HEALTH ENVIRONMENT department

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December 12, 1983

Dr. Stephen G. Wells
University of New Mexico
Department of Geology
Albuquerque, NM 87131

Dear Dr. Wells:

Enclosed is the response to your report of May 19, 1983, we received from Homestake Mining Company. We would appreciate your opinion on the adequacy of their response. Thank you.

Sincerely,

C. Kelley Crossman

C.Kelley Crossman
Uranium Licensing Section

CKC/cvc

enc.

HOMESTAKE MINING COMPANY
P.O. BOX 98
GRANTS, NEW MEXICO
87020

December 6, 1983

CERTIFIED MAIL: P22 0259121

Kelly Crossman
Radiation Protection Bureau
New Mexico Environmental Improvement Division
P.O. Box 968
Santa Fe, New Mexico 87504-0968

RE: SUA-708 Homestake Mining Company - Grants Operation

Dear Mr. Crossman:

This letter is written in response to those questions presented by your contractors on May 5, 1983 (Dr. Schreiber) and May 19, 1983 (Stephen Wells).

The first set of responses shall be directed toward Dr. Schreiber's questions and comments.

1. Section C6.1.3, P. C6-3, last paragraph. What is the design basis of the retaining berm? How many gallons or acre/feet of liquid would be spilled in the case of an embankment breach? In case of a tailings pipe rupture? What is the basis for these volumes? In the event of an embankment breach or pipeline rupture, will the embankment hold all of the liquid released?

RESPONSE:

Homestake surveyed the current southern retaining berm and determined that the area contained by the berm should store 97 acre feet of liquid. The minimum berm height, at it lowest point, is four feet. As discussed on page C6-3, lines 2 and 3, the amount of liquid impounded by the tailings structure is approximately 50 acre feet, based on surveys of the ponds. Even if all of the impounded liquid, 50 acre feet, was released from a tailing embankment breach, the berm area has the capacity to contain the liquid.

If the tailing pipe ruptured at that point other than along the crest of the embankment (where it follows the pond side of the crest and would, therefore, spill to the ponds), it could discharge tailings slurry at a maximum rate of 1500 gpm (the capacity of the pump, C1.2.5.5, page C1-9). The cyclone operator would notice the rupture by the failure of slurry to reach the cyclone. Assuming that it would take the operator one hour to notify the mill and shut down the pump (actual time likely to be much less), 11,952 cubic feet or 0.27 acre feet would spill. This quantity is insignificant compared to the capacity of the retaining berm.

Section C2.2.2 provides details on stability assessment of the embankment buildout. Section C2.2.3 provides details on embankment monitoring. Section C6.1.3.1 discusses extent of contamination in case of a large scale event and Homestake's requirements concerning operations of the tailings facility to preclude release of tailings.

COMMENT:

2. Section C9.2, p. C9-2. I question whether 30 days is enough advance notice to EID prior to mill closure and starting of decommissioning activities.

RESPONSE:

No response required by EID.

COMMENT

3. Section C9.3.4, p. C9-6. The design details for the riprap to be placed on the toe of the embankment should be provided. If details are not provided now, they definitely must be provided for review and approval before reclamation commences.

RESPONSE

Because the stabilization plan is written for decommissioning and stabilization at the year 2000, it would not be prudent at this time to provide design details for the riprap to be placed on the toe of the embankment because sources available at that time cannot be identified with certainty now. As indicated in Section C9.3.4, Homestake may use concrete and rubble from the mill decommissioning, in addition to rock, for embankment toe protection. The amount of concrete or rubble that will be available will not be known until decommissioning commences. Homestake will coordinate with EID prior to any riprap placement.

COMMENT

4. Section C9.3.6, p. C9-9, paragraph 1. The extrapolated graph of the 6-hour and 24-hour rainfall data should be provided for review, as well as the adjustments made for areal corrections.

RESPONSE

The extrapolated graph for 6-hour and 24-hour rainfall data and adjustments made for areal corrections are attached (Attachment 1).

COMMENT

5. Section C9.3.6, p. C9-9, last paragraph. In the event of a 200-year flood, how much freeboard will be available on the flood protection berm?

RESPONSE

As shown on Figure C9-8, the flood surface water elevation for a 200-year flood event at the protection berm (cross-section A-A') will be at elevation 6581.0 feet. As discussed on line 27 and 28, page C9-9 (revised Chapter C9.0) the top of the protection berm will be at elevation 6585 feet which provides four feet of freeboard.

COMMENT:

6. Section C6.2.5, p. C6-17, last sentence. Design details for the 200-year flood protection should be provided for review. If not now, details must definitely be provided for review and approval before construction commences to upgrade the existing protection.

RESPONSE

As discussed above in Comment 3, the stabilization plan is written for decommissioning and stabilization at the year 2000. Prior to construction of the protective berm, design and specifications will be prepared and submitted to the appropriate state agencies for their review and approval.

