



OFFICE OF  
**INSPECTOR GENERAL**  
U.S. DEPARTMENT OF THE INTERIOR

# **BUREAU OF LAND MANAGEMENT'S GEOTHERMAL RESOURCES MANAGEMENT**





OFFICE OF  
**INSPECTOR GENERAL**  
U.S. DEPARTMENT OF THE INTERIOR

MAR 07 2013

Memorandum

To: Neil Kornze  
Principal Deputy Director, Bureau of Land Management

From: Mary L. Kendall *Mary L. Kendall*  
Deputy Inspector General

Subject: Final Evaluation Report – Bureau of Land Management’s Geothermal Resources Management  
Report No. CR-EV-BLM-0004-2012

This memorandum transmits the results of our evaluation of the Bureau of Land Management’s (BLM) Geothermal Resources Management.

Given that the Nation faces significant challenges in meeting its current and future energy needs and that renewable energy, including geothermal, is a key part of this effort, it is important that BLM effectively manage geothermal operations on Federal lands.

Our review concluded that the Geothermal Resources Operational Orders are outdated and that BLM does not have a standardized geothermal inspection and enforcement program.

We make four recommendations to help BLM manage geothermal resources more effectively. BLM concurred with our recommendations and agreed to implement them. Based on management’s response to the draft report, we consider all four recommendations to be resolved but not implemented. We will refer these recommendations to the Assistant Secretary for Policy, Management and Budget to track their implementation. Accordingly, no further response to the Office of Inspector General on this report is necessary.

The legislation creating the Office of Inspector General requires that we report to Congress semiannually on all reports issued, actions taken to implement our recommendation, and recommendations that have been implemented.

We appreciated the cooperation and assistance of BLM staff. If you have any questions regarding this report, please call me at 202-208-5745.

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## Results in Brief

The Nation faces significant challenges in meeting its current and future energy needs. Renewable energy is one key aspect to addressing these challenges. Many Federal lands possess substantial renewable resources that will help meet the Nation's future energy needs while also providing significant benefits to the environment and the economy. The Energy Policy Act of 2005 set a goal for the U.S. Department of the Interior (Department) to approve 10,000 megawatts (MW) per hour of additional electrical generation capacity from renewable energy on Federal lands by 2015. In support of this initiative, Secretary of the Interior Ken Salazar issued Secretarial Order No. 3285, "Renewable Energy Development by the Department of the Interior," that identifies the production, development, and delivery of renewable energy as one of the Department's highest priorities.

Geothermal operations on Federal lands contribute to the Department's goal of approving additional generation capacity. We found two issues that hinder a more effective geothermal energy program at the Bureau of Land Management (BLM). First, Geothermal Resources Operational Orders (orders) are outdated. BLM no longer uses several of the orders, some orders reference organizations and regulations incorrectly, one order has been in draft status since 1980, and none of the orders address inspection and enforcement adequately.

Second, BLM does not have a standardized geothermal inspection and enforcement program. We found variations in types of inspections conducted, forms and formats used for conducting inspections, and frequency of inspections. We also found issues concerning who is conducting inspections and the training requirements for inspectors. Finally, we found inconsistencies in data collection for inspections because there is no guidance on data collection.

We offer four recommendations to help BLM manage its geothermal resources more effectively. We view this as an opportunity for BLM to update policies and procedures for the program and increase the effectiveness of its geothermal inspection and enforcement program.

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# Introduction

## Objective

Our objective was to assess the Bureau of Land Management's (BLM) management and oversight of geothermal resources on Federal lands. This included safety and environmental planning and induced seismicity.<sup>1</sup>

## Background

Due to economic, environmental, and national security needs, the United States must become increasingly reliant on its own clean energy resources. The Energy Policy Act of 2005 set a goal for the U.S. Department of the Interior (Department) to approve 10,000 megawatts (MW) per hour of additional electrical generation capacity from renewable energy on Federal lands by 2015. In support of this initiative, Secretary Salazar issued Secretarial Order No. 3285, "Renewable Energy Development by the Department of the Interior," that states that the production, development, and delivery of renewable energy is one of the Department's highest priorities.

BLM authorizes renewable energy projects on Federal lands as part of the administration's efforts to diversify the Nation's energy portfolio. Geothermal energy offers the Nation a clean, domestic, and abundant renewable resource. Geothermal energy is defined as the heat from the Earth, and is considered renewable. Conventional geothermal power plants use heat energy produced from reservoirs of hot water below the Earth's surface to power electrical generators.

