiating regulatory requirements for existing wells on the basis of age, alternative area of review requirements, assessments for or postponements of national requirements, alternative monitoring schemes, and coverage of natural gas storage facilities. For Class III the agency considered various requirements for mechanical integrity testing as well as aquifer restoration and containment of fluids for solution mining of uranium. EPA also evaluated alternatives for Class IV wells. The discussion of why the Agency selected or rejected these alternatives will not be reiterated here. As noted in the Preamble, the proposed regulations would change several technical requirements. However, except for these proposed changes, the Agency has not changed its views on the various alternatives considered.

#### IV. Expected Results of the Proposed Regulation, Technical Amendments and Program Guidance.

As part of its reevaluation of the regulations the Agency has issued technical amendments and program guidance which deals with EPA policy concerning interpretation of the regulations. The regulations being proposed today and the technical amendments and guidance will result in numerous

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<sup>1/</sup> 45 FR 42490

improvements over the May and June, 1980 regulations in the following categories:

- o Clarification of the original intent of the 1980 regulations;
- o Reduction in paperwork burden to industry and the States;
- o Increased flexibility to State Directors; and
- o Attendant reductions in costs to industry and the States.

This discussion of the main improvements will highlight examples of the major changes but is not intended to analyze the effect of every proposed change.

A. Clarification of original intent. Through the public hearing process and reliance upon materials officially submitted for the record EPA ascertained the concerns of affected parties related to the meaning of various parts of the regulations, and revised them accordingly. Despite diligent efforts to remove uncertainties, some remained. EPA has sought to eliminate any remaining uncertainties in two ways: first, it has revised the regulatory language on the basis of extensive discussions with litigants and a review of the record and second, it has prepared "Program Guidance" to be used by agencies in interpreting various sections of the regulations. To illustrate, the wording of §146.22(h) states that "All Class II wells shall be cased and cemented to prevent movement of fluids into or between underground sources of drinking water." In certain local situations, e.g., where the existence of competent bedrock or plastic shales have made it

possible to construct wells without a long string casing or cement recirculated to the surface, it may not be necessary that a well be cased and cemented in order to prevent significant movement of fluids between aquifers through the well bore. Newly prepared guidance to be provided to enforcement authorities states that existing casing and cemented practices which are not "typical" may be considered adequate under §146.22(e) if it can be demonstrated that they have not resulted in contamination of USDW's and will not do so in the future. Although this was EPA's original intention, the guidance explicitly states that a variety of practices are allowed as long as they do not contaminate USDW's. Since EPA's original assessment of the effects of the regulations was on the basis of our original intention, this analysis of the impacts includes no estimates of savings resulting from the guidance.

B. Reduction in paperwork burden. These reductions take two forms. First, where information is to be collected and/or submitted, EPA would simply require less of it. To illustrate, the 1980 regulations required, for Class II wells, monitoring of the injection pressure, flow rate and cumulative volume of injected fluid at frequencies of once per day, once per week, or once per month, depending upon the type of injection operation. The proposed regulations simply require observation of these parameters at the above frequencies, with actual recording of the data "...at reasonable intervals no greater than 30 days." Another example is the descriptive information to be submitted with an application for an area permit. In 1980, the regulations required that each injection well covered by an area permit be described and identified by location. In the currently proposed regulations



Table 1

Savings Over Five Years in Hourly Burden for  
Monitoring and Reporting  
Class II and Class III Wells  
(thousands of hours)

	1980	Current	
	<u>Regulations</u>	<u>Proposal</u>	<u>Savings</u>
<u>1. Savings to Operators.1/</u>			
Class II	241	48	193
Class III	24	4	20
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Total	265	52	213
 <u>2. Savings to States.1/</u>			
Class II	126	26	100
Class III	20	18	2
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Total	146	44	102

1/ There are no proposed changes in the monitoring and reporting requirements for owners or operators of Class I wells.

"...the Director may accept a single description of wells with substantially the same characteristics..." a clear reduction in paperwork burden for both the operator and the Director.

As indicated in Table 1 below, EPA estimates the reduction in the number of hours required by operators to monitor and report on Class II and Class III wells over a five year period to be on the order of 213 thousand hours, a reduction of 80% from its earlier estimate of the requirement associated with the 1980 regulations. Hourly savings to the States in processing monitoring reports also appear in Table 1 and are approximately 102 thousand hours over five years.