COMMENT

7. Section C3.1.3, p. C3-10, lines 24-26. Maintenance of berms requires continual monitoring and occasional remedial actions. This requirement is not consistent with the concept of long-term stabilization with minimal continual maintenance and monitoring.

RESPONSE

The following is quoted from Section C9.6 Monitoring Program. "In accordance with the recently amended Section 12-300.E of the Radiation Protection Regulations, HMC will inspect and maintain the stabilized tailings disposal area prior to any transfer of ownership of HMC's interest to the state or federal government or termination of the license. Prior to this per HMC will inspect the integrity of the rock and soil cover at leas nnually. During this time, maintenance required to restore the area to its original effectiveness will be performed as needed."

"Upon transfer or termination of the license, New Mexico's continued care fund will assume cost for maintenance and monitoring and the government authority will be responsible for both."

As discussed above monitoring and maintenance of the berm will be continuous.

The following responses are made to Mr. Stephen G. Wells comments:

COMMENT:

General Statement: This report is a clearly written, well organized, and comprehensive document concerning the Homestake mill tailings area. Especially worth noting is the comprehensive work conducted on the alternative site study. In this study, sites D and E were judged "to be superior to the other alternative sites, and are more suitable than the others in terms of impacts to groundwater, surface water, geomorphology, and remoteness of habitation". In fact, the comparison to the present site clearly indicates the superiority of the alternative sites (D and E) to the present location. However, as stated on page A1-5, "the present site achieved total ranking comparable to the preferred alternative sites.

It would appear that the significant findings in this report are overlooked in favor of the present site which by my observations and this report's conclusions is less desirable. The present site is located on an active valley floor system which is susceptible to flooding, cutting and filling episodes, and wind erosion. Pathways for contaminants exist as faults which connect the alluvial aquifer and the San Andres Formation directly south of the tailings area. The proposed stabilization plan for the present site is not commented on in detail in this report, because it would appear that the present site is not an environmentally sound location.

RESPONSE:

A comprehensive alternative site selection for the tailings management system was conducted in accordance with amendments to the Radiation Protection Regulations of New Mexico Environmental Improvement Board (Section 3-300k.1), reported in detail in Appendix B, and summarized in Chapter C3. Section C3.1.3 provides the comparison of the present site to the best alternative sites. Significant findings of the alternative site studies were not overlooked; on the contrary, they were explained and discussed in detail in these sections. The ranking of the present site considered all categories and considerations used for the candidate sites. Note that the present site was ranked second even when economics were considered.

The present system, with the planned buildout, will be in compliance with New Mexico's regulations. An objective assessment of the present site versus other sites must consider that moving the disposal operations to an alternative site would involve:

Environmental degradation of additional land.

Reclamation and long-term stabilization of two areas instead of one.

Abandonment of a physically and environmentally sound existing tailings deposal system.

Incurrence of the large cost of building a new tailings disposal system, which would be prohibitive considering the current price of yellowcake and the status of the uranium industry.

Discussion of the San Mateo valley is contained in paragraphs 2,3, and 4, Section B4.2.1, Physiography. Discussion of flood protection for the present site is contained in Section B3.1.5, Floodplain Determination, page B3-5, lines 24 through 31, page C3-10, lines 19 through 26, and Section C9.3.6, Peak Discharge for the 200-year Flood Event, page C9-9 (revised Chapter 9.0) Lines 18 through 30.

As discussed on page C3-9, lines 1 through 4, the site is characterized as depositional, rather than erosional. While it is recognized that hydrologic regimes can change with time, there is no reason, based on available data, to expect such a change in the vicinity of the mill within the foreseeable future. Although cut-and-fill is associated with isolated hydrologic events, no pattern of channel entrenchment is evident near the mill.

As discussed on page C3-9, lines 29 and 30, and page C3-10, lines 1 through 10, the present site complies with applicable airborne release standards of Part 4. After operations cease, the stabilization treatment will protect against wind erosion for 200 years. Section C9.1.1, Ongoing Program, provides a discussion on Homestake's current interim stabilization program to mitigate blowing tailings and suppression of gully formation on the treated embankment.

From field investigations to date, Homestake does not know of any existing fault(s) directly south of the present site that is a pathway for contaminants between the alluvial aquifer and the San Andres Formation. As discussed on page B3-10, lines 1 through 16, there are two concealed faults east and west of the site. Pumping tests in the Chinle aquifer have shown that these faults react as impermeable boundaries in these aquifers. In addition, page B3-11, lines 19 through 29, provides additional data to support the conclusion that a connection does not exist.

The present site achieved a total ranking comparable to the preferred sites and with the planned buildout will be in compliance with the regulations. Consequently, if total ranking is considered, and specific categories are not treated in isolation, the reviewer must recognize that the present site is environmentally comparable to the better alternative sites.

