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LETTER AND COMMENTS FROM MISSOURI DEPARTMENT OF NATURAL RESOURCES
REGARDING DRAFT GROUNDWATER ASSESSMENT FOR OIL SATURATED AREA,
HAZARDOUS WASTE STORAGE AREA, HAZARDOUS MATERIAL STORAGE AND FIRE
VALVE AREA KANSAS CITY MO
10/18/1996
MISSOURI DEPARTMENT OF NATURAL RESOURCES

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STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 177, Jefferson City, MO 65115

October 18, 1996

Mr. Robert Lodato
OL Q, AFBCA
15471 Hangar Road
Kansas City, MO 64147-1120

RE: Draft Groundwater Assessment, Oil Saturated Area (SS003), Hazardous Waste Storage Area (SS004), Hazardous Material Storage (SS006), and Fire Valve Area (SS009), Operating Location Q, Missouri (Richards-Gebaur Air Force Base) (September 1996)

Dear Mr. Lodato,

The following are the Missouri Department of Natural Resources Comments on the above-referenced document

General Comments:

1. The hydrogeology of the four sites included in this groundwater assessment is not well understood. Although the boring logs lack sufficient detail for thorough comparisons, they do seem to indicate the presence of similar geologic materials across each of the sites. However, shallow groundwater was reportedly encountered at various depths, ranging from several feet to 30 feet below ground surface. Versar was unable to locate uniform water-bearing zones and, therefore, has concluded that shallow groundwater appears to be "perched" in the unconsolidated and weathered bedrock overlying competent bedrock. Because Versar was unable to locate uniform water-bearing zones beneath the sites, groundwater flow directions were not determined.

Many of the wells installed during this investigation contain several feet of water. However, based upon the boring logs and well construction diagrams provided in Appendix A, the majority of wells do not appear to screen substantial saturated zones directly above the bedrock. For example, the materials surrounding the bottom 9.5 feet of the screened interval in SS004-MW-01 are described as "dry" shale and claystone yet, the well contains approximately 15 feet of water. Furthermore, the materials surrounding the bottom 13 feet of the screened interval in SS004-MW-02 are described

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as dry shale-claystone and limestone; however, the well contains about four feet of water. It is possible that the upper portions of the screen and/or filter pack intervals may intercept thin zones of perched water, which are draining into the wells. The sources of water in the monitoring wells should be identified, and targeted for further hydrogeologic investigation.

2. Because Versar was unable to locate uniform water-bearing zones beneath the sites, groundwater flow directions were not determined. However, based on the close proximity of Scope Creek to the sites, regional flow within the shallow groundwater zone was presumed to be toward the Creek. Additional hydrogeologic investigation is necessary in order to determine actual local groundwater flow directions within the uppermost water-bearing unit at each of the sites. It should be noted that "perched" water would be expected to flow in response to the orientation of the underlying semi-impermeable zone, and may not necessarily mimic surface topography or be related to surface drainage, especially in cases such as this, where surface drainages are intermittent.

3. The purpose of this project was to "perform a groundwater assessment at the four sites to determine the presence or absence of groundwater contamination." The presence or absence of groundwater contamination cannot be confirmed until it can be shown that groundwater samples have been collected from locations hydraulically downgradient of the sites.

4. If a sufficient volume of groundwater was not observed in a direct-push borehole, the borehole was reportedly "backfilled to grade with bentonite." The specific type of bentonite used to backfill the borehole should be described. The Well Registration Record provided in Appendix A indicates that both "bentonite slurry" and "bentonite powder" were used to backfill the test holes, however, the number of gallons of water per bag of bentonite was "N/A." Please explain.

Specific Comments:

5. Page 4, Section 1.2, Paragraph 1. According to the text, Sites SS003, SS004, SS006, and SS009 are located in Cass County, Missouri. A comparison of Figures 1-1 and 1-2 indicates that, while Site SS003 is located in Cass County, Sites SS004, SS006, and SS009 are located in Jackson County.

