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STATE OF UTAH
NATURAL RESOURCES & ENERGY
Oil, Gas & Mining

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July 29, 1982

Ms. Marcia J. Wolfe
Kaiser Steel Corporation
P.O. Box 1107
Raton, New Mexico 87740

RE: July 20, 1982 letter to the
Board of Oil, Gas and Mining
Stipulation 5-81-4
Test plots at the Sunnyside Mine
ACT/007/007
Carbon County, Utah

Dear Ms. Wolfe:

As per stipulation 5-81-4 "...pursuant to revegetation requirements, Kaiser Steel Corporation shall provide plans for and commit to maintain revegetation test plots in coal processing refuse...to determine revegetation potential...the test plots shall conform to specifications established by the Division. Kaiser Steel Corporation shall provide results of the test plots for two consecutive years (1981 and 1982) growth." The following should be pointed out:

1. Kaiser established test plots utilizing "coarse refuse" and "slurry". The Division received data collected for the 1981 season.
2. The Division made recommendations to personnel at Sunnyside in regards to the design of the above mentioned test plots.
3. As has been discussed at various times by personnel from Kaiser Steel Corporation. It has been indicated that Kaiser desires not to collect the second season's data, but rather establish new test plots to gain the desired information.

In light of the Division's concerns regarding testplots at the sunnyside mine, let me summerize what has been discussed with Mr. John Huefner in the last few weeks:

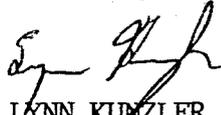
1. Although the existing coarse refuse testplots were poorly designed in terms of controlling several variables (such as runoff) that may skew results, and few (if any) plants established themselves on the coarse refuse plots, valuable information can still be obtained (eg. the "slurry" plots appear to be successful - treatments used for coarse refuse were unsuccessful, species "x" was or was not successful, etc). The Division recommends that this data be collected and submitted (if for no other reason than to meet the requirements of the Board order referenced above and avoid related problems in the future).
2. Test plots can give valuable information on the feasibility of reclamation using various methods. The Division encourages their use for the purpose of finding the best, most economical treatments (including soil amendments, mulches, seedmixes, etc.) so that the operator can be confident that final reclamation efforts will be successful from the onset and will not have to be repeated. In light of this, we encourage using the proposed final reclamation techniques for interim reclamation with an appropriate monitoring program (I have included some general guidelines for such a program for your convenience). Also, to gain the most from these plots, a "control" should be incorporated into the design. Plots should also be located so as to mimic the final slope, exposure, etc. In other words, techniques that were successful on a level test plot may or may not work on a 25% south facing slope.
3. Test plots need not be "formal", unless one desires to publish data in scientific journals (ie roadcuts could be used for testing the effectiveness of various mulches, soil amendments, etc.) What the Division feels is important, is reducing variables which could affect the results (slope, exposure, soil types, seed mixes, etc.) and reducing to a minimum the bias in sampling (a "cover" transect down the top of a drill (seed) row is not appropriate.)

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As Kaiser develops future testplots, the Division is willing to answer specific questions and help in locating appropriate sites.

Should you have additional questions after reviewing the enclosed monitoring guidelines and these concerns and recommendations, please don't hesitate to call.

Sincerely,



LYNN KUNZLER
RECLAMATION BIOLOGIST

Enclosure

LK/mn

cc: OSM

Jean Doutre, DOGM

Steve Cox, DOGM

John Huefner, Kaiser Steel Corp.

The Division has received requests for guidance in monitoring revegetation success on areas planted or seeded under interim reclamation plans where the latter may be used as revegetation test plots. In response to these requests, the Division has drawn up the following general guidelines:

1. It is recommended that monitoring be conducted at least once during the growing season, preferably during July or August, for the first five years following reseeding and every three to five years thereafter. Monitoring should be conducted during approximately the same dates from year to year.
2. Parameters to be measured during each monitoring period should probably include species composition, species cover per unit area and species occurrence per unit area (frequency or density). Total vegetative cover (living biomass) and cover of rock, litter and bare ground would also be useful.
3. Methods employed should be consistent from year to year. It is advisable to permanently mark sampling areas to ensure that the same areas are measured each year. As an example, if 1m^2 plots are utilized, transects should initially be randomly located and the beginning and end of each transect permanently staked. Sample plots could then be evenly spaced along the transect line at the same fixed interval each year. In addition, a number of individual plants of each species planted could be permanently tagged and recorded each year with reference to survival.
4. In addition to quantitative measurements, certain qualitative observations should be noted during each sampling period.
 - A. Note whether or not grazing or browsing has occurred in each sampling area and, if so, which species are being utilized.
 - B. Apparent effectiveness of erosion control should be noted.
 - C. Special conditions, circumstances, etc., should be noted, e.g., sampling conducted during drought year or during unusually wet year.
5. It is strongly recommended that the operator keep a record of which seeding methods and which treatments (mulches, fertilizers, irrigation, etc.) are used in each revegetated area for comparative purposes. This will facilitate decisions made to correct potential problem areas and to revise revegetation plans for final reclamation.

In general, a monitoring program for final reclamation should include at least the following:

1. A schedule (including frequency and season of monitoring).

2. Parameters to be tested (cover, density, productivity, etc.) and methods of testing.
3. The level (parameters) at which revegetation will be deemed successful or inadequate (pursuant to 817.116 and 817.117) during early monitoring.
4. What will be done to correct problem areas?
5. How reference areas or other standards will be used in determining revegetation success?