

# Operable Unit 3: Off-Site Releases

## Reservoirs

### Introduction

The areas near the Rocky Flats Plant (RFP) known as "Operable Unit 3" (OU3 Off-Site Releases) include soils and reservoir sediments that may have been contaminated by releases from RFP, primarily plutonium and its daughter product, americium. The "individual hazardous substance sites" (IHSSs) within OU3 are defined as follows:

- o IHSS199 Contamination of the Land s Surface
- o IHSS 200 Great Western Reservoir
- o IHSS 201 Standley Reservoir
- o IHSS 202 Mower Reservoir

The U S Department of Energy (DOE) recently issued the Historical Information Summary and Preliminary Health Risk Assessment, which discusses IHSS 200-202, and the Final Past Remedy Report, which discusses IHSS 199. Both documents are available for public examination in the reading rooms listed on page 4. The reports describe actions RFP took in response to requirements set forth in the Interagency Agreement signed by DOE, the U S Environmental Protection Agency (EPA), and the Colorado Department of Health (CDH).

This fact sheet focuses on the three reservoirs (IHSS 200-202).

### Interagency Agreement (IAG) Requirements Pertaining to the Reservoirs

The IAG specified two main objectives for preparing the Historical Information Summary and Preliminary

Health Risk Assessment (referred to here as the "reservoir report")

- o Submit all known and accumulated data describing, detailing, or defining contamination within the reservoir(s) and tributaries of the reservoir(s), including surface and ground water sources
- o Submit a health risk assessment, based upon existing data, documenting the risks derived from all potential exposures associated with a no-action alternative for remediation of the contamination

### Reservoir Studies

More than 30 documents containing data that pertain to IHSS 200-202 are summarized, and their titles are listed in the bibliography or Appendix D of the reservoir report. The reservoir report also summarizes pertinent data concerning the reservoirs, as described below.

#### *Great Western Reservoir*

Great Western Reservoir supplies part of the municipal water for the the City of Broomfield. The city owns the reservoir and has fenced the area to prohibit public access.

Great Western Reservoir is fed mainly by Clear Creek, via Lower Church Ditch (see map on page 5). Prior to construction of a diversion ditch in 1989, water from Walnut Creek's north and south branches flowed from RFP into Great Western Reservoir. However, Walnut Creek flow from

the plant is now treated and diverted south around Great Western Reservoir into the drainage below the reservoir outlet. This diversion, called the Broomfield Diversion Ditch, prevents surface water from RFP from reaching Great Western Reservoir.

Several studies about Great Western Reservoir sediments have been completed. Among them are two EPA sampling studies conducted in 1970 and 1973. The studies revealed the presence of plutonium in Great Western Reservoir sediments above EPA's estimated baseline level (worldwide atmospheric fallout from nuclear weapons testing) of  $\leq 0.1$  picocurie per gram (pCi/g). EPA concluded in 1975 that the following RFP activities were the primary sources of this sediment contamination:

- o Normal operations during the 1950s and 1960s
- o Reconstruction of the holding ponds (shown as A-series and B-series on the map) between 1970 and 1973, which resuspended pond sediments and released some of this material to the reservoir
- o A tritium release in 1973
- o Airborne transfer of radionuclides, mainly plutonium

However, another study by EPA in 1973 that focused on water samples, rather than sediment samples, concluded that dissolved plutonium concentrations in the water samples were lower than the fallout-derived baseline level of  $< 0.03$  picocuries per liter (pCi/l).

As described previously, Walnut Creek has been diverted to prevent RFP potential contaminants from reaching Great Western Reservoir. To further ensure that water from Great Western Reservoir is acceptable as tap water, the City of Broomfield and CDH routinely monitor the water for radionuclides and other potential contaminants. RFP must conform to three sets of water standards:

- o The National Pollutant Discharge Elimination System (NPDES) standards for RFP, which limit nonradioactive discharges

- o State drinking water standards for radioactive contaminants in municipal water
- o Colorado Water Quality Control Commission stream standards for both radioactive and nonradioactive contaminants, which were adopted in 1990

### *Standley Reservoir*

Standley Reservoir provides water for the cities of Westminster, Thornton, and Northglenn, as well as supplying water for agricultural use in areas north-east of the lake. Although approximately 96 percent of Standley Reservoir water comes from Clear Creek via an irrigation ditch, some water does come from Woman Creek, which drains the southern side of RFP. Recently, RFP established a surface water control system to prevent runoff from the main production area (shown as "Controlled Area" on the map) from reaching Standley Reservoir. At present, only buffer zone surface runoff and natural ground water seepage flow into the Woman Creek drainage within RFP boundaries.

