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AGENDA

Public Hearing on the Explanation of Significant Differences for Operable Unit 5

August 23, 2001
7:00 p.m.
Alpha Building - Classroom D

Opening Remarks	**Gary Stegner, DOE Public Affairs**
Overview:	
Brief overview of proposed update to Operable Unit 5 ROD for final uranium standard in drinking water	**Rob Janke, DOE Soils & Water**
U.S. EPA Representative	**Jim Saric, Remedial Project Manager for Fernald**
Q & A Session	**Gary Stegner**
10-minute break	
Formal Comment Period (Please step to the mike to make your comment)	**Gary Stegner**

Note: The public comment period on the OU5 ESD ends on August 31, 2001

Graphic 7168. A 8/01

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UPDATING OPERABLE UNIT 5 RECORD OF DECISION:

Final Maximum Contaminant Level Standard Established by the United States Environmental Protection Agency for Uranium in Drinking Water

Graphic 7168. 1 8/01

PURPOSE / HISTORY

FERNALD

- Solicit review and public participation into the FEMP's proposed decision to update the Operable Unit 5 Record of Decision to incorporate the final MCL standard for uranium established by U.S. EPA under the Safe Drinking Water Act

- December 7, 2000 U.S. EPA promulgated the final standard for uranium in drinking water in its publication in the Federal Register of the updated list of the National Primary Drinking Water Regulations

- The proposed change would:
  - Revise the groundwater uranium cleanup level from 20 micrograms per liter (or parts per billion (ppb)) to 30 micrograms per liter or 30 ppb
  - Revise the monthly average (based on daily composite average) uranium concentration discharge limit to the Great Miami River from 20 ppb to 30 ppb

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PURPOSE / HISTORY (Continued)

FERNALD

- During the Operable Unit 5 Feasibility Study development, MCLs, when available, were recognized as the "measure of protectiveness" for the restoration and protection of the Great Miami Aquifer

- DOE and EPA adopted the proposed MCL for uranium with the recognition that it was not a final standard and, therefore, was not an ARAR but rather a To-Be-Considered (TBC) criterion that could be updated later, if and when the final standard for uranium was promulgated

PURPOSE / HISTORY (Continued)

FERNALD

- **During the review of the Operable Unit 5 ROD, regulators and stakeholders questioned what would happen if and when the proposed uranium standard was finalized. DOE responded:**

Consistent with Section 300.430(e)(2)(i)(C) of the National Contingency Plan, the DOE has adopted the maximum contaminant levels under the Safe Drinking Water Act as relevant and appropriate requirements to the restoration of the Great Miami Aquifer. Lacking a final promulgated MCL for uranium, DOE adopted, as part of the selected remedy, the MCL proposed by EPA in July 1991 under the Safe Drinking Water Act of 20 ppb as the final remediation level for restoration of the aquifer. This proposed standard was adopted as a TBC requirement to the selected remedy.

The estimated costs for the restoration of the Great Miami Aquifer are, as would be expected, very sensitive to the established final groundwater cleanup limits. While DOE is committed to fully restoring the aquifer to health-protective levels, DOE must do so in full recognition of its role as a steward of public funds. Within its stewardship role, the DOE must ensure that public funds are committed only to remedial activities which yield a commensurate environmental or human health-related benefit. As such, the DOE must evaluate the technical and economic implications of pursuing adoption of the final MCL for uranium once promulgated by EPA. Such a technical and economic evaluation will be warranted regardless of whether the final MCL for uranium represents higher or lower concentration-based limitation than the proposed 20 ppb standard. In the event DOE considers it appropriate to pursue a change to the final remediation level for uranium in groundwater identified in this decision document, DOE will initiate such a change in a manner consistent with CERCLA, the National Contingency Plan and the terms of the Amended Consent Agreement. As done throughout the RI/FS decision-making process, the DOE will involve the public in any attempt to modify the final remedial level for uranium in the Great Miami Aquifer from the 20 ppb value identified in Section 9 of this ROD.

