



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 8
999 18TH STREET - SUITE 300
DENVER, CO 80202-2466
Phone 800-227-8917
<http://www.epa.gov/region08>

April 12, 2004

Mr. Joe Legare
Assistant Administrator for Environment and Infrastructure
U.S. Department of Energy - RFFO
10808 Highway 93, Unit A
Golden, CO 80401-8200

RE: Original Landfill Interim Measure/Interim Remedial Action (February 2004) Section 4

Dear Mr. Legare:

Enclosed please find our review of the data presented in Section 4 of the IM/IRA. Please contact Vera Moritz at 303/312-6981 if you have questions or wish to discuss these comments further.

Sincerely,

A handwritten signature in black ink, appearing to read "Mark Aguilar".

Mark Aguilar
Rocky Flats Project Manager

cc. Steve Gunderson, CDPHE
Dave Shelton, K-H

Enclosure



Draft Interim Measure/Interim Remedial Action for the Original Landfill 2/2004
Section 4.0, Nature and Extent of Contamination

GENERAL COMMENTS

1. Section 4.0 presents a summary of the Nature and Extent (N&E) of contamination at the site. The data summary presents the existing contamination solely on a comparison of the available analytical data to RFETS Action Levels without first documenting that the existing data are representative of potential migration pathways, or that data are collected from intervals that can be directly compared to background intervals. The accurate portrayal of existing data is essential in defining the extent of the landfill and determining whether the presumptive remedy will be effective in reducing contamination to concentrations that are protective of the environment (since there is no liner and contaminated groundwater may still migrate beneath the cover and impact surface water at levels of ecological concern). Please revise the IM/IRA to provide an accurate portrayal of existing data as indicated in the following comments.
2. It is indicated that analytical data relevant to the OLF were extracted from the Soil Water Database (SWD). An EPA query and review of selected data sets in SWD indicates that there are many apparent discrepancies in the data reported in the IM/IRA versus those reported in the SWD. For example, a review associated with aroclor in surface soil indicated that there are multiple results reported for the same chemical (e.g., aroclor 1221), at the same sample location (e.g., SS507593), with the same sample number (e.g., SS50026AS), reported on the same date, and for the same depth interval (e.g., 0-2 feet). Thus, it appears that there would be a choice of which concentration should be assumed to occur for a given location. Additionally, in a number of instances the reported result is shown to be greater than the Method Detection Limit (MDL), but the result is nevertheless reported as a non-detect (i.e., 'U' qualifier). Further, all data in the SWD do not appear to have been reported in the IM/IRA. For example, Aroclor 1221 was detected above the MDL with a reported concentration 17,000 mg/kg (sample location SS507593/sample number SS50026AS), but not reported in the document. Please clarify why these and other data are not reported and explain fully how it can be assured that all detected data will be reported in the IM/IRA.
3. Contaminant migration from seeps and springs has not been addressed. The evaluation must address mass loading to surface water as identified in RFCA Action Level Framework (ALF), Section 3.2(B)(2 and 3) and Section 3.3. Revise the report to clearly document the locations of seeps and springs and associated analytical data, and identify surface water and sediment locations that are intended to address the migration pathways from seeps and springs to Women Creek.
4. A characterization of sediment downgradient of the OLF needs to be included in the document. Sediment and pore water are the most important indicators of

whether there is migration of groundwater or surface runoff from seeps and springs, and will support the evaluation of mass loading to Women Creek. In addition, sediment samples from low-lying areas directly downgradient of seeps and springs should be presented to document the contamination associated with the OLF. Please revise the document to include an evaluation of sediment data in the context of potential migration and loading of contamination to surface water.

