OVERBURDEN ANALYSIS-IMPLEMENTATION OF THE PLAN

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I AM CERTAIN AFTER YOU HAVE LISTENED TO THE SPEAKERS HERE TODAY YOU HAVE GAINED A RELATIVELY GOOD INSITE AS TO THE MULTITUDE OF INTER-DISCIPLINE TASKS THAT YOU WILL NEED TO CONSIDER IF YOU PLAN TO MINE IN AREAS THAT EXHIBIT THESE SO-CALLED "ACID PRODUCING OVERBURDENS". I WOULD LIKE TO POINT OUT THAT THESE SAME TASKS SHOULD ALSO BE TAKEN INTO ACCOUNT EVEN WHEN YOU ARE MINING IN AREAS NOT ASSOCIATED WITH ACID-PRODUCING OVERBURDENS. REALLY, ONLY THE DEGREE AT WHICH YOU CONSIDER EACH TASK IS CHANGED,

AS I MENTIONED, THERE ARE MANY AREAS OF BASIC CONSIDERATION THAT YOU HAVE TO TAKE INTO ACCOUNT PRIOR TO THE IMPLEMENTATION OF THE MINING PLAN. BRIEFLY, LET US LOOK AT THESE CONSIDERATIONS:

A. GROUNDWATER

GROUNDWATER CHARACTERISTICS ARE IMPORTANT IN DETERMINING APPROPRIATE MINING AND RECLAMATION PROCEDURES AND IN CHOOSING LOCATIONS AND TECHNIQUES FOR VALLEY, HEAD-OF-HOLLOW, OR OTHER OFF-BENCH FILLS. DATA ON GROUND WATER QUALITY, QUANTITY, AND LOCATION SHOULD BE ACCUMULATED PRIOR TO MINING, FROM SPRINGS, SEEPS, AND/OR WELLS IN THE VICINITY.

B. SURFACE WATER

AS WITH GROUNDWATER, CAREFUL STUDY OF PREMINING SURFACE WATER CHARACTERISTICS, INCLUDING QUANTITY AND QUALITY, SHOULD PLAY A PART IN MINE PLANNING. COLLECTION AND RETENTION OF SUCH DATA ON SURFACE AND GROUNDWATER BEFORE, DURING, AND AFTER MINING, WILL BE A BASIS FOR FINAL BOND RELEASE, AS REGULATIONS ARE CURRENTLY PROPOSED. LOCATION AND NATURE OF STREAMS, WHETHER EPHEMERAL, INTERMITTENT, OR PERENNIAL, SHOULD BE ACCOUNTED FOR IN PLANNING SEQUENCE OF MINING AND FILL CONFIGURATION AND PLACEMENT TECHNIQUES. IF LARGE WATERSHEDS EXIST ABOVE THE AREA TO BE MINED, AND/OR INTERMITTENT OR PERENNIAL STREAMS ARE PRESENT, HANDLING MEASURES SUCH AS BUFFER ZONES, DIVERSION CHANNELS, AND OTHER CONVEYANCES FOR

SURFACE FLOWS AROUND OR THROUGH DISTURBED AREAS MAY BE CONSIDERED. SMALL WATERSHED AREAS AND EXISTENCE OF NO STREAMS OTHER THAN THOSE IDENTIFIED AS EPHEMERAL MAY INDICATE LITTLE OR NO SPECIAL SURFACE WATER HANDLING PROCEDURES.

C. GEOLOGY

GEOLOGIC CHARACTERISTICS OF THE SITE TO BE MINED MAY INVOLVE IMPORTANT CONSIDERATIONS IN ADDITION TO THE ACID-BASE POTENTIAL ANALYSIS RESULTS, DIP AND STRIKE OF THE COAL SHOULD BE DETERMINED AS AN INDICATOR OF THE LAY OF THE PAVEMENT SUBSEQUENT TO COAL REMOVAL.

