COMMUNITY RELATIONS PLAN

F A C T S H E E T

Idaho National Engineering Laboratory

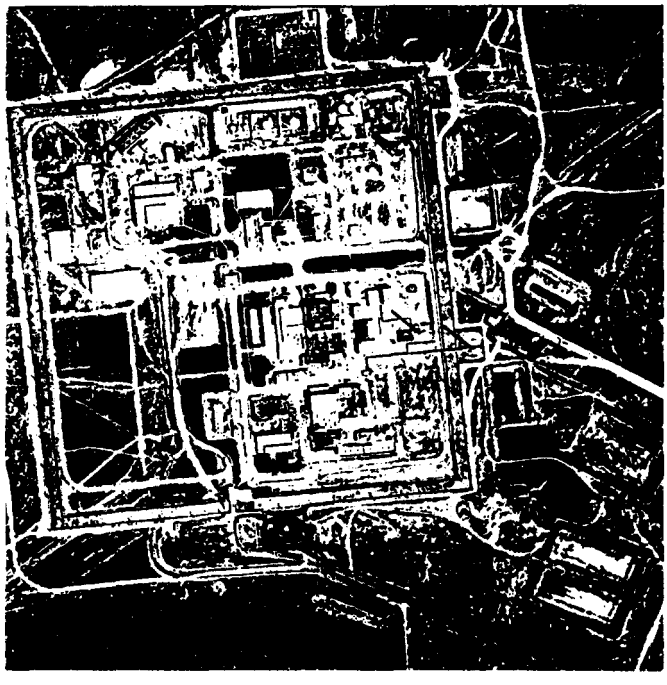
June 1992

Study on the Perched Water System at the Test Reactor Area Continues

Introduction

In April 1991, an environmental study, a Remedial Investigation/Feasibility Study, was initiated to evaluate the risk posed by contamination in and remediation alternatives for the Perched Water System (Operable Unit 2-12) under the Test Reactor Area at the Idaho National Engineering Laboratory (INEL). This fact sheet provides an update on the study and attempts to answer questions citizens may have about contamination in the Perched Water System.

The U.S. Department of Energy, Idaho Field Office (DOE-ID) is conducting this study in cooperation with the Environmental Protection Agency (EPA) Region 10 and the Idaho Department of Health and Welfare, Division of Environmental Quality.



Test Reactor Area 89-279-1-5

Perched Water System

Background

The perched water, a zone of groundwater that is "perched" on a relatively impermeable layer of clay above the Snake River Plain Aquifer, was formed over time due to the seepage from the wastewater disposal ponds at the Test Reactor Area. Wastewaters discharged to the Warm Waste Pond, Cold Waste Pond, Chemical Waste Pond, Sanitary Waste Pond, Retention Basin, and well (USGS-53) have percolated downward forming a shallow and deep perched water zone.

The purpose of the Remedial Investigation/Feasibility Study is to assess the effect of contamination from the perched water on the Snake River Plain Aquifer and the potential risk that is posed to current and future human health and the environment.

Contributors to the Perched Water System

Warm Waste Pond

In the past, the Warm Waste Pond was used for disposal of nuclear reactor cooling water, radioactive wastewater, and discharge from water treatment systems. The Warm Waste Pond is presently used only for disposal of reactor cooling water containing low levels of radioactivity. After the water enters the pond, it passes through the pond bottom sediments, potentially leaching the contaminants into the Perched Water System. Waste products discharged to the Warm Waste Pond have consisted of chromates and radionuclides, although the discharge of chromates ceased in 1964. The most abundant radionuclide discharged to the Warm Waste Pond is tritium. Sediments contaminated as a result of these discharges are being cleaned up this year as a separate operable unit, and the Warm Waste Pond will be replaced with a lined evaporation basin.

Retention Basin

The Retention Basin, first used in 1952, is a large underground concrete tank designed to temporarily hold radioactive wastewater en route to the Warm Waste Pond. It holds wastewater long enough to allow short-lived radionuclides to decay before flowing to the Warm Waste Pond. A leak was discovered in the concrete in 1970, which has also contributed to the Perched Water System.