COMMENT:

1. Re: B3.0, p. B3-1, line 22-24. This statement is incorrect; there is a distinct channel less than one mile north of the mill.

The channel is visible on air photographs and in the field. The mill area is in the region where the drainage becomes discontinuous, which is typical of semiarid drainage systems.

RESPONSE:

On November 17, 1981 a field reconnaissance was conducted by two personnel from D'Appolonia and survey personnel from Homestake. The objective of the reconnaissance was to determine stream channels in San Mateo drainage area. The survey conducted north of the mill site included Section 1, 2, 11, 12, 14, 23 and 24 T12N R10W. This survey extended four miles north of the Homestake mill site. No stream channels or drainage ditches were found during the survey. A diversion dike was located in Section 14 and 23 which seemed to divert the braided San Mateo creek bed west of the original flood plain. Based on on-site observations, the orginial statement is correct.

COMMENT:

p.B3-3, line 23. Are there any values for infiltration capacity? None are given here.

RESPONSE:

Infiltration capacities of the topsoil have not been measured by Homestake, but sandy topsoils of the type prevalent in the area would have a high infiltration capacity.

COMMENT:

p.B3-9, lines 29-31. Daniel Stephens has demonstrated by numerical modeling that recharge to bedrock aquifers may occur from leakage from narrow alluvial aquifers in the subcrop area in this area (near Prewitt). It is important to note that this report does not state that there will be no recharge from the alluvial aquifer into the Chinle and ultimately the major water producer, the San Andres. This report only states that the Chinle will retard downward migration. Are there any measurements for vertical hydrolic conductivity through the Chinle? Given Stephens' data, this type of information is critical. The lack of hydrogologic information is evident in the discussion of the Chinle on page 3-11, lines 11-17.

RESPONSE:

The response to this comment has already been adequately addressed in Homestake's Discharge Plan (DP-200) on Page 3.4-3.

COMMENT:

I'm concerned about faults interconnecting the alluvial aquifer

with the San Andres Formation. I don't have the GWDP so I can't evaluate the locations of the two concealed faults discussed on page B3-10, lines 6-9.

RESPONSE:

Homestake's Discharge Plan (DP-200) discusses in detail the extensive pump tests performed which have shown that these faults act as impermeable boundaries, not recharge sources (Section 3.4).

COMMENT:

It is necessary to have hydrogeologic cross-sections which show the aquifers and the associated potentiometric surfaces (re: p.B3-11, lines 23 - 26). There could be leakage from the overlying aquifers into the San Andres despite a head difference of 70-80 feet. I don't believe that the hydrogeology section is complete, and therefore, a complete evaluation is not possible.

RESPONSE:

Drawings 3.2-1, 3.2-3, 3.2-4 of Homestake's Discharge Plan present geologic cross-sections in the area of the tailings pile. Water level elevations along the line of each of these cross-sections can be obtained from the water-level elevation map for each of the respective aquifers.

COMMENT:

2. Re: 3.2.6, p. B3-18, lines 19-21. I would like to see the data for this statement; this data should be made available for evaluation. What are the concentrations of selenium and uranium in the outcrops; and more important, by what processes are they transported into the alluvial system? In the same section of groundwater quality, the report states that no radionuclides are being carried from the tailings into the alluvial aquifer. The basic question remains:

> Why would radionuclides be mobilized and carried into the groundwater system, but not transported from the tailings into the groundwater? I would like to see this geochemical question answered.

RESPONSE:

Poison Canyon, which is a tributary to San Mateo Creek, drains the outcrop area of the Morrison Formation. Uranium mines exist in this outcrop area, which indicates that mineralization occurs in this formation's outcrop.

Uranium was included with the heavy metals in this discussion and should have been specifically excluded from the statement that the tailings disposal area has not elevated the radionuclide concentration (except uranium) downstream in the San Mateo alluvium system.

COMMENT:

3. Re: B4.2.3, p. B4-7 and Figures B4-2 and B4-4. This diagram illustrates my concern which was expressed earlier; there are faults which are shown both on the map and cross-section which are positioned within several hundred feet down gradient from the tailings (cross-section A-A'). This fault could be a major pathway for contaminations to travel from the alluvial aquifer into the San Andres. Is there any geophysical evidence to verify the existence and location of these faults? I am concerned that, if real, they may be the source of recharge for deep circulation systems described by Dan Stephens.

RESPONSE

Geophysical logs were used to determine the displacement and approximate locations of the faults near the tailing pile. Discharge Plan (DP-200) Drawings 3.2-1, 3.2-3 and 3.2-4 present this information.