Since 2009, the Department has increased geothermal electrical generation capacity almost 50 percent from 942 MW to 1,366 MW. Geothermal leases on Federal lands generated 4,600 gigawatts (4.6 million MW) of electrical power in 2011, providing enough electrical power for about 1.2 million homes. The power generated from facilities on Federal leases amounts to more than 40 percent of U.S. geothermal energy capacity and produces more than \$12 million in royalties to the U.S. Government each year.

For leasing purposes, geothermal resources are identified as all products of geothermal processes, including indigenous steam, hot water, hot brines, and any byproducts. Most Federal geothermal leases produce electrical power by using one of the methods below to produce electricity (see Figure 1).

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<sup>1</sup> See appendix 1 for our scope and methodology.

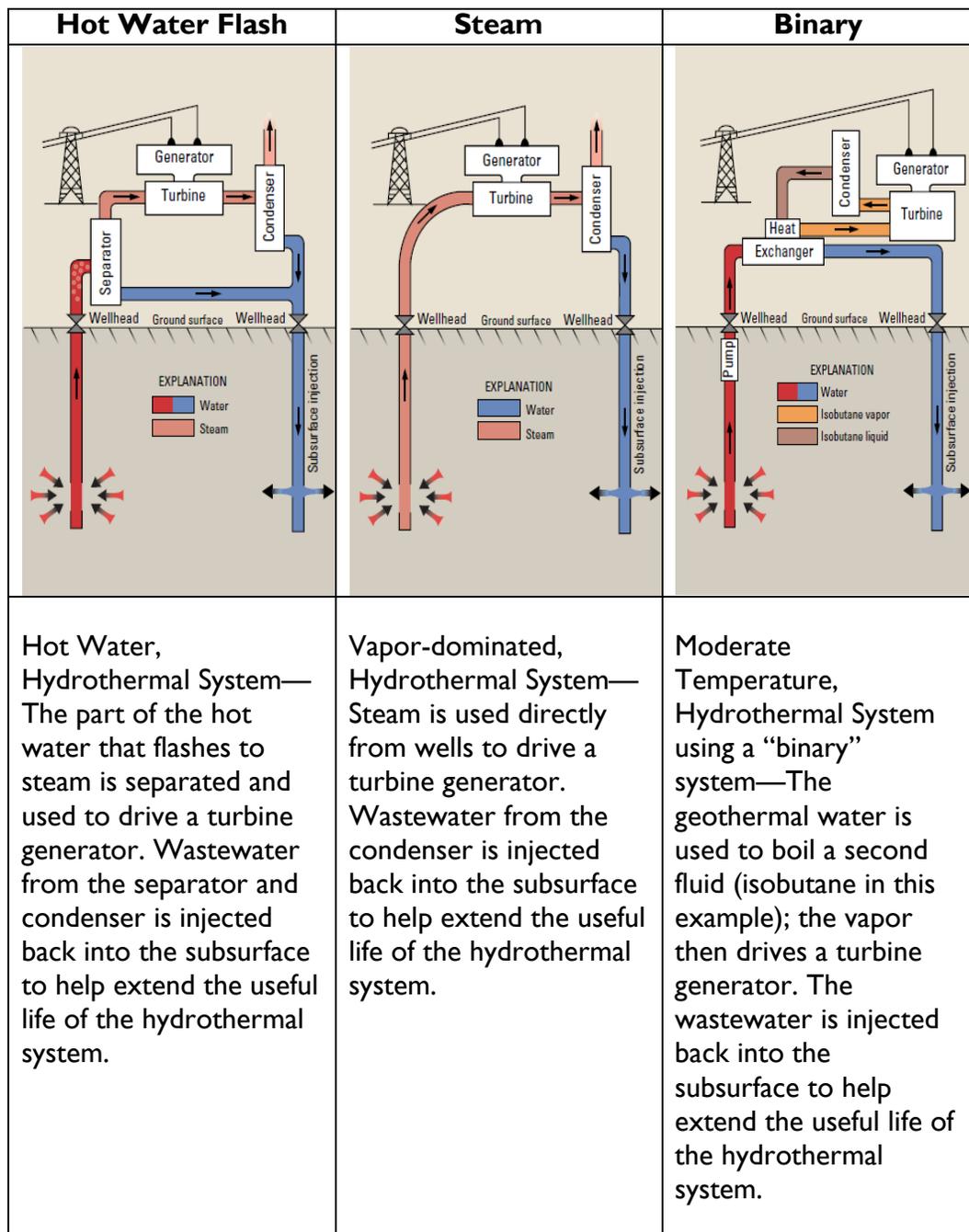


Figure 1. Electrical generation from geothermal energy. Source: U.S. Geological Survey.

