

**RESPONSE TO COMMENTS ON THE 1989 ANNUAL GROUND WATER MONITORING
REPORT FOR REGULATED UNITS AT ROCKY FLATS PLANT**

Response to Comment 1

Data turnaround times have been steadily improving in the last year. Past problems with the Rocky Flats Environmental Database System (RFEDS) and laboratory turnaround time have been addressed. It is anticipated that a much higher percentage of sample data will be available for the 1991 report.

Response to Comment 2

See the Response to Comment 2 in the section which addresses comments on the 1990 RCRA Annual Ground Water Monitoring Report, for the interpretation of the uppermost aquifer.

Response to Comment 3

A preliminary analysis could have been made with available data, however, a statistically significant variation in concentration could not have been determined without at least eight quarters of data. Temporal changes in concentration of a particular analyte can be assessed for each well by the use of control charts. In keeping with customary statistical standards and practices, at least eight data points are required before a control chart can be effectively utilized.

~~Unit-specific background values could be used at each unit. However, as CDH has pointed out, at the Solar Ponds the upgradient background wells may have higher concentrations of analytes than those downgradient. This may be due to sources upgradient of the Solar Ponds. It is highly unlikely that the upgradient wells are actually downgradient of the unit. Plant-wide background tolerance values will continue to be used at each unit.~~

Response to Comment 4

Monthly water level measurements are made at 114 wells on the plantsite with some of these wells designated as RCRA wells. The regulations require that quarterly measurements of water level be made when quarterly sampling is performed (6 CCR 1007-3, section 265.92(e)). Monthly water level data are often too sparse across a regulated unit to allow a detailed and complete monthly potentiometric surface map to be constructed.

Response to Comment 5

The nature and extent of the sandstone underlying portions of the Solar Ponds unit have been further characterized. See the Response to Comment 7 in the section which addresses comments on the 1990 RCRA Annual Ground Water Monitoring Report.

Response to Comment 6

See the Response to Comment 2 in the section which addresses comments on the 1990 RCRA Annual Ground Water Monitoring Report, for the interpretation of the uppermost aquifer.

Response to Comment 7

From a regional perspective, ground water flows eastward in the Arapahoe Formation. This conceptual model of the regional flow system is supported by potentiometric data collected at Rocky Flats Plant, and is consistent with the work of others (Robson et al., 1981). On a local scale, there is a north-northeast component of flow, on the north side of the Solar Ponds.

Most tests were run in January and February of 1990. If significant recharge occurs to the aquifer from infiltration, as might be expected during months of higher precipitation, recovery data from drawdown/recovery tests and slug tests can be affected.

The data presented in the table are the results of each test, at each well. Each value presented should not be taken as the definitive hydraulic conductivity (K) for that portion of the unit. Variability in hydraulic conductivity occurs across the unit, however, no estimates of ranges in K have been compiled.

Response to Comment 8

Elevated levels of certain constituents in these wells may be the result of ground water mounding, preferential pathways, or contaminant sources upgradient of the Solar Ponds. These possibilities will be considered in future reports for the unit.

Response to Comment 9

There is some confusion over exactly which wells are in question. Section 2.4.1.3 discusses ground water quality east of the solar ponds. Section 2.4.1.6 discusses the ground water quality in the South Walnut Creek Drainage. In the following table, the disposition of analytical data from wells discussed in the first paragraph of section 2.4.1.3 is presented.

Disposition of Selected Well Data

provided - data provided in the 1989 report

data not yet received - data that were unavailable at the time of the report and were included in the Addendum to the 1989 RCRA Annual Ground Water Monitoring Report

dry - wells that were completely dry or lacked sufficient water for a full analytical sampling suite

Well #	Quarter	VOCs	Metals	Inorganics	RADs
460	1st '89	provided	provided	provided	provided (Tritium only)
	3rd '89	data not yet received	provided	data not yet received	data not yet received
2886	1st '89	dry	dry	dry	dry
	3rd '89	data not yet received	provided	data not yet received	provided (gross alpha and gross beta only)
2986	1st '89	dry	dry	dry	dry
	3rd '89	dry	dry	dry	dry
3787	1st '89	dry	dry	dry	dry
	3rd '89	not sampled	not sampled	not sampled	not sampled
P207889	1st '89	not yet installed	not yet installed	not yet installed	not yet installed
	3rd '89	not yet installed	not yet installed	not yet installed	not yet installed
P209789	1st '89	not yet installed	not yet installed	not yet installed	not yet installed
	3rd '89	not yet installed	not yet installed	not yet installed	not yet installed

Response to Comment 10

Contaminants from these three areas (903 Pad, Mound Area, and the East Trenches) may be affecting ground water and surface water quality in the South Walnut Creek Drainage. Continued monitoring at wells and surface water stations will permit better assessment of potential contaminant sources and migration pathways.

