



An Affiliate of Cyprus Coal Company  
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May 30, 1989

Mr. Lowell Braxton  
Department of Natural Resources  
Division of Oil, Gas and Mining  
355 West North Temple  
3 Triad Center, Suite 350  
Salt Lake City, UT 84180-1203

RECEIVED  
MAY 31 1989

DIVISION OF  
OIL, GAS & MINING

Re: Response to May 5, 1989, Letter - Stipulation 817.71 - .74

Dear Mr. Braxton:

The attached responses are submitted to address Items 1 and 2 contained in the May 3, 1989, memorandum attached to your May 5, 1989, letter. We do not concur with the position taken by the Division regarding these matters and request that a meeting be scheduled between Cyprus Plateau, Henry Sauer, and James Leatherwood to formulate a program that will bring these stipulations to a mutually acceptable resolution. We would be pleased to conduct the proposed meeting at the mine site. On the basis of previous studies conducted at Cyprus Plateau, we believe our refuse materials are non-acid and non-toxic forming materials.

We are initiating the baseline vegetation, refuse, and soil sampling on Thursday, June 1, 1989. We would prefer to meet after the data from the laboratory are back and we have had a chance to evaluate them. We should be ready to meet sometime in mid to late July. We believe the sampling conducted to date and the literature referenced in our responses to date clearly show the refuse to be suitable for reclamation at the cover depths presented in our reclamation plan (17 inches).

We would like an opportunity to discuss the issues and request that the Division evaluate the data presented and the studies referenced and provide Cyprus Plateau some rationale as to why the data and studies referenced are not satisfying DOGM's concerns. Please let us know by June 15 when a meeting can be scheduled to discuss the issues.

Sincerely,

A handwritten signature in black ink, appearing to read 'Ben Grimes'.

Ben Grimes  
Sr. Environmental Engineer

/kam

Attachment

cc: Kent Crofts  
File: ENV 2-5-2-12  
Chrono: BG890507

## Recommendations:

### Item 1

#### Response:

The Division response to CPMC submittal Exhibit 52 of October 26, 1987, dated February 3, 1988, states:

"Exhibit 52 of the Plateau stipulation response describes the potential impacts to surface and groundwater by leachate or surface runoff from the refuse pile. This response has documented that the potential impacts to the quality of surface and and (sic) groundwater will be nominal."

CPMC sees no reason to commit to a monitoring program when the Division has agreed with the documentation given in Exhibit 52. There was no requirement associated with the Division's finding of February 3, 1988, to commit to future monitoring.

### Item 1A - 1E

#### Response:

CPMC will monitor the refuse and plant life growing on the refuse pile as outlined in the April 27, 1988, response to this stipulation with the following changes:

#### Selenium:

Baseline Sampling: Cyprus Plateau will implement the following sampling program. The two dominant grasses, forbs, and shrubs growing on the refuse pile, as measured by cover data collected in 1988, will be sampled and compared with the same species growing on undisturbed adjacent areas. These species will be determined by examination of the data collected from the refuse test plots in connection with the 1988 monitoring effort. The two treatments that will be sampled from the refuse test plots will be the straight refuse plots and 10 inches of subsoil plots. These treatments will be sampled because they represent the worst possible degree of contamination and treatment most like the treatment that will be used during final reclamation of the refuse pile.

At each site where vegetation samples are collected, soil or refuse materials will be sampled at the 0-6 inch, 6-18 inch, and 18-36 inch intervals. These samples will be analyzed for water soluble selenium levels.

The sampling scheme will follow the recommendations of Fisher et. al. 1987. A total of three plants of each species will be sampled. Since the plant selenium levels are documented as being the highest during the most active period of plant growth, the sampling will be conducted towards the end of May or first of June. Only the youngest, most actively growing tissues will be sampled. Care will be taken to assure that none of the samples are covered with dirt or other contamination that might affect the sample results. Immediately following field sampling, the plant sample will be kept in a cooler with ice until delivered to the laboratory

for analysis. In the laboratory, the samples will be analyzed and the results will be reported on a fresh weight basis. Quality control in the laboratory will be monitored by routinely taking split samples.

Cyprus Plateau will compare the data from these three areas by means of the "t-test" statistic. Specifically, the plant selenium levels from the refuse and topsoiled refuse plots will be compared and then these values will be compared to the plant selenium values from the undisturbed areas. Cyprus Plateau anticipates completing this sampling during the 1989 field season. A report containing the results of the baseline sampling will be submitted to the Division in connection with the Annual Reclamation Monitoring Report. Provided that adequate data is collected from the baseline and refuse pile during 1989, and suitable plant selenium levels are encountered, Cyprus Plateau will request that the Division defer the final sampling on the refuse pile at the time of final reclamation.