The Geothermal Steam Act of 1970 authorizes the Department to lease public lands for geothermal development. Initially, the Department delegated the authority for leasing to the U.S. Geological Survey (USGS). The delegation was transferred to BLM in 1983. Currently, BLM has the authority for leasing geothermal resources on 245 million acres of public lands. This includes 104 million acres of national forest lands managed by the U.S. Forest Service, U.S.

Department of Agriculture. Nine BLM State offices administer 816 geothermal leases. Geothermal facilities currently operate on 72 leases in four States: Nevada (34), California (32), Utah (5), and New Mexico (1).

The Geothermal Steam Act authorizes the Department to prescribe rules and regulations for geothermal operations on Federal lands. These regulations are in the Code of Federal Regulations (CFR), first issued in 1974 (30 C.F.R. § 270) and later updated in 43 C.F.R. pt 3200. Additional changes to the regulations in 2007 address competitive leasing and include a new royalty computation formula. The current regulations define the Geothermal Resources Operational Orders (orders) as formal, numbered orders that BLM issues to implement or enforce the regulations. The regulations also allow inspecting various aspects of geothermal operations, including exploring, drilling, and using the resource. The current orders were issued over 30 years ago by USGS, which no longer has authority over the enforcement of the orders.

A developing method for tapping geothermal energy is called Enhanced or Engineered Geothermal Systems (EGS). Rather than using the heat from wet rock formations that contain steam or water, EGS targets hot, dry rock. In order to develop an EGS system, a permeable zone must be created in the hot, dry rock so water can be introduced into the rock to be heated and withdrawn (see Figure 2). The technique for creating permeability in geothermal wells is called “hydraulic shearing.” Hydraulic shearing is the process of injecting cold water into hot rock to create cracks and fractures, a result of rapid cooling of the rock. Hydraulic shearing is different from the “hydraulic fracturing” process used in oil and gas development, which uses high pressures and chemicals to increase permeability.

According to the U.S. Department of Energy, EGS could increase generating capacity by up to 40 times on both Federal and nonfederal lands by opening up previously inaccessible geothermal energy in hot, dry rock. Present geothermal power generation comes from geographically limited places in the Western United States. EGS allows extending geothermal resources to larger areas of the Western United States, as well as new geographic areas of the entire country.

