



Department of Energy

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FEB 17 2000

00-DOE-01641

Steven Gunderson
Colorado Department of Public Health and Environment
4300 Cherry Creek Drive South
Denver, Colorado 80246-1530

Dear Mr. Gunderson:

The Rocky Flats Environmental Technology Site staff has reviewed your comments on the 1998 Annual Rocky Flats Cleanup Agreement Groundwater Monitoring Report. Enclosed please find our responses to your comments. We will provide an advanced copy of our responses to your staff and that of the U.S. Environmental Protection Agency at the Groundwater Working Group meeting on Thursday, February 17, 2000. A discussion will also be presented on the report comments and responses.

If you should have any additional questions regarding the responses, please contact Norma I. Castaneda at (303) 966-4226 or contact me at (303) 966-5918.

Joseph A. Legare
Assistant Manager
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Enclosure

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ADMIN RECORD
SW-A-003959

1/7

CDPHE General Comment:

We have reviewed the 1998 Annual RFCA Groundwater Monitoring Report and have the following comments. For several years we have not addressed comments on the technical construction of maps. As the site moves into accelerated closure activities it is imperative that the site wide maps provided in this report be detailed and accurate. Many people and projects will be using these maps and most do not re-evaluate the data for their project.

General Comment, Opening Paragraph

We agree that as the site moves into accelerated closure activities all maps must be detailed and accurate.

Specific Comments:

Page 28 - Accuracy: Between the 1998 First and Second Quarterly Groundwater Monitoring Reports a change was made in the information reported for Data Quality Assessment. Table 3-2 "Percent Recovery for Spiked Samples" was eliminated and replaced with a Table 304 "Contract Required Detection Limits for Groundwater Analysis". The CRDL is not an acceptable substitute for the percent recovery information to demonstrate the accuracy of the ground water analyses. We request the percent recovery information for 1998 groundwater samples be compiled and submitted as an addendum to the annual report. We will consider future quarterly reports without percent recovery information as incomplete. This request has been communicated verbally to the report writing staff and does not present a problem to include the information.

Specific Comment, Page 28

The reason for the removal of the "Percent Recovery for Spiked Samples" table from the RFCA Groundwater Quarterly reports and Annual Report was because of changes to procedure RF/RMRS -98-200, *Evaluation of Data for Usability in Final Reports*. This procedure is used for compliance with PARCC determinations at RFETS and no longer requires the spiked recovery determination. However, it is agreed that the table is a useful QC parameter to both CDPHE and others. Therefore, the table will be added back into these reports in the future. RFETS can compile the Spiked Recovery table for CY98 data but will deliver it to CDPHE directly rather than creating an addendum to the Annual Report. This is because only CDPHE has requested this data.

Page 108 - At some point the potentiometric maps need to be changed to reflect the reality presented by the configuration of the IA. That is, the buildings disrupt the presence of, and surface of groundwater, especially in the building 700 and 800 areas. In these areas, the surficial deposits have generally been removed by construction of the buildings. As such, groundwater can not be present in the surficial deposits within the outlines of these buildings, except in the weathered bedrock or possibly Arapaho Sands of the UHSU. Groundwater can only flow around or between these buildings in the surficial deposits. Therefore, these maps need to be changed to incorporate the building information, as well as the well information. In addition, the weathered bedrock contribution to groundwater movement needs to be determined in the IA and especially in the 700 building area considering the limited amount of surficial deposits. Since these maps are supposed to show the potentiometric level of groundwater in the surficial deposits, the rationale to be utilized to include water in weathered bedrock rather than surficial deposits needs to be identified. It is recommended that these modifications be incorporated into the maps presented with the next RFCA Groundwater Monitoring Report.

Specific Comment, Page 108

In the future, the title for the potentiometric maps included in the Annual Report will refer to the Upper Hydrostratigraphic Unit (UHSU) instead of Unconsolidated Surficial Deposits. UHSU monitoring wells are used to construct the maps.

