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MEMORANDUM

SF FILE NUMBER 5-2.0

TO: Mike Zimmerman, OSC
EPA/ERB - Denver

FROM: Troy Sanders T. Sanders
TAT - Region VIII

Cordel Schmidt C. Schmidt
TAT - Region VIII

DATE: September 10, 1992

SUBJECT: Transmittal of Response to PRP Complaint Regarding Well Installation Activities at the Richardson Flats Tailings Site; TDD #T08-9207-019

This memorandum was written to satisfy the requirements of Technical Direction Document (TDD) #T08-9207-019 issued to the Ecology and Environment, Inc., Technical Assistance Team (E & E/TAT) by the Region VIII U.S. Environmental Protection Agency, Emergency Response Branch (EPA/ERB).

From June 23 through 27, 1992, the TAT provided oversight and technical assistance to the drilling subcontractor (Boyles Brothers Drilling Company) with respect to the drilling, installation, and development of three groundwater monitoring wells at the Richardson Flats Tailings site near Park City, in Summit County, Utah. TAT was tasked by the EPA/ERB to perform these activities under TDD #T08-9204-015.

The monitoring wells construction details were based on information obtained during a review of literature describing the local geology and historic site information. All of the wells were installed according to commonly accepted geologic practices for the design, construction, and installation of groundwater monitoring wells in conjunction with EPA guidance (U.S. EPA, 1986) and regulatory requirements, State of Utah Administrative Rules for Water Well Drillers, and E & E Geotechnical Practices Standard Operating Procedures (SOP).

On July 29, 1992, EPA/ERB received a letter from United Park City Mines Company (UPCMC) (see Appendix A, Attachment 1) alleging that the monitoring wells were improperly constructed and completed and that the installation has resulted in the potential contamination of local groundwater. These allegations were based on a report prepared by their consultant (Pioneer Technical Services, Inc. [PTS]), which provided comments and observations on the TAT activities conducted at the Richardson Flats Tailings site.

The TAT categorically rejects the UPCMC's allegations and the conclusions stated in the PTS report that the wells were "improperly

constructed and completed" through a "continuous" and "impervious clay layer"; that the landfill material was "isolated from the ground water;" and that groundwater flowed up the monitoring wells "under pressure" "into the formerly dry geologic formations or construction debris and landfill material."

It appears that UPCMC's stated objective of holding "EPA and its contractor, E & E, ...fully responsible for the ensuing groundwater and surface water contamination," has adversely affected the ability of UPCMC and their consultant to examine the available data in an objective manner: they appear to have ignored the available climatic data and landfill cover data. The latter data make it abundantly clear that the landfill was not and could not have been "formerly dry." The climatic data and the nature of the landfill cover material also make it clear that infiltration from the surface must occur seasonally, resulting in leachate generation by the landfill, which in turn, discharges to the groundwater or directly to the adjoining Silver Creek.

The water level data from the monitoring wells and the geologic cross-section based on TAT logging of the monitoring well boreholes (see TAT cross-section attached) also imply that the aquifer, (or, more properly, zone of saturation), encountered in the monitoring wells, is unconfined, and shows a steep hydraulic gradient towards Silver Creek. This also implies discharge of landfill leachate to Silver Creek.

The fact that the simple site plan prepared by PTS indicates a scale which does not agree with their cross-section; that their PTS cross-section does not agree with their text; and the PTS report is internally inconsistent--does not lend credence to their interpretation of the hydrology. Nor does their failure to provide the well logs on which their criticism of TAT is based. Furthermore, PTS's intemperate use of language and assertion of unsupported conclusions is entirely inappropriate and misleading.

CONCLUSIONS:

As is further discussed in the Appendices to this document, E & E feels that the wells can be used in their present condition to accurately characterize the groundwater at the Richardson Flats Tailings site. However, because of the turbidity of the groundwater now confirmed to exist in the monitoring wells, the TAT recommends that the wells be purged at the lowest rate practicable, and if the turbidity still remains high, that samples for metals analysis be collected both filtered and unfiltered. Samples for organics analyses will, of course, be unfiltered.

Enclosed is the detailed TAT response to the UPCMC letter of July 29, 1992 which is included as Appendix A. The TAT response to the PTS report of July 13, 1992 and the comments and observations of E & E's drilling subcontractor are included as Appendix B. The TAT response to

the PTS letter of August 11, 1992 is attached as Appendix C. For ease of reference, the UPCMC letter and PTS reports that are the subject of the responses are appended to Appendices A, B, and C respectively as Attachment 1.

APPENDIX A

TAT Response to United Park City Mines Company (UPCMC)
Letter of July 29, 1992

RICHARDSON FLATS TAILINGS SITE
SUMMIT COUNTY, UTAH
TDD #T08-9207-019

Figure: TAT Cross-section

Attachment 1: UPCMC letter dated July 29, 1992.

RICHARDSON FLATS TAILINGS SITE
SUMMIT COUNTY, UTAH
TDD #T08-9207-019

TAT Response to United Park City Mines Company (UPCMC)
Letter of July 29, 1992 (See Attachment 1, attached)

1. **UPCMC Comment:** "the monitoring wells...were improperly constructed and completed, and have resulted in the potential contamination of groundwater."

