HOMESTAKE
GRANTS OFFICE

Alan D. Cox
Project Manager - Grants

7 February 2007

U.S. Nuclear Regulatory Commission
Office of Nuclear Materials Safety and Safeguards
Division of Fuel Cycle Safety and Safeguards
Chief of Fuel Cycle Facilities Branch (Mailstop T8-A33)
C/o Document Control Desk
11545 Rockville Pike
Two White Flint North
Rockville, MD 20852-2738

Attn: Mr. Ron Linton, Project Manager

RE: Homestake Mining Company of California
– **License SUA-1471 (TAC J00506)**
Grants Reclamation Project
Response to Questions on Proposed Evaporation Pond License Amendment – per NRC letter dated January 18, 2007

Dear Mr. Linton:

This letter is intended to respond to the questions that were transmitted to Homestake Mining Company of California (HMC) via a Nuclear Regulatory Commission (NRC) letter communication, as referenced above, with respect to HMC's proposed construction and commissioning of a third Evaporation Pond at the Grants Reclamation Project site. Our engineering design package and associated plans, along with a draft Environmental Report and request to amend the site Radioactive Materials License (SUA-1471) was transmitted to your office by letter dated October 25, 2006.

Enclosed please find our response to each of the posed questions; for ease of review, the questions are restated with a response to each immediately following.

We trust that this information is sufficient to allow continuation of the NRC formal review process and ultimately approval of the pond proposal and requisite amendment of the project NRC License.

We appreciate your continued cooperation toward our ongoing reclamation / site closure efforts at the Grants site. If you or any members of the NRC review staff have any remaining questions, or require additional information at this time, please feel free to contact me at your earliest convenience. I can be reached at (505) 287-4456 ext. 25 or via cell phone at (505) 400-2794. I can also be reached via e-mail at acox@barrick.com.

Sincerely yours,

HOMESTAKE MINING COMPANY
OF CALIFORNIA
Alan D. Cox – Project Manager / RSO

Cc: R. Chase – SLC (w/ attachment)
D. Deisley – SLC (w/ attachment)
B. Ferdinand – SLC (w/ attachment)

GRANTS RECLAMATION PROJECT
Response to Questions per NRC letter dated January 18, 2007

QUESTION # 1

1. The Environmental Report contained within the design package submitted is marked as Draft. Provide the final Environmental Report for review.

RESPONSE:

Enclosed please find two (2) copies of the final Environmental Report; these reports are included in Attachment A. During the process of finalizing the document, we have included edits / additional discussion addressing portions of the following NRC questions outlined below. Reference to relevant sections of the final ER will be made where appropriate.

QUESTION # 2

2. HMC has requested an amendment to its license. The review by the NRC staff may conclude with a recommendation to amend the license to allow for the construction of an additional evaporation pond. Propose how the current license language should be changed or modified to accomplish this task.

RESPONSE:

In review of the present License Conditions of the Grants Reclamation Project Radioactive Materials License SUA-1471 – Amendment 40 (most recent amendment, 8/2/06), we are proposing that the license amendment incorporate the changes outlined below as they pertain to the proposed siting and operation of EP3. License amendment suggestions pertain to License Condition LC-35 concerning groundwater compliance monitoring – (LC-35.A.) and operation of the lined evaporation ponds – (LC-35.D.). We believe that Table 2 (8-99), as modified by Amendment 34, should not be modified and re-issued until such time as the proposed CAP revision is finalized. As such, we are recommending the following Licence Condition language to address the addition of EP3 into the license.

Proposed amendments – language to read as follows:

License Condition 35.A.:

A. Implement the groundwater monitoring shown in Table 2 (8-99) submitted September 29, 1999, except that under "Reversal Wells," delete Well KF and replace with Well DZ, and except that Well CW2 will remain in the sampling program monitoring annually for G list of parameters, and Cr is to be deleted from the D and F lists of parameters. Well DD is to be added to the Table list and will be monitored semi-annually for the B and F list of parameters.

License Condition 35.D.:

D. Operate the three lined evaporation ponds, Pond #1 (EP1), Pond #2 (EP2) and Pond #3 (EP3), and enhanced evaporation systems located in each pond as described in the June 8 and 28, 1990; and July 26, August 16, August 19, September 2 and 15, 1994 submittals.

It should be noted that HMC will in the near future confirm, by additional survey confirmation, that Well DD is not overprinted by the design location for EP3. It is very close to the southern extent of the pond location; if Well DD must be replaced, the replacement well will be located in close proximity to, and hydrologically downgradient of, EP3. In the case that Well DD must be replaced with a new monitor well to provide downgradient monitoring for EP3, Well DD will be properly plugged and abandoned pursuant to all applicable regulatory requirements.

QUESTION # 3

3. HMC makes frequent reference to meeting, and several times seeks exemption from, the State of New Mexico requirements in various sections of the New Mexico Administrative Code, Title 19, Chapter 25, Part 12, Rules and Regulations Governing Dam Design, Construction, and Safety. Provide a copy of these requirements.

RESPONSE:

A copy of the referenced New Mexico Rules and Regulations are attached as Attachment B. Also enclosed as Attachment C is a copy of the formal approval letter for construction and operation of EP3 received from the New Mexico Office of the State Engineer.

QUESTION # 4

4. HMC's geotechnical site investigation consists of several test pits from 5-to-7 feet deep. In addition, it makes reference to the fact that the site area of EP3 is well known from deeper borings from previous work related to mill site operations and reclamation. Provide this additional geotechnical information from the deeper borings from previous work related to mill site operations and reclamation, or indicate where this information can be found if located in documents previously submitted to the NRC.

RESPONSE:

It is assumed that the request for this additional information is intended to provide additional technical support for the engineering design. Engineering review of the proposed pond, and related communications with the New Mexico Office of the State Engineer (OSE), provided sufficient information for the agency to complete a technical and structural engineering evaluation and subsequently issue the Permit to Construct and Operate EP3; the OSE approval letter and permit is included in Attachment C. The very shallow excavation needed for the pond, coupled with the small embankment height and impounding capacity, supports the classification of the pond as a low hazard potential classification dam / impoundment.

Soil borrow investigations in the EP3 pond location, conducted by Knight Piesold and Co. in 1994, were submitted to NRC by letter dated September 15, 1994 at the time when material borrow areas were under review for use as interim cover and radon barrier for the large and small tailings pile areas. The report is entitled "Homestake Mining Company Grants Reclamation Project Borrow Investigation – May 2, 1994". Shallow soil investigation data in this report is similar to that obtained from the trench investigations conducted to support the engineering and design of EP3.

We also include, as Attachment D, three (3) well boring drill logs for ground water wells that have been completed in the general area where EP3 is proposed to be located. These well logs typify the alluvial lithology in the area.

CW34 shows that the geological materials are unsaturated to a depth of at least 40 feet, about 4 times the height of the EP3 dike, and are sandy to shaly.

In CW 35, depth to water is around 92 feet with sand, sandy gravel and sandy clay to the bottom of the alluvium.

DD is similar, primarily sand with some clay fractions to 83 feet.

Individually, and as a group, these boring logs describe a relative high strength, low compressibility geologic section under the pond in which the groundwater is far below the depth of soil that will encounter any weight effects related to the dikes (additional load may be felt in the soil to a depth of 1-2 x the height of the dike fill, or about 10-20 feet). As stated in the Design Report, settlement from this load will be negligiible.

QUESTION # 5

5. A discussion of decommissioning/reclamation of this pond once its use has ended is required. If an amendment to the reclamation plan is required, indicate how and when this will be completed.

RESPONSE:

See discussion of decommissioning and reclamation of the pond, and the related pond site location, as described in the final Environmental Report – Section 4.9.

Final reclamation and closure / decommissioning of EP2 (existing pond) and EP3 (proposed pond) are similar. It is planned that both ponds will be evaporated to the extent possible during the latter stages of project closure and reclamation, and the pond sediments / solids removed from the ponds and placed in EP1. In similar fashion, the pond liners and all contaminated materials – piping, plumbing, spray equipment, etc. will be disposed of in EP1. After removal of all contaminated equipment and materials, soils will be sampled and analyzed and any contaminated soils not meeting standards will be removed and transported to the small tailings pile or EP1 areas and incorporated into the final closure plans for the small tailings pile. The site areas for EP2 and EP3 will then be regraded, shaped and revegetated to provide long-term erosional stability.