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REGULATORY PROCESS FOR ADOPTING FINAL URANIUM STANDARD:

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- DOE-FEMP, U.S. EPA and Ohio EPA agreed to consider a revision to the Operable Unit 5 ROD provided we included a full public participation process

- According to EPA guidance, changes to Records of Decision can be handled through three different avenues, depending on the significance of the change:
  - Fact Sheet: Insignificant or minor changes, such as a change in the number of groundwater extraction wells
  - Explanation of Significant Differences (ESD): Significant change such as a change in a cleanup level or standard
  - ROD Amendment: A change in the alternative or remedy

- Through our discussions, U.S. EPA, Ohio EPA, and DOE agreed the most appropriate vehicle of change to accommodate the final MCL standard for uranium was the ESD

REGULATORY PROCESS FOR ADOPTING FINAL URANIUM STANDARD (Continued):

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- The one critical difference between an ESD and a ROD amendment is the requirement that a ROD amendment must include the development of a *Responsiveness Summary* after the public comment period

- The FEMP will develop a *Responsiveness Summary* after the conclusion of the public comment period

- U.S. EPA and Ohio EPA concurred with using the ESD process

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BENEFITS:

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- Less groundwater to cleanup:
  - The extent of the plume is reduced by approximately 74 acres or 30%
  - The volume of groundwater requiring remediation is reduced by 30%

- Less time required to cleanup the groundwater:
  - Increased standard results in less time required for the pump and treat infrastructure to operate
  - Increased discharge standard at Great Miami River allows for increased pumping thereby accelerating groundwater cleanup

COST SAVINGS:

FERNALD

- Cost savings are estimated to be 3 to 5 million dollars per year for each year that the groundwater pump and treat operation is reduced

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Discussion Overview

- Rads rule and Safe Drinking Water Act in perspective
- Use of MCLs in Superfund clean-up
- Uranium occurrence, isotopes, toxicology
- Overview Proposal thru final rule
- Benefits and costs

Radionuclides Rulemaking in Perspective

- Rads first regulated in drinking water in 1976 under the Safe Drinking Water Act (SDWA), but uranium and radon were not included
- The 1986 amendments required regulation of 83 contaminants included uranium and radon.
- A 1991 proposal included a MCL for uranium at 20 micrograms (mass) or 30 picoCuries (radiation) Comments were received on proposal.
- April 21, 2000 Notice of Data Availability discussing new data, requesting comments
- 2000 Final rule

Court Agreement

- Court agreement in 1996 to finalize rule in 4 years
  - Finalize review of existing rule for radium 226,228, alpha emitters (except Uranium and Radon), and man made beta and photon emitters
  - Finalize an MCL for uranium

Safe Drinking Water Act

- SDWA requires
  - A *health based target*, maximum contaminant level goal (MCLG), and
  - An *enforceable limit*, the maximum contaminant level (MCL) which is the set as close to the goal as feasible using best available technology, considering costs MCL is a risk management number: considers toxicology and implementability of rule in public water systems.
  - SDWA gives prerogative to Administrator to set a final MCL above the feasible level to "maximize... protection at a cost whichjustifies the benefits"
- Revisions to *Final* rules requires EPA to "maintain or provide for greater" health protection

DW Standard Used as Cleanup Level

- MCL selected by Drinking Water program follows only requirements of Safe Drinking Water Act and does *not* consider potential applications or costs outside of drinking water, such as clean-up
- Applies to community (subset of public) water systems *not* private wells. Set at level which is feasible considering costs for public water systems
- Superfund statute CERCLA as amended by SARA calls MCLGs "relevant and appropriate requirements". National Contingency Plan clarified to use non-zero MCLGs and MCLs.
- Proposed limit in 1991 was not final
- MCLG became final in 2000 with MCL for uranium.

Uranium

- *Natural* uranium is widespread in rock and groundwater. Its three isotopes have the following crustal abundance by **weight**
  - U-238 (99.27 %), U-235 (0.73%), U-234(0.0055%).
- By **activity**:
  - U-238 (48.9 %), U-235 (2.25%), U-234 (48.9%).
- U-238 is virtually all the mass of U and about half the radioactivity. U-234 with a shorter half life is most of the other half the activity from a tiny mass. The amount of each varies by locale and therefore the activity in relation to the mass. Activity to mass ratios vary from about 0.75 to over 1.5 in drinking water

Toxicology

- Uranium health effects has two Endpoints, Kidney Toxicity and Cancer, both important
- Final Rule in 2000 addresses both
  - Maximum Contaminant Level Goal (MCLG) is zero for all ionizing radiation; recognizes cancer potential
  - MCL is set at 30 micrograms for protection from Kidney toxicity due to heavy metal mass. Radioactivity should be limited to 30 pCi/L
- Uranium is less potent than than lead, mercury or cadmium.

