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Groundwater NRD Claims — The New Frontier of Natural Resource Damage Assessments

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Introduction and Background

A new class of natural resource damage (NRD) claims is emerging that should be a concern to many in the regulated community. Traditional resource damage claims were pursued under authority of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), the Oil Pollution Act of 1990 (OPA), and various state statutes. Such claims primarily sought compensation for human and ecological service losses resulting from injury to surface water, sediments, fish, and wildlife resources. Claims have been most common at sites that had environmental impacts over large areas, such as industrial complexes, mining operations, or major oil spills. Injury due to groundwater contamination, while sometimes a component of such assessments, typically has received less scrutiny than other resources. This is no longer true.

Potential damages to groundwater are the new frontier of NRD claims and a number of states are now active in taking the lead in seeking damages. This emerging trend stems from a state-led application of NRD claims to contaminated groundwater plumes, even in cases where other resources are not affected. The liability to potentially responsible parties (PRPs) may be substantial. In one case in New Mexico, the initial claims by the plaintiffs for injury to groundwater at a Superfund site near Albuquerque ranged into the billions of dollars. Recent court rulings have reduced the value of the claims and limited their scope. The monetary value of this claim may be exceptional, but the potential effects on the regulated community should not be underestimated. In New Jersey, some estimates place the number of sites with groundwater contamination potentially subject to NRD claims in the thousands, with total damage claims possibly exceeding \$750 million. This issue of *Environmental Perspectives* examines the new frontier of groundwater NRD claims.

NRD Claims for Contaminated Groundwater

The basic concept behind groundwater NRD claims is that the resource (groundwater) has been injured by a release of a hazardous substances and that the PRP needs to compensate the trustee (usually the state) for those damages. Even though the PRP probably assessed the plume and may be actively remediating the plume (both at great expense), this does not alleviate the need to compensate the trustee for the damage to, or loss of, the groundwater while the contamination existed.

The State of New Jersey has been pushing the boundary on this new frontier, and other states are watching closely. An increasing concern about this important natural resource, coupled with a tight budget, and the ability to collect substantial damages for existing groundwater contamination may pique the interest of additional states. Exponent is involved in or is aware of claims not only in New Jersey, but also in Colorado, Minnesota, Missouri, Montana, New Jersey, New Mexico, New York, Ohio, Oklahoma, Rhode Island, South Carolina, and the Virgin Islands. There are some pending legal challenges to the way some states are implementing their groundwater NRD programs, but damage claims are being made by trustees for the states, and payments and settlements have been made, ranging from thousands to millions of dollars. Recently, a major industrial company in New Jersey set aside more than 1,800 acres of land, and paid \$1.8 million for tree plantings and \$500,000 in cash, to compensate the trustee for groundwater NRD claims at eight separate sites.

A common factor in many state NRD claims for groundwater resources is that trustees often

ignore the fundamental concepts of baseline and loss of services. Claims are frequently made based on any level of contamination to shallow aquifers, even though there may be no evidence of any loss of services to the public. Moreover, many groundwater plumes exist in aquifers that are naturally unsuitable as a source of potable water, and there is no past or future diminution of services because of these kinds of baseline considerations.

New Jersey Approach

Quantification of injury to resources other than groundwater often involves complex technical analyses and interpretation and application of scientific data. In contrast, current practice indicates that simple mathematical techniques may predominate in evaluation of groundwater injury, based on the model that New Jersey has developed and that other states have shown interest in adapting. New Jersey's groundwater compensation formula is simple:

- A site-specific variable—the area of the contaminated groundwater plume—is multiplied by the predetermined annual groundwater recharge

rate, to calculate the volume of affected water per year.

- The volume of affected water per year is multiplied by the duration of the injury (e.g., the number of years from the start of remedial action until state groundwater quality standards are attained), to determine the total volume of affected water.
- The total volume of affected groundwater is multiplied by the rates charged for municipal potable water, to determine the total dollar value of the NRD claim.