The leak from the basin has not increased the overall volume of water discharge to the Perched Water System because this water would have normally flowed on to the Warm Waste Pond where it would have percolated downward to the Perched Water System. The Retention Basin, which along with the Warm Waste Pond currently contributes 6% of the water to the Perched Water System, will also be taken out of service this year.

Cold Waste Pond

The Cold Waste Pond, currently the largest contributor of water to the Perched Water System but not in contamination, was constructed in 1982 to receive nonradioactive wastewater. Such wastewaster consists primarily of nuclear reactor cooling water, which is nonradioactive, but also includes water from air conditioning units and other drains.

Chemical Waste Pond

The Chemical Waste Pond was first used in 1963 to dispose of wastewater from ion exchange columns and water softeners. Wastewater discharged to the pond is ion exchange regeneration fluid containing sulfuric acid, sodium hydroxide, and sodium chloride. Discharge is now monitored to ensure hazardous waste is not entering the pond.

Sanitary Waste Pond

The Sanitary Waste Pond is comprised of two lagoons, the first was put in operation in 1952 while the second was constructed in 1965. The lagoons receive treated effluent from the sewage treatment plant. Records indicate that no disposal of hazardous waste occurred in these ponds.

Well USGS-53

Well USGS-53 is 90 feet deep and was used for disposal of waste from 1960 to 1964. The types and volumes of waste discharged to the well is not documented but would likely be a portion of water discharged to the pond.

Shallow Perched Water Zone

The shallow perched water occurs directly beneath the waste ponds and Retention Basin. Wastewater discharged to the ponds infiltrates through the pond bottoms to the first clay layer approximately 50 feet below the land surface, which retards downward flow.

Contaminants identified in the shallow perched water that exceed Federal Drinking Water standards include chromium and tritium. However, the use of chromium in reactor operations ceased nearly 20 years ago.

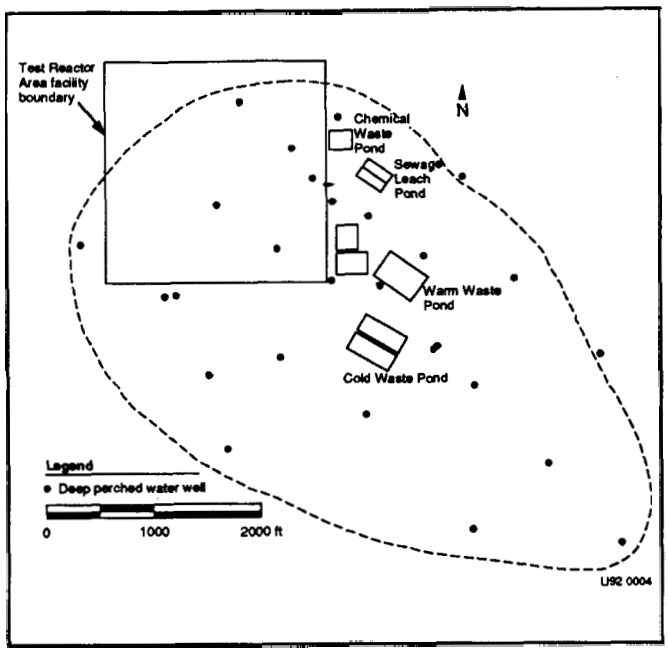
No radionuclides were detected above maximum contaminant levels in the shallow perched groundwater near the Cold Waste or Chemical Waste ponds. Radionuclides detected in groundwater near the Retention Basin were similar to the types of wastes being disposed through the basin to the Warm Waste Pond, primarily chromium and tritium.

The shallow perched water is not currently used, and will never be used for Test Reactor Area water supply. However, the shallow perched water is a potential source of contamination to the deep perched water zone, which in turn drains to the Snake River Plain Aquifer. Drinking water wells tap into the Snake River Plain Aquifer but are located upgradient from the Perched Water System.

