



**Department of Energy**  
Savannah River Operations Office  
P.O. Box A  
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JAN 24 2022

Ms. Susan B. Fulmer, P. G., Manager  
Federal Facility Agreement Section  
Division of Site Assessment, Remediation and Revitalization  
Bureau of Land and Waste Management  
South Carolina Department of Health and Environmental Control  
2600 Bull Street  
Columbia, South Carolina 29201

Mr. Jon Richards  
Savannah River Site Remedial Project Manager  
Superfund Division  
U. S. Environmental Protection Agency, Region 4  
61 Forsyth Street, SW  
Atlanta, Georgia 30303

Dear Ms. Fulmer and Mr. Richards:

**SUBJECT:** Savannah River Site's Responses to the Regulatory Comments on the 2020 K-Area Burning/Rubble Pit and Rubble Pile (131-K and 631-20G) (KBRP) and P-Area Burning/Rubble Pit (131-P) (PBRP) Operable Units Combined Groundwater Monitoring Report (Sampling Summary) SEMS Numbers: 40 and 59

In accordance with the terms of the Federal Facility Agreement, the U. S. Department of Energy (DOE) is submitting the subject comment responses for your review. The U.S. Environmental Protection Agency's (EPA) comments were received on October 5, 2021 and the South Carolina Department of Health and Environmental Control's (SCDHEC) approval was received on October 26, 2021. This report will not be revised; however, the comment response will be included in the next report, as applicable. Please review the response and provide your approval thirty (30) days from receipt. The effort and time that the SCDHEC and the EPA have given on the subject operable units are greatly appreciated.

Questions from you or your staff may be directed to me at (803) 952-8365, or DOE Program Manager, Mr. Philip Prater, at (803) 952-9333.

Sincerely,

**Brian T.  
Hennessey**

Digitally signed by Brian T.  
Hennessey  
Date: 2022.01.19 17:19:34  
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Brian T. Hennessey  
SRS Remedial Project Manager  
Infrastructure and Area Completion Division

JAN 24 2022

Ms. Susan Fulmer  
Mr. Jon Richards

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Enclosure:

SRS Responses to EPA Comments on the 2020 K-Area Burning/Rubble Pit and Rubble Pile (131-K and 631-20G) (KBRP) and P-Area Burning/Rubble Pit (131-P) (PBRP) Operable Units Combined Groundwater Monitoring Report (Sampling Summary) SEMS Numbers: 40 and 59

cc w/o encl:

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### Review Comments

- 1. K-Area Burning/Rubble Pit (KBRP) Operable Unit (OU), Page 2:** The sampling frequency at monitoring well KRP 9 is not clearly understood. For example, the last paragraph indicates based on exceeding the maximum contaminant levels (MCLs) for tetrachloroethylene (PCE) and trichloroethylene (TCE) in 2018, the project team initiated an increase in sampling frequency to semi-annually at well KRP 9. However, according to Figure 2 (Time-Series Plots of PCE and TCE for KRP 9), Page 5, it appears only annual sampling has occurred at KRP 9 since 2018. *Please revise the 2020 K-Area Burning/Rubble Pit and Rubble Pile (131-K and 631-20G) (KBRP) and P-Area Burning/Rubble Pit (131-P) (PBRP) Operable Units Combined Groundwater Monitoring Report (Sampling Summary), SEMS Numbers: 40 and 59, ARF-023256, June 29, 2021 (2020 Sampling Report) to address the discrepancy in the reported sampling frequency at KRP 9, and clarify when the increased sampling frequency is scheduled to begin.*

#### **Response: Clarification.**

**Groundwater monitoring at well KRP 9 was increased to semi-annual sampling starting in the second quarter of 2021. The 2021 groundwater monitoring report that is due in June 2022 will include the results of the semi-annual sampling at this well.**