A hypothetical application of this “New Jersey” recharge method is shown in Table 1.

By this simplistic method, the only plume-specific variable is the lateral extent (area) of the plume. Regional water recharge rates and local cost of water vary with locale, but in New Jersey, they have been pre-established through an existing government study (New Jersey Statewide Water Supply Plan, 1996). The relationship between plume sizes and the monetary values of possible claims is illustrated in Figure 1.

Table 1.
Sample groundwater injury calculation

Step 1

The areal extent of the plume is multiplied by the annual recharge rate to derive a volume of “lost” water for each year that the plume exists.

$$100,000 \text{ sq ft} \times 1.33 \text{ ft/yr} = 133,000 \text{ cu ft/yr}$$

Step 2

Volume of groundwater is converted by the constant (7.48 gal/cu ft) to derive total gallons injured in one year.

$$133,000 \text{ cu ft/yr} \times 7.48 \text{ gall/cu ft} = 994,840 \text{ gal/yr}$$

Step 3

The total gallons is multiplied by the duration of the injury and the local water rate to determine the damage, which is used for determining the scope of a restoration project.

$$994,840 \text{ gal/yr} \times 30 \text{ yr} \times (\$2.00/1,000 \text{ gal}) = \$59,690$$

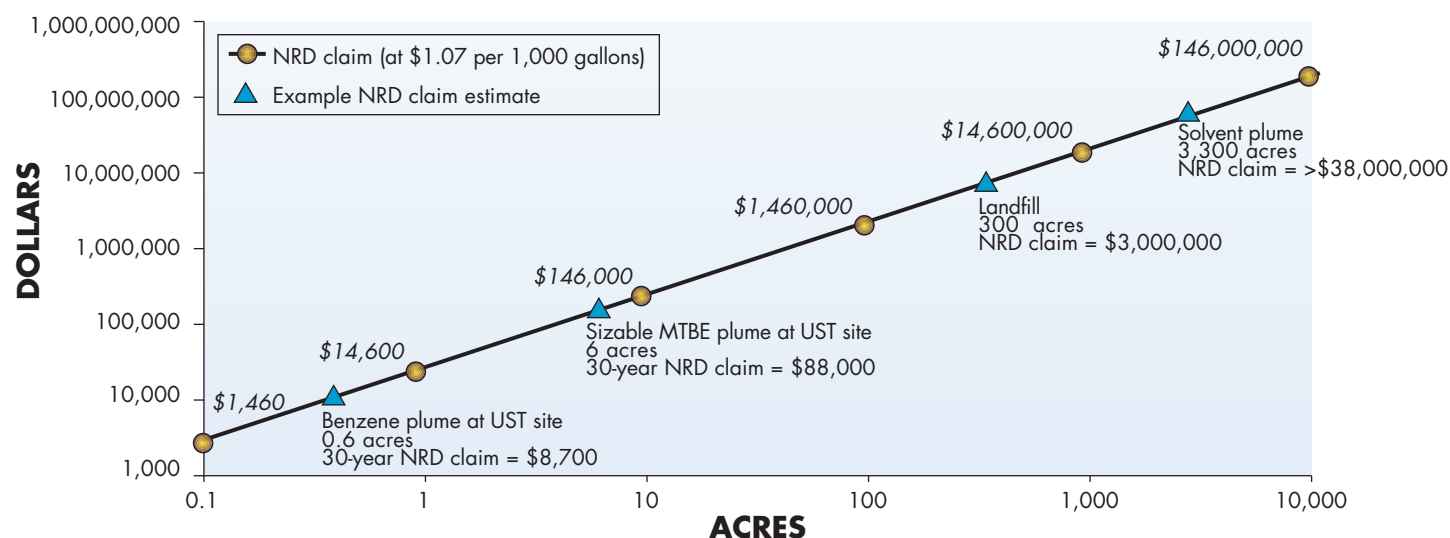


Figure 1.
Possible NRD groundwater claim vs. plume size

Technical Issues

Numerous technical and logical problems are associated with such an overly simplified approach, including:

