



**U.S. Department of Energy**

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**JUN 13 2000**

Mr. Mike Layton  
U.S. Nuclear Regulatory Commission  
Mail Stop T7J8  
Washington, DC 20555-0001

Subject: Compliance Strategy for Vanadium in Ground Water at New Rifle Site

Dear Mr. Layton:

Enclosed is a white paper that proposes an alternate concentration limit as the compliance strategy for vanadium in ground water at the New Rifle site. Please review and provide comments to me.

If you have any questions, you may contact me at (970) 248-7612.

Sincerely,

  
Donald R. Metzler  
Technical/Project Manager

Enclosure

cc w/enclosure:  
K. Karp, MACTEC-ERS  
Project File GWRFL 3.3 (P. Taylor)

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## **White Paper for New Rifle: Vanadium ACL Coupled With Monitored Natural Flushing**

### **Purpose**

The purpose of the white paper is to brief the Nuclear Regulatory Commission (NRC) and the State of Colorado on the Department of Energy-Grand Junction Office (DOE-GJO) proposed compliance strategy for the New Rifle UMTRA Ground Water site in Rifle, Colorado. The proposed compliance strategy combines alternate concentration limits (ACL) for vanadium, monitored natural flushing for the remaining constituents and institutional controls. Very brief background information regarding the site is presented below. However, for more detail, the reader is referred to the *Final Site Observational Work Plan for the New Rifle Site* (SOWP) that was completed in November of 1999. Currently, a *Ground Water Compliance Action Plan* (GCAP) is being prepared for the New Rifle site, detailing the compliance strategy for the site. Response to this white paper will be used in completing the GCAP for the site.

### **Background**

The main focus of this paper is on a compliance strategy for vanadium contamination; ground water modeling has demonstrated that all other contaminants at the site will flush in 100 years and that a monitored natural flushing compliance strategy is appropriate (see the Final SOWP for the New Rifle site). An ACL is required for vanadium because it is above background and because there is no ground water standard for vanadium. The Environmental Protection Agency (EPA) has placed vanadium on its priority contaminant list and is scheduled to decide whether or not to regulate vanadium by August 2001. If the EPA determines that vanadium should be regulated, a ground water standard will subsequently be established.

The risk-based value for vanadium pentoxide (the form of vanadium found at New Rifle) that results in a hazard quotient (HQ) of 1 for a residential exposure scenario is 0.33 mg/L (EPA Region 3 Risk-Based Concentration Table published April 2000). This number is based on a reference dose for vanadium from the scientific literature that employs a 100-fold uncertainty factor. Confidence in the reference dose is low, and limited risk data are available for vanadium.

Characterization of ground water at the New Rifle site has taken place over the last several years, and data are summarized in the New Rifle Final SOWP (November 1999). Ground water concentrations of vanadium at the New Rifle site currently range from non-detection to 32 mg/L. The vanadium contaminant plume is primarily limited to beneath the former millsite. Contaminant transport modeling included in the Final SOWP shows that it will take approximately 300 years for vanadium to flush to the risk-based level, assuming no continuing source is present. However, there is considerable uncertainty associated with transport mechanisms of vanadium, and field observations of vanadium fluctuation (see Figure 5-38, SOWP) are inconsistent with model predictions based on the distribution coefficient ( $K_d$ ) approach for vanadium sorption. Soils from the site have been tested to evaluate the possible presence of a continuing source. Results indicate that high levels of vanadium in soil are quite limited in a real and vertical extent.

## **DOE's Proposed Vanadium Compliance Strategy**

An ACL for vanadium would be established for a point of compliance (POC) in the center of the current vanadium plume and for a point of exposure (POE) at the Colorado River. The POE at the river would be the risk-based concentration of 0.33 mg/L. Because of the large amount of dilution that has been demonstrated when ground water discharges to the river, the risk-based concentration will never be exceeded in the river, even under worst-case conditions. Therefore, concentrations at the POC would be established at approximately 32 mg/L, the maximum current concentrations at the site. Institutional controls would need to be in place to prevent future use of contaminated water through the installation of new wells in the area. These controls would be required for greater than the 100 years permitted under a natural flushing compliance strategy. The regulations do not specify a timeframe for institutional controls when combined with an ACL. This option assumes institutional controls associated with natural flushing could be needed for as long as 300 years or more. Monitoring of the effectiveness of the institutional controls would be required along with periodic ground water monitoring (to be detailed in a separate monitoring plan).

The DOE believes that institutional controls can exist in perpetuity at the New Rifle site because of the millsite deed, which restricts ground water use. Additionally, there is already a water line to the millsite that provides drinking water.

This approach meets the intent of UMTRA ground water standards by ensuring risks to human health and the environment are at acceptable levels.