

STATE OF COLORADO

Bill Owens, Governor
Jane E. Norton, Executive Director

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Colorado Department
of Public Health
and Environment

September 26, 2001

Mr. Joseph A. Legare
Assistant Manager for Environment and Infrastructure
U.S. Department of Energy
Rocky Flats Field Office
10808 Highway 93, Unit A
Golden, Colorado 80403-8200

Dear Mr. Legare:

**Re: Comments on the SAP for Groundwater Monitoring of the Industrial Area
Plume Draft Final Revision D, July 2001**

This letter incorporates the Site Water Programs responses to State comments electronically submitted informally to Steve Singer of RMRS in August and revised in September. Some of our comments were dismissed based on the scope of the SAP. We do not believe our comments were outside the scope of this document. The stated purpose of this SAP is "...to identify those source areas of VOC contamination within interior portions of the plume and to define the lateral extent of elevated concentrations"(Page 29 Section 3.1).

CDPHE will not approve this plan based on the response to our comments. We will need to see the final draft document, and our concerns about potential lateral transport of contaminants in a fault associated fracture zone in weathered bedrock must be resolved. We understand that chasing contamination in utility corridors is not productive in this investigation, however we expect the in-field locations of the proposed wells to consider the potential effects of utility corridors to divert DNAPL type contaminants away from the overall ground water flow.

We have numbered our original comments. If we have a concern with the Water Program response, it follows the response in italic and is titled "Reply".

**Draft Response to Comments on the SAP for Groundwater Monitoring of the
Industrial Area Plume Draft Final, July 2001**

1. Comment: Page 2 Section 2.1, The groundwater divide is an important feature to understanding this document, bring it up in the beginning.

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Response: This comment has been addressed in the final version of the SAP for Groundwater Monitoring of the Industrial Area Plume (IAP).

2. Comment: Figures 2-1, 2-2 Indicate contours are topographic.

Response: This comment has been addressed in the final version of the SAP for Groundwater Monitoring of the Industrial Area Plume.

3. Comment: Figures 2-3 through 2-7 Interpretation of these plumes could be improved by using head contours with the contaminant information and knowledge of the suspected sources.

Response: Although head contours were not superimposed on the plume figures, the head contour map was used as a guide in drawing Figures 2-3 to 2-7. The configuration, orientation, and extent of all the contaminant plumes were drawn based both on concentration data and groundwater contour map.

Reply: The PCE plume north of Sage Ave. is drawn with a strong eastward trend rather than the northeast trend suggested by the head contours, no explanation such as preferential flow along a utility corridor is offered for this difference. The PCE at well 10498 is elongated in a northeast direction when the head contours suggest southeast migration is likely. There is no head evidence to support lumping the lower concentrations of DCE as shown.

4. Comment: Section 2.2.1 Page 15 Area North of Sage Ave. Please refer to these areas of concern by number for those not familiar with the PACs and IHSS designations. The flow lines from wells P114789 and P114689 appear to trace back to the suspected process waste line source near building 334. The wells as identified do appear to be well chosen to investigate this plume.

Response: This comment will be incorporated in the final version of the SAP for Groundwater Monitoring of the Industrial Area Plume.

5. Comment: Page 16 Coexistence of PCE and daughter products at the same location is not necessarily an indication of natural attenuation, sequential location of these products along a groundwater pathway is the more typical footprint of sequential degradation. With the additional wells it may be possible to rough out these footprints if the suspected sources prove out.

Response: This statement was included in the SAP as an ancillary observation of generating the plume figures and is not germane to the primary objective of the proposed groundwater evaluation. This objective is to determine the potential source areas for the existing VOC plumes. However, it is reasonable to assume that parent and daughter

products could exist concomitantly at the same location as a result of natural biodegradation processes.

6. Comment: Section 2.3 A discussion of the top of bedrock channels and their impact on groundwater flow directions is missing. Also traces of the bedrock offsets in the "A" claystone need to be included on a map.