   Response: The wells were installed according to an approved work plan and standard procedures with one exception. When drilling with the Odex method in the clays beneath the site progress was found to be excessively slow, the TAT approved the use of a tri-cone bit within the Odex casing, resulting in a smaller annulus. Because of the nature of the formation, had the borehole been 6 inches in diameter throughout, as opposed to 4-inches within the clay, it is the TAT's professional judgment that this would not have made a significant difference on the effectiveness of the monitoring wells.

   The TAT further disagrees with the UPCMC assertion that the well construction and completion was "improper" partly because TAT disagrees with the text of the report by Pioneer Technical Services Inc. (PTS), since PTS does not support their argument with appropriate well logs or field notes.

   The "potential contamination of groundwater," appears to refer to PTS's unsupported conclusion that water will flow up the monitoring wells "under pressure" and "flood the landfill." It is interesting to note that PTS does not allege a potential problem only, but indicates that groundwater is "now flowing up the well under pressure...and will continue to push water into the landfill"...and that "it is especially critical that MW-2 be plugged so that it does not continue to flood the landfill." At the same time it is admitted, on PTS's interpretation, that the top of the "aquitard" is at 26.5 feet below ground surface (bgs), and the water elevation in the well is at "exactly 26.5 feet bgs." Although the TAT disagrees with PTS as to the elevation of the top of the aquitard, the water level reported will not permit flow into the landfill, let alone flooding of the landfill, since there is no hydraulic head differential to drive the flow.

   In sum, the TAT continues to believe that the potential exists for the contamination of groundwater at the site. This is because the gravel cover materials over the fill are incapable of preventing infiltration into the fill, and the climatic conditions ensure that infiltration will occur (see below).

2. **UPCMC Comment:** "E & E drilled one monitoring well directly in the Park City Municipal Corporation Landfill ("Landfill") against the advice of United Park City Mines Company...and...Pioneer Technical Service, Inc."

Response: Regarding the drilling activity conducted in the landfill, it is true that EPA technical guidance does advise against drilling directly through a landfill (U.S. EPA, 1991). However, the basis for this is concern about hazards from explosive or toxic gases or reactive materials, the danger to drilling personnel or damage to equipment, and the potential for leachate from the landfill entering an underlying aquifer through the borehole.

During the drilling activities at the site, E & E continually monitored the borehole with a combination hydrogen sulfide/oxygen level/combustible gas detector mounted on the drill rig. An HNu photo-ionizer was used to monitor drill cuttings, split-spoon samples and the air within the casing and in the breathing zone of the driller and driller's helper.

Regarding the leachate concern, leachate was not encountered in the fill at the time of drilling, and the wells were completed in the clays beneath the landfill, (in RF-MW-2 and RF-MW-3), or outside the landfill, at RF-MW-1. TAT disagrees with the PTS conclusion that any of the wells as constructed provides a pathway of easy flow, either up the well or down it. This is evident because of the very low yield of these wells, (less than 0.2 gallons per minute), even apart from their construction details. The primary disagreement concerns whether the leachate generated within the landfill is likely to migrate down the wells, as TAT concludes on the basis of cover materials and climatic data, or whether the ground water below the landfill will migrate up the wells as PTS alleges, without supporting evidence. Needless to say, TAT's conclusions remain unchanged.

The Odex method of drilling used by TAT to penetrate the fill, is well suited to drilling through landfills, since the casing is advanced close behind the bit and the bit alone is exposed to entanglement in the fill materials, unlike hollow stem auger drilling. Had the driller objected to drilling through the fill, or had explosive or potentially toxic gases been detected, the hole would have been abandoned. As it was, the borehole provided a very useful indication of both type of fill and the volume of fill at the site, which could not have been gained by a hole drilled outside the fill.

Contrary to the statment made by UPCMC: at no time prior to the drilling of well RF-MW-2 was TAT informed by UPCMC employees or their consultant (PTS) that the location selected was within the former municipal landfill boundary.

3. **UPCMC Comment:** "E & E...breached the impervious clay layer which had formed a continuous barrier between the landfill materials and the underlying groundwater."