The project Reclamation Plan, as amended 10/93, will be reviewed and updated as deemed appropriate. It is proposed that this be accomplished in 2008 after addressing the revised Corrective Action Plan (CAP) which was submitted to NRC in December 2006. HMC will at that time review the current document, assess required modifications to the plan and submit the revised Reclamation Plan to NRC for review and approval.

QUESTION # 6

6. NUREG 1748, section 6.4.12, provides examples of information that should be contained in the Environmental Report pertaining to public and occupational health

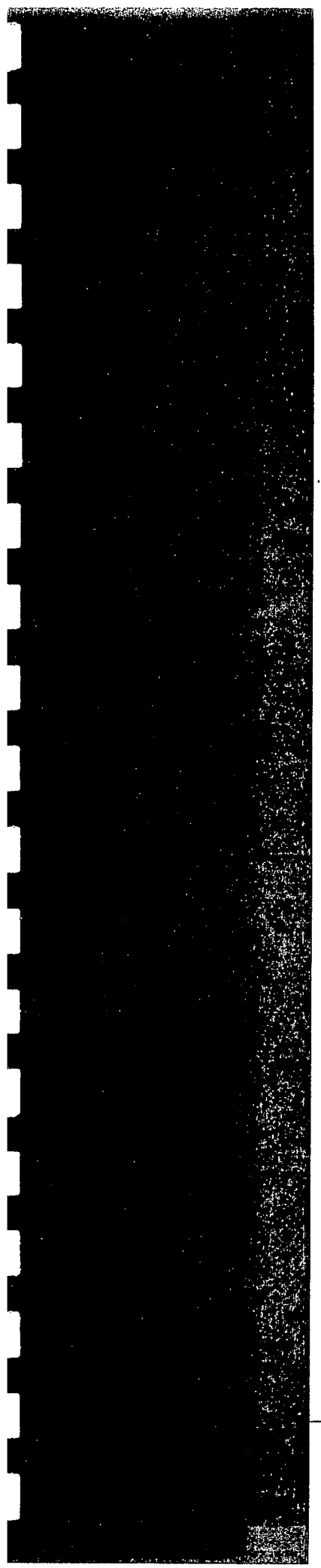
impacts. Provide information relevant to this project concerning the radiological impacts of the proposed action or justification why the analysis is not needed.

RESPONSE:

Please see the discussion that was added to appropriate sections of the final Environmental Report document. The ER is enclosed as Attachment A.

In terms of potential public health impacts, the proposed location of EP3 is more remote than our other existing evaporation ponds at the project. There have been no identified public exposure issues with the existing evaporation ponds as documented in the project Semi-Annual Environmental Monitoring reports on file with NRC.

In terms of potential occupational health impacts, we see no difference with EP3 as compared to EP1 and EP2, which have been in operation for a number of years. Occupational health monitoring is likewise documented in the semi-annual reports with no issues identified to date.



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ATTACHMENT A

Final Environmental Report
(2 copies)

ENVIRONMENTAL REPORT FOR THE CONSTRUCTION OF EVAPORATION POND # 3 (EP3) AND ASSOCIATED OPERATIONS BOUNDARY EXPANSION

January 30, 2007

License SUA-1470
Docket No. 040-08903
(TAC J00506)

U.S. Nuclear Regulatory Commission
Office of Nuclear Material Safety and Safeguards
Division of Fuel Cycle Safety and Safeguards
Fuel Cycle Facilities Branch

A report prepared for:

Homestake Mining Company of California, Grants Project

ENVIRONMENTAL REPORT FOR THE CONSTRUCTION OF EVAPORATION POND # 3 (EP3) AND ASSOCIATED OPERATIONS BOUNDARY EXPANSION

File No.:16977.4ER

Prepared by:

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January 30, 2007

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1.0 INTRODUCTION

1.1 Relevant Actions

The Homestake Mining Company (HMC) submitted a proposed tailings reclamation and mill-decommissioning plan for the Grants Mill to the US Nuclear Regulatory Commission (NRC) for review in January 1991 (NCR 1993). On December 8, 1992, HMC also submitted a supplement to their environmental report that had been prepared in 1982. The supplement describes the expected impacts associated with mill decommissioning and tailings reclamation, and evaluates alternatives for mitigating the impacts. Additional information regarding the site environment and environmental impacts of the proposed site closure plan was provided in letters dated January 11 and March 16, 1993. In a letter dated January 16, 1996, HMC requested that the large tailings compound be removed from the annual Technical Evaluation as the final stabilized configuration had been achieved. In a subsequent letter dated March 7, 1996, HMC submitted a Completion Report and notified the NRC that the Grants Mill decommissioning was completed, and requested the amending of License Number SUA-1471 to reduce monitoring requirements. The NRC responded in a letter dated July 31, 1996, which issued their determination that HMC's requests to reduce environmental monitoring and tailings impoundment monitoring requirements were acceptable and amended Source Material License SUA-1471 by modifying license requirements.

As part of Amendment 34 to the Grants Reclamation Project Radioactive Materials License –SUA-1471-Docket 40-8903 approved June 19, 2002, License Condition (LC) 42 was further amended to require submittal of a land use survey with the License annual report to NRC. Pursuant to (LC) 42, as amended, the annual survey has been filed with NRC as part of the annual Performance Review Report.

This Environmental Report (ER) is being prepared in accordance with NRC requirements in 10 CFR 51.21 and 51.30, and with the associated guidance in NRC report NUREG-1748, "Environmental Review Guidance for Licensing Actions Associated with NMSS Programs." An EA is defined by the Council on Environmental Quality in 40 CFR 1508.9 as a concise public document that briefly provides sufficient evidence and analysis for determining whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI).

1.2 Previous Environmental Reports and Supporting Documents

Documents evaluated in the preparation of this ER include:

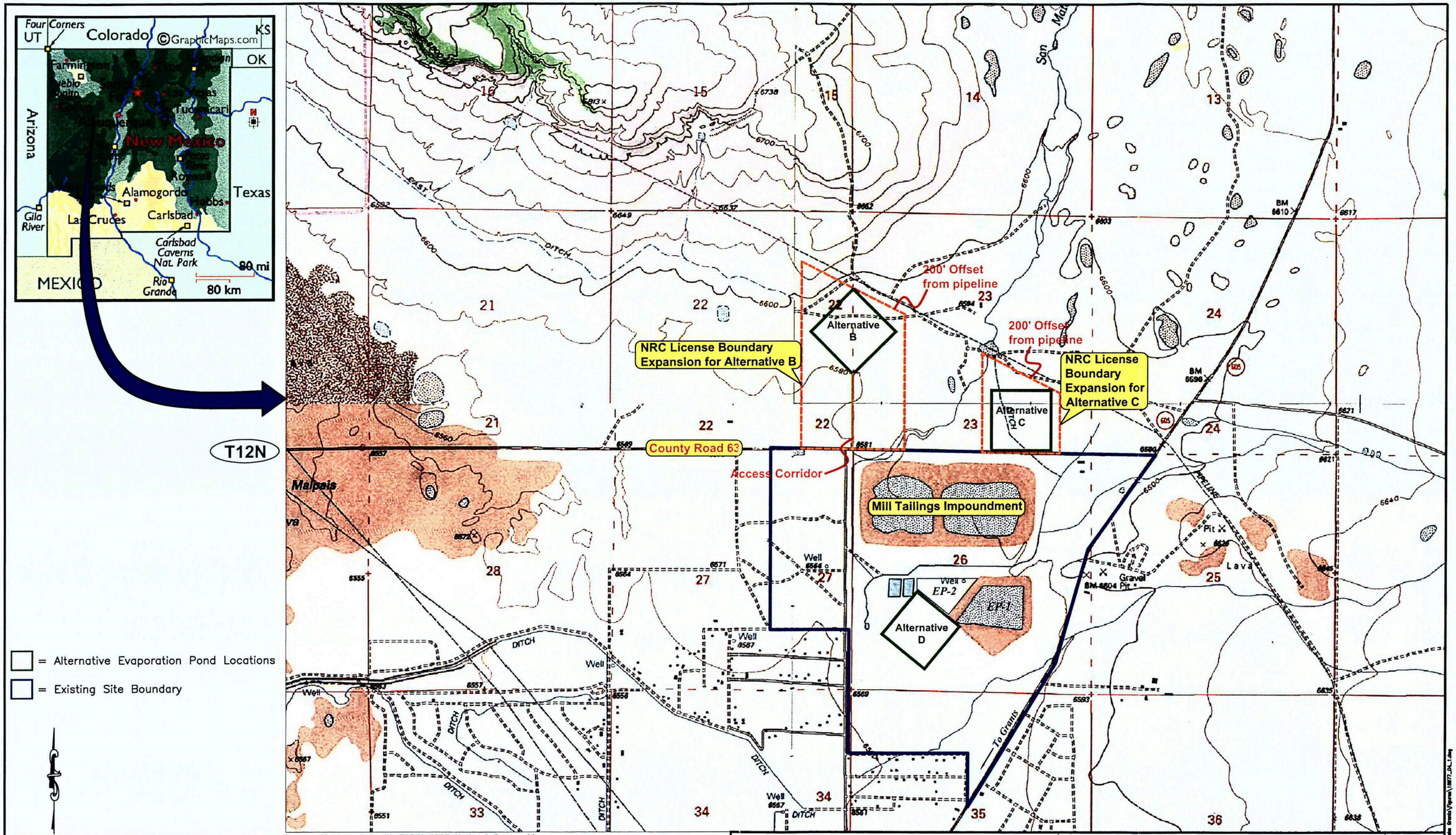
- "2005 Annual Monitoring Report/ Performance Review for Homestake's Grants Project, Pursuant to NRC License SUA-1471 and Discharge Plan DP-200"; March, 2006;
- "Environmental Assessment for the Decommissioning and Reclamation of the Grants Mill and Tailings Ponds," Docket No. 40-8903, May 1993;
- "Environmental Review Guidance for Licensing Actions Associated with NMSS Programs," NUREG-1748, Final Report, U.S. Nuclear Regulatory Commission, August 2003;
- "Standard Review Plan of a Reclamation Plan for Mill Tailings Sites Under Title II of the Uranium Mill Tailings Radiation Control Act of 1978."
- NUREG-1620, Rev. 1, Final Report. U. S. Nuclear Regulatory Commission, June 2003.

Additional references may be found in Section 8.0 of this ER.

1.3 Purpose and Need for the Proposed Action

HMC has, through a variety of partnerships and joint venture associations operated a uranium milling operation in Cibola County, New Mexico north of the City of Grants in Section 26, Township 12 North, Range 10 West (Figure 1). Uranium milling began at the Site in 1958 and continued through 1990 under NRC License SUA-1471. A total of approximately 22 million tons of ore were milled at the site using a conventional alkaline leach process. From 1993 to 1995, the mill was decommissioned and demolished (EPA 2001). At that time, final surface reclamation commenced in accordance with the amended US NRC requirements (NCR 2006).

HMC currently manages a ground water restoration program as defined by NRC License SUA-1471, and New Mexico Environment Department (NMED) Discharge Plan, DP-200 and DP-725 (HMC, 2006). An amendment to the NRC Site License and an amendment of NMED DP-725 will be required to address the addition of Evaporation Pond #3 (EP3), and the attendant site boundary expansion depending on the selected site location for the proposed pond. The restoration program is a dynamic on-going strategy based on a ground water restoration plan, which began in 1977, and is scheduled for completion in 2017. Additional evaluation of the ground water restoration program recently has identified the need to extend the program by approximately four years to 2017 to finish cleanup objectives.



Source: Map created with TOPO! 2003 National Geographic

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Drawn By: C. Landon	Date: June 2006
Project No.: 16977	Filename: 16977_04_0.dwg
Scale: 1" = 2,000'	Revision: 1

SITE LOCATION MAP
Homestake Grants Project
9km North of Grants of New Mexico
Grants, New Mexico

FIGURE
1

HMC's long-term goal is to restore the groundwater aquifer system in the area to levels as close as practicable to the up-gradient groundwater quality background levels. A groundwater collection area has been established and is hydraulically bounded by a down-gradient perimeter of injection and infiltration systems comprised of wells and infiltration lines. Alluvial groundwater that flows beneath the tailings pile areas enters this bounded collection area. All groundwater in the alluvial aquifer that is within the collection area is eventually captured by the collection well system. Once groundwater quality restoration within the zone is complete and approved by the agencies, the site is to be transferred to the U.S. Department of Energy (DOE), which will have the responsibility for long-term site care and maintenance.

The restoration program is designed to remove target contaminants from the groundwater through use of injection and collection systems, utilizing deep-well supplied fresh water or water produced from the reverse osmosis (R.O.) plant. The R.O. plant has operated at the site since late 1999 to augment groundwater clean-up activities. A series of collection wells is used to collect the contaminated water, which is pumped to the R.O. plant for treatment or, alternatively, reported to a series of evaporation ponds.

The purpose of HMC's request is to seek NRC approval to construct an additional evaporation pond (EP3) for assisting and enhancing groundwater restoration activities at the HMC mill site located north of Grants, New Mexico. This approval would include an associated expansion of the licensed operations boundary, depending on the selected site alternative for the proposed pond. In this regard, uranium mill tailings site reclamation is regulated by the NRC pursuant to the requirements of Part 40 of Title 10 of the Code of Federal Regulations (10 CFR Part 40), "Domestic Licensing of Source Material".

1.4 Proposed Action

HMC proposes to expand the current license boundary to construct EP3 for groundwater reclamation at the HMC Project. Accordingly, HMC has requested that Source Material License SUA-1471 be amended to permit the expansion of the permitted operations boundary to construct EP3 for groundwater reclamation activities at HMC.

Currently, groundwater remediation is underway, and as part of this remediation program HMC proposes to construct EP3 on HMC property north of the large tailing impoundment at a location in Section 22 and 23 (Alternative Site B) approximately 1,800 feet north of County Road 63. A 50-foot wide access corridor will be constructed to access the proposed pond and to locate piping and associated infrastructure to the proposed pond area. The proposed area of impact for Alternative B is approximately 33 acres, including the service corridor

and earthen containment dike. The evaporative surface area of the proposed pond is approximately 26.5 acres. The pond will be constructed as an at-grade facility, with cut and fill designed to be in rough balance. Therefore, no significant quantities of soil will be imported or exported from the site. The pond will have a double High Density Polyethylene (HDPE) liner with a leak detection/collection system. After groundwater remediation is complete (in approximately ten years time), the pond will be removed and the area reclaimed.

The proposed site is located in the San Mateo Creek valley north of the San Mateo Creek 100 year floodplain. The San Mateo Creek channel is well defined in the upper portion of the watershed but loses definition within a few miles upstream of the HMC site. The valley floor runs in a south-southwesterly direction across HMC property with no visible channel.

The proposed location for EP3 is within the SE ¼ of and NE ¼ of Section 22, and within the SW ¼ of and NW ¼ of Section 23, generally lying between 107° 52' 10" and 107° 52' 30" longitude and 35° 14' 50" and 35° 15' 00" latitude (Figure 2).

The Environmental Report (ER) provided herein assesses the likely impacts to the environment from HMC's proposal to expand the current licensed boundary to construct EP3 for ground water reclamation at HMC. This document serves to provide information to satisfy the requirements under the National Environmental Policy Act of 1969 (NEPA) for both the NRC and NMED to consider the environmental affects of the proposed actions under their jurisdiction.

1.5 Alternatives to the Proposed Action

1.5.1 Alternatives Available to HMC

There are three alternatives available to HMC to increase evaporation and storage capacities required for the groundwater reclamation. HMC is the property owner of lands associated with the evaporation pond citing alternatives discussed in this section (Figure 2). Construction details and evaporation pond designs are common throughout the Alternatives B-D including the preferred Alternative.