D. TOPOGRAPHY AND LAND USE

SITE TOPOGRAPHY WILL BE A DETERMINING FACTOR IN MINING AND BACKFILLING METHODOLOGY, TO THE EXTENT THAT STEEPNESS OF SLOPES IS A FACTOR IN APPLICABILITY OF CERTAIN REGULATORY REQUIREMENTS FOR MINING AND BACKFILLING, IT WILL AFFECT PROCEDURES CHOSEN FOR THE SITE. PLANNED POST-MINING LAND USE, PARTICULARLY IN MOUNTAINTOP REMOVAL AND AREA MINING, WILL INFLUENCE MINING AND BACKFILLING METHODS TO SOME EXTENT. THESE FACTORS MUST BE MESHED WITH PLANS FOR HANDLING WATER AND TOXIC OVERBURDEN.

E. EQUIPMENT TO BE USED IN MINING

THE EQUIPMENT SPREAD IS OF MAJOR IMPORTANCE. AN OPERATION UTILIZING OVERBURDEN BLENDING WILL ALLOW FLEXIBILITY IN EQUIPMENT SELECTION AND USAGE. MATERIAL SEGREGATION AND SELECTIVE PLACEMENT MAY REQUIRE SPECIAL EQUIPMENT CONSIDERATIONS.

F. BLASTING TECHNIQUES

DRILLING AND BLASTING TECHNIQUES SHOULD BE IMPLEMENTED THAT CONFORM TO THE INTENDED MATERIAL HANDLING PROCEDURES FOR THE MINING OPERATION. THIS MUST BE PLANNED DURING THE PREMINING STAGES IN ORDER TO FACILITATE EQUIPMENT REQUIREMENTS AND OTHER INTRICATE PARTS OF THE OVERALL MINE PLAN.

G. COST

IT IS CLEAR THAT A MINING PLAN MUST DISPLAY ECONOMIC FEASIBILITY. PROJECTION OF COSTS WILL BE MORE IMPORTANT THAN USUAL IN PLANNING FOR AN OPERATION INVOLVING SPECIAL HANDLING OF OVERBURDEN AND OTHER EXTRAORDINARY EXPENSES.

H. OVERBURDEN ANALYSIS

WHEREAS PREMINING OVERBURDEN ANALYSIS IS A VALUABLE TOOL FOR MINE PLANNING, VARIABILITY OF STRATA QUALITY SHOULD BE ACCOUNTED FOR DURING OPERATION. AS A JOB PROGRESSES, ADJUSTMENTS TO OPERATIONAL PROCEDURES MAY BE NECESSARY TO INSURE PROPER HANDLING OF POTENTIALLY TOXIC MATERIALS. FIELD CLUES TO OVERBURDEN

QUALITY AND SELECTIVE TESTING METHODS MAY BE APPLIED BY OPERATING PERSONNEL ON A REGULAR BASIS. BASED UPON OVERBURDEN QUALITY AND QUANTITY, A CHOICE BETWEEN OVERBURDEN BLENDING, SEGREGATION OF TOXIC MATERIALS, OR A COMBINATION THEREOF, MAY BE MADE. IT IS GENERALLY FELT THAT BLENDING MAY BE USED WHERE THE ALKALINE MATERIALS ARE CAPABLE OF NEUTRALIZING THE ACIDIC MATERIALS. THIS DETERMINATION COULD BE BASED ON STUDY OF OTHER MINE SITES WITH SIMILAR OVERBURDEN, WHICH ARE KNOWN TO HAVE NO ACIDIC WATER PROBLEMS ASSOCIATED WITH THEM AND/OR DETAILED EVALUATION OF THE SITE IN QUESTION, IF BLENDING IS USED, IT SHOULD BE THOROUGH SO AS TO AVOID POCKETS OF POTENTIALLY TOXIC MATERIALS. WHERE BLENDING IS SHOWN NOT TO BE A VIABLE OPTION, SEGREGATION AND ISOLATION OF THE POTENTIALLY TOXIC ZONES SHOULD BE CONSIDERED AS ANOTHER OPTION. SEGREGATION AND ISOLATION MAY BE ACCOMPLISHED BY USE OF THE FOLLOWING MEASURES:

A. CONTROL DRILLING AND BLASTING TO ALLOW MATERIAL SEGREGATION DURING EXCAVATION. IN ADDITION, IT MAY BE BENEFICIAL TO KEEP POTENTIALLY TOXIC MATERIALS IN LARGE PARTICLES, AND TO CREATE FINER PARTICLE SIZE IN MATERIAL WITH EXCESS ALKALINITY.