Response: A discussion of the top of the bedrock channels has not been included in the SAP because there is little data to suggest these features exist in the IAP. The Geologic Characterization Report (EG&G, 1995) has identified channels near the eastern edge of the IA but not in the study area. One well, 61199 installed as part of the East Industrial Plume indicates that bedrock scouring may have occurred in the vicinity of Building 883. The lateral extent of this feature is presently unknown but will be further investigated during this groundwater evaluation by the placement of a monitoring well located approximately 200 feet west of well 61199.

Reply: Plate 4-3 in the Geologic Characterization Report shows a bedrock high trending northeast through the area in question although the 20 foot contours are based on much less well information than should be available with the 1999 well data. It is important to provide up to date scientific assessment to support this proposal.

The trace of the fault was not included on any of the figures because Water Programs does not believe there is any hydrologic impact of the fault on groundwater movement and/or on migration of the contaminant plume. Head contours in this area, as shown on Figure 2-9 in the SAP, do not appear to exhibit any perturbations in flow conditions that tend to signify either a no-flow/limited flow boundary or preferential pathway. In addition, there is no geologic evidence to support the conclusion that the fault extends through the more recent Quaternary surficial deposits. Given the fact that the proposed groundwater investigation is primarily involved with the alluvial material and not the bedrock in this area, the presence of the fault should have little or no impact on groundwater flow directions and migration of the contaminant plume.

Reply: We strongly disagree with this assessment. The Geomatrix investigation of fault capability was moved away from an area with ground water contamination to avoid dealing with the water during the trench excavation. The subsequent trench north of the landfill showed significant transmission of groundwater. We have accepted that the fault fracture zones close and heal with depth but we are concerned still with the lateral transmission potential. Any area of fractured bedrock is highly weathered and therefore part of the UHSU. The contaminants in question are all denser than water and would tend to collect in a permeable low area.

7. Comment: Usually more than one quarter of head data is considered to evaluated the stability of the flow directions being used to interpret the plume contours. I would like assurance that paleochannels and multiple head maps were evaluated in locating the propose wells. Upon examination of the contaminant information with the single head

map provided some inconsistency of interpretation is apparent. The plume associated with well P114889 should extend to the Northeast and appears to fall within the influence of the building 371 drain system. The location to investigate the suspected source is fine but a well is needed to determine if the plume is migrating in this direction. Groundwater flow and contaminant transport may be influenced by the fault that runs to the east of building 371. A series of boreholes into the upper bedrock is needed to investigate the transport of potential fracture zone that is likely associated with this fault.

Response: Potentiometric surface maps from the second and fourth quarters of 1999 were also reviewed prior to constructing the contaminant plume maps. However, the plumes were based mostly on recent head data from the fourth quarter 2000 that was used to generate Figure 2-9 in the SAP. The reason for this is that these data are more inclusive and utilize continuous water level measurements from the site-wide water balance study and also measurements from other wells that have not been previously used to construct site potentiometric surface maps. The overall density of well coverage on Figure 2-9 is much greater than on past maps and therefore, this map is considered a more accurate representation of groundwater flow conditions than other head maps.

Several monitoring wells already exist in an area located downgradient from the plume associated with P114889 and within the drain influence of Building 371. One of the wells 22098 has not reported contamination while low levels (below Tier II) of PCE, TCE, and 1 cis 1,2-dichloroethene have been detected in 21998 which is located approximately 100 feet east of well 22098. On this basis, no additional wells are needed to monitor plume migration in this area.

While it may be true that a fault runs east of Building 371, that area is outside the area of concern in this groundwater evaluation as defined in the SAP. No additional wells are planned in this area.

Reply: We will concede the request for a plume extent well more directly south of building 371 for the present investigation. However, as explained above, we believe the fracture system potentially associated with the fault is capable of transmitting contaminants. Previous investigations have shown contamination in this drainage, it is important to determine if the fault zone provides a preferential pathway to this drainage and eventually to North Walnut Creek. None of the wells drilled in this area extend more than a foot into the weathered bedrock the description of that foot for wells 21898 and 21798 indicate disturbed bedrock and fracturing.