COMMENT

4. Re: B4.3, p. B4-9, lines 23-25. There are two new articles by Northup and Machette published in 1982 which provide more current information. These articles are in Albuquerque Country II, published by the New Mexico Geological Society. Machette states that many fault scarps were formed during the late Pleistocene (150,000 - 10,000 years); although no magnitude value is assigned, this suggests greater frequency of surface rupturing in the Albuquerque Basin than indicated in this environmental report.

RESPONSE

This environmental report was prepared in 1982 before the papers referenced by the reviewer were available. Nevertheless, the findings of those papers are irrelevant to the level of seismicity (effective peak horizontal acceleration) applicable to the HMC mill. Frequency as reported in those papers would not affect the 0.10g acceleration used for the seismicity analysis.

COMMENT

5. Re: C3.1.1, p. C3-2. I am most impressed with the criteria and methodology used in the analyses of alternative sites for tailing disposal, but I am uncomfortable with the underlying

concept that tailings disposal sites can be protected from 100-year flood events by berms. The longevity of flood control structures in northwestern New Mexico is not completely evaluated; however, unpublished work by myself and Dr. T. Gardner indicates that berms are susceptible to breaching by floodwaters, especially if mine waters exist in the channel during flooding. For example, in the Kim-me-ne-oli wash, a berm (flood diversion structure) was breached between 1977 and 1980, which resulted in channel cutting through the berm at a rate of downcutting equal to 0.5 m per year (Figure 1). Between 1977 and 1981, a channel with a cross-sectional area of 14 m^2 developed. Thus, our data shows berms are not necessarily reliable, long-term features for flood control in northwestern New Mexico.

RESPONSE

The reviewer's comment is too general to indicate which question he is addressing in particular. The reviewer's example relates to a flood control berm for which no data is presented. It might have been constructed without compaction control, with inappropriate fill, etc. In addition, no mention is made about whether monitoring or maintenance was performed after construction. The retaining berm constructed by Homestake, and discussed on page B3-5, is monitored during milling operations and if any remedial action is required it can be accomplished in a very short period of time. In addition, monitoring and maintenance will continue after cessation of operations as discussed in Section C9.6.

COMMENT

6. Re: C3.1.2., p. C3-6. I agree with the conclusions of the alternate site review: areas D and E look on an initial basis to be very good sites. This is based on (1) lack of major alluvial valley fill, (2) no mapped structure, (3) remoteness, (4) no gully erosion, drainage area for floodwater runoff and damage. Therefore, I don't agree that the present site is better than sites D and E. The present site is not remote, as pointed out in the report. Figure B2-1 shows that wind direction is from the northwest which could transport airborne releases to downwind residences (such as the subdivision south and east of the mill and tailings). (In fact, there is a strong secondary wind direction from the northwest as illustrated in Figure B2-1.)

As pointed out in the report, areas D and E do provide better protection from the ground water system. I don't agree with the statement on page C3-8 (lines 15-18) that recharge on the tailings site will be eliminated in 200 years. This contradicts comments in this report concerning reducing runoff on the tailings area due by increasing infiltration (six-inch cover of gravel). This increased surface roughness (described in the reclamation plan) will promote

recharge through the tailings pile. Additionally, there are mapped faults in the present site which could promote leakage from the alluvial aquifer into the San Andres Formation. Sites D and E contain no mapped faults.

This report makes the assumption that gully erosion is due to slope, primarily. The present location of the tailings is in a active drainage-valley floor system system (see attached draft map by J. Grimm; Figure 2 a,b). Age dating and correlation of these deposits (Qa5 on Grimm's map) indicate that they are probably 1500 years old or younger. It is characteristic of these valley floors to cut and fill in the time frame of tens to hundreds of years. Thus, one cannot conclude that there will be no gully incision in this valley floor in 200 years since there is no channel present now. Semiarid valleys switch from depositional to erosional regimes in relatively short time periods. For example, entire drainage networks which are meters deep and tens of meters long can develop in a few years (Figure 3).

I have addressed flooding in my discussion above. I restate that berm protection has to be carefully evaluated, in that many in northwestern New Mexico have a history of failure (P. Lagasse, 1981, pers. commun.). Also, the statement that a 100 year event is one that occurs "but once in a 100 years" (p. C3-9, line 18) is erroneous and misleading. This report must state the true statistical meaning of a 100 year flood event.

My conclusions based on this report are that alternate site D and E appear to outweigh the present site based on this report's data and conclusions. The present location is in a geologically young and active environment which makes it much less desirable than regions out of the valley floors. A competent study of alternate sites is presented in this report but this is ignored.

RESPONSE:

It is not stated in the report that the present site is "better than sites D and E". The report states that "the present site achieved total ranking comparable to the preferred alternative sites" (page C3-7, lines 22-23). Section C3.1.3 provides specifics of the evaluation of the present site. Also see response to comment under General Statement.