It is not universally true that the surficial deposits may have been entirely removed in the immediate vicinity of a building during construction. It may be true in the case of a building that has a basement or sub-basement. Foundation drains by design are constructed within some permeable material. The permeability of the bedding material probably approaches or is greater by design than the permeability of the surficial deposits. To say that there is no groundwater present beneath the buildings or that groundwater can only flow around the buildings is probably incorrect. Accordingly, a potentiometric contour can pass through a building imprint if the contour elevation is lower than that of the building foundation drain.

Page 108 and 109 - This section needs to be modified to properly discuss the data utilized to construct the contours shown. It is stated that these maps are constructed utilizing monitoring well data. However, it appears that the well data is insufficient to support the contouring around the buildings identified with foundation drains. Therefore, the elevations of foundation drains are being utilized as well as the monitoring wells. As such, this appropriate use of information needs to be stated.

Specific Comment, Page 108 & 109

A brief discussion of the use of foundation drain locations and elevations will improve the text as suggested. In addition, as discussed in a subsequent response (**Specific Comment, Page 109-2**), all buildings with foundation drains have had their foundation drain elevations either added, if missing, or checked and corrected if necessary.

Page 109 - It is stated that the unsaturated areas shown in previous maps, specifically the 1993 maps, have been retained and modified based on current information. Since the areas on the 1993 map appear to have diminished, and the areas shown on the 2nd and 4th Quarter map are not always the same, they are not apparently identifying permanently unsaturated areas, only areas that are dry during the specific sampling event being mapped. Since these are only temporarily dry areas, then all areas that are dry during the sampling event mapped should be shown, which is currently not being done. This should be incorporated into the next RFCA Groundwater Monitoring Report.

Potentiometric Maps - In future maps presented, the contour interval within the IA should be changed to at least 5 feet rather than 10 feet to provide better accuracy in contouring and to better demonstrate the various affects of Site activities. In addition, the contours should also be drawn to honor the data provided on all of the maps, at least two obvious data points have not been honored by the contouring of the potentiometric maps, Wells P215789 and P213689 in the center of the IA. These and all future maps need to be constructed to honor the data. Please perform an in-depth review of the data and provide correctly contoured maps to replace the current potentiometric maps.

Page 109 - The depths of the Foundation drains need to be shown and incorporated into the groundwater maps for all of the building drains rather than just a few of the buildings, and the depths of the drains need to be corrected for some of the buildings shown. For example, the depths of the foundation drains shown for Building 865 are incorrect and need to be changed. As indicated below, the drains in Building 865 range in depth from 5988 to 5986, not 5976 as

shown. Please modify, as necessary, as follows:

Building 111 - drains from 6025 to 6023, 1 from south to north

Building 124 - drains from 6028.73 to 6027 from west to east

Building 371/374 - drains from 5968.04 to 5966.1 from west to east down the center and 5985 to 5982.2 along the sides

Building 444 - drains from 6007 from the south to the north and from 6008.25 under the southeast quadrant of the building

Building 447 - drains from 6018 to 6010 & 6005 from the west to the north side and to the south side of the building respectively

Building 517/518 - drains from 5969.53 from the north to the south and from 5971.5 to 5970 from the west to the east

Building 559/561 - both drain from pits, the elevation of the pit in Building 559 is 5985.14, which may drain to the north and/or to the west

Building 707 - drains from 5982.75 to 5981 from the northeast to the southwest

Building 709 - drains from a sump on the north side elevation unknown

Building 771 - drains from 5948.58 to 5935 from the south to the northwest

Building 774 - drains from 5952 to 5938 from the south to the north

Building 776/777/778 - have drains but locations and depth are unknown

Building 779 - drains from 5979.5 to 5974.2 from the west to the northeast

Building 773 - storm drains act as foundation drains, depth unknown, drain from east and southwest to the northeast

Building 850 - drains from 5991.79 from north to sought under the northeast quadrant of building