5. Groundwater data must be presented in the context of the depth and aquifer interval in order to document the vertical extent of contamination in upper hydrogeologic units versus bedrock units. In addition, please clearly identify wells and associated analyses that are intended to document the groundwater to surface water migration pathway. Please present the screened interval for all monitoring wells and provide an evaluation of how the wells are adequate to represent each unit and the migration of groundwater within each unit.
6. The discussion of existing data is presented only in terms of human exposures and does not address ecological concerns. Please revise the document to indicate that the Comprehensive Ecological Risk Assessment is in-progress and therefore not available for the IM/IRA. Draft Ecological Action Levels are currently available and should be used to document and discuss contamination in terms of the ecological resources.
7. EPA's query of the dataset indicates that the majority of the contaminant data provided in the IM/IRA appears to have been sampled in 1991, 1992, and 1993. Please provide the dates associated with all data on which IM/IRA decisions are based.

SPECIFIC COMMENTS

1. **Page 21, Section 4.1.** A summary of the sampling program for the OLF is presented in a bulleted list with the number of samples for each media. However, the numbers presented cannot be verified. For example:

Surface soil - indicates that there are 70 locations, but the figures do not show 70 locations. Revise the report to include a specific list of sample numbers and show all labeled locations on a figure.

2. Boreholes - states that there are "24,964 validated analyses from 175 soil samples EPA's query of the database indicates many samples collected over large compositing intervals. For example, Location 56694 (Sample Number BH00122AS) is indicated as having been collected from a depth of 43 to 150 feet, Location 50592 (Sample Number BH50066AS), is listed as 0 to 32 feet and analyzed for VOCs, SVOCs, and PCBs. Please clarify if these were the compositing intervals and list the correct sampling interval for all subsurface samples.

If the sampled intervals are as large as they appear, it is not surprising that contaminants, particularly VOCs, were not detected since the large composites would dilute concentrations. Analytical results from these samples would be inconclusive. Please present qualifying information that would justify including these samples in evaluating existing conditions.

Groundwater - indicates there are 213 samples from 50 wells. Please revise the report to present a list of the specific monitoring well locations, and a monitoring well summary to document total depth and screened interval. Provide a figure that identifies all monitoring wells with location number. A frequency of detection table should be provided and include all analytes.

Surface water - indicates there are 15 locations. Please revise the report to include a table of all surface water locations, identify one-time RFI/RI surface water locations versus those used for monthly/annual monitoring, identify those that represent seep or spring locations, and indicate all sample locations on a figure.

Sediment – existing sediment data have not been included in the report. A summary of the sediment data should also be included in the list.

3. **Page 22, Section 4.2.** It is indicated that analytical data relevant to the OLF were extracted from the Soil Water Database (SWD), which include the groundwater and surface water data that have been collected since the RFI/RI. It is not clear which of the data represent one-time samples versus those with multiple sampling events, and the associated suite of analyses that were performed for each event. The objectives of sampling associated with the OLF, versus locations established for periodic monitoring of temporal changes and conditions provide different types of information. Revise the IM/IRA to clarify the RFI/RI data and the data associated with annual monitoring of surface water and groundwater to clarify the locations for each. The rationale for locations used to document contamination versus the locations and analyses that were subsequently identified for continued monitoring should be presented.
4. **Page 22, Section 4.2, Second Paragraph.** It is stated that data were validated and rejected data with 'unusual units' represents less than 5% of all the data for a given medium and analytical suite. There are many discrepancies between the data presented in this report versus data presented in historical reports. Please provide an accurate accounting of all data that have been eliminated. Please indicate other validation parameters that resulted in data being eliminated (e.g., sample locations without latitude/longitude) and provide a table that lists all rejected data. In addition, an evaluation of locations or data points that were removed should be included to determine if these locations need to be re-sampled. Examples of several discrepancies associated with the different media are presented in the following comments.

