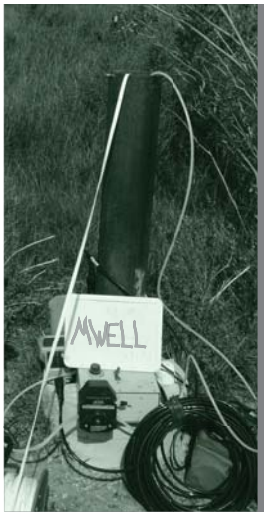
SECTION 5
Response Action Program



ULTRA PETROLEUM

QEP ENERGY

GROUNDWATER POLLUTION PREVENTION, MONITORING AND RESPONSE ACTION PLAN

Pinedale Anticline Project Area
Sublette County, Wyoming

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5.0 RESPONSE ACTION PROGRAM

The Response Action Program (RAP) is the third of three interrelated programs that form the Groundwater Pollution Prevention, Monitoring and Response Action Plan (Plan). The primary goal of the RAP is to specify responses to measured exceedences of established water quality thresholds. This section describes the conditions that must occur to launch the RAP, and the process steps associated with implementing the RAP. The RAP is not absolutely prescriptive; rather it was designed to permit flexibility in responding to a variety of possible future situations.

Besides describing key components of the RAP, this section discusses the overall Plan review cycle, and how success of the overall Plan will be measured. The regular "review cycle" to be held by regulatory and Operator representatives assigned to the Review Team (**Section 1.5.2**) is an important part of the Plan, and provides opportunities to scrutinize results of implementing the Plan and offer suggestions to adapt or amend the Plan, if necessary.

5.1 PROGRAM INITIATION

Three conditions would trigger implementation of the RAP:

1. ***Condition No. 1: Water Quality Threshold Exceeded*** – Groundwater quality results for a Groundwater Monitoring Program (GMP) well(s) exceed an absolute value threshold for a monitored parameter, show a statistically significant increase in concentration of at least one parameter, and/or show an increase in dissolved methane of at least 5 milligrams per liter (mg/L) (see **Section 4.4** and **Figure 4-12**). Given the strategy for the GMP, it is understood that the particular well that exceeded a water quality threshold has already been resampled and reanalyzed to confirm the water quality threshold exceedance.
2. ***Condition No. 2: Existing Hydrogeologic Conceptual Model Needs Revision*** – Data developed through implementation of the GMP indicate that the existing hydrogeologic conceptual model presented in AMEC (2012, 2013) needs to be changed or improved. These data could include: supplemental geologic information obtained when drilling new water supply or monitoring wells in areas of the PAPA that don't currently have wells; additional groundwater elevation data that may improve the understanding of groundwater flow; and/or new groundwater quality data that suggest the conceptual model should be revised.
3. ***Condition No. 3: BMP Failed or Absent*** – During employment of best management practices (BMPs) described in **Section 3.0**, evidence is available that indicates an existing BMP has failed, or information becomes available that a BMP is needed for a new or existing E&P activity.

If one of the conditions described above has occurred, the Bureau of Land Management's (BLM's) Project Lead will assemble the Review Team and make the determination of launching the RAP (see **Section 5.2**). This may occur during a regular Plan review cycle or immediately after BLM's Project Lead is notified of one of the defined conditions triggering the RAP. The RAP communication and notification process is described in **Section 5.2.5**.

If groundwater quality data obtained through implementation of the GMP confirms that one of the monitored parameters ***exceeds*** a Wyoming Department of Environmental Quality (DEQ) standard (see

Table 4-4), BLM's Project Lead will notify the well owner and DEQ. The water quality situation in the well would then be under the regulatory supervision of DEQ and not under this RAP. However, if information becomes available to the BLM Project Lead that the cause of the water quality exceedance is the result of a failed or absent BMP, the RAP would be launched to remedy the BMPs in the Pollution Prevention Program (**Section 3.0**).

5.2 RESPONSE ACTION PROCESS

Figure 5-1 shows the various process steps for the RAP. If one of the three conditions identified in **Section 5.1** occurs, BLM's Project Lead will initiate and direct the RAP. The following sections and **Figure 5-1** outline the response action process steps.