B. IF THE COAL SEAM AND/OR CLOSELY ASSOCIATED MATERIALS ARE POTENTIALLY TOXIC, THE PIT SHOULD BE CLEANED PRIOR TO BACKFILLING, AND BEFORE SHOOTING THE NEXT ADJACENT CUT. THESE MATERIALS SHOULD BE REMOVED AND HANDLED AS OTHER POTENTIALLY TOXIC MATERIALS.

C. PLACE NON-TOXIC MATERIAL ON THE FLOOR OF THE PIT, AND AGAINST THE FINAL HIGHWALL. IT IS SUGGESTED THAT THE LAYER ON THE PIT FLOOR BE AT LEAST FOUR TO SIX FEET IN THICKNESS, AND THAT THE COLUMN AGAINST THE HIGHWALL BE TEN TO TWENTY FEET WIDE, IF MATERIALS WITH EXCESS POTENTIAL ALKALINITY ARE AVAILABLE, IT MAY BE HELPFUL TO INCORPORATE THEM INTO THESE LAYERS.

D. IF POSSIBLE, POSITIVE DRAINAGE SHOULD BE PROVIDED DOWN THE HIGHWALL AND ACROSS THE FLOOR OF THE PIT WITHIN THE LAYER OF NON-TOXIC MATERIAL. AS FILLING PROCEEDS LEAVE ENOUGH ROOM ON THE OUTSLOPE SIDE OF THE FILL FOR A COVERING OF NON-TOXIC MATERIAL AND FOR SURFACE TREATMENT. POTENTIALLY TOXIC MATERIALS SHOULD BE SELECTIVELY PLACED SO THAT THEY ARE COMPLETELY SURROUNDED BY NON-TOXIC MATERIALS.

E. FINAL FILL OF OUTSLOPES SHOULD BE NON-TOXIC MATERIAL, IT IS SUGGESTED THAT MATERIAL CLOSE TO THE SURFACE BE FINELY SHOT DURING EXCAVATION, OR PULVERIZED BY TRACKING WITH EQUIPMENT AS IT IS PLACED.

IF PAVEMENT MATERIALS ARE POTENTIALLY TOXIC, ACID-PREVENTIVE MEASURES COULD BE APPLIED. ONE ALTERNATIVE IS TO THOROUGHLY AND UNIFORMLY COAT THE PAVEMENT WITH A LAYER OF AGRICULTURAL OR HYDRATED LIME, IN ORDER TO FORM A SEAL AND PREVENT CONTACT OF WATER WITH TOXIC STRATA, THE INTENDED EFFECT OF THE LIME COATING IS NOT TO NEUTRALIZE TOTAL POTENTIAL ACIDITY, BUT RATHER TO REACT WITH IRON IN THE WATER TO CREATE A NON-REACTIVE CHEMICAL SURFACE ATOP-THE POTENTIALLY ACIDIC MATERIAL, CONVENTIONAL AGRICULTURAL TYPE LIME SPREADERS HAVE BEEN SUCCESSFULLY USED FOR SUCH LIME APPLICATION

OTHER SEALERS COULD BE USED, SUCH AS NON-TOXIC CLAYEY SOILS OR WEATHERABLE SHALES, OR MANUFACTURED SEALENT MATERIALS.