Response to Comment 11

This is a possibility, however, potentiometric data still support the assessment that ground water is generally moving in a northeasterly direction. More detailed studies of

preferential flow paths in sandstones of the Arapahoe Formation have been conducted and will aid in further assessment of potential contaminant migration pathways.

Response to Comment 12

Well 4886 is in an excellent position for detection of downgradient migration of potential contaminants from the West Spray Field and none have been found there. The statement in the report also reflects the fact that potential contaminants are unlikely to be migrating into bedrock because of the low hydraulic conductivity of the claystones in this area.

Response to Comment 13

See the Response to Comment 2 in the section which addresses comments on the 1990 RCRA Annual Ground Water Monitoring Report, for the interpretation of the uppermost aquifer.

Response to Comment 14

Well 881 is slated for abandonment because no as-built construction details are available and it is unclear which formation the well is screened in. In our assessment, wells 4886 and 4686 do both provide good downgradient indications of bedrock ground-water quality. Well 4986 is not mentioned in section 3.4.7 because it is screened in the Rocky Flats Alluvium, not in bedrock. It is positioned next to well 4886. Well 5286 will continue to provide background water quality information for the bedrock aquifer, as it is screened in the unweathered portion of the Laramie Formation.

Response to Comment 15

The concluding remarks state that, "... spray application of liquids ... have resulted in localized elevated levels of nitrate in the alluvial ground water." It is neither stated nor implied that investigations have led to the conclusion that this represents the only area of elevated nitrates. It simply states where elevated levels were found in 1988 and 1989. Monitoring of bedrock ground water is continuing at the West Spray Field and to date no evidence has been observed of elevated levels of nitrates attributable to spray irrigation.

Response to Comment 16

Between 1977 and 1981, portions of the leachate and groundwater diversion system were buried during landfill expansion. The eastward expansion covered the discharge points of the leachate collection system into Pond No. 1. The west embankment and Pond No. 1 were covered in May of 1981 during further eastward expansion of the landfill. In 1982, two slurry walls were constructed to prevent groundwater migration into the expanded landfill area. These slurry walls were tied into the north and south arms of the groundwater diversion system. The approximate extent of the landfill material is shown on the attached Landfill Structures map.