6. Page 5, Section 1.3.1, Paragraph 1. Three sediment samples and one surface water sample were collected from a drainage ditch along the western edge of Site SS003. It is unclear whether this drainage ditch receives runoff from the former source area at Site SS003. According to the Belton 7.5-minute quadrangle, as well as topographic

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contours presented on the map of Figure 1-3, topography in the area of Site SS003 slopes to the east or southeast. In addition, the presumed hydraulic downgradient direction is to the south or southeast (see Page 24, Section 4.1, Monitoring Well Installation, Paragraph 1)

7. Page 7, Section 1.3.2, Paragraph 1: Surface water runoff in this area would reportedly flow into a grassy drainage ditch along the western part of the site. However, according to the Belton 7.5-minute quadrangle, the topography in the area of Site SS004 slopes to the east or southeast. In addition, according to Figure 1-4 (Page 9), the estimated direction of groundwater flow is to the east in the vicinity of the site. A detailed topographic map should be included and an explanation of the relationship between surface water runoff and estimated groundwater flow directions should be provided.

8. Page 11, Paragraphs 3 and 4: Fifteen borings were drilled at Site SS009 in 1994. According to the text, TPH was detected in only one of these borings, at a concentration below the MDNR soil cleanup guideline for TPH-impacted soil. However, a small area of contaminated soil was also reportedly encountered near the site of the former excavation. It is unclear whether these contaminated areas have since been excavated.

9. Page 13, Section 2.2, Paragraph 2: According to this paragraph, Scope Creek is an intermittent stream. However, according to other Richards-Gebaur reports, Scope Creek is largely intermittent in its headwaters, but becomes perennial in the northeast part of the facility, where it joins the Little Blue River.

10. Page 13, Section 2.2, Paragraph 2: The text states that surface water supplies are limited in the Saline Province. Please define and describe the "Saline Province."

11. Page 14, Paragraph 2: According to the text, the Lane Formation is a medium gray to bluish-gray shale that is commonly silty in the upper part. It should be noted that "Several feet of massive to cross-bedded sandstone is present near the top of the Lane in exposures on the Richards-Gebaur U.S. Air Force Base. Lenses of conglomerate consisting of locally derived particles of limestone, shale, chert, and carbonized wood are interbedded with the cross-bedded sandstone." (Gentile, Richard J., Geology of the Belton Quadrangle, Missouri Department of Natural Resources - Division of Geology and Land Survey Report of Investigation, Number 69, p. 23)

12. Page 14, Section 2.4, Paragraph 1: A 1976 USGS publication reportedly indicates that OL-Q is located within the Osage Salt Plains groundwater area on the Central Nonglaciaded Plains groundwater region. This publication should be listed as a

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reference in Section 6.0 (Pages 41 to 42).

13. Page 16, Figure 3-1 This map should contain a north arrow

14. Page 19, Figure 3-4 Two of the direct-push borings depicted on this map are labeled as "HP07," while none of the borings are labeled as "HP08 "

15. Page 21, Paragraph 1 Soil cuttings obtained through air rotary drilling were screened for VOCs using a PID. Reliability of such screening is questionable, due to the potential for volatilization of VOCs during air rotary drilling

16. Page 22, Paragraph 1: Due to extremely low recharge rates, a sufficient volume of groundwater was not recovered for *in situ* measurements at the end of purge for several of the wells. It is unclear whether ex-situ measurements were taken

17. Page 25, Paragraph 2: Based on Versar's observations, the shallow groundwater encountered appears to be "perched" above the bedrock (in the unconsolidated sediments and weathered bedrock) However, according to the boring log and well construction diagram provided in Appendix A, SS003-MW-02 is screened entirely within the bedrock, but contains approximately two feet of water. This indicates a water-producing zone within the bedrock at MW-02.

18. Page 26, Table 4-1 Information regarding direct-push borehole SS009-HP-05 has been omitted from this table

19. Page 28, Groundwater Sampling Results VOCs were detected at low concentrations in the samples collected from well SS004-MW-01, which was presumed to be a hydraulically upgradient well. This may indicate that the estimated groundwater flow direction is incorrect. Additional hydrogeologic investigation should be conducted

20. Page 31, Site Geology and Hydrogeology, Paragraph 2 Based on Versar's observations, the shallow groundwater encountered appears to be "perched" above the bedrock (in the unconsolidated sediments and weathered bedrock) However, according to the boring log and well construction diagram provided in Appendix A, SS006-MW-01 is screened entirely within the bedrock but contains approximately seven feet of water. This indicates a water-producing zone within the bedrock at MW-01

21 Page 34, Paragraph 2: According to the text, temporary well SS009-PZ-02 was located on the *northwestern* side of the previously excavated areas. However,

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according to Figure 3-4 (Page 19), this temporary well was located *southeast* of the excavated area.