Figure B2-1 shows the prevailing wind is in a southwest direction, not northwest. There are no residences within five kilometers of the site except in the W, WSW, SW, and SSW sectors, which are upwind of the prevailing wind direction (see Figure B1-4). Interim stabilization practices (Section C9.1.1) are being used to minimize airborne transport of tailings.

The present driving head for seepage from the tailings is from the 50 acre feet of liquid impounded within the two cells (see Section

C6.1.3.1). It is estimated that seepage from the present tailings disposal system is 53 gpm based on mill production of 3400 tpd see page C6-6, lines 1 through 3). After cessation of milling operations, the liquid in the ponds will evaporate and drain from the tailings, gradually reducing the head and seepage of tailings liquid. The slope and cover of the stabilized tailings embankment are designed to control runoff (not eliminate it). The stabilization cover will retard runoff and most of the precipitation should drain off the embankment cover or evaporate. The remainder will infiltrate, but without a constant liquid source or persistent salurated zone, a driving head will not develop, infiltration will be intermittent, and subsequent evaporation will eliminate most of the infiltrated moisture. Therefore, recharge through the stabilization cover should be negligible.

The possibility for leakage along faults is recognized. The report states on page C3-8, lines 18-20, that groundwater considerations most strongly favor areas D and E over the present site. The report states (page C3-8, line 28) that gully erosion is strongly influenced by slope, not due to slope. The report did not conclude that "there will be no gully erosion ...200 years". Rather, the report states that the present site "is easily protected from gully erosion..." (page C3-9, line 3). Neither the authors of the report nor the reviewers have the ability to give assurances about geological processes over the next 200 years. However, protection against erosion is possible and can be implemented if necessary.

Line 18, page C3-9 should have read "that it could be expected to be equalled or exceeded an average of once in 100 years over the long term".

The alternative site study did not ignore the more active geological environment of the present site. The attributes and shortcomings of the present site are discussed in detail in both Chapter C3 and Appendix B. A throughly objective evaluation of sites must consider more than the issue of what site would be best, ideally. It must consider what is best under existing, perhaps less-than-ideal, circumstances. The mill and tailings embankments exist where they are and have made the impacts described. It is academic to argue whether in retrospect a better site could have been selected initially. The real question to be answered is whether the present site is sufficiently flawed to justify removal of operations to another location. The report shows that this is not the case, that the present site meets environmental requirements and is comparable to alternative sites when total impact assessment is used.

COMMENT:

7. Re: C9.3, p. C9-3. I believe the most important step to be taken, prior to evaluating a final reclamation and stabilization plan, is whether the present site is environmentally sound. This report documents that it is not an environmentally sound location; therefore, I have not spent much time evaluating the final stabilization plan for the present site.

RESPONSE:

The report neither states not documents that the present site is not environmentally sound. Refer to your responses above for explanation. The reviewer seems to imply that if a site is not environmentally sound, stabilization is a mute point. We disagree - stabilization is important for any site. The alternative implied by the reviewer's comment is that an environmentally unsound site should be completely eliminated by removal (if not stabilized in place). The environmental impacts of removing a mill and tailings would be enormous, probably far exceeding any impact of stabilizing in place. No serious and objective assessment can ignore this.

If you have any comments or questions concerning these responses, please do not hesitate to contact me.

Very truly yours,

HOMESTAKE MINING COMPANY - GRANTS

Edward E. Kennedy

Edward E. Kennedy
Director or Environmental Affairs

EEK/bgl

Enclsoures:

cc: J.M. Parker
G.S. Crout

ATTACHMENT 1:

To determine the 200-year, 6 and 24-hour storms the precipitation frequency relationships for the 2 thru 100-year storms were plotted on semi-log paper and the relationship extended to 200-years. The 2-100 year storm amounts were obtained from the National Oceanic and Atmospheric Administration Precipitation-Frequency Atlas for New Mexico.