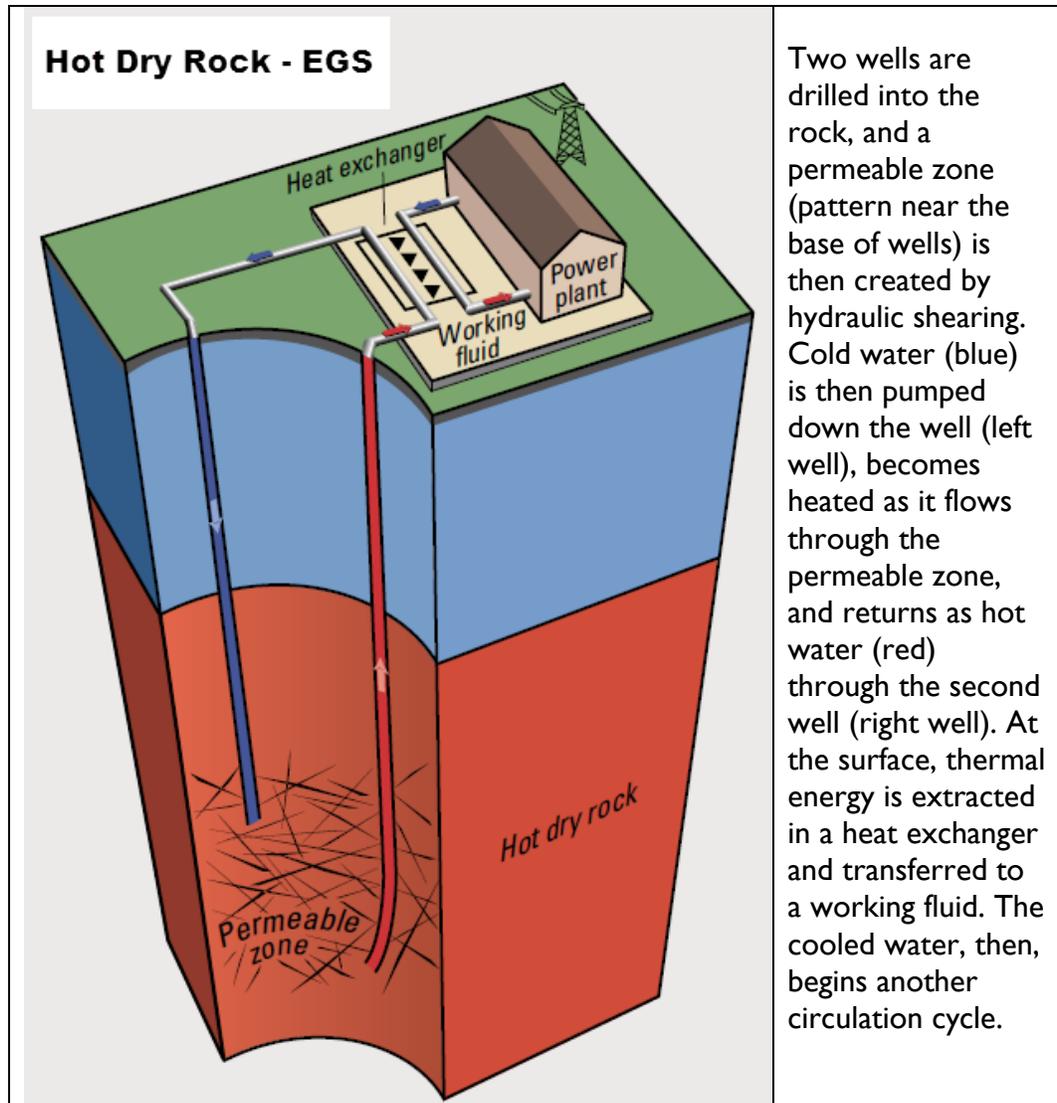


Figure 2. Hot, dry rock EGS. Source: USGS<sup>2</sup>

Recent public concern and attention has been given to induced seismicity (triggered earthquakes created by injecting fluids into rock formations) associated with energy development. Recent studies on induced seismicity by the USGS<sup>3</sup> and the National Research Council<sup>4</sup> suggest that changing pressure, fluid imbalances, and proximity to faults contribute to induced seismicity. These studies say that only a small fraction of the hundreds of thousands of energy development sites in the United States have induced seismicity at levels that are

<sup>2</sup> U.S. Geological Survey, Circular 1249, Geothermal Energy—Clean Power From the Earth’s Heat, (2003). <http://pubs.usgs.gov/circ/2004/c1249/c1249.pdf>

<sup>3</sup> U.S. Geological Survey, Is the Recent Increase in Felt Earthquakes in the Central U.S. Natural or Manmade, (2012). <http://www.doi.gov/news/doinews/Is-the-Recent-Increase-in-Felt-Earthquakes-in-the-Central-US-Natural-or-Manmade.cfm>

<sup>4</sup> National Research Council, Induced Seismicity Potential in Energy Technologies, (2012). [http://www.nap.edu/catalog.php?record\\_id=13355](http://www.nap.edu/catalog.php?record_id=13355)

noticeable to the public. The consensus is that further research is required to better understand and address the potential risks associated with induced seismicity.

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## Findings

We found two areas in our review of BLM’s geothermal program where BLM could improve oversight and reduce risk of noncompliance. First, we found outdated orders. Second, we found inconsistent inspection and enforcement of geothermal operations.

### **Outdated Geothermal Resources Operational Orders**

USGS approved six of seven geothermal orders more than 30 years ago and one has been in draft status since 1980. Because the orders are so outdated, they no longer cite correct regulations and responsible parties, they fail to account for technological advancements, and some are no longer applicable. The orders do not incorporate inspection criteria and protocols for induced seismicity.

The current regulations, updated in 2007, define the orders as “a formal, numbered order, issued by BLM, that implements or enforces the regulations.” Present orders reference the old regulations, formerly codified at 30 C.F.R. part 270, rather than the current regulations at 43 C.F.R. part 3200. They also refer to USGS as the responsible party rather than BLM.

BLM personnel reported that four of the orders (Orders 1, 4, 6, and 7) were no longer applicable as the provisions of the orders have been incorporated into the regulations. BLM personnel also reported that they currently only use two of the orders (Orders 2 and 3) to regulate specific activities on BLM leases. Orders 2 and 3 were approved in 1975, and are outdated due to technological advancements—for example the EGS process. To compensate for this, BLM relies on additions to the “Conditions of Approval” section in geothermal drilling permits to address those areas where the orders are insufficient. The result is a web of requirements that include regulations, outdated orders, and “Conditions of Approval,” rather than straightforward practices outlined in an order.

Order 4 also includes the provision: “If induced seismicity is determined to represent a significant hazard, the Supervisor may require remedial actions including, but not limited to, reduced production rates, increased injection of waste or other fluids, or suspension of production.” Similar provisions are not in the regulations. While a study by the National Research Council has preliminarily concluded that current geothermal practices pose minimal risk of induced seismicity, the increasing use of EGS may boost public concern of seismic risks. In addition, as will be discussed more in-depth in the following section, the orders have limited inspection and enforcement provisions and no requirements for mandatory Bureau inspections of geothermal operations.