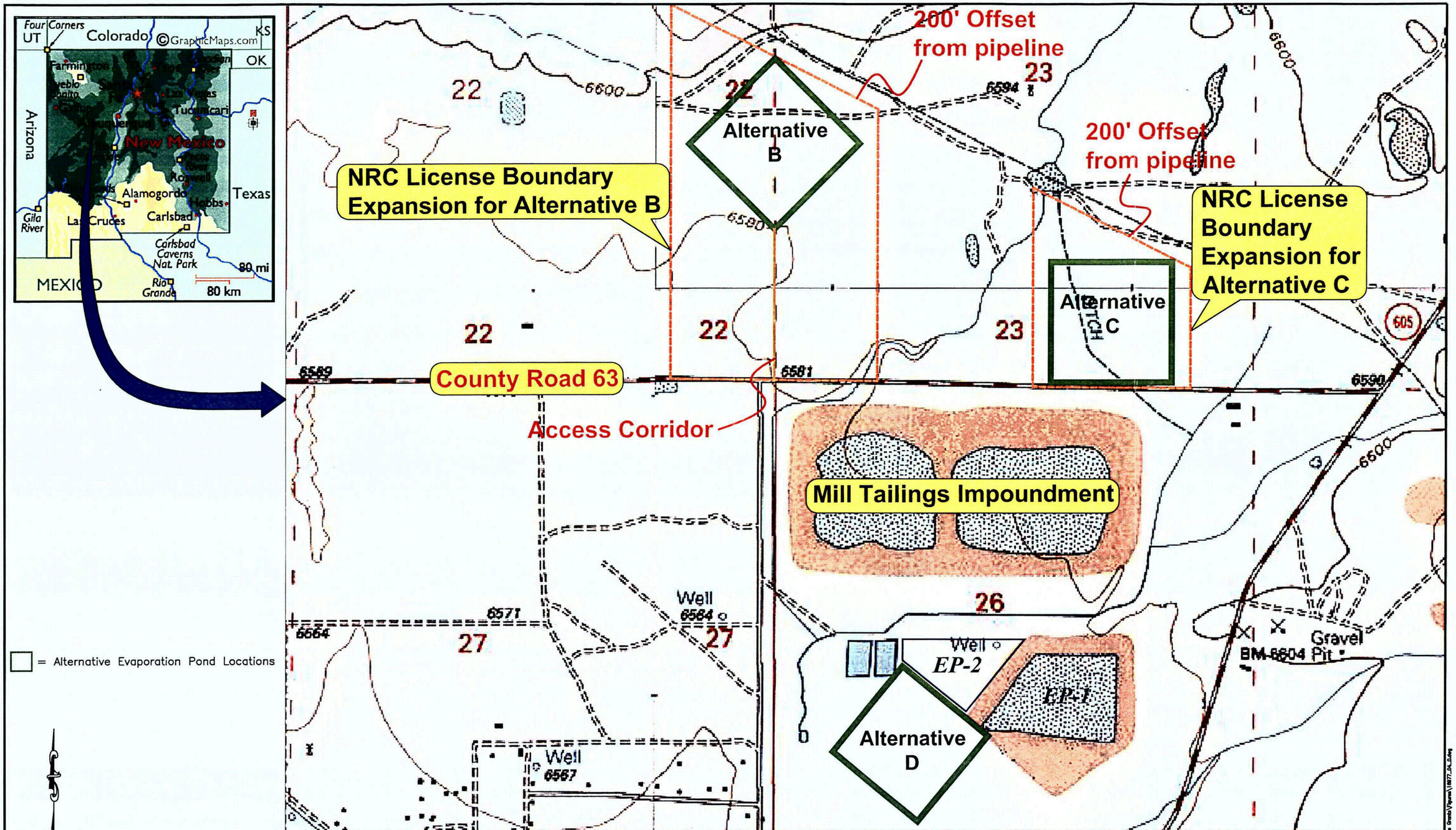
Alternative A: This is the No Action Alternative, which provides for the groundwater reclamation at the HMC facility under current capacities and at the direction of the NRC and NMED. No substantial changes to the reclamation plan would occur except for the likely need to extend the time period for completion of the reclamation. All current operations and maintenance programs would continue as planned according to the general provisions of the HMC Closure Plan dated May 12, 1993.

Alternative B: This alternative involves expanding the current licensed boundary and constructing EP3 approximately 1,800 feet north of County Road 63. Access to proposed site will be via a 50-foot access corridor. The NRC licensed boundary would be expanded to encompass approximately 185 acres.

Although the construction of EP3 is a planned activity, the placement of the pond north of County Road 63 and the expansion of the licensed boundary has not been approved by NRC or NMED. The placement of EP3 north of County Road 63 will disturb approximately 33 acres of land and be square in shape. The 33-acre impact area includes the access corridor and earthen containment dike. The pond is designed to provide 26.5 acres of surface area for evaporation and water storage purposes. The pond will be constructed as an at-grade facility, with cut and fill designed to be in rough balance. Therefore, no significant quantities of soil will be imported or exported from the site. The pond will have a double HDPE liner with a leak detection/collection system. County Road 63 may be temporarily closed during the construction of EP3 to facilitate installation of piping systems necessary to connect the pond with water management pipe systems in the tailings site area south of the county road.

Alternative C: This alternative involves constructing EP3 within the $SE^{1/4}$ of Section 23 along County Road 63 and within 1,800 feet of NM 605. The NRC licensed boundary would be expanded to encompass approximately 68 acres. The pond shape is proposed to be square in shape and disturb approximately 30 acres of land including the access corridor and earthen containment dike. The pond is anticipated to provide 26.5 acres of surface area for the evaporation and water storage purposes. The pond will be constructed as an at-grade facility, with cut and fill designed to be in rough balance. Therefore, no significant quantities of soil will be imported or exported from the site. The pond will have a double HDPE liner with a leak detection/collection system. County Road 63 may be temporarily closed during the construction of EP3 to facilitate installation of piping systems necessary to connect the pond with water management pipe systems in the tailings site area south of the county road.

Alternative D: This alternative involves constructing EP3 on the southwest side of Evaporation Pond # 2 (EP2) located south of the large tailings pile impoundment in the SW ¼ of Section 26. Under this alternative EP3 will share the southwest dike wall of EP2 within the existing licensed boundary. This alternative would not require permitting an NRC license boundary expansion, as it would be within the bounds of the present NRC licensed area. Placement of EP3 south of the mill tailing impoundment would have the potential to contribute to the evaporative odors and noise, in the residential areas to the south of the site, that would be associated with the reclamation activities.



KLEINFELDER

Drawn By: C. Landon	Date: June 2006
Project No.: 16977	Filename: 16977_04_0.dwg
Scale: 1" = 2,000'	Revision: 0

ALTERNATIVE POND LOCATIONS
Homestake Grants Project
9km North of Grants of New Mexico
Grants, New Mexico

FIGURE
2

1.5.2 Alternatives Available to NRC and HMC

The action that NRC is considering is the HMC request to amend Source Material License SUA-1472 and the NMED DP- 725 permit. The amendment for this HMC project will permit the boundary expansion associated with locating EP3 north of the mill tailings impoundment and north of County Road 63. In this regard, the alternatives available to the NRC and NMED are:

- Approve HMC's licensed amendment request for boundary expansion and the construction of EP3 north of the mill tailings impoundment and north of County Road 63 at one of two alternate locations. Additionally, approve the license amendment request with any license conditions that are considered necessary to protect public health and safety and the environment.

- Deny HMC's boundary expansion and locate EP3 south of the mill tailings impoundment.

- Deny HMC's construction and placement of EP3 south of the mill tailings impoundment (essentially the No Action alternative).

The selection of any alternative is based on a consideration of a number of factors related to protection of public health and safety and the environment. Consistent with the requirements of 10 CFR Parts 40.32 and 40.45, the HMC license amendment request will be approved if, among other things:

- The application is for a purpose authorized by the Atomic Energy Act; and
- The applicant is qualified by reason of training and experience to reclaim mill tailings for the purpose requested in such manner as to protect health and minimize danger to life or property; and
- The applicant's proposed equipment, facilities and procedures are adequate to protect health and minimize danger to life or property; and
- The issuance of the license will not be inimical to the common defense and security or to the health and safety of the public.