C. Increased flexibility to State Directors. In some cases a proposed change to the regulations may result in reduced cost of compliance as well as increased flexibility. Therefore the decision to classify a given change as an example of increased flexibility rather than an example of cost savings is judgemental. Increased flexibility is often synonymous with reduced costs to States and/or owners and operators, but these savings are not estimated in this section.

The 1980 regulations contained a host of provisions which gave the Director flexibility in making various determinations. Among others the Director had the latitude to determine: which method to use in ascertaining the zone of endangering influence (§ 146.06); the adequacy of corrective action (§ 146.07); the need for aquifer cleanup and monitoring to ensure that contaminants do not migrate into an underground source of drinking

water (§ 146.01(d)); and the geological data to be provided in authorizing a Class II well (§ 146.24(a)(5)).

The currently proposed regulations would enhance the Director's flexibility in numerous ways, such as:

- o §122.39(a) - in issuing area permits the Director may accept a single description of wells with substantially the same characteristics, rather than requiring a separate description of each one;
- o §146.10(a) - the Director may now allow Class III wells to be plugged with various materials, rather than only with cement, as currently required;
- o §146.22(b)(4-9) - many items of information the Director is required to consider in determining and specifying casing and cementing requirements would be optional;
- o §146.24(a)(10-14) - certain information which the Director is now required to consider before issuing a permit for an existing Class II well or the construction of a new Class II well would become optional;
- o §146.04(c) - the Director may determine that an aquifer which meets the criteria for an underground source of drinking water is an exempted aquifer if the total dissolved solids content of the ground water is more than 3,000 and less than 10,000 mg/l and is not reasonably expected to supply a public water system.

EPA anticipates that the added flexibility will reduce the regulatory burden to both owners or operators and the States by reducing the amount of information which must be submitted and reviewed, by allowing wider latitude in adopting construction techniques to site-specific characteristics and by removing from coverage aquifers which have high mineral content and are not reasonably expected to be used as a source of drinking water.

#### D. Reduced Costs to Owners or Operators and States

The savings to owners or operators and States are a major benefit flowing from the regulations being proposed today. These figures are based upon EPA's analysis of the cost of the promulgated regulations. Other assessments of the cost of those regulations could produce different estimates of the savings. EPA estimates the savings to owners or operators over the 1980 regulations to be approximately seventy million dollars in 1981 prices, the bulk of which results from the relaxation of mechanical integrity testing requirements for certain Class II wells. Other significant cost reductions occur in the areas of Class II and Class III monitoring, reporting and permit application, and from the transfer of certain types of wells from coverage under Class III to Class V. Except as noted in this section dollar figures are in 1977 terms. They are approximately 60% higher in 1981 dollar terms because of cost increases for the affected industries.

##### 1. Class II.

a. Mechanical integrity testing (-\$37 million). For existing wells without a packer the owner or operator may now evaluate, under proposed §146.08(b)(3),

the absence of significant leaks by means of monitoring records showing the absence of significant changes in the relationship between injection pressure and injection flow rate. Currently such an evaluation has to be made by monitoring of the annulus pressure or by a pressure test with liquid or gas. Based on the assumption that adequate records exist for all such wells, EPA estimates that the savings in testing of \$1500 per well, offset by reporting costs of \$25 per well, will result in a net savings of \$37 million over five years to owners and operators.

b. Monitoring and reporting (-\$3.2 million). Currently an owner or operator is required to monitor injection pressure, flow rate and cumulative volume daily, weekly or monthly depending upon the type of injection operation. Proposed section 146.23(b) would require the owner or operator merely to observe these parameters at the above frequencies, and to record one observation at reasonable intervals, but not more often than every thirty days. Such a change would bring the monitoring requirement closer to industry practices. EPA estimates an 80% reduction in the costs of monitoring and reporting, resulting in a savings of some three million dollars over a five year period.

c. Application costs for new enhanced recovery wells. (-\$2.6 million). costs to operators. Under proposed §122.39(a)(1), the Director may accept a single description of wells with substantially the same characteristics, rather than requiring a separate description of each and every one. In addition, the requirement under current §122.39(a)(3), that the injection wells be of similar construction, would be deleted. Under proposed §122.39(c), the area permit may authorize the permittee to plug and abandon

wells, as well as construct and operate them. EPA estimates that these changes will reduce permit application costs by 40%, resulting in a savings of approximately \$2.6 million over five years.