In response to our “Notice of Potential Findings and Recommendations” on this issue, BLM responded that it concurred with our findings and our

recommendation to review and update the orders. BLM also agreed to develop protocols for induced seismicity. As a result, BLM has contacted the U.S. Department of Energy (DOE) and other Federal agencies about developing protocols.

### **Recommendations**

1. BLM should review and update existing orders to:
  - a. determine the relevancy of existing orders;
  - b. eliminate redundant, conflicting, or outdated requirements;
  - c. include current standards and practices commonly included in Conditions of Approval; and
  - d. include inspection criteria and procedures.
  
2. BLM should develop and incorporate induced seismicity protocols into the orders.

## **Inspection and Enforcement**

BLM does not have a standardized inspection and enforcement program. We asked officials in California and Nevada for examples of their inspection process and found variations in types of inspections conducted, forms and formats used for conducting inspections, and frequency of inspections. We also found problems in recruiting, retaining, and training inspectors; and inconsistencies in reporting data into the geothermal database.

The current regulations issued in 2007, and the orders developed in the 1970s, only minimally address inspection and enforcement. Except for a 1992 policy on meter reading, there are no other national inspection and enforcement policies or standards for geothermal operations. As a result, BLM has no guidance on what inspections should be considered mandatory (other than the monthly accountability inspections of production meters), how inspections should be done, and frequency of inspections. This has created inconsistencies among BLM's State and field offices and makes it difficult to share promising practices.

In the absence of national policy or standards, each location we visited had developed its own inspection process. One location emphasized "housekeeping" issues, such as materials or trash left on the well pad, and improper or broken signs and fences, while another location focused on safety and pipeline issues. This presents different enforcement expectations for industry depending on where their operations are located.

No standardized policy exists to identify who is qualified to perform inspections, as well as the training required for inspectors. In some cases, this has led to geothermal activities being inspected as a collateral duty by BLM personnel with little or no experience in geothermal operations. BLM attempts to fill geothermal

oversight positions with Petroleum Engineering Technicians. These individuals go through oil and gas inspection training and certification because geothermal engineering technician positions and specific geothermal training do not exist. As we found during our prior review of BLM's oil and gas inspection and enforcement activities,<sup>5</sup> BLM also has trouble hiring and retaining qualified inspectors for geothermal oversight.

BLM uses the Geothermal Resources Automated Support System (GRASS) database where it enters data on leases, customers, wells, facilities, well production, well injection, well completion reports, inspections, bonds, and more. BLM personnel can also enter enforcement information and generate standard reports. We found, however, that BLM personnel do not enter the data consistently because they do not have national guidance on data entry.

In response to our "Notice of Potential Findings and Recommendations," BLM responded that it would: 1) standardize the geothermal inspection and enforcement program, which will model the oil and gas program where appropriate; 2) include inspector training adopted on oil and gas PET training and certification; and 3) reexamine staffing levels for inspectors.

### **Recommendations**

3. BLM should create a standardized inspection and enforcement process for geothermal operations that specifies:
  - a. who is to inspect what and how often;
  - b. training requirements for inspectors; and
  - c. what data is to be entered into the GRASS database, and how often.
4. BLM should examine staffing levels of inspectors to ensure geothermal operations meet critical safety and environmental requirements.

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<sup>5</sup> Office of Inspector General, Department of the Interior, No. CR-EV-BLM-0001-2009, Bureau of Land Management's Oil and Gas Inspection and Enforcement Program, (December 2010).

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# Conclusion and Recommendations Summary

## Conclusion

With the Department's priority on renewable energy projects and the projected increase in geothermal projects, the urgency of managing and protecting Federal geothermal resources will have increasing importance. By implementing our recommendations, BLM could improve its oversight role and reduce risk of noncompliance.

## Summary of Recommendations

We recommend that:

1. BLM should review and update existing orders to:
  - a. determine the relevancy of existing orders;
  - b. eliminate redundant, conflicting, or outdated requirements;
  - c. include current standards and practices commonly included in Conditions of Approval; and
  - d. include inspection criteria and procedures.

**BLM Response:** BLM concurred with the recommendation and will 1) consider incorporating current standards and practices that are commonly included in conditions of approval and the inspection criteria and procedures; 2) pursue rulemaking to update and revise Orders 2 and 3 according to the results of the review; and 3) will also consider revising Order 1, which applies to temperature gradient wells, as it contains information not covered in the regulations.