5. **Page 23, Section 4.3, Surface Soil.** It is indicated that only uranium and a few PAHs are above RFCA Action Levels. An EPA query of aroclor data in SWD shows sample SS507593 with Aroclor 1016 concentration 11,500 mg/kg and Aroclor 1221 concentration 17,000,000 ug/kg; sample SS507693 with Aroclor 1232 concentration 9,930 mg/kg; sample SS507793 with Aroclor 1242 concentration 8,120 mg/kg, Aroclor 1248 concentration 12,200 mg/kg, and Aroclor 1254 concentration 12,000,000 ug/kg; sample SS507893 indicates Aroclor 1254 concentration 12,000 mg/kg and Aroclor 1260 concentration of 14,400 mg/kg. All values should be reported since units appear to be appropriate, concentrations are above the corresponding MDL, and are all above the RFCA ALs (RFCA Attachment 5, Table 3). In addition, the surface soil data presented on Table 4-1 only includes Aroclor 1254. EPA requires that total PCBs be evaluated. Revise the text and tables to present and discuss all PCBs.

5a. The text and associated table (Table 4-1) are presented only in terms of human health and do not reflect an evaluation of ecological resources. The 1996 RFI/RI (Figure 4-3C) suggests that detections of PCBs in surface soil are outside and downgradient of the South Interceptor Ditch (SID), however, there is no documentation of sample locations in low-lying or depositional areas. All existing data associated with PCBs and other persistent, bioaccumulative, and toxic (PBTs) should be accurately presented and represented in terms of Ecological Action Levels.

5b. Figure 4-1 presents surface soil sampling locations and shows approximately 40 surface soil locations. However, Table 4-1 indicates there were 52 sample locations analyzed for PCBs. Please clarify the data presentation and present all locations for all media.

6. **Pages 23-29, Sections 4.3-4.6.** The description of Tier I Action Levels (100 times the MCL), Tier II Action Levels (MCL), and RFCA Surface Water Action Levels (Colorado Surface Water Standards) is not provided, and the document does not make it clear that for most media, the summary of exceedances to RFCA Action Levels is related to an evaluation of human health exposures ONLY. Revise the document to provide a brief description of RFCA Action Levels. In addition, the specific background data sets for each media should be provided to document that the comparisons that are being made are appropriate. For example, it is not clear whether the composite samples that were collected over large intervals (see subsurface soil comment) are comparable to the background soil intervals, whether background surface water and sediment are from seeps or streams, etc. Please revise the IM/IRA to provide a brief description of the appropriateness of the comparison to the background data set for each medium, provide a definition of RFCA Action Levels, and include Ecological Screening Levels.

7. **Page 24, Section 4.4, Subsurface Soil.** A review of subsurface soil data indicates that samples were composited over intervals ranging from two feet in

length to over 100 feet. For example, Location 56694 (Sample Number BH00122AS) is indicated as having been collected from a depth of 43 to 150 feet (See IM/IRA Figure 4-4). Please document how it is appropriate to compare the analytical results from the large composite samples directly to RFCA Action Levels, or how the large composite samples are directly comparable to background subsurface samples.

In addition, EPA's query of the database indicates that samples were collected over many different intervals. For example, at Location 59494 (Sample Number BH00154AS) VOCs were collected from 7.6-7.9 feet and 11.6-11.9 feet (i.e., 3-inch intervals), while at Location 58963 (Sample Number BH50417AS) VOCs were collected from a 0 to 6 feet composite interval. It is likely that samples composited and homogenized over a 6-foot interval may have compromised the VOC and SVOC concentrations, and may not be an accurate reflection of contamination. Further, samples collected over larger intervals (of many feet) are not directly comparable to samples from a 3-inch sample interval. Please revise the tables to include the depth interval and the text to indicate the dilution and varying depth interval implications associated with the reported concentrations for all borehole data.