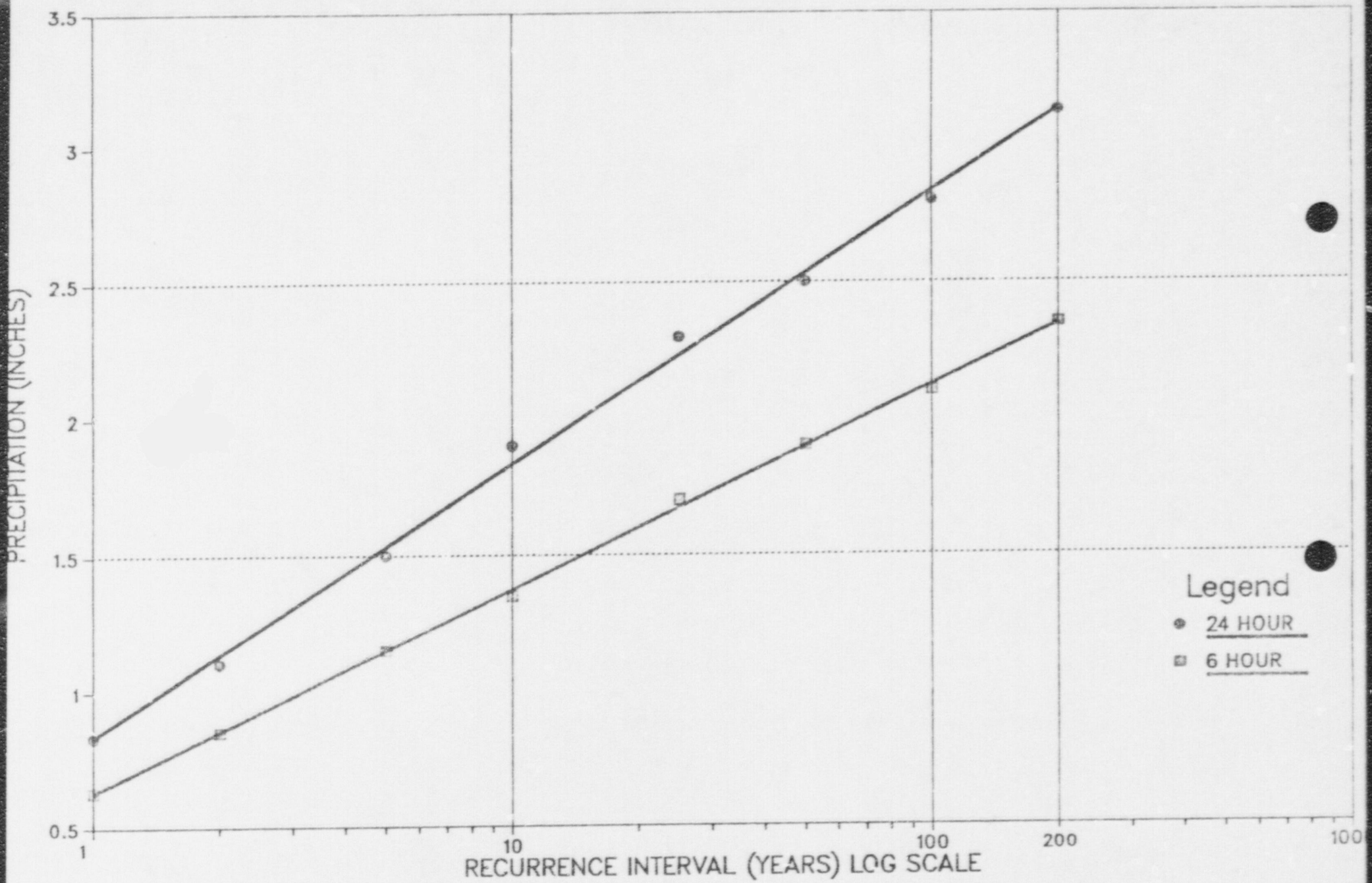
Recurrence Interval	6-hours	24-hours
2	0.85	1.1
5	1.15	1.5
10	1.35	1.9
25	1.70	2.3
50	1.9	2.5
100	2.1	2.8
200	2.34	3.14 (from graph)

The area reduction factors for 291 square miles are 0.839 and 0.916 for 6 and 24-hour storms, respectively.

200	1.96	2.88 (reduced)

These precipitation amounts were used in THYDB to compute the 200-year peak discharges. The peak discharge of 8456 cfs was used in the HEC-2 program.

HOMESTAKE MINING COMPANY — GRANTS PRICIPITATION FREQUENCY RELATIONSHIP:



Felix's remarks
Dec 14, 83

HOMESTAKE FACILITY

Uranium ore processing at the Homestake site commenced in 1958. Two tailings disposal facilities currently exist on the Homestake property. The smaller, approximately 40 acre site, was used up to 1962 and contains an estimated 1.225 million tons of tailings. It is currently anticipated that reclamation costs for this site will be provided through the Comingled Tailings Act. The larger tailings disposal facility covers approximately 170 acres and contains 20 million tons of tailings.

It is generally agreed that current concerns for groundwater contamination are primarily the nonradiological parameters, with elevated levels, i.e. they exceed the NMWQCC standards, for unrestricted areas (more specifically for the subdivisions to the south and west of the facility) reported for selenium, molybdenum, sulfate, nitrate and total dissolved solids.

Data for only two radiological parameters are available. They are radium-226 and total uranium. Uranium concentrations were also found to exceed the groundwater standards, however, this problem is apparently being mitigated to a great extent by corrective actions currently being utilized by Homestake. At present, only the area in the north-east corner of Broadview Acres appears to be impacted by the facility. Uranium

concentrations just North of Broadview Acres were reported at 6.36 mg/l for the upper Chinle aquifers in 1982. For comparative purposes, 8 wells which were sampled in 1975, in Boradview acres had uranium concentrations ranging from 0.01 mg/l to 24.3 mg/l. The groundwater standard for uranium is 5 mg/l. Radium-226 values do not appear to be elevated in alluvial groundwaters.