- Not all groundwater is potable
- Applying municipal rates of delivered drinking water to *in situ* groundwater (i.e., finished product rate applied to raw material source) is not economically justified
- Current supply and demand conditions for potable water are not reliable indicators of future value
- Loss of one service (e.g., drinking water) does not mean full loss of services (e.g., irrigation or cooling water)
- Plume area and thickness vary with time and space
- Definition of plume varies (1 ppb or 10 ppb? MCL?)
- Groundwater plumes mingle, dive, and naturally attenuate
- Groundwater plumes move in complex ways due to interaction with surface-water bodies, production wells, injection wells, and man-made recharge (irrigation, etc.).

In summary, making simple, static volume estimates for dynamic and variable groundwater plumes is clearly unrealistic and can lead to unrealistic damage claims.

Habitat and Groundwater Equivalency Analyses

While current emphasis for groundwater natural resource damage assessments (NRDAs) is placed on deriving monetary values for compensation, that

situation is changing. New Jersey and other states are promoting a resource-to-resource restoration approach that avoids quantifying damages strictly monetarily. For example, a major component of the previously mentioned settlement in New Jersey was the PRP's agreement to protect 1,875 acres of land with a high aquifer recharge rate, to partially offset injuries to 2,400 acres of groundwater.

A particularly useful tool for service-to-service scaling that has been applied to settle NRD claims for other resources is habitat equivalency analysis (HEA). Simply put, HEA equates the present value of lost services to the present value of future services provided by restoration actions. This is accomplished by applying simple techniques that discount injuries or restoration benefits over time, and scaling factors that standardize the services provided by injured and restored habitats. HEA is proving to be a useful tool for reaching efficient settlements by providing a framework for conducting settlement discussions, evaluating restoration options, and establishing boundaries for required restoration.

Groundwater provides many services that are potentially amenable to equivalency analysis, and options can exist for PRPs to provide in-kind services, such as preserving watershed habitat, as a means of meeting their liabilities. In such cases, groundwater equivalency analysis (GWEA) should be explored as a potentially useful alternative technique for scaling compensatory restoration requirements, in lieu of direct monetary valuations.

Technical Defenses for the New Frontier

Groundwater NRD claims are gaining momentum as states develop formulaic assessment approaches that can be applied rapidly at a wide range of sites. For the regulated community, the implication of this escalation in assessments and claims is that substantial NRD liabilities may be encountered at sites where classical NRD claims under CERCLA or OPA may be minimal or non-existent. Exponent offers several recommendations that companies should consider as they ready themselves for this new frontier.

- Pre-analyze your possible NRD claims using several different methods. Experience shows that the volume of affected groundwater at a site can vary when estimated by vertical recharge methods (discussed above as the "New Jersey" method), lateral flux methods, direct loss-of-service estimates, and other hydrogeological approaches. Make sure the method used and the conceptual model of the plume formation and duration are both selected carefully, and are site-specific, to ensure the most reasonable and accurate results.
- Consider recharge/restoration options. Companies should actively explore options to develop and scale groundwater restoration projects using GWEA, in a manner similar to that which has proven successful in scaling habitat mitigation in more traditional NRD cases. Based on Exponent's experience in NRD settlement negotiations, we believe that GWEA represents a powerful tool for developing a defense against groundwater NRD claims and achieving a technically accurate compensation package.

- Engage in cooperative discussions with natural resource trustees. Exponent has found that this approach has potential benefits—it engages trustees early in the assessment process, gives PRPs a role in designing data analysis plans, and allows early identification and evaluation of restoration opportunities. For PRPs that may face liability at multiple sites within a state, cooperative discussions may represent an efficient means of streamlining damage assessments and facilitating a rapid fulfillment of liability obligations.

In conclusion, the new frontier of natural resource damages indicates that groundwater contamination is becoming the primary driver of many new NRD claims. While initial claims may be sizeable, reasonable solutions can be found through sound science, creative problem solving, and skilled negotiations.

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