Reclamation Sampling: Cyprus Plateau expects to initiate a sampling program on the existing refuse pile reclamation during the 1989 field season, as described above. In the event that the data are insufficient to obtain a variance from sampling at the time of final reclamation, then Cyprus Plateau will commit to implement the following plant selenium monitoring program at the time of final reclamation.

Two years prior to reclamation, Cyprus Plateau will sample the two most dominant grasses, forbs, and shrubs based on the total plant cover. Plant tissues will be sampled using the sampling scheme described above under baseline sampling. The data collected from the refuse pile will then be compared to the data collected during the baseline sampling program. If the reclamation plant selenium values are less than or equal to the baseline levels, as measured by the "t-test" comparison, then no additional monitoring will be conducted. If acceptable selenium levels are found, then the selenium monitoring program will be discontinued. Since the existing shales and associated vegetation adjacent to the existing refuse pile have been documented as having elevated selenium levels, Cyprus Plateau submits that it will be highly unlikely that elevated plant selenium on the refuse materials will be encountered.

Since no apparent correlation has been documented between soil selenium levels and plant selenium concentrations, no additional soil sampling for selenium is anticipated.

#### Refuse Soil Sampling Program

Sample Spacing: Prior to topsoil placement and subsequent to regrading, the refuse material will be sampled. A grid system will be laid with 500 foot centers. At each interval the refuse will be sampled in 2 foot intervals to a depth of 4 feet. If potential phytotoxic zones are encountered, sub-samples will be taken at 250 foot intervals from the initial sample. In this manner, the extent of potential phytotoxic zones can be identified.

Depth Intervals: At each sample point, two samples will be taken. The first sample will be a composite of the 0 to 2 foot interval, and the second composite sample will correspond to the 2 to 4 foot interval.

Parameters to be Analyzed: At a minimum, the samples will be analyzed for pH, electrical conductivity, boron, pyritic and organic sulfur, acid-base potential, and selenium.

Sampling Schedule: Reclamation sampling for refuse pile materials will be conducted two years prior to reclamation.

Mitigation Measures: In the event that potentially acid or toxic producing materials are identified in the sampling scheme, the following mitigation measures will be implemented for all parameters with exception of acid base potential, provided conditions allow. The potential "hot spot" will be covered with non-acidic or non-toxic forming materials. If conditions do not allow for the material to be covered, then the materials will be mixed on-site by grading or ripping this material to a sufficient degree that the problem area is adequately diluted. Following mixing, the site will be resampled as outlined above prior to topsoiling.

The acid producing potential of the refuse is open to interpretation based upon the assumptions used in the acid base potential test. Cyprus Plateau proposes to calculate acid base potential based upon pyritic sulfur only. The data presented in Table 15 of Exhibit 51 show that no decrease in organic sulfur in refuse range from fresh to 18 years in age can be documented. Therefore, there is no evidence that organic sulfur is being oxidized and contributing to the acid forming potential of the refuse. The same Table amply demonstrates that, at a maximum, only 49% of pyritic sulfur is oxidized within the 18 year age of the refuse.

There are numerous studies available which document that almost all acidification occurs within a three to five year period following exposure to the weathering process. Since only less than half of the pyritic sulfur is being oxidized, Cyprus Plateau proposes to utilize only pyritic sulfur in calculating the acid base potential of the refuse material. Cyprus Plateau submits that, since this approach over-estimates the acid producing potential by a factor of over two, it is sufficiently conservative for the Division's purposes at this site.

If acid base potential values of less than -5 tons CaCO<sub>3</sub>/1000 tons are encountered, then the measures described above will be initiated. Specifically, the "hot spots" will either be covered with a cleaner refuse material or mixed by grading or ripping, as described above.

## Item 2

### Response:

Since only the top few feet of the to-be-reclaimed refuse pile will be the area of potential acid forming/toxic forming materials, Cyprus Plateau sees no value

whatsoever in sampling the refuse pile until time of final reclamation. Refuse material lying deep within the pile will have no bearing on the final reclamation vegetation. No further monitoring until final reclamation is justified for acid forming/toxic forming characteristics. Plants growing on the refuse pile during the proposed baseline vegetation monitoring will give adequate data on selenium levels to resolve the issue. In a memo from James Leatherwood to John Whitehead dated September 29, 1988, under Recommendations, Mr. Leatherwood recommends the sampling program be undertaken at baseline and "at the time of final reclamation." We concur with this recommendation.