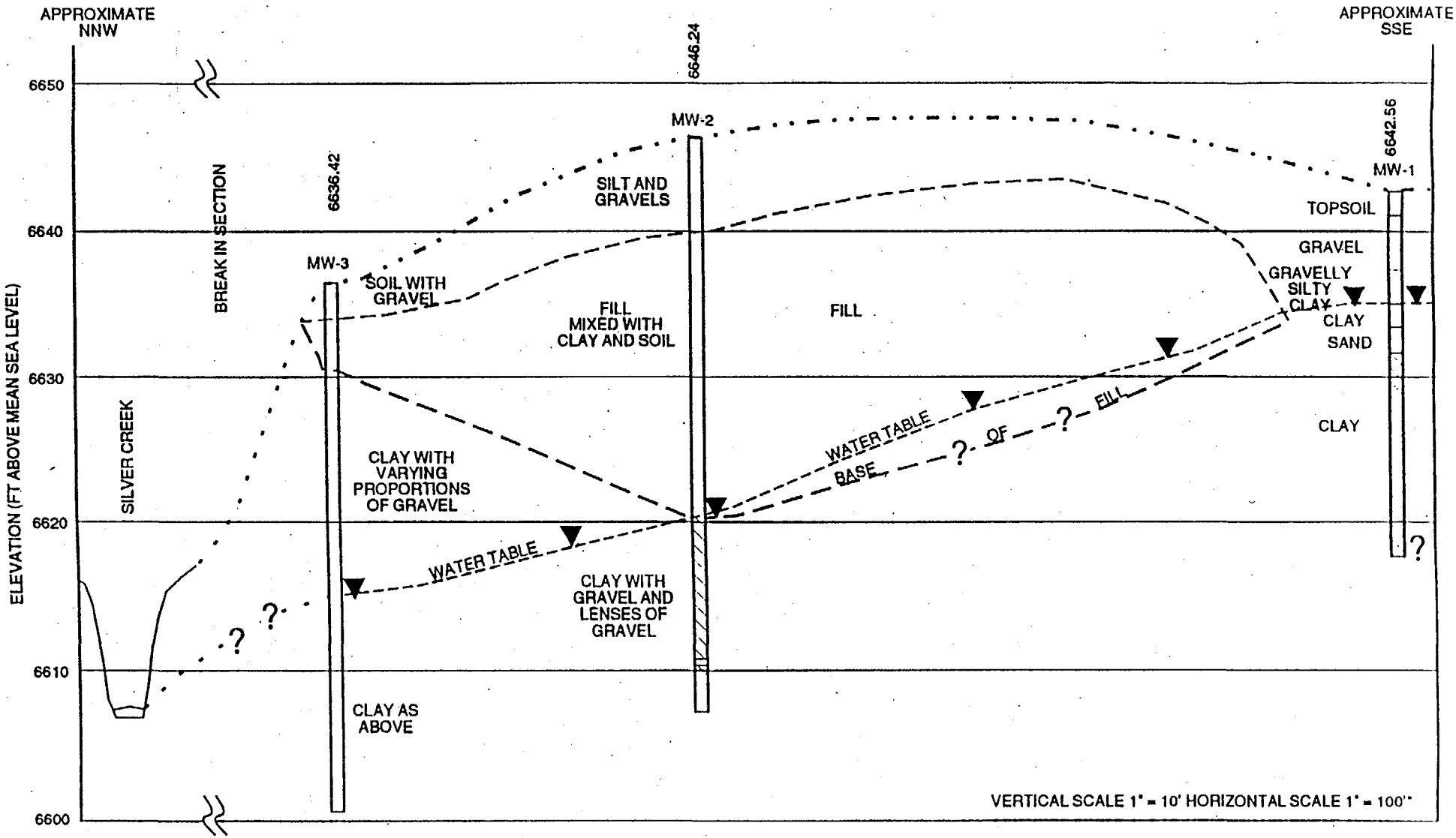
   Response: This is pure supposition. No evidence exists that the clay is "continuous," "impervious," or a "barrier between the landfill materials and the underlying groundwater." To the contrary, the cross-section prepared by TAT strongly implies that the water table, (unconfined) aquifer is not perched on or confined beneath the clay, but occurs within it, or perhaps within stringers of gravel in the clay (see TAT Cross-section attached). Climatic conditions require that recharge to groundwater from the surface occurs all over the landfill, and therefore this would result in the generation of leachate within the landfill. Because the TAT wells did not find leachate within the fill during the time of well installation, it is clear that the leachate drains out of the fill into the groundwater on a seasonal basis, and therefore, the clay under the fill cannot be "continuous," "impervious," or a "barrier between the landfill materials and the underlying groundwater," except in a relative sense.

4. **UPCMC Comment:** "EPA and its contractor, E & E, ...are fully responsible for the ensuing groundwater and surface water contamination."

   Response: Since the landfill is generating leachate by infiltration of precipitation from the surface, and this leachate must either enter groundwater or discharge directly to Silver Creek adjoining the site, the site owners are responsible for this long standing leachate migration problem. Whether this leachate is significantly contaminated, or has a significant impact on surface water and requires remediation, has yet to be determined.

5. **UPCMC Comment:** "we strongly recommend and will expect that these monitoring wells not be sampled...and that all three monitoring wells be correctly plugged and abandoned as soon as possible."

   Response: At present there is no basis for abandoning the wells, but E & E suggests that sampling for metals may need to include both filtered and unfiltered samples to allow assessment of the role of particulates in the turbid samples of water that wells completed within a clay-rich horizon usually produce.



*Taken from Pioneer Technical Services Cross-Section not from PTS Plan which has different horizontal scale.

RICHARDSON FLATS TAILINGS SITE–SUMMIT CO. UTAH
CROSS-SECTION THROUGH TAT BOREHOLES
USING PIONEER TECHNICAL SERVICES ELEVATIONS

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