Kelley's input

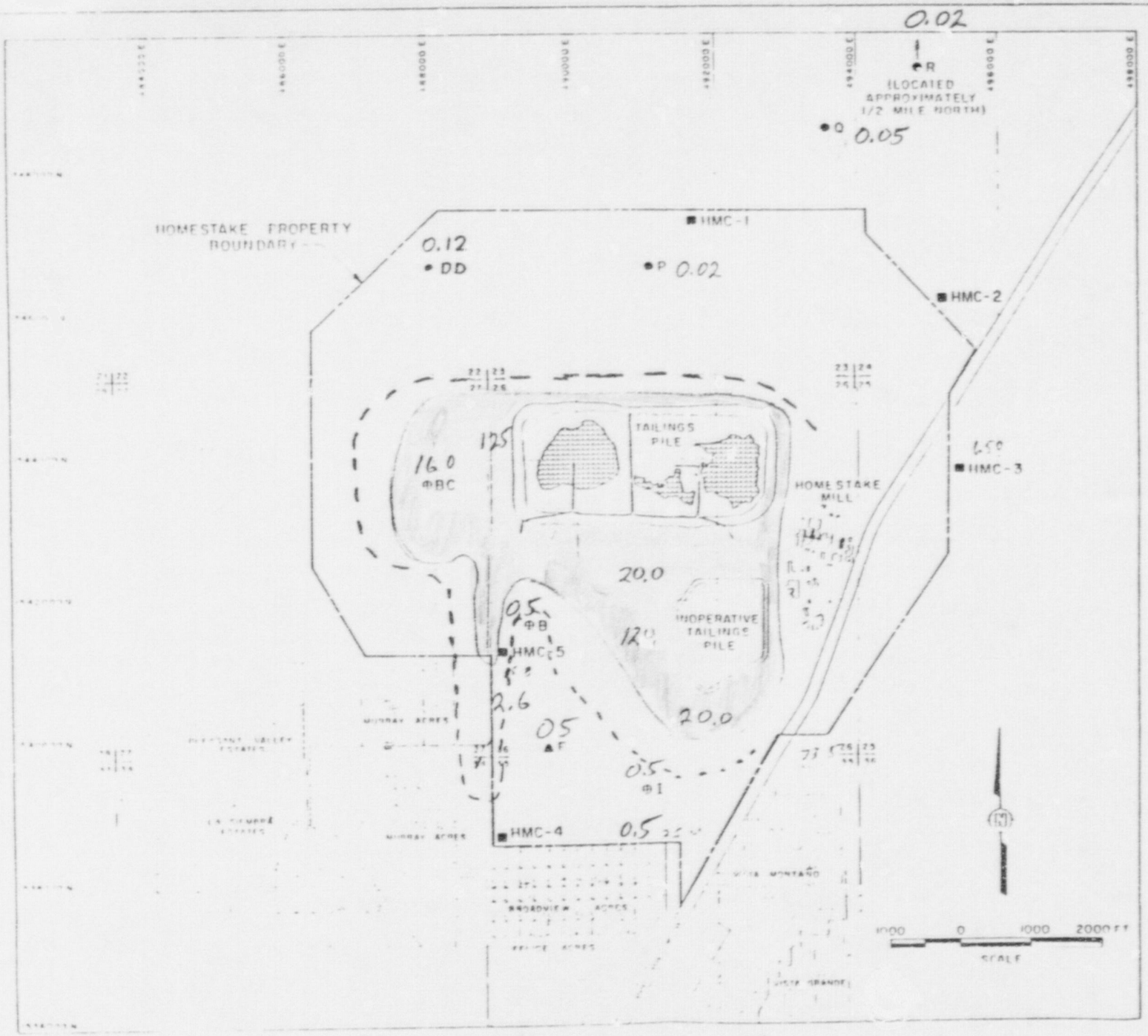
Homestake Mining Company-Grants

Dec 12, 1983

Uranium milling began in 1958 at the site 5.5 miles north of Milan, NM. Originally operating as two distinct mills under two different partnership agreements, the mill and property is now wholly owned by Homestake. The smaller mill operated for several years and sold its yellowcake exclusively to the AEC. Its 40 acre tailings pile falls under the Commingled Tailings Act for Federal funding of reclamation. The 170 acre active tailings pile contains commingled tailings, the earlier operation producing yellowcake for sale to the AEC. Present capacity is 3500 tons of ore per day with a nominal throughput of less than 1000 tons per day because of reduced demand. The estimated 20 million tons of tailings presently on site form a pile 90 feet high and seep approximately 150 gallons per minute into the groundwater.