8. *Comment: Also, the head contours and the apparent contaminant movement around building 123 do not make sense. The fault trace appears to cross very near this plume source, well 10498 shows PCE between 280 and 980 ug/l in the First Quarter of 2001. No bedrock information is available in this vicinity.*

Response: While the fault trace appears to run near Building 123, there is no hydrogeologic evidence to support the conclusion that the fault is affecting contaminant

movement. Head contours in this area on Figure 2-9 in the SAP do not appear to exhibit any perturbations in flow conditions that tend to signify either a no-flow/limited flow boundary or preferential pathway. In addition, there is no geologic evidence to support the conclusion that the fault extends through the more recent Quaternary surficial deposits. Given the fact that groundwater flow is primarily through the alluvial material and not the bedrock in this area, the presence of the fault should have little or no impact on groundwater flow directions and migration of the contaminant plume. Also, the main focus of the SAP was to identify contaminant source areas by characterizing and evaluating flow conditions in the unconsolidated alluvial deposits and not in the bedrock formations.

Reply: We disagree. The head contours as drawn on Figure 2-9 show a much steeper gradient east of the 123 slab than most other flat areas of the IA. We made no suggestion that faulting had any impact on the Quaternary sediments, only that the 30 feet of weathering identified in bedrock in this area might be associated with faulting. High concentrations of contaminant in a permeable low area may explain the erratic PCE results seen in 10498 and the lack of obvious eastward migration. Utility corridors may also affect this plume.

9. Comment: The groundwater flow pattern around building 444 indicates the contaminants identified by the D&D wells around the building may be entering the two drain systems of this building. The drains should be sampled if possible. It also appears that the plume identified by well P320089 may be drawn into the drain system of building 883. This drain should be sampled if possible.

Response: Groundwater flow around Building 444 appears to be influenced by one or both of the drain systems in place around this building. These drains may also be capturing contaminants such as PCE and TCE that are known to be present in the area. However, Water Programs believes that the proposed sampling plan described in the SAP includes a sufficient amount of wells in the area to accomplish the stated objectives of the SAP. Given that the object of this evaluation is to identify potential source areas within the IAP, sampling these drains is outside the scope of this project.

This same response also applies to the second part of the above comment. While the drain system around Building 883 may be capturing contaminants, sampling these drains is not part of this project. Sampling for the drain systems around Buildings 444 and 883 will eventually be conducted during demolition and decommissioning (D&D) of these buildings.

Reply: We request sampling of these drains be added into the D&D sampling of these buildings in the IMP.

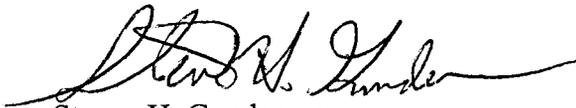
10. Comment: Section 5.3 Page 36 If natural attenuation is suspected it would be advisable to collect some of the parameters needed to evaluate the potential for MNA, ie.

Dissolved Oxygen, Total Organic Carbon, Iron, Manganese (and other metals, Chloride, Nitrate, and Sulfate.

Response: The SAP will be ammended to state that once the data from this installation project are evaluated, wells may be chosen to investigate biodegradation. Biodegradation can only be evaluated once the pathway from source to surface water is understood. We believe that the proposed project will aid in determining that pathway and may allow for an evaluation of plume degradation in the future.

We have discussed these comments with EPA and they are in agreement that investigating the fault zone for potential contaminant transport is within the scope of this investigation and will also help satisfy public concerns about the faults. Please contact Elizabeth Pottorff at 303-692-3429 with any questions on these comments.

Sincerely,



Steven H. Gunderson
Rocky Flats Project Coordinator

SHG/ETP/etp

cc: Norma Castañeda, RFFO
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