**In future reports, an explanation of the additional sampling will be included such as the following:**

**“Based on exceeding the MCLs for PCE and TCE in 2018, the project team has initiated an increase in sampling frequency from annual to semi-annual at well KRP 9 starting in the second quarter of 2021 to facilitate our understandings of the need for continued monitoring at this unit. The USEPA’s groundwater monitoring guidance, *Recommended Approach for Evaluating Completion of Groundwater Restoration Remedial Actions at a Groundwater Monitoring Well* (OSWER 9283.1-44, August 2014), recommends a minimum number of data points to evaluate each phase of groundwater monitoring. Per this guidance, four data points are required for the remediation monitoring phase and eight data points for the attainment monitoring phase. Since KRP 9 is the only well that has had an exceedance since 2008, the eight data points required to reach unit closure could be obtained at a faster rate by increasing the sampling frequency from annual to semi-annual.”**

**Responsible Party: Justin Steadman, (803) 952-7346, [justin.steadman@srs.gov](mailto:justin.steadman@srs.gov)**

- 2. P-Area Burning/Rubble Pit (PBRP) OU, Page 7:** Based on the information presented, the groundwater flow direction at the PBRP OU is uncertain. For example, the text in this section states the groundwater flow is to the southwest as shown on Figure 7 (PBRP Monitoring Well Network, 1,1-DCE Values, and Water Elevation Measurements During 4Q2020), Page 12. However, based on the northeast-southwest linear alignment of monitoring wells PRP 5, PRP 6 and PRP 7, insufficient triangulation between the monitoring

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wells creates uncertainty in the groundwater flow direction. To reduce the uncertainty, a monitoring well on the north side of the PBRP OU is needed to address this data gap in local groundwater flow direction. Based on the topographic contours, southeasterly groundwater flow towards Steel Creek is probable. *Please revise the 2020 Sampling Report to address this issue to ensure groundwater flow direction at the PBRP OU is adequately characterized.*

**Response: Clarification.**

Sampling optimizations that were developed and approved by USEPA and SCDHEC and presented in the *Standardizing Sampling and Reporting Requirements P, L and K Area Burning Rubble Pits* (see ACP-08-133, dated January 15, 2008) continued at PBRP in 2020. The approved groundwater network consists of three wells (PRP 5, PRP 6 and PRP 7). As an alternative to installing an additional well to the north side of the PBRP OU, SRS plans to augment the existing monitoring network with the addition of existing wells as described below.

Several wells within the P Area are sampled for synchronous water elevations in the first and third quarters as part of the P-Area Groundwater (PAGW) OU network (including wells PRP 1A and PRP 2, located north of the PBRP OU). Figure 1 (attached) shows the potentiometric surface based on this larger set of wells. Water elevations gathered from several wells within the PAGW OU monitoring network, near the PBRP OU, will be used to construct a more comprehensive potentiometric surface to provide sufficient triangulation and reduce the uncertainty associated with groundwater flow beneath the unit.

A table that is similar to Table 1 below will be included in future reports to identify the wells used to determine the potentiometric surface. An explanation of the additional wells that help with determining groundwater flow direction will also be included with language similar to the following:

“To better define the groundwater flow direction beneath the PBRP OU, selected wells from within the PAGW OU monitoring network (Table 1) will be used to help evaluate the potentiometric surface in the area. All water elevations will be collected in the third quarter of the year.”

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**Responsible Party:** Justin Steadman, (803) 952-7346, [justin.steadman@srs.gov](mailto:justin.steadman@srs.gov)

3. **P-Area Burning/Rubble Pit (PBRP) OU, Page 7:** The text does not discuss that due to the exceedances of respective MCLs at monitoring well PRP 6, the 1,1-dichloroethylene (DCE) and TCE plumes are not laterally defined, particularly to the southeast. Additionally, the text does not present a discussion of whether the vertical extent of contamination is defined. *Please revise the 2020 Sampling Report to discuss the need to define the lateral and vertical extents of contamination at PRP 6 as needed to address the MCLs exceedances in this well.*

**Response:** Clarification.

SRS's understandings of the lateral and vertical extent beneath the PBRP OU includes the following:

Within the Steel Creek, three surface water stations (SC-02, SC-03 and SC-04) are sampled downgradient of the PBRP OU as part of the PAGW OU. In 2018, several shallow wells (PSC series) were also installed along Steel Creek as part of the PAGW OU investigation to identify localized impacts to Steel Creek from existing PAGW OU VOC plumes. The PAGW OU monitors several volatile organic compounds (VOCs) including 1,1-DCE, cis-1,2-DCE, and TCE at each of these monitoring stations. Surface water location SC-03 has traditionally exhibited elevated levels of TCE and is currently the primary area where the PAGW OU VOC plume is discharging based on concentrations from previous investigations and data from the shallow wells installed near Steel Creek. SRS believes that any impact to Steel Creek from the PBRP OU is insignificant based on years of no detections of 1,1-DCE within Steel Creek (Table 2). This is consistent with the low concentrations in groundwater associated with the PBRP OU, and accounting for physical monitored natural attenuation (MNA) mechanisms including diffusion and dispersion. SRS is also proposing to monitor for 1,4-dioxane at surface water stations SC-02 and SC-03 to discern if the contaminants of concern at the PBRP OU have any impact to Steel Creek.

In addition, the RFI/RI/BRA for the PBRP OU (WSRC-RP-98-4174, Revision 1.1, April 2001) determined that there was no problem warranting additional or separate action for the segment of Steel Creek located adjacent to the PBRP OU.

Due to the proximity of PBRP to Steel Creek and the presence of a locally continuous clay layer (the "tan clay") below the upper portion (UAZ) of the UTRA, it is expected that any dissolved contamination present in the Upper Aquifer Zone would move laterally towards Steel Creek rather than vertically deeper.

In future reports, a discussion of the lateral and vertical extent of contamination will be included with language similar to the following:

"The water table aquifer beneath the PBRP OU represents the "upper" aquifer zone of the UTRA. The top of the upper aquifer zone is approximately 23 ft below ground

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surface and approximately 57 ft thick down to a locally continuous clay layer (the “tan clay”). The water table aquifer discharges to Steel Creek, 250 ft south of the PBRP OU. Therefore, the lateral extent of the groundwater contamination at the PBRP OU is defined by the Steel Creek and the vertical extent of contamination is likely bounded by the local confining layer.”

**Responsible Party:** Justin Steadman, (803) 952-7346, [justin.steadman@srs.gov](mailto:justin.steadman@srs.gov)

4. **P-Area Burning/Rubble Pit (PBRP) OU, Page 7:** The last paragraph states Savannah River Site will continue to monitor groundwater annually for the constituents of concern identified in Table 2 to determine if the elevated results observed in fourth quarter 2020 are reproduced. However, it is unclear if continued exceedances of MCLs in monitoring well PRP 6 will trigger a recommendation to increase PRP-6 sampling frequency to semiannually. *Please revise the 2020 Sampling Report to clarify if continued exceedances of MCLs in monitoring well PRP 6 will trigger a recommendation to increase PRP-6 sampling frequency to semiannual.*

**Response:** Clarification.

Due to the significant rise in concentrations at well PRP 6, it is unlikely that results will decrease below the MCL for some time. Constituents that exceeded the MCL during 2020 have been sampled in 2021 and are included in Table 3 below.

In future reports, the PBRP OU section will include text similar to the following:

“If increasing trends in TCE or 1,1-DCE are observed at monitoring well PRP 6 in 4Q22, the project team will recommend that the sampling frequency be increased to semi-annual.”

**Responsible Party:** Justin Steadman, (803) 952-7346, [justin.steadman@srs.gov](mailto:justin.steadman@srs.gov)

5. **Figure 7, PBRP Monitoring Well Network, 1,1-DCE Values, and Water Elevation Measurements During 4Q2020, Page 12:** The dark-colored rectangle-shaped PBRP OU depicted on the figure is not defined in the figure legend. *Please revise the figure legend to address this issue so the PBRP OU is clearly defined.*

**Response:** Agree.

In future reports, Figure 7 will be revised to define the PBRP OU within the legend.

