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Mr. Ben Grimes  
Plateau Mining Company  
P.O. Drawer PMC  
Price, Utah

September 3, 1993

RE: Response to Hugh Kleins Comments regarding Updated PHC.

ACT/007/006  
#2

Dear Ben:

The following contains our response to comments made by Mr. Tom Munson and Mr. Hugh Klein in their letters to Pamela Grubaugh-Littig dated March 10, 1993 and March 11, 1993 respectively. These letters were forwarded to CPMC under a cover letter from Ms. Grubaugh-Littig dated March 25, 1993. Our responses include comments and decisions made during our joint meeting with DOGM on April 19, 1993 as best we understand them. Response to comments made by Tom Munson are based upon Page 4 of his letter wherein his recommendations are made. Responses to comments made by Hugh Klein are identified by page numbers referenced throughout his letter and start with comments regarding Page 700-62.

**RESPONSE TO RECOMMENDATIONS MADE BY  
TOM MUNSON IN LETTER DATED MARCH 10<sup>TH</sup>**

**Response 1**

A variance from requiring baseline monitoring for periods in excess of one year will be requested and received before the sampling program is modified to operational monitoring at any new water monitoring stations. Appropriate modifications have been made to permit text and Table 728h on page 700-82o, and to the monitoring schedules shown on Table 731.211a for the years between 1993 and 1997.

**Response 2**

Table 731.211a has been modified to include appropriate quarterly well P92-10-1 water level monitoring through 1997.

**Response 3**

Well 86-18-2 was deleted from Table 731.211a during the last submittal.

Filename: 2LKLEIN RES

**Response 4**

Gentry Mountain mine flows are collected and monitored at the Gentry Ridge Station shown in Table 731.211a. Appropriate modifications to the table have been made to reflect the concerns of DOGM.

**Response 5**

This response refers back to the analyses made earlier throughout Toms letter. Response to each analysis paragraph is provided below.

**Paragraph 1 - Page 2**

- Included within Response 1 above.

**Paragraph 2 - Page 2**

- No response required.

**Paragraph 3i - Page 2**

- Text indicating a firm commitment to analyze the strata below the coal seam at the time of drilling has been added to page 700-82n.

**Paragraph 3ii - Page 3**

- No response required.

**Paragraph 3iii - Page 3**

- No response required.

**Paragraph 3iv - Page 3**

- No response required.

**Paragraph 3v - Page 3**

- No response required.

**Paragraph 3vi - Page 3**

- Included with Response 1 above.

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## **RESPONSE TO LETTER FROM HUGH KLEIN DATED MARCH 11<sup>TH</sup>**

### **Page 700-62**

#### **Paragraph 3**

This comment is editorial in nature, however inconsistencies have been corrected throughout the 700 section where they have been identified.

### **Page 700-63**

#### **Paragraph 1**

Page 700-63 has been corrected to include all of the first paragraph. The shading indicates which water sources are identified by the specified water right. No breakdown of quantity by source is provided in the water right. The total amount of water indicated in the table heading can be diverted from one or all of the specified sources.

### **Page 700-64**

#### **Paragraph 1**

Information related to local earthquakes previously referenced within the permit has been added to the permit along with a reference to the communication had with the University of Utah Seismology Department at the end of Section 700.

#### **Paragraph 2**

The text on Page 700-64 has been modified to acknowledge that other explanations might exist as well as to clarify the intent of the discussion as interpreted by the author.

### **Page 700-65**

#### **Paragraph 7**

Clarification as to the location of detailed geologic descriptions is provided within the second paragraph after the heading "Gentry and Castle Valley Ridge Characteristics" on page 700-64.

**Page 700-66**

**Paragraph 1**

Reference to the Hintze and Stokes publications have been added to the list of references found at the end of Section 700 of the permit. In addition, clarification has been made within the text as to the sources of information discussed within paragraph 1. The intent of the discussion was not to specifically note by reference which materials have been reviewed, for the preparation of such a listing would be extensive and impractical. The intent was however to indicate a general reference to the sources and types of material reviewed and the level of experience gained within the region. For a list of references to which the paragraph is based the reader should review the "List of References" found at the end of Sections 600 & 700.

**Paragraph 2**

Preliminary information received related to the CO-OP drilling operation indicated that there was a possible upward gradient as noted. At the time it was prepared, the text attempted to provide the best and most complete information available. However, since conditions are now formally defined, the reference to the possibility of an upward gradient within the CO-OP mine has been deleted from the text.