Carcinogenicity

- Natural uranium has not been directly linked to cancer in animals or humans. More radioactive isotopes have induced tumors in animals in many organs
- Human epidemiology data are inadequate to assess the carcinogenicity of uranium because confounding variables from worker exposure are less well understood being partially due to external exposure, inhalation and ingestion as well as possible drinking water component or other elements such as radon.
- 20 pCi/l is 5x10-5 risk; 30 pCi/L is 7.5 x 10-5 risk.

1991 Proposed Uranium MCL

- Flaws in 1991 proposal
  - The proposed limit for uranium was 20 micrograms based on kidney toxicity, and thought to be equivalent to 30 picoCuries of radiation activity.
  - The activity translation was an error
    - Based on the National Inorganics and Radionuclides Survey (NIRS) data in mid '80s, the geometric mean of activity to mass ratio is 0.9 above 3.5 pCi and below 3.5 the ratio is 1.3 (In 1991 a ratio of 1.3 was used).
    - Used a default contribution from drinking water of 20%. In the final rule, 80% was used.
  - Based on 1949 (rabbit) study

1998 Panel of Experts

- In June of 1998 EPA invited scientists from the US and Canada to participate in an Uranium Issues Workshop
- Consensus among scientists from was that the lowest observable level which might cause cellular changes indicating kidney toxicity using newest studies, relative source contribution, and uncertainty was again 20 ug/L

Notice of Data Availability in 2000

- EPA published a notice of data availability in April, 2000
- Included results of occurrence study of radiums, lead and polonium
- Also had data from Federal Guidance Report-13 (FGR-13) on rads risks and the uranium panel report
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Final rule in 2000

- For non uranium radionuclides, it "maintained or provided for greater protection" by retaining the current MCLs and revamping monitoring requirements.
- For Uranium, after receipt of public comments on the 1991 proposed rulemaking, we updated the science behind the
  - health effects studies
  - uncertainty factors
  - drinking water contribution

Uranium MCL

- **Kidney Toxicity**
  - Not absolute numbers because is no dose response curve to predict difference in effect between 20 and 30ug/L. May be none in a lifetime since it is virtually a *no effect* level.
  - 30 ug/L offers a reasonable margin of safety for protection from lifetime kidney toxicity at justifiable level
- **Cancer**
  - Protection from cancer at less than 10-4 risk

Impact Analysis at 20 and 30 ug/L

- **Costs**
  - Considers exposure and treatment costs for mostly small systems. Number of community water systems impacted by a rule at 20ug/L is about 860. Standard at 30 ug/L decreases to about 500 systems.
  - Annual cost of compliance decreases from $90 million treating to 20 ug/L, to $50 million treating to 30 ug/L
  - Additional 0.2 associated cancer cases at 30 ug/L (total of 0.9 cases nationwide, 0.6 statistical deaths) costs about one million $ in lost benefits.

Impact Analysis (con't)

- **Public Health Benefits**
  - Reduced Uranium exposure for 620,000 people in 500 mostly small systems at 30 ug/L
  - Quantification is Based on Cancer, because risk of death at any concentration can be calculated from FGR-13 model. Disease or death from Kidney toxicity is highly unlikely at MCL
  - At 30, benefits are $3.5 million from avoidance of 0.6 statistical cancer deaths nationwide. At 20pCi/L, benefits increase by $1 M, avoiding 0.2 more cancer deaths. Additional unquantifiable benefits from avoidance of kidney toxicity and avoidance of non-fatal cancers.

The Uranium MCL

- Utilized new provision in SDWA
  - Based on discretionary authority, selected a MCL which "maximizes health protection at a cost which is justified by the benefits" SDWA 1412(b)(6)
- 30 ug/L concentration is MCL
  - Reflects concern over both kidney toxicity and cancer. Number is a reasonable no effect level.
  - Calculation uses conservative 2 liters consumption instead of average 1.1 liters
  - 30 ug/L will almost always have less than 30 pCi/L radioactivity. The risk of cancer death is 7.5 x 10 -5, one in 13,333 exposed for 70 years (2 liters at the ceiling of 30 pCi/L).