**Responsible Party:** Justin Steadman, (803) 952-7346, [justin.steadman@srs.gov](mailto:justin.steadman@srs.gov)

SRS Responses to U.S. Environmental Protection Agency Comments on 2020 K-Area Burning/Rubble Pit and Rubble Pile (131-K And 631-20g) (KBRP) and P-Area Burning/Rubble Pit (131-P) (PBRP) Operable Units Combined Groundwater Monitoring Report (Sampling Summary), SEMS Numbers: 40 and 59, ARF-023256, Dated June 29, 2021

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**Table 1. Synchronous Water Elevation Network**

<b>Station</b>	<b>Water Elevation Reference</b>	<b>Easting (UTM NAD 27)</b>	<b>Northing (UTM NAD 27)</b>
PGW014DU	277.8	445264.8	3676551.7
PRP 1A	284.7	445122.9	3676625.5
PRP 2	286.6	445164.1	3676670.5
PRP 5	287.8	445281.4	3676683.9
PRP 6	281.9	445186.9	3676616.7
PRP 7	282.0	445156.2	3676605.5
PSC002D1	239.0	445157.9	3676510.7

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**Table 2. 1,1-DCE Concentrations from within Steel Creek**

Station	Collection Date	Analyte	MDL	PQL	EPA Storet Codes	Lab Qualifier	Result	Unit
SC-02	8/19/2002	1,1-DICHLOROETHYLENE	0.17	1		U	1	ug/L
SC-03	8/19/2002	1,1-DICHLOROETHYLENE	0.17	1		U	1	ug/L
SC-04	8/19/2002	1,1-DICHLOROETHYLENE	0.17	1		U	1	ug/L
SC-02	11/20/2002	1,1-DICHLOROETHYLENE	0.17	1		U	1	ug/L
SC-03	11/20/2002	1,1-DICHLOROETHYLENE	0.17	1		U	1	ug/L
SC-04	11/20/2002	1,1-DICHLOROETHYLENE	0.17	1		U	1	ug/L
SC-02	3/11/2003	1,1-DICHLOROETHYLENE	0.11	1		U	1	ug/L
SC-03	3/11/2003	1,1-DICHLOROETHYLENE	0.11	1		U	1	ug/L
SC-04	3/11/2003	1,1-DICHLOROETHYLENE	0.11	1		U	1	ug/L
SC-02	5/29/2003	1,1-DICHLOROETHYLENE	0.11	1		U	1	ug/L
SC-03	5/29/2003	1,1-DICHLOROETHYLENE	0.11	1		U	1	ug/L
SC-04	5/29/2003	1,1-DICHLOROETHYLENE	0.11	1		U	1	ug/L
SC-02	8/21/2003	1,1-DICHLOROETHYLENE	0.11	1		U	1	ug/L
SC-03	8/21/2003	1,1-DICHLOROETHYLENE	0.11	1		U	1	ug/L
SC-04	8/21/2003	1,1-DICHLOROETHYLENE	0.11	1		U	1	ug/L
SC-02	11/18/2003	1,1-DICHLOROETHYLENE	0.11	1		U	1	ug/L
SC-03	11/18/2003	1,1-DICHLOROETHYLENE	0.11	1		U	1	ug/L
SC-04	11/18/2003	1,1-DICHLOROETHYLENE	0.11	1		U	1	ug/L
SC-02	3/9/2004	1,1-DICHLOROETHYLENE	0.11	1		U	1	ug/L
SC-03	3/9/2004	1,1-DICHLOROETHYLENE	0.11	1		U	1	ug/L
SC-04	3/9/2004	1,1-DICHLOROETHYLENE	0.11	1		U	1	ug/L
SC-02	6/2/2004	1,1-DICHLOROETHYLENE	0.11	1		U	1	ug/L
SC-03	6/2/2004	1,1-DICHLOROETHYLENE	0.11	1		U	1	ug/L
SC-04	6/2/2004	1,1-DICHLOROETHYLENE	0.11	1		U	1	ug/L
SC-02	9/13/2004	1,1-DICHLOROETHYLENE	1	2		U	2	ug/L
SC-03	9/13/2004	1,1-DICHLOROETHYLENE	1	2		U	2	ug/L
SC-04	9/13/2004	1,1-DICHLOROETHYLENE	1	2		U	2	ug/L
SC-02	3/3/2005	1,1-DICHLOROETHYLENE	1	2		U	2	ug/L
SC-03	11/5/2007	1,1-DICHLOROETHYLENE	1	2		U	2	ug/L
SC-03	6/11/2008	1,1-DICHLOROETHYLENE	0.79	2		U	2	ug/L
SC-02	12/10/2008	1,1-DICHLOROETHYLENE	0.79	2		U	2	ug/L
SC-03	12/10/2008	1,1-DICHLOROETHYLENE	0.79	2		U	2	ug/L

