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Subject: Blue Alert- Drilling Rig Design Flaw

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Date 12/08/1999 Identifier ID--BBWI-1999-456

Synopsis- An air rotary drill rig's solid/air cyclone separator unit (dust hog) failed due to 4 rivets being eroded by the rock cuttings being blown through it. Two operators were sprayed with rock particles from the rig's main air hose after a joint came apart.

Summary- On a drill rig using a solids/air cyclone separator unit, the main air hose separated from the cyclone when a riveted joint on the unit failed. The rig operator and his helper were sprayed with pieces of rock. The joint failed when the drill cuttings being blown through the unit eroded the head off of four rivets and the weight of the hose pulled the joint apart. The contractor had not provided the manufacturer with sufficient information concerning operating conditions of the unit (i.e., the abrasiveness of the rock cuttings and the weight of the main air hose). The manufacturer redesigned the unit after it failed; the riveted joint was welded and a pipe, which was attached to the cyclone at one end, was secured to the side of the trailer, thus providing a "fixed" connecting point for the rig's main air hose. This latter fix effectively placed the weight of the main air hose on the trailer, rather than on the cyclone separator.

Lessons Learned Statement- Contractors should ensure that the specifications and quality requirements they provide to subcontractors/fabricators contain sufficient information/details concerning the operation and in-field use of the product that they are being asked to design and construct. Newly fabricated products should be examined for any design weaknesses and operated with extreme caution during a "wear-in" period.

Discussion and Analysis- Dust hog units have primarily been installed in fixed locations. However, the unit that failed was specifically designed and built for the filtration of discharge cuttings and air from an air rotary drill rig and was mounted on a trailer. Because the manufacturer's design engineer had not been given sufficient information about the conditions the unit would be subjected to, he failed to consider the abrasiveness of the drill cuttings (basalt) and the stress load on the cyclone due to the weight of the main air hose. An inspection prior to use of the unit failed to identify any design/fabrication weakness. All appropriate hose whipchecks were in place at the time of the failure.

Recommended Actions- All dust hog (or similar units) being used to separate/filter drill cuttings and air from an air drill rig should be evaluated to determine their discharge volume and material. In this case, the abrasiveness of the cuttings and the volume of material being moved required that all connections be welded or bolted and subjected to appropriate engineering and quality reviews. In addition, the location of the main air hose inlet connection may need to be

moved/fixed-in-place so that it will adequately support the weight of the hose (i.e., so that the weight of the hose will not place a stress load directly on the dust hog).

Priority Descriptor BLUE

Hazards Any mass in motion

DOE/User Functional Categories Construction, Design, Operations, Quality, Safety, Management

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