**Paragraph 3**

The paragraph has been modified to include a statement indicating that the well data collected reflects short term stabilization conditions.

**Paragraph 4**

The first sentence of this paragraph applies to generalized hydrogeology often found within the Wasatch Plateau Coal Field wherein conditions similar to those discussed within the paragraph are found. Reports reviewed as part of this and other studies conducted within the region reference the same types of general conditions found throughout the Wasatch Plateau. Some of these conditions include the overall consistency of regional stratigraphy in the macro sense, as well as the presence of local features which produce a multitude of inconsistent perched and confining systems in the micro sense. Some of the references from which these conclusions are reached include Edmond M. Spieker, 1931; H. H. Doelling, 1972; Thomas C. Chidsey, Jr, 1991; and miscellaneous reports prepared over time by consultants for CPMC. A more complete list of geologic references from which geohydrologic conditions have been gleaned are found at the end of Section 700.

The conclusion regarding upward gradients found within the Gentry Ridge area was derived based upon information collected as part of the in-mine well drilling program during the preparation of the PHC. Data available at that time which showed this slight upward gradient occurring in February of 1992 is shown within Table 728b.

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Information regarding well 92-10-1 has been added to the permit in the form of a drill log found in Exhibit 728b. A brief statement has also been made on Page 700-66a referencing the exhibit for information related to the well log (and thereby the geologic strata encountered during drilling).

Page 700-67

**Paragraph 2**

With this submittal, well log information (including geology) for Wells P92-01-WD, P92-02-WD, P92-03-WD, P92-04-WD, and 92-10-1 has been updated and included within Appendix 728b. None of the wells penetrated the entire thickness of the Star Point Sandstone and all wells should be considered partially penetrating (if one considers the entire sandstone thickness a single aquifer). An approximate determination of percent penetration can be made by comparing data shown in the well logs to that provided in the geologic cross sections (Maps 624.110Xa through 624.110Xd) submitted as part of the permit renewal package. According to CPMC geologists, the Star Point Sandstone is approximately 350 to 450 feet thick. Using an average 400 foot thickness, the percent penetrations into the Star Point Sandstone for each of the five wells identified above are 15, 15, 4, 4 and 10 percent respectively. In addition to modified well log details for Appendix 728b, text on Page 700-67 and 700-68 has been modified slightly to reflect the addition of new data available for well 92-10-1.

Page 700-68

**Paragraph 1**

Information requested related to the location of the piezometers within the geologic stratum was provided as part of the response for Page 700-67.

**Paragraph 2**

Information requested related to the location of the piezometers within the geologic stratum was provided as part of the response for Page 700-67.

**Paragraph 3**

Information requested related to the location of the piezometers within the geologic stratum was provided as part of the response for Page 700-67.

**Paragraph 4**

It was decided in a joint meeting held on April 19, 1993 between DOGM, CPMC and HA&L that this comment did not require a response at this time.

**Paragraph 6**

It was decided in a joint meeting held on April 19, 1993 between DOGM, CPMC and HA&L that this comment did not require a response at this time since the issue had already been resolved in previous meetings with DOGM staff.

**Paragraph 7**

The term bedding structure has been changed to lithology and verbiage found within the paragraph has been changed to reflect a more clear description of the intent of the discussion. Seeps and springs occur in nature at locations where anomalies exist in local geology which allow their development. Such a principal is based upon fundamental engineering principals of ground water development and occurrence. Conclusions reached regarding the location of seeps and springs with respect to geology is based upon both engineering knowledge, judgement and available mapping.

Detailed geologic investigations have been conducted throughout many locations within the mine permit area. Mr. Glenn Miller, a consulting geologist from Colorado has completed numerous field investigations regarding both surface and subsurface geology, including the identification of local faults and fractures. Much of the geology presented within the text of the permit as well as on permit mapping was developed under his direct supervision. In addition to work completed by Mr. Miller, other reports have also been submitted directly to CPMC to investigate and resolve questions related to local geology as they directly relate to coal mining activities. One such report recently completed is entitled "Stratigraphy and Structure of Coal-Bearing Upper Cretaceous Strata in Nuck Woodward Canyon, Wasatch Plateau, Utah" by T. H. Morris, S. M. Ritter, L. A. VeVitre, and A. K. Aase.

Page 700-69

**Paragraph 3**

Quantification of mine inflows encountered to which the text is referring is given within the discussion on the following page under the heading "Gentry and Castle Valley Ridges".