**Table 2. 1,1-DCE Concentrations from within Steel Creek (cont'd/end)**

**SRS Responses to U.S. Environmental Protection Agency Comments on 2020 K-Area  
Burning/Rubble Pit and Rubble Pile (131-K And 631-20g) (KBRP) and P-Area Burning/Rubble Pit  
(131-P) (PBRP) Operable Units Combined Groundwater Monitoring Report (Sampling Summary),  
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Station	Collection Date	Analyte	MDL	PQL	EPA Storet Codes	Lab Qualifier	Result	Unit
SC-02	6/16/2009	1,1-DICHLOROETHYLENE	0.79	2		U	2	ug/L
SC-03	6/16/2009	1,1-DICHLOROETHYLENE	0.79	2		U	2	ug/L
SC-02	12/1/2010	1,1-DICHLOROETHYLENE	0.083	0.5		U	0.5	ug/L
SC-03	12/1/2010	1,1-DICHLOROETHYLENE	0.083	0.5		U	0.5	ug/L
SC-04	12/1/2010	1,1-DICHLOROETHYLENE	0.083	0.5		U	0.5	ug/L
SC-03	6/22/2011	1,1-DICHLOROETHYLENE	0.12	2		U	2	ug/L
SC-04	6/22/2011	1,1-DICHLOROETHYLENE	0.12	2		U	2	ug/L
SC-03	6/26/2012	1,1-DICHLOROETHYLENE	0.083	0.5		U	0.5	ug/L
SC-04	6/26/2012	1,1-DICHLOROETHYLENE	0.083	0.5		U	0.5	ug/L
SC-03	12/11/2012	1,1-DICHLOROETHYLENE	0.083	0.5	21	J	0.13	ug/L
SC-04	12/11/2012	1,1-DICHLOROETHYLENE	0.083	0.5		U	0.5	ug/L
SC-02	6/17/2013	1,1-DICHLOROETHYLENE	0.3	1		U	1	ug/L
SC-03	6/17/2013	1,1-DICHLOROETHYLENE	0.3	1		U	1	ug/L
SC-04	6/17/2013	1,1-DICHLOROETHYLENE	0.3	1		U	1	ug/L
SC-03	11/13/2013	1,1-DICHLOROETHYLENE	0.08	1		U	1	ug/L
SC-04	11/13/2013	1,1-DICHLOROETHYLENE	0.08	1		U	1	ug/L
SC-03	11/3/2014	1,1-DICHLOROETHYLENE	0.08	1		U	1	ug/L
SC-04	11/4/2014	1,1-DICHLOROETHYLENE	0.08	1		U	1	ug/L
SC-03	11/17/2015	1,1-DICHLOROETHYLENE	0.08	1		U	1	ug/L
SC-04	11/17/2015	1,1-DICHLOROETHYLENE	0.08	1		U	1	ug/L
SC-02	4/3/2019	1,1-DICHLOROETHYLENE	0.333	1		U	1	ug/L
SC-03	4/3/2019	1,1-DICHLOROETHYLENE	0.333	1		U	1	ug/L
SC-04	4/3/2019	1,1-DICHLOROETHYLENE	0.333	1		U	1	ug/L
SC-02	2/5/2020	1,1-DICHLOROETHYLENE	0.333	1		U	1	ug/L
SC-03	2/5/2020	1,1-DICHLOROETHYLENE	0.333	1		U	1	ug/L
SC-04	2/5/2020	1,1-DICHLOROETHYLENE	0.333	1		U	1	ug/L
SC-02	2/8/2021	1,1-DICHLOROETHYLENE	0.333	1		U	1	ug/L
SC-03	2/8/2021	1,1-DICHLOROETHYLENE	0.333	1		U	1	ug/L
SC-04	2/8/2021	1,1-DICHLOROETHYLENE	0.333	1		U	1	ug/L

21 result is above the detection limit but less than quantitation limit

MDL method detection limit

PQL practical quantitation limit

U non-detect value

J estimated value

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Table 3. PBRP OU Groundwater Data for 2021

Analyte	MCL (µg/L)	4Q2021 (µg/L)		
		PRP 5	PRP 6	PRP 7
1,1-Dichloroethylene (1,1-DCE)	7	ND	<b>15</b>	2.1
Trichloroethylene (TCE)	5	ND	<b>32</b>	1.9