7a. Page 24 states that PAHs were the only organics detected in subsurface soil. EPA cannot agree with this evaluation. Data reported in the 1996 RFI/RI Report and Draft Site Characterization Report (K-H, 2002) indicates that approximately 35 volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) were also detected in borings. It is of particular concern that many of the organics not reported in the IM/IRA, but included in historical data sets, are persistent, bioaccumulative, and toxic, and merit particular attention as to the potential for long-term effects. For example, borehole BH50417AS detected dibenzofuran at 20,000 ug/kg (6-12 feet composite sample interval), borehole BH50140AS detected aroclor-1260 at 1,300 ug/kg (zero-16 foot composite sample interval), and borehole BH50344S detected mercury at 1.4 mg/kg (6-12.7 foot composite sample interval). While the concentrations may appear to be low, it is likely that the concentrations are diluted as a result of samples being composited over a large interval. It cannot be determined whether waste and significantly higher concentrations occur within the large interval of the composite samples. Tables that clearly document the frequency of detection for all analytes and depth intervals, regardless of whether they are above an Action Level, are requested in order to provide an accurate documentation of all existing data.

8. **Pages 24-25, Section 4.5, Groundwater.** Groundwater contamination is discussed in terms of comparisons to the RFCA Tier I and Tier II Action Levels. Page 25 indicates that many analytes exceeded their Tier II Action Levels (i.e., concentration is greater than the MCL), and two samples exceeded the Tier I Action Levels (i.e., concentrations is 100 times greater than the MCL). The IM/IRA describes the frequency of these many exceedances as being 'generally

low'. This type of generalized evaluation does not address whether the exceedances occurred during the different flow conditions (i.e., low or high flow). Please revise the document to provide a more specific evaluation of flow and seasonal conditions at the time of the exceedances to better identify whether pulse loading or other irregular flow conditions may be occurring. Also provide the exceedances in the context of monitoring well depths and aquifers as indicated in previous comments.

9. **Pages 25, Section 4.5, Groundwater.** In general, groundwater contamination is discussed in terms of whether the detected concentrations are above Maximum Contaminant Levels (MCLs) established for drinking water. However, this comparison is not entirely sufficient. Groundwater from wells immediately adjacent to Woman Creek should be clearly identified on a figure, including depths, and an indication of how the depth is representative of groundwater discharge to the Creek. The groundwater data from the appropriate wells should be discussed in terms of potential exceedances of the RFCA Surface Water Action Levels in order to assess the potential and likelihood of whether a continuing source of contamination to ecological resources may be present. Revise the N&E of contamination in groundwater to include other chemicals that may be discharging at levels greater than RFCA Surface Water Action Levels.
10. **Page 25, Section 4.5, Second Paragraph.** It is indicated that "average concentrations" are greater than their Tier II ALs. It is not appropriate to compare averaged concentrations to Tier II Action Levels. Please report individual comparisons as indicated in RFCA Section 3.0.

10a. Paragraph 4 states, "There is no surface water AL for manganese, and therefore, manganese contaminated groundwater does not present a surface water quality concern". This statement is inappropriate and should be deleted. The assessment of risk to ecological receptors will include the use of Ambient Water Quality Criteria for manganese (acute=3 mg/L; chronic =1.7 mg/L). Please revise the document to present surface water data for manganese. The AWQC should be used for evaluation of data (See General Comment No. 5).

10b. Paragraphs 4 and 5 include an evaluation of selenium and indicate that the Action Levels were only exceeded in 3 wells. The evaluation should indicate the depth of the wells and discuss the contamination and migration in the context of upper aquifer zones and the bedrock, and indicate whether the depth interval of the well is appropriate to document migration of selenium to surface water (i.e., the furthest downgradient well 10994).

10c. Paragraph 5 indicates that plutonium and americium were "infrequently detected above MCLs" and "the averages are below surface water Action Levels". To properly evaluate the reported radionuclide contamination, please indicate whether the exceedances were in the same well, the seasonal flow implications, how frequently the well with the exceedances was sampled, the proximity of

location of the well(s) with exceedances to past disposal history (e.g., IHSS 196), depths and aquifers being monitored, the dates the samples were collected, which wells are considered in the downgradient migration pathways, and other supporting data to document that the sampling for plutonium has been well established. Further, the simple comparison of average concentrations does not adequately address whether there is impact to the surface water. Please revise the evaluation to include a discussion of the specific concentrations associated with seasonal implications, and present the detections in the context of the groundwater to surface water migration pathway (as indicated in Comment 10b).