**Paragraph 4**

Water right number 91-3555 (priority date January 8, 1991) has been issued to CPMC for the purpose of developing water captured in reservoirs and pumped for mine use. The water right allows for the year round use of 0.91 cfs of water utilizing portable pumps and distribution lines within the mine.

#### **Paragraph 5**

It was not the intent of this paragraph to define a quantity associated with the term "significant", but to provide a verbal description of flow characteristics upon the first encounter with inflows versus long term conditions. In order to rectify this misunderstanding a slight modification has been made to paragraph 5 referenced on page 700-69 as well as to the introductory paragraph immediately under the heading "Gentry and Castle Valley Ridges" on page 700-70. Available data indicating the rapidity of the decline of mine inflows is available for selected stations in the annual hydrologic reports submitted to DOGM. Individual flow data pertaining to Gentry Ridge is not available due to the conditions clarified in the above referenced text.

#### **Page 700-70**

#### **Paragraph 1**

The annual flow yield of 134 gpm used is the approximate maximum in-mine flow recorded within the areas east of Gentry Ridge. This number was used because the intent of the discussion as stated in the following paragraph was to provide a reference to the fact that waters encountered could easily be the result of a release in storage, and not necessarily all from interflow or fault flow. The fact that mine inflows have decreased over time helps document this as a possibility.

#### **Paragraph 2**

At present, water encountered within the mine remains within the mine and is pumped to abandoned mine sections. After pumping, the water continues to migrate southward whether it be through mine workings or through natural flow paths.

#### **Paragraph 4**

It was decided in a joint meeting held on April 19, 1993 between DOGM, CPMC and HA&L that this comment did not require a response at this time.

#### **Paragraph 6**

It was decided in a joint meeting held on April 19, 1993 between DOGM, CPMC and HA&L that this comment did not require a response at this time.

#### **Paragraph 7**

Text has been changed from "submerged tight geologic structure" to "aquitard located beneath the water table". The last sentence has also been modified to clarify the meaning of the paragraph.

Page 700-71

Table 728c

The drill hole lithologies and responses to comments for each well identified in this request are presented in the following table.

WELL	LOCATION OF LITHOLOGY INFO.	RESPONSE
86-18-2	EXHIBIT 624.310b	192 feet of well screen was installed between elevations 8454.7 and 8262.7. The well penetrated a total depth of 1342 feet and terminated at elevation 7331.7.
86-26-6	EXHIBIT 624.310d	Complete water level data are shown in the Annual Hydrologic Summary Report. 187 feet of well screen was installed between elevations 7911.9 and 7724.9. The collar elevation of the well is 9726.9 and the bottom of the well is located at elevation 7724.9.
86-35-1,2,3	N/A	Available water level data are shown in the Annual Hydrologic Summary Report.
86-01-TD	N/A	No Lithology/Log Information is available for this well. However, it is known that the Collar is at elev. 8482.5', the Third Floor seam elev. is 8480', the floor of the Hiawatha seam is at elev. 8425', the top of perforations are at elev. 8408', the bottom of perforations are at elev. 8341', and the bottom of the well is at elev. 8335'. Perforations are in the Star Point Sandstone. Some very minor changes in water level have occurred over time, however, no net change between the time periods indicated is noted.

WELL	LOCATION OF LITHOLOGY INFO.	RESPONSE
86-02-HD	N/A	No Lithology/Log Information is available for this well. However, it is known that the Collar is at elev. 8475.5', the floor of the Hiawatha seam is at elev. 8473', the top of perforations are at elev. 8463', the bottom of perforations are at elev. 8413', and the bottom of the well is at elev. 8402'. Perforations are in the Spring Canyon Sandstone. Complete water level data are shown in the Annual Hydrologic Summary Report.
86-03-WD	N/A	No Lithology/Log Information is available for this well. However, it is recorded that the Collar is at elev. 8467.5', the floor of the Wattis seam is at elev. 8466', the floor of the Third Seam is at elev. 8316', and the bottom of the well is at elev. 8272.5'. Perforations are located within the bottom 50' of the well.
92-01-WD	EXHIBIT 728b	The depth the well penetrates into the Spring Canyon Sandstone can be scaled from Exhibit 728b. See the response to page 700-67 comments.
92-02-WD	EXHIBIT 728b	The depth the well penetrates into the Spring Canyon Sandstone is identified on Exhibit 728b. See the response to page 700-67 comments.
GRABEN CROSSING	N/A	As indicated in Table 728c, this well was lost shortly after it was drilled and therefore no additional data are available.