5.2.1 Establish Working Group

BLM's Project Lead will contact the Review Team and inform the regulatory and Operator representatives of the specific condition that caused the RAP to launch. A small Working Group made up of both regulatory and operator representatives will be chosen by the BLM Project Lead within 30 days of determining the RAP needs to be enacted. This Working Group, which may include the Operator's primary consultant/contractor, would then be assembled by BLM's Project Lead. The Working Group would initiate and direct the incremental response action process described in **Section 5.2.2.**

5.2.2 Incremental Response Approach

Objective O3.2 (see **Section 2.3**) specifies an incremental response approach for the RAP, owing in part to the relatively slow groundwater velocity in the PAPA. For Condition No. 1 (Water Quality Threshold Exceeded; **Section 5.1**), the initial response step for the GMP well(s) exhibiting the threshold exceedance will include quarterly monitoring for one year of all Core and Supplemental list parameters (**Figure 4-11**) to confirm or deny the exceedance (**Figure 5-1**).

Data generated during the one-year of quarterly monitoring will be compiled by the Operator's contractor and evaluated by the Working Group as follows (**Figure 5-1**):

1. Should any quarterly sampling result demonstrate that a DEQ water quality standard has been exceeded, the BLM Project Lead will contact the well owner and refer the situation to DEQ for regulatory supervision.
2. If quarterly sampling results:
    - do not reveal a continued exceedance of an absolute value threshold; and
    - show that dissolved methane concentrations in the GMP well during quarterly sampling remained at least 5 mg/L less than the sampling event that triggered the RAP; and
    - if the trend in concentrations from the triggering event through four quarters of sampling (i.e., five data points) does not show a statistically increasing trend per the Mann-Kendall test (see **Section 4.4**); then
    - the well will be referred back into the regular GMP (i.e., annual sampling).

3. However, if after four quarters of monitoring, the absolute value threshold continues to be exceeded, if dissolved methane remains at least 5 mg/L higher than the concentration from before the triggering event, or if there continues to be a statistically significant increasing trend in concentrations, then the Working Group will investigate the cause as described in **Section 5.2.3**.

The Working Group will also address the two other conditions that would launch the RAP (**Figure 5-1**): the existing hydrogeologic conceptual model needs revision (Condition No. 2); and/or a BMP has failed or is absent (Condition No. 3). To address Condition No. 2, the Working Group, directed by BLM's Project Lead, would convene and discuss the available data and information that indicate the existing conceptual model should be revised. The BLM, based on recommendations from the Working Group, may direct the Operators to develop a work plan to revise the conceptual model and explore the possible ramifications the change(s) would have on the Plan, if any. For instance, if groundwater level data in Wasatch HSU wells which are generated from implementing the GMP indicate a regional decline in groundwater elevations, how would this observation affect the GMP, if at all? The work plan (if required) would describe what revisions are necessary to the conceptual model and how they would be made. Once the Working Group accepts the work plan, and BLM approves the work plan, the Operators would revise the hydrogeologic conceptual model and make recommendations to the Working Group if the revisions would cause a need to revise any other component of the Plan (e.g., GMP). The BLM Project Lead would then inform the entire Review Team of the findings, and the BLM AO would approve the revised hydrogeologic conceptual model.

To address Condition No. 3 for launching the RAP, the Working Group would meet and discuss the evidence suggesting that an existing BMP failed and/or the circumstances indicating that a new BMP is required (e.g., due to an improvement in technology or new operational method) (**Figure 5-1**). The BLM, based on a recommendations from the Working Group, may direct the Operators to develop a work plan to revise the groundwater pollution prevention practices described in **Section 3.0**. BLM would approve the work plan to improve the pollution prevention practices. Once the pollution prevention practices have been revised, the improvements would be evaluated by the entire Review Team. If BLM's AO agrees with and approves the revised pollution prevention program, all PAPA operators would have to comply with the updated pollution prevention practices.

