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DEPARTMENT OF NATURAL RESOURCES

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Technical Analysis and Findings
Utah Coal Regulatory Program

PID: C0410002
TaskID: 4513
Mine Name: SUFCO MINE
Title: VEGETATION INFO & FINAL FOR BIOLOGICAL STUDIES

Operation Plan

Topsoil and Subsoil

Analysis:

Deficiencies Details:

R645-301-121.200, Appendix 2-9 Link Canyon Portal Vegetation, Aquatic Fauna, and Soil Investigations was updated with information on evaluation dates July and September 2013. Two opposing statements on page 1 of the July 2013 report are confusing. In the first paragraph the report states, "The area at the West Portal has been heavily grazed by cattle this spring" in the 4th paragraph, the report states, "This site has not been grazed by domestic livestock." Please make the appropriate corrects to the report.

pburton

Vegetation

Analysis:

SUMMARY:
On February 19, 2014 the Division received an amendment containing vegetation and macro invertebrate survey information. This memo will include a review of that information.

TECHNICAL ANALYSIS:
OPERATION PLAN
VEGETATION

Regulatory Reference: R645-301-330, -301-331, -301-332.

Analysis: The following additions and text changes to chapters two, three and seven include:
The addition of Appendix 2-9 to chapter two;
Pages 3-v, 3-19 thru 3-21 and 3-46 and additions to the back of appendices 3-10, 3-14, and 3-15 (Infrared Color Photography) to chapter three and;

This information includes the 2013 vegetation study of the link Canyon portal area, proposed text changes to discontinue the Link Canyon vegetation studies and the color infrared aerial surveys, and the macro-invertebrate survey conducted by Dr. Dennis Shiozwawa for the south fork of Quitcupah creek.

Prior to the submittal of this information Division staff biologists (Ingrid Campbell & Joe Helfrich) had individually discussed the option of discontinuing the Link Canyon vegetation and the CIR surveys. The following rationales are provided:

For the Link Canyon Portal site the vegetation surveys over the past ten years and the most current assessment by Mount Nebo Scientific clearly indicate that the vegetation has become well established and has remained stable over time. Therefore no further monitoring is required at the link Canyon Portal site. The proposed text changes to pages 3-19 and 20 are adequate.

For the Color Infrared Aerial Surveys the Division is recommending that the text on page 3-45 remain the same for the time being. In the meantime the division will further research the prospect of discontinuing the monitoring. The permittee should obtain past or recent (2013 or 2014) aerial imagery from one of the referenced web sites for comparison to the imagery that may be required in 2018 or 2019.

The following background information is provided in order to further understand the purpose of collecting and interpreting color infrared aerial imagery. Images obtained by satellites and high-altitude aircraft give engineers and scientists a tool to study landforms, vegetation health patterns, environmental pollution, and other effects of human activities on the planet's surface.

According to the following article in the Norwegian Journal of Geography: (Ihse, M. 2007. Color infrared aerial photography as a tool for vegetation mapping and change detection in environmental studies of Nordic ecosystems: A review Norsk Geografisk Tidsskrift_Norwegian Journal of Geography Vol. 61, 170_191. Oslo. ISSN 0029-1951.),

"Aerial photographs on color infrared film still provide one of the best sources of information on ecological conditions in the landscape and on the status of and changes in vegetation. The advantages of aerial photos are clear. They are cheap and easily available and the information is easy to extract without using advanced methods and instruments.

CIR film is also more suited for differentiating between different soil moisture contents, between vegetation and soils in different conditions, such as mineral soils, substrate, humid topsoil, bedrock outcrops, or thin soil layers (Lunde'n 1977), and between living, damaged and dead vegetation. It can also distinguish stressed and damaged vegetation at an early stage, often 'pre-visual', i.e. before it can be detected in the field (Wastenson et al. 1987)".

Given this information it is obvious that color infrared aerial imagery is a valuable tool that could be used to determine changes in vegetation over time. However there is some uncertainty with regard to the adequacy of the information required to make an accurate interpretation of the data provided (2008 & 2013 Aerial imagery).

From personal recollection (20-25 years prior) it seemed as though each SMCRA permittee that was mining coal below National Forest property was required to provide color infrared aerial imagery every five years to the Forest Service for the purpose of determining whether or not mining related subsidence had any impacts to the vegetation or water sources above the mine. To date there has been no known results of the interpretation of the imagery.

In summary the Division will investigate:

What criteria would benefit the comparative analysis of the color infrared aerial imagery and;
The need for mining companies to continue providing this information.

For the "Assessment of the Macroinvertebrates of the South Fork of Quitcupah Creek Emery County, Utah", the report should include a map to appropriate scale that shows the locations of the sampling stations noted in table 1.

Deficiencies Details:

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