As with Great Western Reservoir, several entities have conducted studies of sediments and water in Standley Reservoir (and the same deficiencies in data useability apply). One study that CDH conducted in Standley Reservoir--but not in Great Western Reservoir--sought to determine whether fish caught in Standley Reservoir were safe for human consumption. Several species of fish were analyzed for selected metals, radionuclides, and certain organic pollutants. No radionuclides were detected in the fish. Low concentrations of some other contaminants were detected, however, the report stated that the source of these contaminants was not determined and none of the pollutants found were unique to RFP.

The cities of Northglenn, Thornton, and Westminster each monitor untreated water from Standley Reservoir at their respective water treatment plants for volatile organic compounds and radionuclides. In addition, CDH regularly samples and analyzes water from Standley Reservoir for radioactive and nonradioactive contaminants.

ADMIN RECORD

Sediment studies conducted in the last 10 years have shown that contaminated sediments in both Great Western Reservoir and Standley Reservoir have been buried by noncontaminated sediments and that water quality has not been measurably affected

#### *Mower Reservoir*

Mower Reservoir is privately owned and is used for agricultural purposes such as irrigation and water for livestock. The reservoir is fed by Woman Creek via Mower Ditch, an irrigation ditch that originates within the RFP boundary. Depending upon the amount of water withdrawn for agriculture, water from Mower Reservoir may enter Standley Reservoir. Because Mower Reservoir is not a public water supply, its water quality is not monitored.

EPA sampled sediments from Mower Reservoir in 1970 during its initial study of radioactive contamination in the aquatic areas near RFP. Four surface sediment samples were collected, whose plutonium concentrations ranged from 0.09 to 0.18 pCi/g (EPA's estimated baseline level is  $\leq 0.1$  pCi/g).

Although only one investigation of Mower Reservoir itself has been conducted, there have been many studies of plutonium in surface soils near Mower Reservoir. These studies concluded that the primary source of the plutonium was wind-carried particulates from the 903 Pad at RFP (see map). It is expected that Mower Reservoir received similar amounts of plutonium through airborne transport as did the nearby soils.

#### **Health Risk Assessment**

The IAG stipulates that RFP conduct a health risk assessment for OU3 based upon existing data. Because the data from studies previously completed do not meet current quality control standards for a quantitative risk assessment of human health, the reservoir report provides a qualitative risk assessment which defines human health risk in relative terms rather than providing calculated risk values. The reservoir report also includes a "generic" risk assessment calculation that shows how a quantitative risk assessment is conducted. This "generic" assessment

calculates risk values based upon hypothetical plutonium concentrations in sediment and water.

According to the reservoir report, inhalation of sediments that become resuspended in the air is considered the most significant pathway that could expose human beings to plutonium from the reservoirs. However, airborne plutonium concentrations, as measured by air monitors downwind of these reservoirs, have remained below the DOE standard.

Additional data needed to support a "nongeneric" quantitative risk assessment for the reservoirs will be collected as part of the RCRA Facility Investigation/Remedial Investigation (RFI/RI) activities scheduled for OU3.

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For more information on OU3 contact.

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### Information Repositories

Rocky Flats Public Reading Room  
Front Range Community College Library  
3645 West 112th Avenue  
Westminster CO 80030  
303-469-4435

Hours. M, T 12 00 pm 8 00 pm  
W 10:00 am 4:00 pm  
Th, F 9 00 am - 4:00 pm

Rocky Flats Environmental Monitoring Council  
1536 Cole Boulevard, Suite 325  
Denver West Office Building 4  
Golden, CO 80401  
303 232 1966

Hours M F 8 30 am 5 00 pm

EPA Superfund Records Center  
999 18th Street, Suite 500  
Denver CO 80202  
303 293 1807

Hours M F 7 30 am 4.30 pm

Colorado Department of Health  
Hazardous Materials and Waste  
Management Division  
4210 East 11th Avenue, Room 351  
Denver CO 80220

303 331 6733  
Hours M F 8:00 am 5 00 pm

U S Department of Energy HQ  
FOI and Privacy Branch  
AD234.1 1G-051/FORS  
1000 Independence Ave. S W  
Washington, DC 20585  
202-586 6025

Hours M F 9 00 am 4 00 pm  
(Eastern Time)