NEUTRALIZING REAGENTS MAY BE ADMIXED WITH OVERBURDEN TO OFFSET POTENTIAL ACIDITY OF THE STRATA, IT IS PROBABLY NOT NECESSARY THAT THE LIME APPLICATION RATE BE ADEQUATE TO NEUTRALIZE THE TOTAL EXCESS POTENTIAL ACIDITY OF THE OVERBURDEN. IT IS FELT THAT THE AMOUNT OF LIME USED SHOULD BE IN RELATION TO THE CALCULATED IMMEDIATE LIME REQUIREMENTS, WITH DUE CONSIDERATION OF STRATA WITH EXCESS ALKALINITY. FURTHER RESEARCH AND FIELD TRIALS ARE RECOMMENDED TO ESTABLISH PROPER PROCEDURES FOR ADMIXING.

POTENTIALLY ACIDIC COAL REFUSE PLACED IN SURFACE MINE AREAS MAY CAUSE FUTURE PROBLEMS.IN THAT SUCH REFUSE IS OFTEN MUCH MORE TOXIC THAN OVERBURDEN, AND MAY GREATLY COMPLICATE WATER POLLUTION CONTROL, IT IS RECOMMENDED THAT AN IN-DEPTH STUDY OF THE CHEMICAL CHARACTERISTICS OF THE REFUSE AND OF THE SITE CONDITIONS BE MADE PRIOR TO THE DISPOSAL OF WASTE MATERIAL IN AREAS THAT EXHIBIT TOXIC OVERBURDENS.

WHAT I WOULD LIKE TO DO FOR THE NEXT FEW MINUTES IS TO DISCUSS HOW YOU AS AN OPERATOR CAN RECOUP SOME OF THE COST OF ALL THIS ADDITIONAL TESTING THAT YOU ARE BEING REQUIRED TO DO AS PART OF YOUR PERMIT. THE ADDITIONAL TESTING I AM TALKING ABOUT, OF COURSE, IS THE REQUIREMENT FOR OVERBURDEN ANALYSIS.

OVERBURDEN ANALYSIS CAN BE A VALUABLE ASSET AND NOT JUST ANOTHER EXPENSIVE LIABILITY THAT EVERYONE THINKS IT is, THERE ARE OTHER THINGS THAT WE AS SOIL SCIENTISTS LOOK FOR IN AN OVERBURDEN SECTION BESIDES JUST POTENTIALLY TOXIC MATERIALS. WE ARE CERTAINLY INTERESTED IN IDENTIFYING THESE TOXIC ZONES AND RECOMMENDING PLACEMENT TECHNIQUES THAT WILL RENDER THESE ZONES INACTIVE, OR AT LEAST MINIMIZE THEIR POTENTIAL NEGATIVE IMPACTS ON GROUND AND SURFACE WATER AND ALSO REVEGETATION SCHEMES.

BUT WE ARE EVEN MORE INTERESTED IN THE OPPORTUNITIES THAT ARE AVAILABLE BY WHICH YOU AS A MINE OPERATOR CAN CONSTRUCT OR CREATE VALUABLE LAND WHICH IN MANY CASES CAN BE MUCH MORE PRODUCTIVE THAN THE NATURAL SOILS AND THEIR NATURAL STATE PRIOR TO MINING.

YES, YOU CAN CREATE NEW SOILS THAT HAVE EXCELLENT CHARACTERISTICS, BOTH PHYSICAL AND CHEMICAL.

THEY WILL HAVE AN ABUNDANCE OF NUTRIENTS AVAILABLE FOR PLANTS AND POSSESS EXCELLENT PHYSICAL PROPERTIES AS; MOISTURE-HOLDING CAPACITY, PORE SPACE, INFILTRATION RATE, AND HAVE A HIGH RESERVE OF CHEMICAL COMPONENTS THAT WILL BE RELEASED OVER TIME THAT WILL MAKE THE NEW SOIL EVEN MORE FERTILE. THIS IS EXTREMELY IMPORTANT TO YOU AS AN OPERATOR. FOR INSTANCE, YOU ARE REQUIRED TO SPECIAL HANDLE TOPSOIL AND SEGREGATE IT INTO PILES WHICH ARE TO BE SEEDED AND MULCHED. IF YOUR OVERBURDEN HAD CERTAIN SECTIONS THAT COULD BE USED AS TOPSOIL SUBSTITUTIONS, THINK OF THE SAVINGS OF NOT HAVING TO SCRAPE UP EVERY INCH OF AVAILABLE TOPSOIL FOR FUTURE USE.