Building 865 - drains from 5988 to 5986 from west side to east, also from a sump on the westside with unknown depth

Building 881 - drains from 5975 & 5968.6 on the NW & north side of 5960 on the south side and to 5949 at Building 887, also from 5981 on the NE side to 5945 on the SE side, also from the building from 5967 to 5963 from the NW to the SE, and also under the building from 5954 to a sump from the NE to the south

Building 883 - drains from 5983.1 on the NE to 5981.8 on the NW and to 5979.7 on the SW to a sump, also from a floor drain on the east side, depth unknown.

Building 886 - drains from 5976.68 to 5976.12 from NW to SW

Building 828 - drains from 5976.62 to 5975.9 from NE to SW, then to sum east of Building 875

Building 875 - drains from NE to sump on east side, depths unknown

Building 910 - drains from west to east, depths unknown

Building 991 - drains from 5932.1 to 5920 from NW to NE, and 5932.1 to 5926.5 from NW to w-NW; also from a sump in the SE corner, depth unknown

Building 997 - drains from 5944 to 5932 from west to east and then south to Building 985 and 991

Building 988 - drains from north to south to Building 991, depth unknown

Building 999 - drains to 997, depths unknown

Building 995 - drains from the clarifier on the SW, from the digesters and clarifiers or sludge beds, depths unknown

Specific Comment, Page 109

Only areas that we monitor for groundwater elevation can be shown as saturated or unsaturated. It is not stated on the maps that the unsaturated areas on the maps are permanently unsaturated; they are described as "Approximate extent of Unsaturated Area". We cannot show areas as unsaturated where we have no well control. In the future, unsaturated areas will be current with

the data mapped. Historical references to unsaturated areas will not be made. Accordingly, we will increase the area of the maps described as "Area without Groundwater Elevation Data".

Specific Comment, Potentiometric Maps

Because of the lack of well control in the Industrial Area, and the scale of the maps, it is not necessarily pertinent to have a 5-foot contour interval on the potentiometric maps presented in the Annual Report. These sitewide maps are not intended for use on a per building basis, and as such a 10-foot contour interval provides the detail needed for the intended purpose of the maps. Potentiometric maps presented to the CDPHE in Building D&D and other Sampling and Analysis Plans (SAPs), and other Figures, will provide blow-ups of the individual building areas which show potentiometric contours on 5-foot intervals.

Contours are always drawn to honor data provided on the maps. Unfortunately, the few errors made on the large number of different maps produced are not always caught. The contouring error observed between monitoring wells P215789 and P213689 has been corrected and the updated map will be submitted in the near future to CDPHE as part of the SAP for the D&D Groundwater Monitoring of Buildings 707, 776/777, 371/374, 865 and 883. Future potentiometric maps, as well as all other site maps submitted as part of the Annual Report, will undergo a more extensive review before their submittal to CDPHE.

Specific Comment, Page 109 (2)

Based on maps and reports available at RFETS, the majority of building foundation drain elevation data has been previously incorporated into the sitewide potentiometric maps. The correction to the drains in Buildings 865 and 886 has been made. In addition, all buildings with foundation drains have had their foundation drain elevations either added, if missing, or checked and corrected if necessary.

Regarding the range of elevations that encompass a given building drain, posting the range is only pertinent if the range of elevations for a building spans a 10-foot contour interval. This happens in a few instances including Building 771/774, Building 881, Building 447, and Building 991. As each case warrants, for the buildings listed, additional foundation drain elevations have been posted. For the other buildings, because the ranges generally span only a few feet, a median elevation is posted on the maps. This does not affect the local potentiometric contours with respect to the scale of the map. All of this foundation drain elevation data has been incorporated into the figure that will be submitted to the CDPHE with the D&D SAP referenced above. Some recontouring has resulted from the addition of the data to the map.