ND = Not Detected

**Bold** values exceed the respective MCL/RSL

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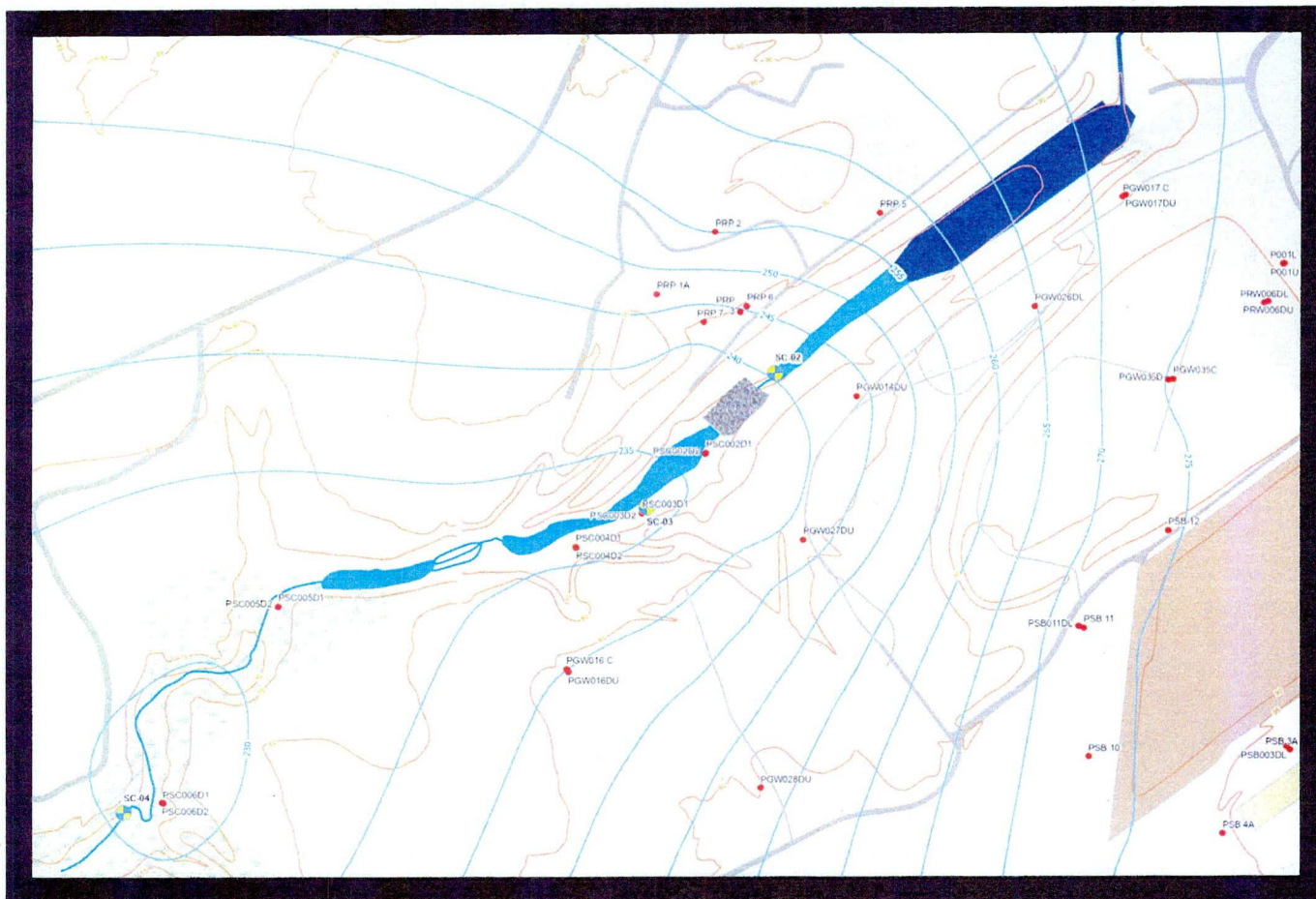


Figure 1. PAGW OU Upper Aquifer Zone Potentiometric Surface