5.2.3 Investigate Cause of Water Quality Threshold Exceedence

The incremental response approach described above for Condition No. 1 is intended to methodically confirm that groundwater degradation has occurred, presumably as a result of E&P activities. To initiate an investigation into the cause of the threshold exceedance, BLM's Project Lead would convene a joint regulator-operator Working Group (**Figure 5-1**). Since the reason for an investigation is related to water quality issues, at least one member of the Working Group would be a DEQ representative. Although the subject well owner/operator cannot be specified for this RAP, it is assumed that one of the Operators would have operations at or near the GMP well site. This Operator would also be included as a member of the Working Group.

The Working Group would meet to discuss the elements of an investigation which may include records reviews, testing, and/or soil and groundwater investigations. The Working Group would define objectives for the investigation and identify the anticipated outcomes. The Operator(s) would be responsible to prepare a work plan to guide the investigation which will describe the scope of the

investigation, schedule, and deliverables. The work plan would be reviewed by the Working Group, revised as necessary, and approved by BLM and DEQ.

Findings from any investigation would be reviewed by the Working Group and evaluated with respect to cause and if remedial actions should be considered. If the cause of the groundwater degradation is determined to be a failed or absent BMP, the process steps described in **Section 5.2.2**, will be followed. It is difficult to predict what an investigation may determine, including the entity responsible for the groundwater degradation. Further details regarding the response to investigation findings would become apparent to the Working Group depending upon specific future circumstances; no further attempt is made in this RAP to describe the myriad of possible scenarios potentially associated with Condition No. 1, or if any modifications to any component of this Plan would be necessary.

One possible investigative finding, however, is that an exceedance of a water quality threshold (Condition No. 1) is not related to E&P activities. It is conceivable that some undefined natural condition could be responsible for a threshold exceedance. It is also possible that investigative findings could reveal that a non-E&P activity is responsible for a threshold exceedance. For all cases, the Working Group would evaluate the results of any investigation and not exclude these other possible causes for water quality threshold exceedances.

5.2.4 Evaluate BMPs

An important part of this Plan is groundwater pollution prevention. **Section 3.0** describes a comprehensive set of BMPs being employed by operators in the PAPA to prevent groundwater pollution during all E&P project phases. The process to address a failed BMP discovered as a result of groundwater monitoring is explained above for Condition No. 3. However, through continuous improvement values embraced by the oil and gas industry, improvements to the BMPs are expected over time. As E&P technology continues to advance, additional BMPs or modifications to existing BMPs may be appropriate in the future.

The Plan Review Cycle, described in **Section 5.3**, includes a regular annual evaluation by the Review Team of the suite of BMPs contained in **Section 3.0**. If the Review Team determines that an existing BMP needs to be revised, or suggests a new BMP is required, a Working Group will be established, and the Operators will lead the change effort by preparing a work plan (**Figure 5-1**). They will initially list the rationale for requiring a change to a BMP or a new BMP, as required by Objective O3.2. A detailed description of the BMP being modified or new BMP added, along with the associated rationale, will be prepared and provided to the Working Group for comment. After responding to any Working Group comments on the BMP(s), the Operators will propose the change to BLM's AO. The AO will make the final determination regarding a modified or new BMP. If approved, the Operators would make the necessary revisions to the Pollution Prevention Program (**Section 3.0**).

5.2.5 Communication and Notification

The BLM Project Lead has the primary responsibility for communication and coordination with the Review Team (Regulatory Team and Operator Team) and BLM's AO. Should groundwater monitoring results indicate that a DEQ groundwater standard was exceeded in a GMP well, the BLM Project Lead would also notify the well owner and DEQ of the occurrence. The chart on the following page

identifies responsibilities for a range of potential actions under this RAP and indicates who would be notified at specific junctures. Project participants are shown on **Figure 1-3**.

5.3 PLAN REVIEW CYCLE AND MEASURES OF SUCCESS

Objective O2.10 from the GMP and Objective O3.5 from the RAP both specify a regular Plan review cycle comprised of a regularly scheduled review of the entire Plan by the Review Team. The Plan Review Meetings will be a continual stop-gap for the Plan because all issues that arise that may affect the purpose of this Plan (protecting groundwater resources from potential impacts that could result from natural gas E&P activities) would be deliberately examined by the Review Team.