In addition, the last sentence states that there were only 2 samples where the Tier I AL was exceeded, "but only by a small margin". Since Tier I ALs are set at 100 times the MCL, any exceedance is significant. RFCA indicates that locations with Tier I exceedances should be addressed via Accelerated Action. Please revise the document to address this issue in accordance with RFCA.

11. **Page 26, Second Paragraph.** The first two paragraphs present an evaluation and comparisons of uranium concentrations and ratios without describing whether the wells being compared represent similar depths. Please revise the document to discuss the contamination in terms of the groundwater intervals. In addition, please provide the citation for use of a ratio of 10 in water to identify depleted uranium.
12. **Page 27, Section 4.6, Surface Water:** Please discuss whether the downstream locations represent the most likely migration pathway for potential contamination that would be emanating from OLF through either surface runoff, seeps, or springs discharging to surface water. None of the surface water locations appear to be adjacent to the furthest extent of waste materials vicinity of Women Creek (See RFI/RI, Figure 2-1). Please revise the report to include a figure of the source areas, similar to figures presented in RFI/RI) and indicate how the locations are representative of the potential migration of wastes and seeps and springs from the landfill.
13. **Page 29, Section 4.7.** A generalized summary of risk based on the 1996 OUS RFI/RI is presented and does not mention the on-going Comprehensive Risk Assessment (CRA). While some information from the previous risk assessment may be relevant, some exposure assumptions and ecological benchmarks are being updated. In addition, the summary is over-generalized and does not extract important information related to the potential for risks associated with mercury and other contamination that was reported in the 1996 risk assessment. Revise the summary to include a discussion of the potential for ecological risks to all chemicals that are above appropriate and updated ecological action levels and benchmarks. The discussion needs to also mention the possibility of exposures to buried waste (using specific historical waste disposal information) being disturbed by burrowing animals.

14. **Pages 31-40, Tables 4-1 through 4-6.** The tables provide a frequency of detection summary that show inconsistent lists for each of the analyte groups. For example, the subsurface soil tables (Table 4-2) list only 3 PAH compounds for the organics list, surface water upstream versus downstream (Tables 4-4 through 4-6) show different lists of metals. It is not evident whether other chemicals were analyzed for each media and never detected, or whether these chemicals were never analyzed. A complete list of chemicals with their associated detection frequencies should be presented to appropriately document the existing data.

15. **Page 32, Table 4.2.** Aroclor detections should be included on this table. Samples 50992, 51092, 58393, 58493, 58693, 59493 and 61093 all show aroclor detections. Sample 50992 was composited over a 16 foot interval (0-16 feet) while the other samples were composited over 6-foot intervals. The detection of any contaminant in such a large composite sample indicates the potential presence of a concentrated source. These samples were all collected in 1992 and 1993, and it appears that there are no other recent samples. Please report all detections, composite intervals, and associated dates of samples.

16. **Pages 35-40, Tables 4-4 and 4-6.** Tables 4-4 and Table 4-5 indicate there are 100 and 144 samples for mercury (respectively), but it is not known whether this information reflects 100 samples collected from one location collected over many years, or whether these are data from the 4 locations reported in footer of Figure 4-1. Previous statements (Section 4.2, Page 22) indicate that in addition to OU5 data, data from annual water monitoring data have been included. Revise the evaluation and tables to clarify sampling and results in terms of historical or one-time sampling events versus the temporal characterization of surface water represented by the routine sampling. As indicated in previous comments, the report should indicate the rationale for the routine monitoring locations and the relevance the location has to groundwater migration and runoff from the OLF.

10/10