**OIG Reply:** We consider this recommendation resolved but not implemented.

2. BLM should develop and incorporate induced seismicity protocols into the orders.

**BLM Response:** BLM partially concurred with this recommendation, agreeing that it should provide additional guidance on potential induced seismicity impacts at geothermal energy projects on Federal lands. BLM does not agree that the current DOE Induced Seismicity Protocol (Protocol) should be incorporated into the Orders at this time. To address the complexities involved, BLM and DOE Geothermal Technologies Program are discussing tailoring the Protocol to meet BLM's mission and to address different situations presented by the BLM's regulations and management authorities.

**OIG Reply:** We accept BLM’s approach and consider this recommendation resolved but not implemented.

3. BLM should create a standardized inspection and enforcement process for geothermal operations that specifies:
  - a. who is to inspect what and how often;
  - b. training requirements for inspectors; and
  - c. what data is to be entered into the GRASS database, and how often.

**BLM Response:** BLM concurred with the recommendation to establish a consistent Geothermal Inspection and Enforcement program modeled on the existing oil and gas program. BLM believes the development of an instruction manual and manual/handbook, similar to the oil and gas H-3160-5 “Inspection and Enforcement Documentation and Strategy Handbook,” rather than development of regulations or an order, provides the greatest flexibility for implementation.

**OIG Reply:** We consider this recommendation resolved but not implemented.

4. BLM should examine staffing levels of inspectors to ensure geothermal operations meet critical safety and environmental requirements.

**BLM Response:** BLM concurred with the recommendation, noting that a part of the information manual and manual handbook will include guidelines to assist in determining inspection and enforcement workloads in order to forecast appropriate inspector staffing levels.

**OIG Reply:** We consider this recommendation resolved but not implemented.

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# Appendix I: Scope and Methodology

## Scope

We focused on the Bureau of Land Management’s (BLM) oversight of geothermal policies and procedures, and especially focused on the inspection and enforcement process. Geothermal royalty considerations were not included in this review as the Office of Inspector General completed a review of these processes in 2010.<sup>6</sup>

## Methodology

We conducted this evaluation in accordance with the “Quality Standards for Inspection and Evaluation” issued by the Council of the Inspectors General on Integrity and Efficiency in January 2011. We conducted the evaluation from March through July 2012. We believe the work performed provides a reasonable basis for our conclusions and recommendations.

We reviewed laws, regulations, policies, and procedures related to geothermal leasing activities; examined geothermal inspection and Geothermal Resources Automated Support System reports; examined geothermal leasing documents and interagency agreements; reviewed current geothermal studies; and interviewed knowledgeable geothermal personnel.

We visited or contacted the following organizations:

- BLM Program Office, Washington, DC;
- BLM California State Office, Sacramento, CA;
- BLM Desert District Office, Moreno Valley, CA;
- BLM Ukiah Field Office, Ukiah, CA;
- BLM Ridgecrest Field Office, Ridgecrest, CA;
- BLM Colorado State Office, Lakewood, CO;
- BLM Nevada State Office, Reno, NV;
- BLM Utah State Office, Salt Lake City, UT;
- U.S. Geological Survey, Earthquake Science Center, Menlo Park, CA;
- and
- U.S. Geological Survey, Pacific SW Area, Menlo Park, CA.

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<sup>6</sup> Office of Inspector General, Department of the Interior, No. C-IN-MOA-0004-2009, Geothermal Royalties (March 2010).

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## **Appendix 2: BLM Response**

The Bureau of Land Management's response to our draft report follows on page 14.



United States Department of the Interior  
BUREAU OF LAND MANAGEMENT

Washington, D.C. 20240  
<http://www.blm.gov>



JAN 27 2013

In Reply Refer To:  
1245/3200 (830/301)

To: Assistant Inspector General for Audits, Inspections and Evaluations

Through: Tommy P. Beaudreau  
Principal Deputy Assistant Secretary  
Land and Minerals Management

From: Mike Pool  
Acting Director

Subject: Office of the Inspector General Evaluation Draft Report, Bureau of Land Management's Geothermal Resources Management (CR-EV-BLM-0004-2012)

Thank you for the opportunity to review and comment on the Office of the Inspector General (OIG) draft Evaluation Report, "Bureau of Land Management's Geothermal Resources Management" (CR-EV-BLM-0004-2012). The purpose of the OIG's evaluation was to assess the Bureau of Land Management's (BLM) management and oversight of geothermal resources on Federal lands. The OIG report contains four recommendations to strengthen the BLM Geothermal Energy Program.

The OIG evaluation found that the BLM has a few Geothermal Resource Operational Orders ("Orders") that are outdated, and that greater standardization in geothermal inspection and enforcement may be warranted. The BLM concurs with three of the Recommendations that address these concerns, specifically Recommendations 1, 3, and 4.