22. Page 34, Paragraph 2 According to the text, temporary well SS009-PZ-03 was completed to bedrock (13 feet beg) However, according to information presented in Table 4-1 (Page 26), the depth to bedrock at PZ-03 was 14 feet

23. Page 34, Paragraph 2 Because temporary well SS009-PZ-03 did not contain a sufficient volume of water, well SS004-MW-01 was "used as the upgradient well" for Site SS009. Because the groundwater flow direction was not determined at Site SS009, the wells should not be referred to as either "upgradient" or "downgradient "

24. Page 35, Paragraph 2: The concentrations of arsenic, chromium, lead and barium detected in groundwater at Site SS009 are described as "relatively low " It should be noted that MCLs were exceeded for each of these analytes

25. Page 39, Section 5.2: Groundwater flow directions have not been determined It is, therefore, not known whether the existing wells are upgradient or downgradient of the site. These data gaps are unacceptable. Groundwater flow directions must be determined in order to ascertain whether the groundwater has been impacted by soil contamination at the various sites

26. Page 39, Section 5.2. The statement is made that although groundwater flow directions are unknown, since borings were completed "around the perimeter of most of the sites," and evidence of contamination was either not observed or contaminants were only detected at "relatively low concentrations" (i.e., based on field screening of the soil samples and groundwater sampling results), the actual determination of groundwater flow direction does not impact the overall conclusions of this study It should be noted that field screening consisted only of screening soil cuttings for VOCs using a PID Contaminants of concern include compounds other than VOCs In addition, the use of air during drilling could volatilize VOCs, so that they may not be detected, regardless of whether or not they were initially present Furthermore although boreholes may have been completed around the perimeter of the sites in most cases, groundwater monitoring wells were not Finally, Missouri Department of Natural Resources disagrees with the claim that "the actual determination of groundwater flow direction does not impact the overall conclusions of this study " If the groundwater flow direction is unknown, analytical results from the existing wells are insufficient for confirmation of the presence or absence of groundwater contamination at the site It is necessary to determine the groundwater flow direction to ensure that groundwater was sampled at the proper locations

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27 Page 39, Section 5.3, Bullet 2: Versar recommends no additional environmental activities be performed at Sites SS003, SS004, and SS006 and that case closure be granted for each of those sites, based partially on the idea that the target compounds were either not detected or detected at "relatively low concentrations" in the groundwater samples. It is necessary to first determine whether the groundwater samples collected were hydrologically downgradient of the site. It should also be noted that some of the contaminants were detected above their respective MCLs.

Recommendations:

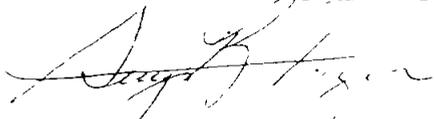
28. The text refers to this investigation as a "preliminary groundwater assessment" (Page 23, Section 3.6, Paragraphs 1 and 4). Results of this "preliminary assessment" indicate that the hydrogeology of the area is somewhat complex and may consist of multiple zones of perched water. In order to further define the hydrogeology at Sites SS003, SS004, SS006, and SS009, additional investigation is necessary. Because direct-push technology and air rotary drilling are not ideal techniques for the investigation of potential perched zones, which may be difficult to recognize during drilling operations, Missouri Department of Natural Resources recommends that additional boreholes be advanced using a hollow stem auger (HSA) and that a split spoon sampler be used to continuously sample the soils. Use of this method should improve the ability to detect horizons suitable for monitoring.

29. In the event that a persistent water-bearing unit can be identified through the use of an HSA, then groundwater flow direction should be determined, and downgradient groundwater samples collected and analyzed.

Please contact me at (573) 751-2506 with any questions regarding these comments.

Sincerely,

HAZARDOUS WASTE PROGRAM



Guy Frazier, Project Manager, DOD Unit
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GF:lg

c. Bob Koke, EPA
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