DURING MINING AS YOU RESTORE THE BACKFILLED AREAS WITH TOPSOIL, YOU ARE CREATING EROSION HAZZARDS AND IN MOST CASES YOU ARE TOPSOILING I THE EARLY SPRING WHICH IS ALSO WHEN WE HAVE MOST OF OUR MAJOR PRECIPITATION EVENTS, THUS, YOU ARE CREATING AN EXCESSIVE EROSION PROBLEM THAT IN MOST CASES WOULD BE MUCH LESS IF YOU WERE USING A TOPSOIL SUBSTITUTE, I HAVE AN EXCELLENT EXAMPLE WHERE I COULD NOT MEET THE NPDES EFFLUENT REQUIREMENTS OF 70 MG/L FOR TOTAL SUSPENDED SOLIDS IN ANY AREAS WHERE I HAD USED THE ORIGINAL TOPSOIL IN RESURFACING MY BACKFILL; HOWEVER, WHERE I HAD USED A CALCAREOUS GRAY MUDSTONE AS MY SURFACING MATERIAL THERE WAS LITTLE OR NO PROBLEM MEETING THE NUMBERS GAME

IN NEARLY ALL CASES THAT I HAVE STUDIED WHERE A GRAY CALCAREOUS MUDSTONE WAS USED AS A TOPSOILING SUBSTITUTE, THERE WAS A MUCH BETTER GROWTH RESPONSEAND A MORE VIGOROUS PLANT ESTABLISHMENT THAN ON ADJACENT NON-DISTURBED SITES, ESPECIALLY FOR HERBACEOUS COVER. THIS MEANS LESS TOUCHUP WORK AND LESS RESEEDING OF AREAS AFTER THE INITIAL SEEDING.

ANOTHER AREA OF SAVINGS IS IN LIME AND FERTILIZER RATES APPLIED AT TIME OF SEEDING. WHERE SUITABLE TOPSOIL SUBSTITUTES ARE USED, MOST OFTEN THERE IS NO NEED FOR LIME AND ONLY ABOUT ONE-HALF THE AMOUNTS OF FERTILIZER IS NEEDED FOR INITIAL ESTABLISHMENT,

WHAT ABOUT POST-MINING? I AM SURE YOU ARE AWARE THAT AFTER YOU BACKFILL AND RECLAIM A PERMIT, YOU HAVE TO WAIT FIVE (5) YEARS BEFORE YOU ARE SO ELIGIBLE FOR FINAL BOND RELEASE, DURING THIS FIVE-YEAR PERIOD, YOU ARE RESPONSIBLE FOR THE MAINTAINENCE OF THE SITE, THAT IS, YOU VERY LIKELY WILL HAVE TO LIME AND FERTILIZE THE PERMIT AREA AT LEAST TWICE DURING THIS PERIOD. I AM SURE THAT YOU ARE AWARE OF THE COST OF THIS APPLICATION. WELL, IN MOST CASES, THESE ADDITIONAL APPLICATIONS WOULD NOT BE NECESSARY IF YOU HAD GOOD CALCAREOUS MUDSTONES PLACED ON THE SURFACE. IN MOST CASES, WE ARE BURYING THE BEST MATERIAL THAT WE HAVE BACK INTO THE PIT AND COVERING IT UP WITH OLD WORN OUT ORIGINAL TOPSOIL WHICH WE HAVE TO HEAVILY LIME, FERTILIZE, AND SUBSEQUENTLY, TREAT FOREVER,

JUST THINK OF THE POTENTIAL SAVINGS THAT YOU COULD BENEFIT FROM FROM THE EVALUATION OF ONE OVERBURDEN CORE. IT CAN AND WILL PAY OFF -- IF YOU TAKE ADVANTAGE OF IT.