## 2. Class III Wells.

a. Proposed reclassification of geothermal and in-situ gasification wells from coverage under Class III to Class V. (-\$40 thousand). Total compliance costs to owners or operators for these wells were estimated to be \$40 thousand for the current regulations. Their reclassification to Class V results in a reduction of industry costs over the next five years. (Savings in permit processing costs to States are another result of this change. Such savings are discussed below).

b. Closing and reclassification of certain copper operations. (-\$260 thousand). In 1980 there were three operating copper leaching mines which were expected to incur \$360 thousand over five years in order to comply with the regulations. In its discussion with the litigants EPA has learned that two operations have been closed, and the third is an experimental endeavor. Hence it is no longer appropriate to include these costs as a part of total compliance costs.

c. Monitoring for remaining Class III wells. (-\$410 thousand). The current regulations require, under §146.33(b)(2), the installation and use of continuous recording devices to monitor the injection pressure, flow rate and volume. The proposed requirements is for 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. In addition the current requirement, that fluid level and the parameters chosen to measure water quality in the injection zone be monitored weekly, has also been relaxed. Under §146.33(b)(4) monitoring of the fluid level would be performed semi-monthly, as appropriate, and monitoring of water quality, semi-monthly rather than weekly. EPA estimates a savings of 20%, or \$410 thousand over five years, accruing from these changes.

Table 2 summarizes the cost savings to owners or operators. All of the savings are in transaction costs except those relating the removal of certain wells from coverage under Class III. Of the total savings of \$44 million over five years, transaction cost savings account for 98%, or \$43 million in 1977 price levels. When converted to 1981 price levels EPA estimates the savings to be on the order of seventy million dollars, of which transaction costs represent roughly \$69 million.

3. Reduction in State costs of permit processing. (-\$1.4 million).

The proposed regulations are expected to reduce the number of Class II permit applications as well as the amount of information provided in them. EPA estimates that this reduction in workload to the States will result in savings of approximately \$1.4 million over five years. The removal of geothermal, in-situ gasification and copper leaching wells from Class III also will reduce the permit processing workload. It is estimated that such savings will total \$38 thousand over five years. The total savings to States is \$1.4 million in 1977 price levels, or roughly \$2.3 million in 1981 prices.

TABLE 2

SAVINGS OVER FIVE YEARS IN COSTS TO INDUSTRY  
 1977 dollars (in 1,000) except as noted

	<u>Original Estimate</u>	<u>Revised Cost</u>	<u>Savings</u>
CLASS II			
Mechanical Integrity Testing	37,620	627	36,993
Monitoring and Reporting	4,024	804	3,220
Application costs for New Enhanced Recovery Wells	6,420	3,852	2,568
CLASS III			
Geothermal	19	0	19
In Situ Gasification	21	0	21
Cooper Leaching	358	0	358
Monitoring			
Salt	100	20	80
Potash	345	69	276
Frasch Sulfur	15	3	12
Uranium	53	11	42
	<hr/> 48,975	<hr/> 5,386	<hr/> 43,589
Estimate in 1981 Dollars	78,400	8,600	69,800



## V. Impacts.

### A. Aggregate Production.

In connection with the 1980 version of the regulations EPA estimated no losses in oil production due solely to the inability of a well to absorb the cost of a mechanical integrity test or casing leak test.

Since the effect of the currently proposed regulations is to eliminate certain testing and other requirements, EPA anticipates that no further impacts on production will accompany this proposal.

Similarly, no further impacts on production from Class III wells are expected to occur. As stated in connection with the 1980 regulations, the potential impact on Class III owners and operators is not expected to be significant because (1) for most industries the production from the sites subject to the regulations accounts for only a small proportion of domestic supply; (2) for salt and Frasch sulfur production, compliance costs are relatively small, and (3) firms engaged in solution mining are diversified. The regulations proposed today would reduce the cost of compliance and regulatory burden even further.