Denial of the license amendment for Alternatives B, C or D would result in the selection of Alternative A (No Action Alternative) resulting in no environmental affects beyond the current levels, with the implication that it may further extend the period necessary to complete reclamation activities at the HMC Grants site.

2.0 DESCRIPTION OF ALTERNATIVES

2.1 Introduction

There are three alternatives available to HMC to increase evaporation and storage capacities required for the groundwater reclamation. HMC is the property owner of lands associated with the evaporation pond citing alternatives and their boundary expansion options are discussed in this section. Construction details and evaporation pond designs are common throughout the Alternatives B - D including the proposed Alternative.

2.2 Alternative A

No Action Alternative: Alternative A is defined as the continuation of current management of the HMC's Grants Projects operation and project area conditions. No measures would be taken by HMC to increase reclamation processes, timelines, or improve conditions as they currently exist, except for future management actions that would occur regardless of the alternative selected.

Alternative A provides for the groundwater reclamation at the HMC facility under current capacities and at the direction of the NRC and NMED. All current operations and maintenance programs would continue as planned according to the general provisions of the HMC Closure Plan dated May 12, 1993.

2.3 Alternative B

Alternative B involves expanding the current licensed boundary and constructing EP3 approximately 1,800 feet north of County Road 63, located in the NE ¼ of Section 22 and in the NW ¼ of Section 23. Access to proposed site will be via a 50-foot access corridor.

Although the construction of EP3 is a planned activity, the placement of the pond north of County Road 63 and the expansion of the licensed boundary has not been approved by NRC or NMED (Figure 3). The expanded license boundary would encompass approximately 185 acres. The placement of EP3 north of County Road 63 will disturb approximately 33 acres of land and be square in shape. The current land use is rangeland utilized for grazing.

The 33-acre impact area includes the access corridor that currently exists but will require improvements, construction of the pumping facilities and piping along with construction of an earthen containment dike. The access corridor will traverse the current 100-year floodplain. No dredge or fill is anticipated within the 100-year floodplain.

The pond is designed to provide 26.5 acres of surface area for evaporation and water storage purposes. The pond will be constructed as an at-grade facility, with cut and fill designed to be in rough balance. Therefore, no significant quantities of soil will be imported or exported from the site. The pond will have a double HDPE liner with a leak detection/collection system. County Road 63 may be temporarily closed during the construction of EP3 to facilitate the installation of piping systems necessary to connect the pond with water management piping systems in the tailings site area south of the county road.

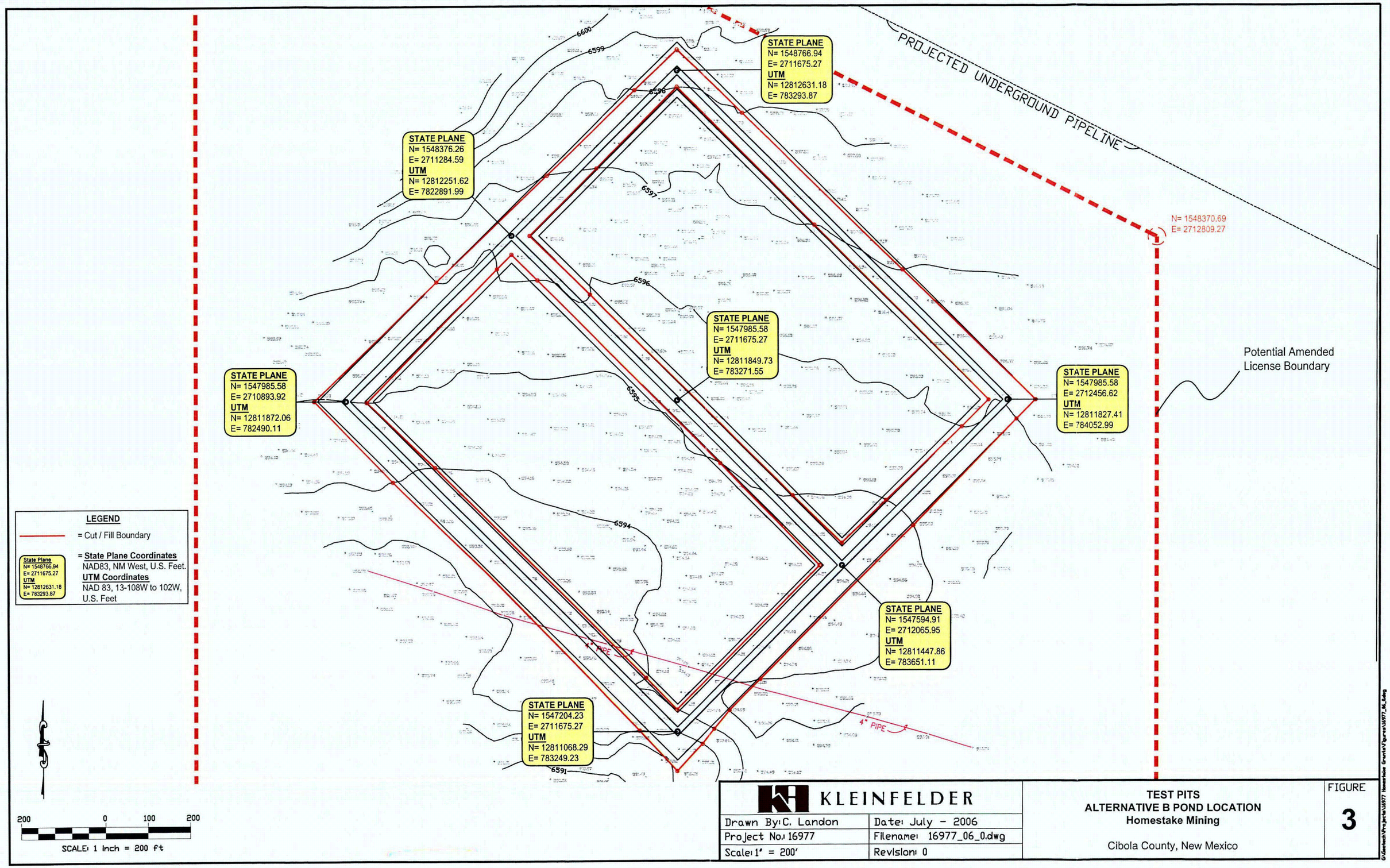
2.4 Alternative C

Alternative C involves constructing EP3 within the SE 1/4 of Section 23 along County Road 63 and within 1,800 feet of state highway NM 605 (Figure 4). The pond shape is square in shape and would disturb approximately 30 acres of land including the access corridor and earthen containment dike. The area has been mechanically bladed to remove wind blown contaminants within the past ten years.

The pond is anticipated to provide 26.5 acres of surface area for the evaporation and water storage purposes. The pond will be constructed as an at-grade facility, with cut and fill designed to be in rough balance. The permitted license boundary expansion would encompass approximately 68 acres. Therefore, no significant quantities of soil will be imported or exported from the site. The pond will have a double HDPE liner with a leak detection/collection system. County Road 63 may be temporarily closed during the construction of EP3 to facilitate the installation of piping systems necessary to connect the pond with water management piping systems in the tailings site area south of the county road.

2.5 Alternative D

Alternative D involves constructing EP3 on the southwest side of EP2 located south of the mill tailing impoundment (Figure 5). Under this alternative EP3 will share the southwest dike wall of EP2 within the existing licensed boundary. This alternative is fully contained within the existing license boundary and would not require permitting a boundary expansion. Placement of EP3 south of the mill tailing impoundment would have the potential to add to the evaporation odors occasionally observed in the residential areas south of the site that are associated with the reclamation activities.