Additional Information

- On drinking water can be found at: www.epa.gov/safewater
- On Radionuclides in drinking water can be found at: www.epa.gov/safewater/rads/implement.htm
  - Fact Sheets
  - Copy of Dec 7, 2000 Final Radionuclides Rule
  - Quick Reference Guide
  - April 21, 2000 Notice of Data Availability
  - Technical Support Documents
  - Health Risk Reduction and Cost Analysis

FACT SHEET

UPDATING OPERABLE UNIT 5 RECORD OF DECISION GROUNDWATER CLEAN-UP STANDARD AND SURFACE WATER DISCHARGE STANDARD FOR URANIUM

BACKGROUND:

The final remediation levels for the Great Miami Aquifer adopted in the Operable Unit 5 Record of Decision (ROD) are designed to achieve Safe Drinking Water Act (SDWA) Maximum Contaminant Levels (MCLs) or, in the absence of MCLs, the 1 x 10^{-5} Incremental Lifetime Cancer Risk (ILCR) or 0.2 Hazard Quotient (HQ) values for individual constituents through the drinking water pathway (Operable Unit 5 ROD, page 9-33). At the time of ROD signature (January 1996), EPA had not yet promulgated a final MCL for uranium in drinking water. The 20 µg/L proposed uranium MCL (Federal Register Volume 58, Number 138, pages 33050 and following, July 18, 1991) was therefore utilized as the representative uranium MCL in the ROD pending the outcome of EPA's actions in setting the final MCL. The final MCL for uranium in drinking water was recently established at 30 µg/L.

PROPOSED CHANGE:

- Revise the groundwater uranium cleanup level to 30 µg/L consistent with the recently promulgated MCL for uranium under the SDWA.
- Revise the Monthly Average Uranium Concentration Discharge Limit to the Great Miami River to 30 µg/L for consistency.

BENEFITS:

- Less Groundwater to Cleanup
  - The extent of the plume is reduced by about 74 acres or a 30% reduction
  - An estimated 30% reduction in the volume of groundwater requiring remediation when the 30 µg/L uranium MCL is used.
- Less Time Required to Cleanup Groundwater
  - By increasing the aquifer cleanup level to 30 µg/L savings will be realized because it will take less time to reach 30 µg/L than it will to reach 20 µg/L. This means less operating time for the pump and treat infrastructure required to remediate the aquifer. Groundwater modeling indicates it will take approximately five years less time to cleanup the aquifer to 30 µg/L than it would to reach 20 µg/L.
  - Increasing the Great Miami River discharge limit to 30 µg/L will allow for substantially higher groundwater extraction rates in the hot spots, which will in turn cause quicker flushing thereby shortening the time to reach the cleanup goal.
- Less Infrastructure Required to Accomplish Groundwater Cleanup Objectives
  - May not need Waste Storage Area Phase II Module
  - May not need the Plant 6 Module.

JUSTIFICATION:

- National Primary Drinking Water Regulations at Federal Register: December 7, 2000 (Volume 65, Number 236)] [Rules and Regulations] [Pages 76707-76753]
  - "EPA, thus, believes that the difference in kidney toxicity risk for exposures at 20 (sic)g/L versus 30 (sic)g/L is insignificant."
  - "EPA believes that 30 (sic)g/L is protective of the general population, including children and the elderly."
  - "...[t]he Administrator has determined that an MCL of 30 (sic)g/L maximizes the health risk reduction benefits at a cost justified by the benefits."
- DOE Stewardship Role
  - OU5 ROD, January 1996, responsiveness summary: "Within its stewardship role, the DOE must ensure that public funds are committed only to remedial activities which yield a commensurate environmental or human health related benefit. As such, the DOE must evaluate the technical and economic implications of pursuing adoption of the final maximum contaminant level for uranium, once promulgated by EPA."
- OSWER Directive 9200.0-22, "Superfund Reforms: Updating Remedy Decisions, US EPA, September 1996" encourages US EPA to:
  - Align past remedy decisions with the current state of knowledge.
  - Revisit selected remedy decisions at sites where new scientific information, technological advancements, or other considerations will protect human health and the environment while enhancing overall remedy cost effectiveness.

COST SAVINGS: 16

Cost savings are estimated to be 3 to 5 million dollars per year for each year that the groundwater pump and treat operation is reduced.