Page 127 - This discussion suggest that the VOC contamination upgradient of the solar ponds will be collected by the SPP collection and treatment system. This statement should be quantitatively addressed by the model that will be created by the Site Water Balance project and confirmed by sampling for organic compounds in the performance monitoring wells west of the collection system.

Specific Comment, Page 127

The initial scope of the Site Water Balance project does not include fate and transport of potential site contaminants. Once the model is developed for site water balance, additional applications of the model may be applicable to fate and transport studies, and may be feasible as funding permits.

We do not feel that transport modeling is necessary in this instance. Volatile organic compound

(VOC) contamination upgradient of the Solar Evaporation Ponds (SEPs) is collected by the Solar Ponds Plume (SPP) collection and treatment system. Part of the SPP collection and treatment system contains a reactive metals treatment cell used to remove radionuclides from SPP groundwater. The reactive metals treatment cell also serves to degrade dissolved VOCs. The reactive metal media works by inducing conditions that cause the substitution of hydrogen for chlorine in the chlorinated VOCs. The end products of the process are completely dehalogenated hydrocarbons and non-toxic salts. The system is effectively engineered to remedy VOCs.

We agree that performance monitoring of wells 70099, 70199, and 70299 should be expanded to include VOCs to ascertain the SPP treatment system's success in removing VOCs from groundwater to the north of the treatment system.

Page 158, Section 5.3: In recent questions raised during the D&D of Building 779, it has come to our attention that the D&D wells installed around this building were not deep enough to monitor water believed to be impacting pits below the basement level. Apparently, these pits were known to building personnel but not documented information used by the groundwater program in establishing locations for these wells. Better communication between site personnel is essential to ensure adequate and timely monitoring of the environment during D&D. We request the site deepen these wells or replace them with wells that will monitor the potential UBC/ground water interaction in this area.

Specific Comment, Page 158, Section 5.3

The sub-basement discovered to be located in the northeast to north central portion of Building 779 is estimated to extend to a depth of approximately 24 feet below ground surface (bgs). Existing D&D monitoring wells 02297, 02397, and 02497 are completed to depths of 12, 11, and 11 feet, respectively. These wells are adequate for monitoring, horizontally and vertically, the remaining portion of the building. The area north of Building 779 is congested with utilities, process waste lines, and the remains of the demolition of Building 779. Drilling new monitoring wells, even at existing locations may not be feasible in the near future. What makes sense is to identify an existing monitoring well that will adequately monitor the vertical and horizontal area delineated by the Building 779 sub-basement. To that end, we have identified monitoring well P209189 as an appropriate well to add to the D&D monitoring program for Building 779. The screened interval of the well is 13.3 to 35 feet bgs. It is located downgradient and will adequately monitor to the depth penetrated by the sub-basement.

Page 178, Section 7.2: Only a graphical presentation of the real time data collected was presented in Plate 11. We request the spreadsheet data used to create these graphs including the water level and precipitation data information.

Specific Comment, Page 178, Section 7.2

We will supply the CDPHE with the spreadsheet data requested including the water level and precipitation data.

General comment - To avoid confusion, the inorganic sample results should be provided in consistent units, rather than some in ug/l and other s in mg/l. Since the state groundwater standards, and EPA MCLs are provided in mg/l, please provide all of the inorganic groundwater sample results in mg/l. Also since the state standards and EPA MCLs for organics are provided in ug/l, the groundwater sample results for organics should be providing in ug/l.

General Comment

This comment is regarding the units used in the reporting of inorganic sample results. Metals are the only inorganic parameters that are currently being reported in $\mu\text{g/L}$. All other inorganic parameters are reported in mg/L . The detection limits used by the analytical laboratory are driving why metals are reported in $\mu\text{g/L}$. Because the detection limits for metals are often in the range of $0.1 \mu\text{g/L}$, it is more efficient for the laboratory to report the results similarly. We are reporting metals results in the same units as we receive them from the analytical laboratory. The Surface Water group reports their results for metals similarly.