To aid future discussions related to these wells the table just referenced has been modified and added to Exhibit 728b to provide the supplemental information to the permit.

Page 700-72

### Paragraph 1

As shown through a comparison of mapping completed prior to the preparation of the updated PHC, the overall configuration and gradient of the water table has not changed significantly over time. This concept was the real intent of the paragraph in question. In our joint meeting held on April 19, 1993 between DOGM, CPMC and HA&L questions were raised whether or not Maps 722.100c dated June 1991 should be combined with Map 728a prepared in April of 1992 in response to DOGM's updated PHC request. At this time we recommend leaving both maps in the permit to 1) help document the fact that little overall gradient change has occurred between the two time periods, 2) help maintain the geologic detail shown on Map 722.100c which can not be maintained if transferred to a smaller scale, and 3) maintain data shown on Map 728a which is not within the boundaries of Map 722.100c.

To help reduce confusion, Map 722.100c has been renamed to "1991 Piezometric Surface - Regional Aquifer System", Map 728a has been renamed to "1992 Regional Hydrogeology", and the text has been modified to more closely reflect true intent. Further, Map 27 out of the old permit can be compared. Contours between the time periods continue to show a southeastern flow with the northernmost contours of Map 27 generally matching gradients shown on more recent mapping.

### Paragraph 2

Well logs for CVR-1, CVR-8, CVR-9 and CVR-10 can be found within Exhibits 624.310d and 624.310e. Only a select number of well logs which were felt to be representative of conditions have been inserted into permit Exhibit 624.310d. A single copy of logs for wells CVR-2, CVR-3, CVR-5, CVR-5A, CVR-6, and CVR-7 are included as part of this response for Hugh Kleins reference. It is not the intent however to reduce these logs to graphical form or to summarize them in verbal form and add them to the permit package.

### Paragraph 4

Although it is preferable to have all ground water data based upon true equilateral spacing, it is not necessary to obtain realistic interpretations of generalized conditions. Any possible error potentially introduced by non equilateral conditions between the three wells identified is well within any margin of error which could be hoped to obtain. When dealing with real world conditions and data, non ideal conditions have to be accepted. And since it would be impossible to install enough wells within the area to completely define the influence that all the local faults have on regional water tables, conditions have to be generalized. The fact that local geology is complex and varied therefore results in the conclusion that any statements made, unless specifically noted, deal with generalized conditions.

**Page 700-74**

**Paragraph 1**

It was decided in a joint meeting held on April 19, 1993 between DOGM, CPMC and HA&L that this comment did not require a response at this time due to further clarification provided at the meeting. However, one note is made regarding the comment that Map 722.100c provided in the permit does not adequately represent ground water contours in the location of the in-mine wells within Gentry Ridge. At the time of the meeting it was indicated that it was my understanding that the contours had been misplaced at the time of drafting, however, this is not the case. Map 722.100c was prepared in 1991 prior to the completion of in-mine wells P92-01-WD, P92-02-WD, P92-03-WD and P92-04-WD and therefore did not have data in the area to refine the contours. Therefore the map is correct for the data and time frame in which it was prepared. To clarify this issue, the map has been renamed as stated previously under our response to Page 700-72 Paragraph 1.

**Paragraph 2**

The information provided in the permit is based upon comments received from the well driller. The text has been changed to reflect this.

**Paragraph 3**

Theoretical permeabilities for sandstones and shales has been added to the text.

**Page 700-75**

**Paragraph 1**

Comment addressed earlier under our response to Page 700-66, Paragraph 2.

**Paragraph 2**

Text referring to upward gradients at the CO-OP mine have been removed from the paragraph.

**Table 728e**

Data for wells P92-01A-WD through P92-02-WD shown in Table 728e were collected with the aid of an Omnidata Datapod II data logger after which the resulting data was analyzed through the use of "AQTESOLV", an aquifer test design software package developed by Geraghty & Miller, Inc.. A similar statement to this has been added to the permit text immediately prior to Table 728e.

**Page 700-76**

**Paragraph 2**

The discussion presented within the permit has been modified to provide generalized references for the conclusions reached. The references given maintain a general description because no single reference makes the conclusion upon which the statement is made. The conclusion reached was developed after filtering through previous knowledge gained in the area as a result of studies, geologic investigations by CPMC, a review of geologic reports, discussions with CPMC staff, development of contour mapping, etc..

**Paragraph 4**

The spelling error has been corrected within text where located.