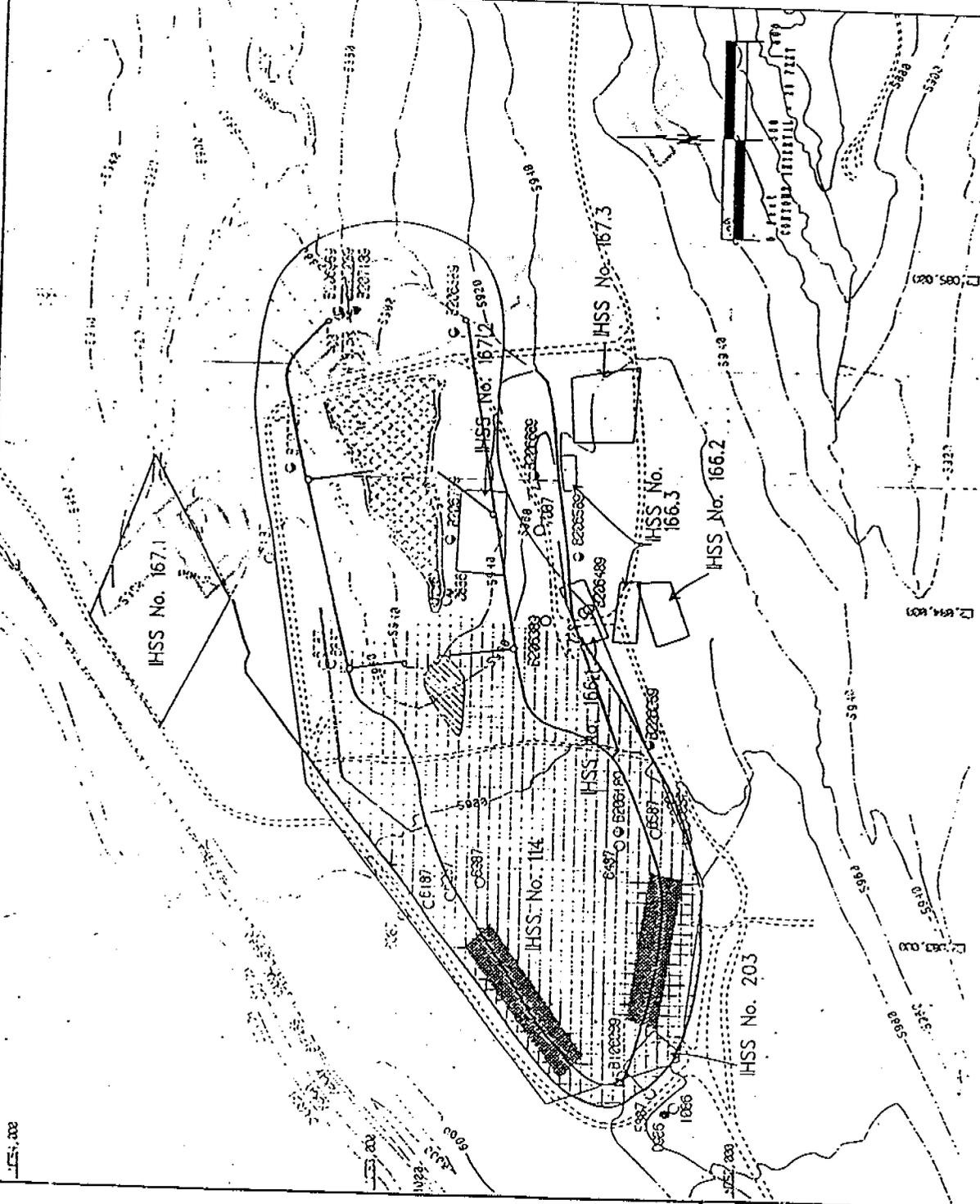
EXPLANATION

- ALLUVIAL WELL
- WEATHERED BEDROCK WELL
- UNWEATHERED BEDROCK WELL
- DECOMMISSIONED WELL
- DIRT ROADS
- STREAMS, DITCHES, DRAINAGE FEATURES
- GROUNDWATER INTERCEPT SYSTEM
- SLURRY WALLS
- SURFACE WATER DRAINAGE DITCH
- ▨ SURFACE WATER IMPOUNDMENTS
- ▨ APPROXIMATE EXTENT OF LANDFILL (1988)
- ▨ APPROXIMATE EXTENT OF LANDFILL MATERIAL, 1988
- ▨ AREAL OF POTENTIAL GROUNDWATER FLOW BENEATH GROUNDWATER INTERCEPT SYSTEM

PREPARED FOR:
U.S. DEPARTMENT OF ENERGY
 Rocky Flats Plant
 Golden, Colorado
FIGURE 4-8

LANDFILL STRUCTURES

FIG. NO.	30-953	DWG. NO.	304953-892
DRAWN BY	C. BRAND	CHECKED BY	C. BRAND
DATE	12/10/91	APPROVED BY	RIJA HYRIA
		SCALE	AS SHOWN



REFERENCE: DRAFT FINAL PHASE I DRI/RI
 WORK PLAN FOR THE PRESENT LANDFILL,
 DOE, AUGUST 1991.

Response to Comment 17

In 1973, tritium was detected in leachate draining from the landfill. A program was initiated to locate the source of the tritium, and the monitoring of waste prior to burial was initiated to prevent further disposal of radioactive material at the Present Landfill. A phased drilling program was instituted to identify the general location of the tritium source. Wells were installed directly in the landfill waste or directly below the saturated waste materials. When elevated concentrations were detected, additional wells were drilled until the general location of the source had been identified.

The depth of the tritium source, total activity, configuration, and container, if any, were never determined. The tritium source is located in an area of the landfill used in 1970. The extent of the tritium in leachate is shown on the attached map of Concentrations of Tritium in Present Landfill Leachate. Tritium is a beta emitter with a half life of 12.3 years. Because of its relatively short half life, it is fair to assume that over half the original quantity of tritium has decayed to a daughter product.

Response to Comment 18

Investigations concerning the presence and extent of fracturing in bedrock formations continue under the drilling and coring program. Continuous core is being taken from each new well drilled at RFP. The core is logged along with descriptions of the depth and orientation of any fracture zones. At this time, no definitive relationship has been established between fractures and bulk hydraulic conductivity in the unweathered claystones.

Response to Comment 19

Alluvial well 4087, which is just downgradient from the Present Landfill dam, is completed down to the contact with the bedrock. The alluvium here dries out occasionally, perhaps in response to depressed heads caused by the dam. Since this well is screened at the bottom of the alluvium, it is as deep as needed to monitor conditions in the alluvium.

Response to Comment 20

The alluvium dries out in this vicinity, however, the weathered sandstone usually does not. Well B207089 is screened in the weathered sandstone. Section 4.4.3.2 refers to making a comparison of chloride concentrations between well B207089 and a nearby alluvial well that was dry. As stated in the Response to Comment 19, alluvial wells in this area go all the way down to the contact with bedrock. If the alluvium dries out then the alluvial wells will also dry out.