The Plan review cycle will be annually as a key topic of discussion is GMP results for the current year (see **Section 4.3.2**). This cycle may be modified in the future by BLM's AO based on the Review Team's regular evaluation of findings from implementing the pollution prevention, monitoring and response action programs. For instance, if all groundwater monitoring results have been below thresholds for several consecutive years, the Plan review cycle may be modified to an as-needed frequency.

BLM's Project Lead will schedule the annual Plan Review Meeting in conjunction with the regular Annual Planning Meeting held between the BLM and PAPA Operators at BLM's Pinedale Field Office, Pinedale, Wyoming. An agenda for the Plan Review meeting will be prepared by the BLM's Project Lead and distributed to the Review Team. At a minimum, the agenda would include the topics listed below, with particular attention given to evaluating whether the Plan is satisfying the objectives listed in **Section 2.0**.

- Changes to Review Team or Project Oversight Team members.
- Changes to operators or changes in natural gas operations in the PAPA.
- Pollution Prevention Program:
    - Evidence that any BMP needs to be modified or improved; and
    - Information regarding technological changes in E&P activities that may require a new BMP.

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RESPONSIBILITIES FOR NOTIFICATION AND COMMUNICATION

Potential Reason / Action		Responsible Party(ies)	Who Notified
Condition Reached to Trigger RAP		BLM Project Lead	Review Team
DEQ Groundwater Standard Exceeded		BLM Project Lead	Well Owner; DEQ; Review Team
Establish Working Group		BLM Project Lead	Review Team; Contractor
Condition No. 1	Conduct One-Year of Quarterly Monitoring for Well with a Threshold Exceedance and Compile Results	Operators Contractor	Working Group
	Threshold Exceedance Confirmed by Quarterly Monitoring	Working Group BLM Project Lead	Review Team
	Develop Objectives for Investigation into the Cause of Threshold Exceedance	Working Group BLM Project Lead	Review Team
	Prepare Work Plan to Investigate Cause of Threshold Exceedance	Operators Contractor	Working Group
	Review and Accept Work Plan to Investigate Cause of Threshold Exceedance	Working Group BLM Project Lead	Operators
	Complete Investigation and Summarize Findings	Operators Contractor	Working Group
	Further Investigation or Additional Responses to be Determined Based on Specifics of the Incident	BLM Project Lead Working Group Operators	Review Team
Condition No. 2	Prepare Work Plan to Revise Hydrogeologic Conceptual Model	Operators Contractor	Working Group
	Review and Accept Work Plan to Revise Hydrogeologic Conceptual Model	Working Group BLM Project Lead	Operators
	Revise Hydrogeologic Conceptual Model	Operators Contractor	Working Group
	Review and Comment on Revised Conceptual Model	Working Group	Operators
	Finalize Revised Hydrogeologic Conceptual Model	Operators	Working Group
	Approve Revised Hydrogeologic Conceptual Model	BLM AO	Review Team Public
Condition No. 3	Prepare Work Plan to Revise Groundwater Pollution Prevention Practices	Operators	Working Group
	Review and Accept Work Plan to Revise Groundwater Pollution Prevention Practices	Working Group BLM Project Lead	Operators
	Revise Groundwater Pollution Prevention Practices	Operators	Working Group
	Review and Comment on Revised Practices	Working Group	Operators
	Finalize Revised Pollution Prevention Practices	Operators	Working Group
	Approve Revised Groundwater Pollution Prevention Practices	BLM AO	Review Team; Public