**Paragraph 6**

Comment only - no response required as per the joint meeting held on April 19, 1993 between DOGM, CPMC and HA&L.

**Page 700-79**

**Paragraph 1**

Comment only - no response required as per the joint meeting held on April 19, 1993 between DOGM, CPMC and HA&L.

**Page 700-80**

**Paragraph 3**

The exact reference from which the tritium information was obtained for inclusion into the permit was taken from the personal library of Peter Nielsen, a former CPMC employee and is not available. However, a similar reference to tritium, giving its occurrence and value as a testing medium has been added to the text and reference page.

**Paragraph 7**

Comment only - no response required as per the joint meeting held on April 19, 1993 between DOGM, CPMC and HA&L.

**Paragraph 8**

Historic data as well as water quality analyses over time are reported in the Annual Hydrologic Reports submitted to DOGM.

Page 700-81

**Paragraph 5**

The comment made herein refers to sources of spring water which are considered deep as opposed to shallow or surface. Spring water sources can be the same source which would be encountered if a well were installed locally to obtain water level data. The statement therefore provides a basis for allowing water quantity and quality data which has been collected from local springs to serve as representative data for local baseline ground water since the source of water is ground water. Baseline issues related to this comment have also been discussed earlier within this response.

Page 700-82

**Paragraph 2**

Baseline issues have previously been addressed. No additional comment required as per the joint meeting held on April 19, 1993 between DOGM, CPMC and HA&L.

Page 700-82c

**Paragraph 4**

No additional comment is required as per the joint meeting held on April 19, 1993 between DOGM, CPMC and HA&L.

Page 700-82e

**Paragraph 1**

Data related to the July 2, 1986 stream survey is included on Map 722.100d and a discussion related to results and conclusions of the effort is found within Section 722.100 of the permit. Clarification of a proper reference has been made to the permit text.

**Paragraph 3**

It would be infeasible to tie down spring sources more than in a generalized sense since one can not determine the full influence of geology without the complete removal and documentation of the geologic stratum. Therefore, spring sources and the probable hydrologic

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consequences of mining have been stated to the extent possible at this time. Baseline and operational monitoring of each spring found within the monitoring program will tell through time if there has been a change in upgradient recharge characteristics.

**Paragraph 4**

Continued impact upon perched aquifer systems is not only likely, it is probable. Longwall mining cannot be conducted without resulting in the subsidence of the geologic strata above the coal seam and hence upon the local perched aquifers that lie within the subsided zone. We feel that we have given serious consideration to these issues and that the conclusions reached within the PHC reflect our position regarding the potential for overall impact.

Page 700-82g

**Paragraph 3**

No additional comment is required as per the joint meeting held on April 19, 1993 between DOGM, CPMC and HA&L.

**Paragraph 4**

No additional comment is required as per the joint meeting held on April 19, 1993 between DOGM, CPMC and HA&L.

Page 700-82k

**Paragraph 1**

No indication could be found within the text that indicated that the possibility of impact to Birch and Bear Canyon springs was eliminated due to the complexity nor the additional length of water flow.

**Paragraph 3**

No additional comment is required as per the joint meeting held on April 19, 1993 between DOGM, CPMC and HA&L.

**Paragraph 4**

No additional comment is required as per the joint meeting held on April 19, 1993 between DOGM, CPMC and HA&L.

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**Page 700-82k-2**

**Paragraph 3**

The comment regarding carbon filtering has been modified to indicate that filtering will occur through two coal seams and interbedded mudstone units. The intent of the paragraph is to indicate that mine contaminants will tend to be removed as mine waters pass through downgradient formations through possible filtering, bonding and/or reaction. Whether water passing through the coal seam will pick up additional concentrations of pyrite and sulfate is irrelevant to the intent of the discussion since undisturbed water in many cases would likely pass through the coal seams and pick it up anyway as it moves downward.

**Page 700-82m**

**Paragraph 7**

No additional comment is made since issues raised by this DOGM response have been previously addressed.

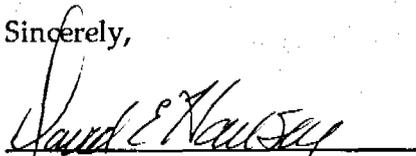
**Page 700-82n**

**Paragraph 2**

No additional comment is required as per the joint meeting held on April 19, 1993 between DOGM, CPMC and HA&L.

Should you have any questions or feel that additional clarification needs to be made, please call.

Sincerely,



David E. Hansen, Ph.D., P.E.  
Principal - Project Manager