Homestake has reported dissolved natural uranium and radium-226 in the groundwater since 1976. There is no detected movement of radium-226 from the pile into the groundwater. The attached sketch shows the approximate profile of the uranium seepage that exceeds the New Mexico Water Quality Standards. The NMRPR standards based on radioactivity are more lenient and are met at all areas outside the red-shaded area. NMWQ standards are

met outside the red-shaded area; the contamination is confined to HMC property. The new standards proposed by EPA under 40 CFR 192 allow for no degredation by Uranium. The contamination boundary under the EPA standards is shown on the sketch as a dashed line.



LEGEND

- PERIMETER SAMPLING LOC (AIR, SOIL AND VEGETATIO
- BACKGROUND GROU WATER MONITOR WELLS
- DOWNGRADIENT GROUNDWA MONITOR WELLS
- NEAREST RESIDENT GROUN MONITOR WELL

NOTE: PERIMETER SAMPLING SHOWN ARE APPROXIMA

URANIUM
As of April 83

EPA STD

NM STD

FIGURE CR-1

PERIMETER SAMPLIN AND GROUNDWATER MO MONITORING LOCATION

PREPARED FOR

HOMESTAKE MINING CO GRANTS, NEW MEXIC

NM Water Std for U_{nat} = 5.0 mg/l
NMRPB Std for U_{nat} = 44.3 mg/l = 3×10^{-5} μCi/ml

Survey shows no uranium-related cancer

New Mexican 12/27/83

By The Associated Press

An apparent increase in gall bladder disease among men who live near uranium tailings piles in the Grants area is the only significant health disorder uncovered in a recent study.

Dr. Jonathan Mann, state epidemiologist, said the health survey revealed no evidence of increased cancer, high blood pressure, heart disease or other major illnesses among nearby residents.

Mann released partial results of the survey of 200 people who live near the Homestake uranium mill tailings piles near Grants on Thursday. He will present the full results at a public meeting in Grants next Wednesday.

Mann told a news conference in Santa Fe that the higher incidence of gall bladder disease among men in the study group coincided with fewer cases of skin rash and severe headaches than anticipated.

The study of health effects and water quality also found no significant incidence of arthritis, stroke, kidney disease, neurologic disease, thyroid disease, miscarriage, birth defects or menstrual problems, Mann said Thursday.

Mann said that the only significant finding reported among women in the survey group was fewer skin rashes and more severe headaches than expected.

The study suggests that residents who are not experiencing chronic diarrhea or high blood pressure have little to fear from the water they drink, he said.

Mann said the survey is significant because major problems were not uncovered, but it would have indicated the need for a more elaborate study if a high level of major illness had been found.

He said the more important phase of the study, to be completed by the end of February, will determine the effects of radiation and air quality on nearby residents.

Mann said the study of radiation in the area will be more helpful because there is much more information available on the effects of radiation than there is on gall bladder disease.

The water quality and health effects study was limited, Mann said, because the sample of people was small and might not reflect the extent of any medical problems and the team relied on reported health problems rather than confirmed health problems.

He added that cancer often takes longer to show up in a person exposed to radioactivity, and the current residents may not have lived in the area long enough to develop any serious diseases.

Mann will present the full findings of the health team at a public meeting at 7 p.m. Wednesday at Grants City Hall. Mann and members of the working team who conducted the health survey and water analysis will also respond to questions of area residents.

New Mexican 12/29/83

Health survey 'reassuring' for Grants residents

GRANTS (AP) — The state epidemiologist says he finds the results of a health survey of residents who live near Homestake Mining Co.'s uranium mill tailings piles "reassuring."

Dr. Jonathan Mann detailed the results of the survey Wednesday night to about 10 people who turned out for a public meeting on the results, which had been made public earlier this month.

The survey found no evidence of increased cancer, hypertension, heart disease, arthritis, stroke, kidney disease, neurologic disease, thyroid disease, adverse pregnancy outcome or menstrual problems.

However, it also found that in males, skin rash and severe headache were less prevalent and gall bladder disease "significantly more prevalent among study participants compared to national data."

The studies were conducted, under Mann's direction, under a mandate from the state's Health and Environment Department.

Mann said the small number of people surveyed "limit its ability to detect significant differences between reported health effects in the study population and New Mexico or national national data," he believes it met its mandate to identify any health effects that might exist among the population near the tailings piles.

Homestake Mining Co., under a stipulated agreement with the Environmental Protection Agency, has announced plans to hook up residents of subdivisions south of the mill to the Milan water system.

Some of the residents in the subdivisions have sued the mining firm, claiming its uranium mill tailings operations have contaminated their ground water and damaged the value of their property.

Mann said the project was done with no additional funds or staff and any further studies must be mandated by the political system.