KLEINFELDER	
Drawn By: C. Landon	Date: July - 2006
Project No.: 16977	Filename: 16977_06_0.dwg
Scale: 1" = 200'	Revision: 0

TEST PITS
ALTERNATIVE B POND LOCATION
Homestake Mining

Cibola County, New Mexico

FIGURE
3

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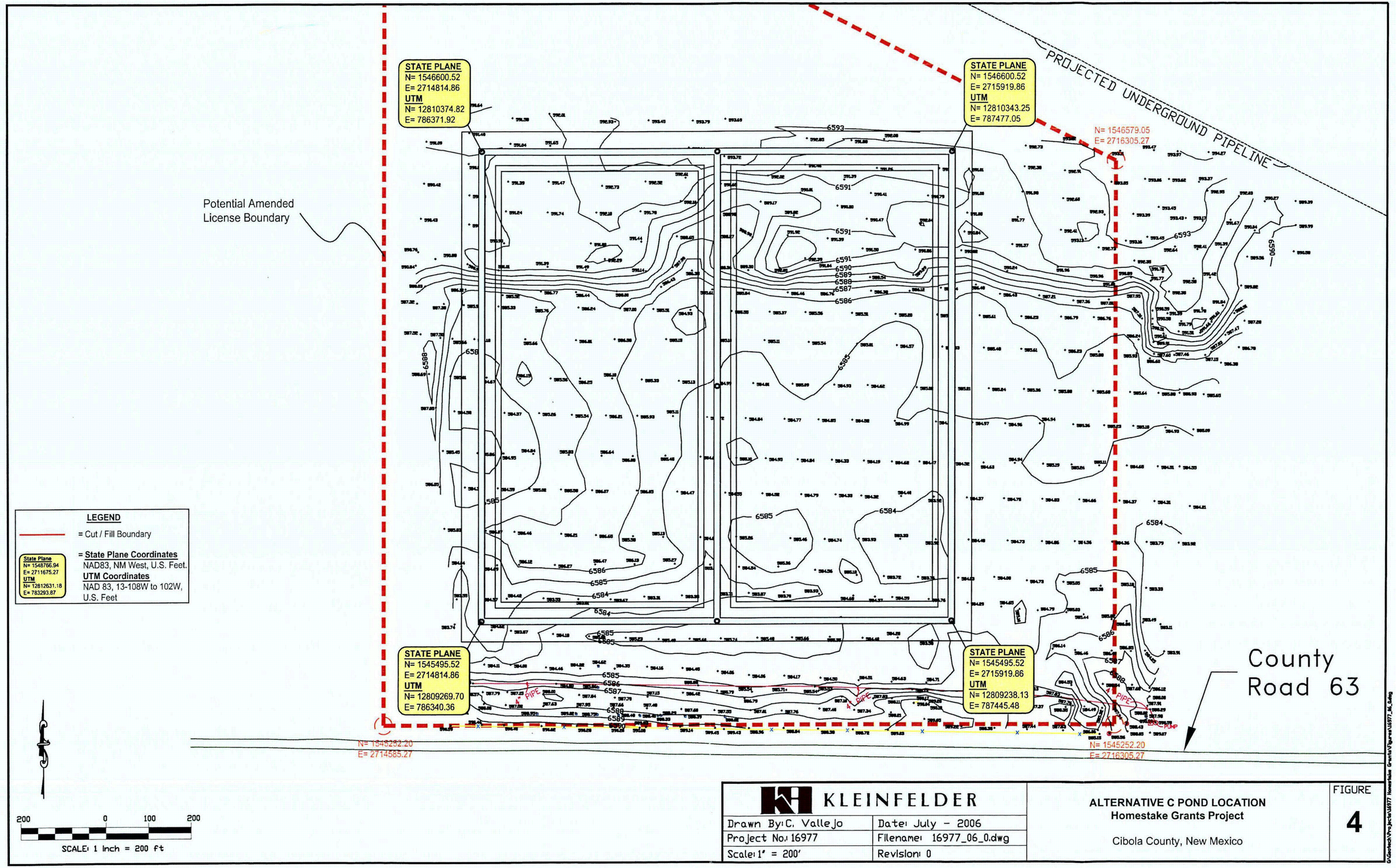

KLEINFELDER		ALTERNATIVE C POND LOCATION Homestake Grants Project Cibola County, New Mexico	FIGURE 4
Drawn By: C. Vallejo	Date: July - 2006		
Project No.: 16977	Filename: 16977_06_0.dwg		
Scale: 1" = 200'	Revision: 0		

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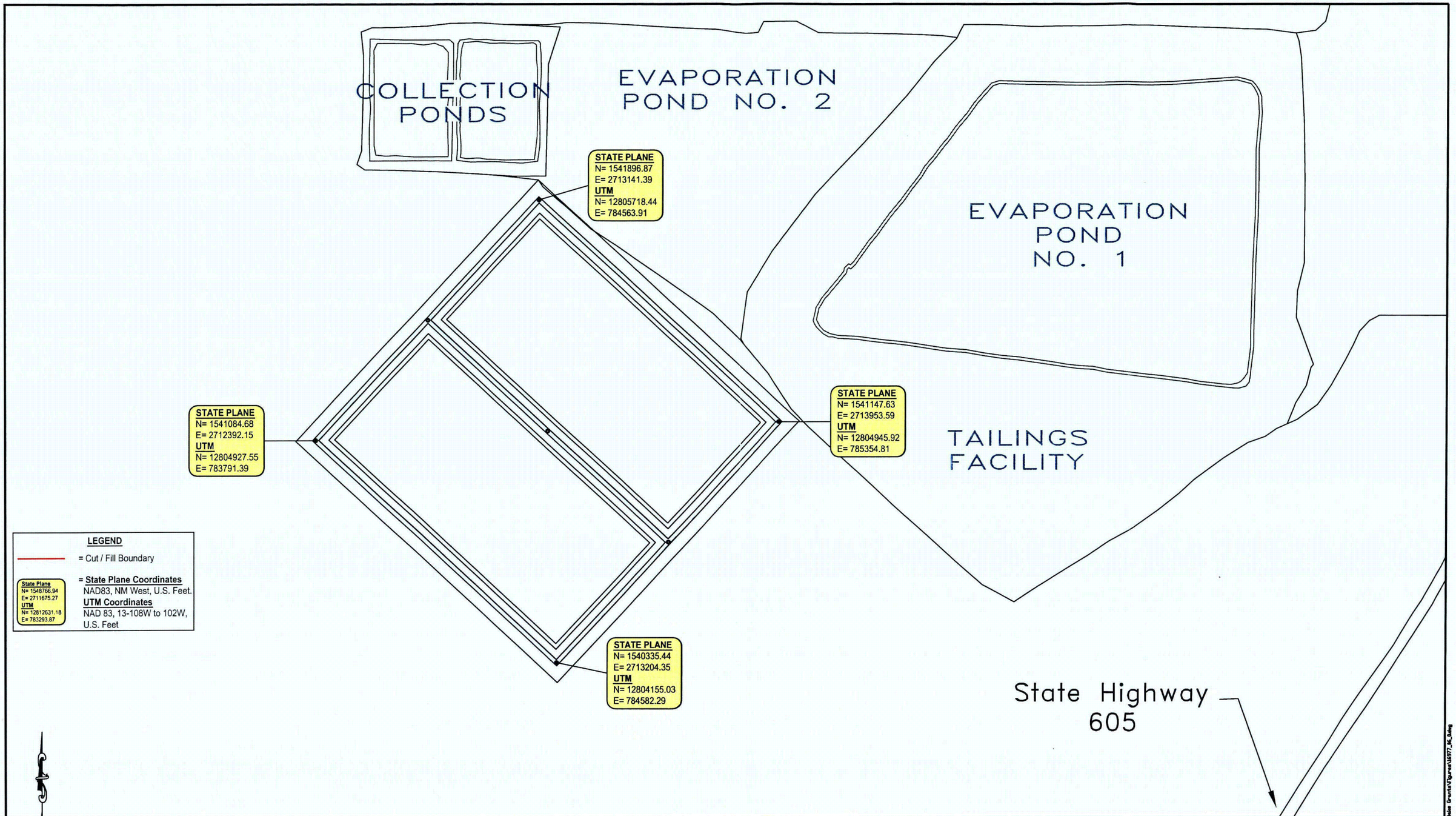

KLEINFELDER	
Drawn By: C. Vallejo	Date: July - 2006
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ALTERNATIVE D POND LOCATION
Homestake Grants Project

Cibola County, New Mexico

FIGURE
5

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3.0 AFFECTED ENVIRONMENT

Uranium milling operations at the Grants site began in 1958 and was terminated in February 1990. Two separate mills were originally located at the site. The smaller mill operated until January 1962, after which all milling activities were conducted in the larger facility. Both mills utilized alkaline leach circuits, with a nominal capacity for the two mills of 3,400 tons of ore per day.