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- Groundwater Monitoring Program:
    - Report on condition of monitoring wells;
    - Summary of changes in groundwater elevations;
    - Summary of groundwater quality results including trends, threshold exceedances, etc.;
    - Summary of any changes in dissolved methane concentrations in groundwater samples;
    - Discussion regarding any sampling or analytical laboratory issues that would necessitate revisions to SAP or QAPP;
    - Discussion of the effectiveness, continued relevance and appropriateness of:
        - the well network (modifications to add/remove wells),
        - Core and Supplemental List parameters,
        - sampling or laboratory analysis methods,
        - thresholds (absolute values or statistically significant concentration increases),
        - sampling frequency,
        - reporting system (including analysis tools and EDMS), and
        - existing hydrogeologic conceptual model.
    - Discussion of the reasons for retaining and maintaining the study wells and piezometers installed for the Hydrogeologic Data Gaps Investigation (AMEC 2012).
- Response Action Program:
    - If the RAP was triggered, summarize status of response actions; and
    - Discussion of need for improvements or modifications to the RAP.
- Sunsetting the Plan (an eventual occurrence):
    - Events, such as the cessation of natural gas production in all or portions of the PAPA, that would change the requirements for implementing all or portions of the Plan;
    - Well decommissioning and well site restoration; and
    - Disposition of Plan records (e.g., laboratory reports, field sampling records, EDMS, annual reports, etc.).

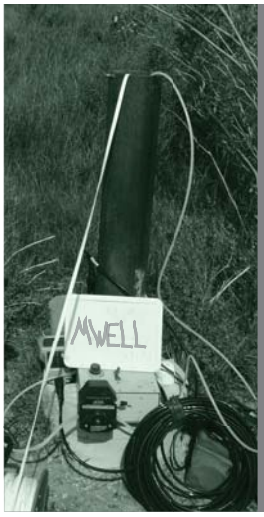
During each Plan Review Meeting, BLM's Project Lead will record minutes of the meeting. These would be distributed to the Review Team and posted to BLM's Pinedale Field Office website.

5.4 REFERENCES FOR SECTION 5.0

AMEC Environment & Infrastructure, Inc. (AMEC). 2012. Technical Report – Hydrogeologic Data Gaps Investigation, Interim Plan, Pinedale Anticline Project Area ROD, Sublette County, Wyoming, May.

_____. **2013**. Final Numerical Groundwater Modeling Report, Interim Plan. Pinedale Anticline Project Area ROD, Sublette County, Wyoming. October.

FIGURES



RESPONSE ACTION PROGRAM

CONDITIONS TO LAUNCH

Water Quality Threshold Exceeded — *or* — **Review Team Determines Hydrogeological Conceptual Model Needs Revision** — *or* — **Review Team Determines BMP Failed or Absent**

Exceed Water Quality Standard?

Yes → BLM Project Lead Refers Well to DEQ

No → **INITIATE RESPONSE ACTIONS**

BLM Project Lead Assembles Review Team

CONFIRM CONDITION

No → Continue Pollution Prevention and Groundwater Monitoring Programs

Yes

Establish Working Group for Threshold Exceedance

- Operators Conduct Quarterly Monitoring for One-Year for Core & Supplemental List Parameters
- Working Group Reviews Results

Is Threshold Exceedance Confirmed?

No → Continue Sampling Under GMP

Yes

- Working Group Investigates Cause & Develops Investigation Objectives
- Operators Prepare Work Plan for Working Group Review; BLM and DEQ Approve Work Plan
- Conduct Investigation
- Working Group Reviews Findings and Determines Course for Action, as Necessary

Establish Working Group for Comceptual Model Revision

- Operators Prepare Work Plan for Working Group Review
- Revise Conceptual Model
- Working Group Reviews and Comments on Revised Conceptual Model
- BLM's A.O. Approves Revised Hydrogeologic Conceptual Model
- Working Group Determines if Revised Conceptual Model Will Affect Existing GMP

No → Continue with the Existing GMP

Yes → Operators Responsible for:

- Preparing Work Plan for GMP Modification and Obtaining Approval from Working Group
- Revising the GMP
- Addressing Working Group Comments
- Obtaining BLM's A.O. Approval of the Revised GMP

Establish Working Group to Revise Groundwater Pollution Prevention Program Based on Failed or Absent BMP

- Operators Prepare Work Plan for Working Group Review
- Revise Pollution Prevention Program
- Working Group Reviews and Comments on Revised Pollution Prevention Program
- BLM's A.O. Approves Revised Pollution Prevention Program

NOTE: GMP - Groundwater Monitoring Program
A. O. - Authorized Officer

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Flowchart of the Response Action Program
Pinedale Anticline Project Area
Sublette County, Wyoming
FIGURE 5-1