Deep Perched Water Zone

The deep perched water zone forms on low-permeability sediments within the interbedded basalt-sediment sequence at about 140 to 200 feet below land surface. The water is perched about 300 feet above the regional Snake River Plain Aquifer. In March 1991, the areal extent of the deep perched water was about 6,000 feet x 3,000 feet, and the maximum saturated thickness was about 150 feet. The volume of deep perched water was estimated to be 3.96×10^6 meters (1.4×10^8 cubic feet). Like the shallow perched water, the deep perched water is not used for water supply.

Water samples were collected from 24 wells used to monitor the deep perched water. Radionuclides detected above Federal maximum contaminant levels included tritium and strontium-90. The Federal maximum contaminant levels for tritium and strontium-90 are 20 and 0.008 picocuries per milliliter,



Extent of deep perched water zone.

respectively. The concentrations of tritium in the deep perched water ranged from below detection levels to 930 picocuries per milliliter, and the strontium-90 concentrations ranged from below detection levels to 0.124 picocuries per milliliter. Based on analytical results, no organic compounds were detected above Federal maximum contaminant levels.

Only cadmium, chromium, and manganese were detected above Federal maximum contaminant levels in filtered water samples. Chromium was the most widespread metal exceeding a regulatory standard. In filtered water samples, chromium concentrations ranged from below detection levels to 114 micrograms per liter, approximately twice the Federal primary maximum contaminant level of 50 micrograms per liter. The highest concentrations of chromium were north of the Warm Waste Pond, in the north central portion of the deep perched water zone.

Snake River Plain Aquifer

The Snake River Plain Aquifer, an underground aquifer source, has not been adversely impacted by organic compounds in the vicinity of the Test Reactor Area. Levels of volatile organic compounds and phthalates detected in the Snake River Plain Aquifer are below drinking water standards.

Chromium was the only metal detected in groundwater samples from the aquifer at concentrations exceeding Federal Drinking Water Standards. Chromium levels have dropped since 1968 and are expected to continue

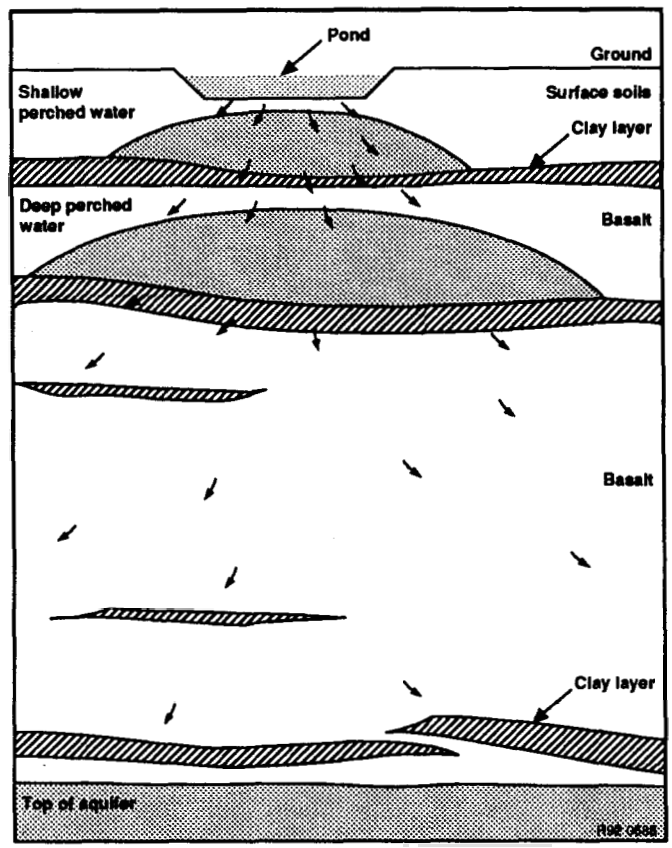


Illustration of shallow and deep perched water zones.

to fall since chromium has not been used as a corrosion inhibitor at the site since 1972, and therefore, has not been released to wastewater ponds.