Following extraction of the uranium, the tailings were discharged to a small or a large tailings impoundment. The small impoundment was constructed using an earth fill containment dike into which the tailings were discharged. The larger impoundment was also constructed using an earth fill containment dike. The larger impoundment was raised using the centerline construction method and tailings for the construction material. The impoundment out slopes and containment dikes were formed by hydraulic placement of the coarse fraction of the tailings, while the finer fraction of the tailings and the tailings liquid were discharged into the pond.

The small impoundment contained approximately 1.8 million tons of tailings, while the large impoundment contained approximately 21 million tons. The alkaline leach circuit employed at the Grants Mill required a finer grind of the material to be leached than does an acid leach circuit. As a result, up to 60 percent of the tailings solids are finer than a No. 200 sieve used by the Unified Soil Classification System to identify fine particles (NRC 1993). The finer materials are more susceptible to migration or transport through natural mechanisms such as wind and water erosion.

The Homestake site is underlain by alluvial material, which ranges from 40 to 120 feet (12 to 36 meters) thick at the site. The alluvium is underlain by about 850 feet (255 meters) of shales and siltstones, which comprise the Chinle formation.

The Chinle formation acts as an effective barrier between the aquifer-bearing portion of the alluvium and the underlying San Andres formation, which is the principal water-bearing formation in the vicinity of the mill. Milling activities at the site have resulted in impacts to the alluvial aquifer, which underlies the Grants Mill. A ground-water corrective action program has been implemented at the site since 1977. The corrective actions include the injection of fresh water from an underlying aquifer into the alluvial aquifer near the licensee's property boundary to form a hydraulic barrier to the seepage and reverse the local groundwater gradient so contaminated water can be retrieved by a series of collection wells located near the tailings impoundment. The captured water is currently treated through the R.O. plant or reported to synthetically-lined evaporation ponds. The corrective action program appears to be successful in mitigating the negative impacts of seepage from the tailings ponds.

3.1 Site Location and Layout

As shown on Figure 1, the Homestake Mill is located in Cibola County, about five and one-half miles (8.8 kilometers, km) north of the City of Grants and the Village of Milan, New Mexico. The site is situated in the San Mateo drainage at an elevation of 6,600 feet (1980 meters) above Mean Seal Level (MSL). The project area is surrounded by mesas ranging in elevation from 7,000 to 8,600 feet (2100 to 2580 meters) above MSL. The mesas define a roughly circular valley about ten miles (16 km) in diameter. The San Mateo drainage is an ephemeral arroyo, which drains an area of approximately 291 square miles (75,369 hectares) and connects with the Rio San Jose near the Village of Milan.

The US Census estimated the total population of Cibola County for 1990 at 23,794, and the Northwest New Mexico Council of Governments estimated the County population to increase to 26,509 by 2010. The adjacent incorporated areas of Grants and Milan contain the largest population in the area. The Grants Chamber of Commerce estimated the population of the Grants-Milan community in 1990 to be about 11,400. There are several subdivisions located approximately one-half-mile (0.8 km) to one and one-half-miles (2.4 km) south and southwest of the site. Based on information compiled by HMC in 1989, the subdivisions consisted of 66 residences. There are currently nearby residences located to the south and west of the facility. The majority of the land in the vicinity of the current mill site is undeveloped rangeland. The ARCO Bluewater uranium mill site is located approximately five miles (8.05 km) west of the HMC site.

Residential areas were estimated to account for approximately three-percent of the area. The only surface water bodies in the vicinity of the site are several stock ponds and some small ephemeral ponds, which do not appear affected by site activities or the proposed EP3 construction. Drinking water for the Grants-Milan area is obtained from deep wells drilled into the San Andres aquifer. Domestic water for the subdivisions south and west of the site is also obtained primarily, but not exclusively, from the Grants-Milan system.

3.2 Land Use of Proposed Site and Surrounding Area

3.2.1 Land Use Planning

The New Mexico State Legislature created the County of Cibola, the southernmost county in the northwest region of the state of New Mexico, in 1981. Cibola County spans over 4,000 square miles and its Board of Commissioner's has jurisdiction over the unincorporated county land areas that are not administered by the federal government.

3.2.2 On-Site Land Use – Homestake Properties

HMC owns and controls a sizeable land area in and around the Grants Reclamation project. Over the years, additional lands have been acquired as opportunity has arisen and acquisition of such lands are deemed appropriate in relation to ongoing groundwater remediation and restoration activities and final reclamation / closure of the site.

HMC lands owned in the area that are not within the immediate proximity to the tailings pile complex have been, and are continuing to be, utilized for livestock grazing on a lessor/lessee tenant arrangement. Most of the current land area within the present Site Boundary has been excluded from livestock grazing and other land use, except those areas that are not directly related to the ongoing groundwater restoration activities. As such, livestock grazing is not currently allowed in the immediate tailings pile areas, evaporation pond areas, or the office/maintenance shop locations. These areas have been livestock fenced to exclude grazing. Certain small areas in the southern and western portions of land within the Site Boundary are, however, utilized for livestock grazing.

Several small lot / small acreage parcels (e.g. residential lots) held by HMC in the general area of the reclamation site are idle and are essentially not in use except in certain instances where fresh water injection and water collection is underway as part of the ongoing groundwater restoration program.

3.2.3 Off-Site Land Use – Pleasant Valley Estates, Murray Acres, Broadview Acres, Felice Acres and Valle Verde Residential Subdivisions

Aside from the land uses on HMC land in the Grants Reclamation Project area described in the previous section above, the other major land use immediately proximal to the Site consists of residential development located in the Pleasant Valley Estates, Murray Acres, Broadview Acres, and Felice Acres residential subdivisions. HMC provided these subdivision areas with a potable water supply system as an extension of the Village of Milan water supply in the mid 1980's. The Village of Milan water supply extension to these areas was provided at that time to address a concern over the quality of groundwater used for domestic purposes in these nearby and adjacent subdivision areas. The Valle Verde subdivision and immediately adjacent area is supplied by the Village of Milan water system, however, some residents are on private well supplies.

An assessment of current land use in these residential subdivision areas was completed by Hydro-Engineering, LLC of Casper, Wyoming in late 2005 and early 2006 to provide an annual review of the present uses, occupancy and status for the various lots within these subdivisions. A review of land use for HMC properties and the residential subdivision areas to the immediate south and west of the Grants Reclamation Project site indicates that present land uses in

the area have not changed significantly over the past five years. Over the years, permanent residential homes, modular homes and mobile homes have been established in the subdivision areas, and immediate adjacent areas, as would typify a rural residential neighborhood. A number of lots remain vacant, or are utilized for uses such as horse barns, corrals, and/or equipment storage. In some cases, dwellings are present on several lots throughout the subdivisions, but are currently vacant or have been permanently abandoned.

Field review of the five subdivision areas, along with follow-up inquiries as required to confirm the status of water use at each property, indicates that at present all occupied residential sites in, or immediately adjacent to the Felice Acres, Broadview Acres, Murray Acres, and Pleasant Valley subdivisions are on metered water service with the Village of Milan. In the Valle Verde residential area and immediately adjacent to the subdivision, 12 residences were identified that are not on the Village of Milan water supply system and are therefore obtaining domestic-use water from private well supplies. One of these 12 is a residence on a private well supply about one-quarter mile west of the Valle Verde subdivision. Current information indicates that all other occupied residential lots in the Valle Verde area are on the Village of Milan water supply system.

