METHODS FOR OPTIMIZING AND MONITORING UNDERGROUND DRILLING

A method of optimizing underground drilling in which the Specific Energy, such as the Mechanical Specific Energy, is determined at a plurality of weight on bits and drill bit rotary speeds. The drilling operation is optimized by drilling at the operating conditions, including weight on bit and drill bit rotary speed, at which the standard deviation in Mechanical Specific Energy is a minimum. The drilling operation is monitored by determining the Mechanical Specific Energy and changing the operating parameters if the standard deviation in the Mechanical Specific Energy exceeds a predetermined value.
Date of publication of the international search report:
25 June 2015
INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/062022

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - E21B 44/04 (2013.01)
USPC - 175/27

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC(8) - E21B 7/00, 7/04, 44/00, 44/04, 47/12; G06F 17/10 (2013.01)
USPC - 166/250.01, 250.135; 175/24, 26, 27, 40, 702/9, 703/10

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
CPC - E21B 7/00, 7/04, 44/00, 44/04 (2013.01)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PatBase, Google Patents, Google.com

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>US 20110186353 A1 (TURNER et al) 04 August 2011 (04.08.2011) entire document</td>
<td>1-4, 6-9, 11-13</td>
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Further documents are listed in the continuation of Box C.

* Special categories of cited documents:
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Date of the actual completion of the international search:
04 January 2013

Date of mailing of the international search report:
25 JAN 2013

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