Tritium was the only radionuclide detected above Federal Drinking Water Standards. Since 1970, tritium levels have decreased and will likely continue to decrease once the proposed lined evaporation pond for the warm waste disposal are operational (planned for 1992) and the tritium source is eliminated.

Contaminants of concern

As a result of wastewater discharge from the ponds at the Test Reactor Area, several contaminants are present in the Perched Water System. Thirteen contaminants identified as a concern are arsenic, beryllium, cadmium, chromium, cobalt, fluoride, lead, manganese, americium-241, cesium-137, cobalt-60, strontium-90, and tritium.

Remedial Investigation/ Feasibility Study

A Remedial Investigation is the Comprehensive Environmental Response, Compensation, and Liability Act (i.e., Superfund) process of determining the extent of hazardous substance contamination and assessing the risk posed to human health and the environment. According to EPA guidelines, if the risk assessment in the Remedial Investigation indicates that the hazardous substances at the operable unit pose a threat to human health and the environment, a Feasibility Study must be performed.

The Feasibility Study identifies treatment alternatives for remedial actions and evaluates their effectiveness for protecting human health and the environment. The effectiveness of a particular alternative is determined by how well it satisfies applicable or relevant and appropriate requirements related to the confirmed environmental contamination.

If there is no significant risk posed by the operable unit, then the Feasibility Study may not be performed and no further action is warranted. Even under the no action alternative, the operable unit is still monitored to ensure that the operable unit continues not to be a threat to human health and the environment.

What Has Been Done So Far?

DOE began the process to evaluate the Perched Water System by holding public meetings in August 1991. These meetings assisted DOE in identifying public concerns on the project.

As part of the Remedial Investigation, a computer model was used to aid in understanding how the contaminants move through the soil. The computer model predicted the movement of water and concentrations of contaminants from the Perched Water System to the Snake River Plain Aquifer. Data used in the investigation was collected from sampling in 1990. Data that was collected by DOE and the United States Geological Survey, which dates back to 1949, was also compiled and used in the investigation.

Risk Assessment

A risk assessment was conducted on the contaminants of concern to determine the potential adverse effects posed to human health and the environment. The main contaminants of concern are tritium and chromium because they exceed Federal Drinking Water Standards in the aquifer.

To be "at risk" means that:

A harmful substance is:

- In a concentration that is sufficient to cause harm
- Expected to be, or is actually, in contact with a person
- Is present in a chemical form that can cause harm (e.g., if ingestion is the concern, it is in a form than can be ingested).

The risk assessment expresses this risk as:

(a) increased chance of cancer if a contaminant present is suspected of having the capability to cause cancer,

or

(b) a hazard quotient that describes the overall health hazards such as damage to liver, kidneys, or the central nervous system from exposures to substances.

DOE, EPA, and the State of Idaho are currently evaluating results of the risk assessment to determine if the risks are sufficient to require evaluation of a range of cleanup alternatives.

Public Involvement Opportunity

Once the Remedial Investigation is finalized by the DOE, EPA, and the State of Idaho, the Proposed Plan will be distributed to the public. The Proposed Plan will describe the results of the Remedial Investigation and risk assessment. A 30-day public comment period will be opened to gather public comments on the Proposed Plan. Public meetings will be conducted to explain the Proposed Plan and the results of the Remedial Investigation. The public is encouraged to identify concerns and suggestions on the Perched Water System and any possible environmental impacts.

Any comments or questions regarding contaminants, potential risks, cleanup methods or other information is this fact sheet should be directed to Mr. Jerry Lyle at the address listed below. Comments and suggestions offered will be incorporated in the selection of the alternative as appropriate. Comments made to the DOE will be helpful to the decision-makers. Comments should be sent to:

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