The BLM partially concurs with Recommendation 2, which indicated that the BLM should develop and incorporate induced seismicity protocols into the Orders. The BLM acknowledges a need to reinforce protocols for existing policy and provide additional guidance on potential induced seismicity at geothermal energy projects on Federal lands. The BLM has initiated a cooperative effort with the Department of Energy (DOE) Geothermal Technologies Program, which will help address the induced seismicity recommendation made by the OIG in the draft Report. However, the BLM does not concur with the recommendation that the current DOE Induced Seismicity Protocol (Protocol) be incorporated into the Orders at this time. The BLM considers the Protocol to be a work in progress that is subject to short-term changes, and currently limited in how it addresses the unique issues specific to BLM-managed lands. The BLM is working with the DOE to address issues related to public lands and will consider further changes to the BLM policies and Orders after the DOE finalizes the Protocol. The attachment provides additional details regarding this recommendation.

The OIG evaluation found that four of the six Orders identified in the OIG evaluation, Orders 1, 4, 6, and 7, were updated and incorporated into the current BLM geothermal regulations, with BLM still relying upon Orders 2 and 3. Orders 2 and 3 are used for drilling, completion, spacing, and plugging and abandonment of geothermal wells. As noted in the draft Report, drilling technology has changed significantly since the 1970's, when Orders 2 and 3 were approved, and Enhanced Geothermal System (EGS) projects require very different standards. The BLM agrees that for these reasons, it should consider a rulemaking, as appropriate, to update Orders 2 and 3. BLM will also consider updating Order 1, which covers temperature gradient wells, as it continues to provide guidance to field offices. The attachment provides additional details on this recommendation.

As the draft Report notes:

Since 2009, the Department has increased geothermal electrical generation capacity almost 50 percent from 942 MW to 1,366 MW. Geothermal leases on Federal lands generated 4,600 gigawatts (4.6 million MW) of electrical power in 2011, providing enough electrical power for about 1.2 million homes. The power generated from facilities on Federal leases amounts to more than 40 percent of U.S. geothermal energy capacity and produces more than \$12 million in royalties to the U.S. Government each year.

With the almost 50 percent increase in geothermal electrical generation since 2009, the BLM agrees that there is a need to update the policies and procedures for the Geothermal Resources program. The attachment provides specific responses to each of the recommendations, which includes a summary of the actions taken or planned by the BLM to comply with the OIG's recommendations, as well as the contact information for the responsible official and the target dates of implementation.

If you have any questions about this response, please contact Ray Brady, National Renewable Energy Coordination Office Manager, at 202-912-7312, or LaVanna Stevenson, BLM Audit Liaison Officer, at 202-912-7077.

Attachment

Cc:

ASLM (2) (6628-MIB)

Ray Brady/National Renewable Energy coordination Office

WO-830 Official Copy (20 MSt)

WO-830 rf/hold (20 MSt)

WO-830:LStevenson:ll:01/02/2013:DOC-ID OIG Draft Geothermal Energy Report Proposed  
Response 1-2-13 Final 300

Response to Recommendations included in the Office of the Inspector General Evaluation  
Draft Report, Bureau of Land Management's Geothermal Resources Management  
(CR-EV-BLM-0004-2012)

**Recommendation 1:** The BLM should review and update existing Orders to:

- a. determine the relevancy of existing Orders;
- b. eliminate redundant, conflicting, or outdated requirements;
- c. include current standards and practices commonly included in "Conditions of Approval"; and
- d. include inspection criteria and procedures.

**Response:** Concur. The BLM will establish a team to review existing Geothermal Resource Orders ("Orders") to ensure consistency and determine their relevance by eliminating redundant, conflicting, or outdated requirements. The BLM will consider incorporating current standards and practices that are commonly included in conditions of approval and the inspection criteria and procedures. The BLM will pursue rulemaking to update and revise Orders 2 and 3 according to the results of the review. The BLM will also consider revising Order 1, which applies to temperature gradient wells, as it contains information not covered in the regulations. During the interim period while this review and revision of the Orders is occurring, the BLM will provide guidance to the field offices in the form of an Information Bulletin (IB). This IB will advise the field offices to continue to comply with the current BLM geothermal regulations and Orders 1, 2, and 3, as applicable, as well as any other local guidance and policy until the new Orders are promulgated.