### B. Small Businesses.

Under the Regulatory Flexibility Act EPA must prepare an initial regulatory flexibility analysis whenever it proposes a regulation, unless the head of the agency certifies that the rule, if promulgated, will not have a significant economic impact on a substantial number of

small entities. If the agency head so certifies, a succinct statement explaining the reasons is to be provided.

The proposed regulations have their major effect on Class II and III wells. Class III wells are generally owned by larger firms and the operations often represent a small portion of their overall business. Both large and small firms own Class II wells. The proposed changes to the regulations affect enhanced recovery and salt water disposal wells for oil and gas extraction (SIC 13).

The Department of Energy has divided the industry into large, intermediate and small firms on the basis of production. Large firms are defined as annually producing more than 1.5 million barrels of oil or over 15 billion cubic feet of gas approximately one hundred fifty firms fit this definition. Intermediate firms, of which there are about 350 annually, produce between 400,000 and 1.5 million barrels of oil or between 2 and 15 billion cubic feet of gas. Approximately 15,500 small firms produce annually less than 400,000 barrels of oil or less than 2 billion cubic feet of gas. Unfortunately, DOE does not have data on the distribution of wells ownership by size of firm. Therefore, it is difficult to analyze the impact of the regulations on small entities on the basis of ownership.

Regardless of the size of the firm, owners and operators of wells affected by this proposal usually employ the same general approach in reaching an investment decision. Viewing each well or project as a separate producing entity, the owner or operator considers production prices, costs, and makes a decision on the basis of the expected

return. If the value of the expected returns does not exceed the contemplated costs, the investment will not be made.

The currently proposed regulations will reduce compliance costs by almost \$70 million over five years to all owners and operators of Class II wells. These savings will result from reduced requirements for mechanical integrity testing; monitoring and reporting, and permit application costs for new enhanced recovery wells. The expected cost savings to small owners and operators over the regulations promulgated in 1980 will improve their economic position. In addition to the dollar savings, the reduction in requirements dealing with monitoring and reporting, and permit application, will also benefit small businesses which have a smaller revenue base over which to spread the costs. Because 97% of the oil firms fall into the smallest size category it is likely that a substantial portion of the dollar savings and the paperwork reduction benefit would redound to them.

EPA also investigated using a stripper well as an alternative definition of a small entity. Stripper wells produce less than 10 barrels per day of oil. They may be obtained by any size firm. This definition was used to allow the output from small wells to be sold at world prices while oil from more productive wells was under price controls. This special treatment of stripper wells was to ensure maximum production from them. Stripper wells account for approximately 70% of all producing wells and about 13% of production. Since the proposed regulations change the requirements for wells it is likely that the majority of benefits will accrue to owners and operators of stripper wells.

Since one effect of these proposed regulations is to reduce the administrative burden and cost of compliance for all owners and operators, the Administrator certifies that this proposed regulation will not have a significant economic impact on a substantial number of small entities. The proposed regulations provide for numerous changes which reduce the regulatory burden on owners and operators of all sizes.

#### VI. Provisions for Review of the UIC Regulations.

Sections 122.18(c)(4) and 146.35 require that certain information be provided by the Director so that EPA may evaluate the operation of the UIC regulations. EPA will review these reports and, in conjunction with other information it develops under its own evaluation plan, will ascertain the need for further changes to the UIC regulations. Among other matters, EPA will be interested in the total number of wells requiring repairs, the adequacy of the provisions to allow cementing records to serve as a basis for demonstrating the soundness of a well, and the various provisions relating to the area of review.

#### VII. Summary.

The proposed regulations would reduce the regulatory burden and cost of compliance to both industry and States, reduce paperwork requirements, and increase flexibility without reducing the level of protection afforded to underground sources of drinking water. Industry impacts, which were generally small under the 1980 regulations, are expected to be reduced under the currently proposed regulations as well. In addition changes

1. The following information was obtained from the Agency

2. The following information was obtained from the Agency

in the language and the preparation of guidance have eliminated uncertainty on the part of industry in the interpretation of numerous provisions. This should facilitate smooth implementation by the States and EPA.