**Target Date:** December 31, 2015

**Responsible Official:** Michael D. Nedd, Assistant Director, Minerals and Realty Management

**Recommendation 2:** The BLM should develop and incorporate induced seismicity protocols into the Orders.

**Response:** Partially concur. The BLM agrees that it should provide additional guidance on potential induced seismicity impacts at geothermal energy projects on Federal lands. However, the BLM does not agree with the recommendation that the current DOE Induced Seismicity Protocol (Protocol) should be incorporated into the Orders at this time. Although the Protocol is intended by DOE to be a living document for the public, regulators, and the geothermal operators, the BLM considers it to be a work in progress that is subject to short-term changes as well as not being specific to BLM-managed lands. Local conditions at each site will call for different types of actions. To address the complexities involved, the BLM and the DOE Geothermal Technologies Program are discussing tailoring the Protocol to meet BLM's mission and to address different situations presented by the BLM's regulations and management authorities.

The BLM will continue to work with the DOE to amend the protocol. After DOE completes a protocol to address potential impacts of induced seismicity projects on Federal lands, the BLM will determine whether to incorporate the protocol into one of the revised Orders or to provide

the guidance through an Instruction Memorandum (IM). The IM format would give the BLM the flexibility to more easily incorporate any future revisions of the protocol by DOE.

**Target Date:** December 31, 2014, for conclusion of discussions with DOE and the determination of the appropriate mechanism for providing policy guidance to BLM field offices. December 31, 2015, for finalization of an IM or inclusion of the induced seismicity standards in a revised order.

**Responsible Official:** Michael D. Nedd, Assistant Director, Minerals and Realty Management

**Recommendation 3:** BLM should create a standardized inspection and enforcement process for geothermal operations that specifies:

- a. who is to inspect what and how often;
- b. training requirements for inspectors; and
- c. what data is to be entered into the GRASS database, and how often.

**Response:** Concur. The BLM will establish a consistent Geothermal Inspection and Enforcement program modeled on the existing Oil and Gas program. We believe the development of an IM and Manual/Handbook, similar to the oil and gas H-3160-5 *Inspection and Enforcement Documentation and Strategy Handbook*, rather than development of regulations or an order, provides the greatest flexibility for implementing this Geothermal Inspection and Enforcement program. Where appropriate, the BLM will use concepts similar to those used in the oil and gas program to ensure consistency between programs.

The IM and Manual/Handbook will address drilling, abandonment, and production accountability (utilization) activities and will incorporate and update those provisions in geothermal policy IM 93-94 and 93-94, change 1, which initially established the geothermal production accountability program. The production accountability program required the establishment of measurement points and frequency of inspections at geothermal utilization facilities, which will be incorporated into the new Geothermal Inspection and Enforcement program.

This new Geothermal Inspection and Enforcement program will require establishment of a new training program and certification standard for geothermal inspectors, similar to the Petroleum Engineering Technicians (PETs) training and certification program for oil and gas inspectors. In response to recommendation three, the BLM will develop the new Geothermal Resources Automated Support System II (GRASS II) database, a component of the new Automated Fluid Minerals Support System II program. An automated inspection module will be part of GRASS II, which will take time to design and build. The BLM will include guidance on the input of data into the GRASS II system.

**Target Date:** December 31, 2015

**Responsible Official:** Michael D. Nedd, Assistant Director, Minerals and Realty Management

**Recommendation 4:** The BLM should examine staffing levels of inspectors to ensure geothermal operations meet critical safety and environmental requirements.

**Response:** Concur. As explained in response to Recommendation 3, a part of the IM and Manual/Handbook, the BLM will include guidelines to assist in determining inspection and enforcement workloads in order to forecast appropriate inspector staffing levels. The BLM's implementation of the recommended staffing levels will be contingent on the availability of appropriations. Additionally, the Geothermal Inspection and Enforcement program will address national training requirements and either adopt or modify the oil and gas PET training and certification program to ensure a cadre of knowledgeable inspection staff. The workload for Geothermal Inspection and Enforcement is substantially less than that for oil and gas, and, therefore, the staffing levels will also be significantly less than oil and gas levels.

**Target Date:** December 31, 2015

**Responsible Official:** Michael D. Nedd, Assistant Director, Minerals and Realty Management

## Appendix 3: Status of Recommendations

In response to our draft report BLM concurred with recommendations 1, 3, and 4. BLM partially concurred with recommendation 2 and we accept their approach. We consider all recommendations resolved but not implemented. The table below summarizes the status of the recommendations.

Recommendations	Status	Action Required
1	Resolved but not implemented.	Recommendations will be referred to the Assistant Secretary for Policy, Management and Budget for tracking implementation.
2	Resolved but not implemented.	Recommendations will be referred to the Assistant Secretary for Policy, Management and Budget for tracking implementation.
3	Resolved but not implemented.	Recommendations will be referred to the Assistant Secretary for Policy, Management and Budget for tracking implementation.
4	Resolved but not implemented.	Recommendations will be referred to the Assistant Secretary for Policy, Management and Budget for tracking implementation.

# Report Fraud, Waste, and Mismanagement



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