Land use survey / reviews are completed on an annual basis to meet annual reporting requirements under the NRC License. This will help in assuring that land use activities in the immediate area surrounding the Grants project are regularly reviewed and assist in determining that those uses do not present a new concern with local groundwater usage until project groundwater restoration activities are completed.

3.3 Socioeconomics

3.3.1 Cibola County

Cibola County was created by a division of Valencia County in 1981; therefore, population data for the new county before 1981 are estimated. In 1970, the county's population was 20,125, rising to 30,109 in 1980 and falling to 23,794 in 1990. These population changes were mainly related to uranium mining activity in the area.

The Cibola County population is currently estimated to be 25,595 (City-Data 2006a). The county encompasses a land area of 4,539 square miles.

Industries providing employment include: educational, health and social services (27.4-percent), Arts, entertainment, recreation, accommodation and food services (12.8-percent), Public administration (12.3-percent), and Retail trade (10.5-percent).

Types of workers within Cibola County include, private wage or salary - 58 percent, Government - 35 percent, Self-employed, not incorporated 6-percent, and unpaid family work-1-percent. Cibola County population by ethnic background includes: American Indian-41.8 percent, Hispanic-33.4 percent, White Non-Hispanic-24.7 percent, Other race-15.4 percent, two or more races 3.2 percent, and African American 1-percent. The total can be greater than 100-percent because some Hispanics could be counted as other races.

A mix of rural and industrial activities has characterized the Cibola County economy with uranium mining as the biggest factor in both the "boom" cycles of the 1950's, 60's and 70's and the "bust" cycle of the 1980's. The location of federal and state prisons in the county has helped buffer some of the consequences of the economic downturn, and the County is currently on a pronounced economic upswing, as evidenced by the recent location in Grants of a Wal-Mart Superstore and the construction of an inter-agency "gateway to the region" Visitor Center.

3.3.2 City of Grants

The City of Grants is the largest incorporated area near the proposed project site. The population of Grants in November of 2005 was estimated at 15,232. Between the year 2000 and 2005 the population of Grants has increased 2.7 percent (City-data.com 2006b). The City of Grants encompasses approximately 13.7 square miles. The next nearest city is Rio Rancho, located approximately 80 miles east of the HMC site, with a population of 51,765. The City of Albuquerque is located approximately 85 miles east with a population of 448,607.

Table 1. Local Government and Payroll (City – Data 2006b)

Local government employment and payroll (March 2002)					
Function	Full-time employees	Monthly full-time payroll	Average yearly full-time wage	Part-time employees	Monthly part-time payroll
Health	3	$3,759	$15,036	0	$0
Parks and Recreation	16	$24,518	$18,388	11	$2,814
Judicial and Legal	0	$0		3	$3,830
Housing and Community Development(Local)	2	$4,016	$24,096	0	$0
Water Supply	6	$13,443	$26,886	0	$0
Local Libraries	4	$6,925	$20,775	0	$0
Welfare	12	$14,962	$14,962	0	$0
Streets and Highways	14	$23,772	$20,376	0	$0

Local government employment and payroll (March 2002)					
Function	Full-time employees	Monthly full-time payroll	Average yearly full-time wage	Part-time employees	Monthly part-time payroll
Fire - Other	1	$1,820	$21,840	0	$0
Firefighters	10	$22,315	$26,778	0	$0
Police - Other	10	$14,885	$17,862	0	$0
Police Protection - Officers	19	$65,818	$41,569	0	$0
Other Government Administration	9	$20,513	$27,350	0	$0
Financial Administration	5	$10,291	$24,698	0	$0
Other and Unallocable	1	$1,311	$15,732	0	$0
Totals for Government	112	$228,348	$24,465	14	$6,644

According to City – Data (2006b), in comparison to the State of New Mexico average, the City of Grants:

- Median house values are below state averages.
- Unemployed percentage is above the state unemployment average.
- Black race population percentage is significantly below the state average.
- Hispanic race population percentage is significantly above the state average.
- House age is below the state average.
- Institutionalized population percentage is above the state average.
- Percentage of population with a bachelor's degree or higher is below the state average.
- Population density is below the state average for cities.

3.4 Cultural Resources

Taschek Environmental Consulting (TEC) personnel conducted an intensive (100-percent) cultural resource survey on approximately 350 acres in Sections 22 and 23 of Township 12 North, Range 10 West for the proposed project. The field survey was conducted on June 5 to June 8, and from June 12 to June 15, 2006. The New Mexico Cultural Resource Inventory System (NMCRIS) Project Activity Number for the survey is 100406.

Eleven new sites (LA 153549–LA 153559), one previously recorded site (LA 108856), and 53 isolated occurrences (IOs) were identified during the survey. Of the twelve documented archaeological sites, three sites (LA 153552, LA 153557,

and LA 108856) are recommended eligible for inclusion in the National Register of Historic Places (NRHP) under Criterion D for their information potential, based on the high probability of intact buried cultural deposits at these sites. An undetermined eligibility status is recommended for three sites (LA 153553, LA 153556, and LA 153559) pending a testing program that would determine the presence or absence of intact subsurface cultural deposits. The remaining six sites (LA 153549-153551, LA 153554, LA 153555, and LA 153558) are recommended ineligible for inclusion in the NRHP due to their lack of integrity (TEC 2006).

3.5 Climate and Meteorology

Climatology and meteorology data are based on data summaries acquired from the National Climatology Data Center (NCDC) and the New Mexico Climate Center (NMCC) within the proximity of the project location and include National Weather Service data from the City of Grants (approximately 5.5 miles southeast of the project area.

Monthly average temperatures in Grants New Mexico range from the low thirties (degrees Fahrenheit) during the winter, to the low seventies in the summer. Maximum summer temperatures reach into the low nineties while minimum winter temperatures fall in the low teens.

Precipitation received in the area averages approximately 12 inches per year with the maximum monthly totals received during the summer months, accounting for nearly half of the annual total. Summer precipitation is usually associated with thunderstorms, which form with the arrival of warm, moist air from the Gulf of Mexico. Winter precipitation is derived mainly from storms from the Pacific Ocean, although the amounts received are much less than during the summer months.

Relative humidity in the area averages near 60 percent with the highest monthly average in December and the lowest in May. Annual evaporation for the area, estimated using equations outlined by (D'Appolonia 1982), is approximately 78 to 94 percent of the annual precipitation, or 9 to 11 inches per year.

Meteorology

Wind Speed and Direction

Surface winds in the project area are predominantly from the north-northwest (NMCC 2006). Average wind speeds vary from 3.6 miles per hour (mph) to over 10 mph.

Atmospheric Stability

Atmospheric stabilities are evaluated in terms of the Pasquill Stability Classes A – F. These classes represent the ability of the atmosphere to promote vertical movement of air and, therefore, mixing and diffusion of pollutants. Stability Class A represents the most unstable conditions, Class D represents neutral conditions, and Class F represents the most stable conditions. The remaining classes are intermediate gradations.

The concept of stability can be explained through the use of an imaginary parcel of air, which can be moved vertically in the atmosphere. During unstable conditions, if the parcel is moved upward, the parcel will continue to move upward once released. Under neutral conditions, the parcel will remain in the position at the time of the release. During stable conditions, the parcel will return to its original location after release.

Atmospheric stabilities in the project area are most frequently neutral, occurring over 40-percent of the time. Unstable and stable conditions occur approximately 20 and 35-percent of the time, respectively. Each stability class occurs more frequently during winds from the northwest through the north, reflecting the predominance of winds from these directions; however, the stable classes also exhibit a secondary increase during winds from the east-northeast to the southwest. These conditions are probably associated with early morning drainage winds from the Continental Divide. The atmosphere associated with these winds is stable and the light winds do not increase until the surface heating begins to mix the atmosphere and the surface winds become influenced by the upper level flows generally from the west and southwest (NMCC 2006).

3.6 Air Quality

Air quality status of the project area are considered to be unclassifiable or in attainment with the National Ambient Air Quality Standards (NAAQS) for the regulated criteria air pollutants including particulate matter less than 10 microns in diameter (PM-10), Nitrogen Dioxide (NO^2), Sulfur Dioxide (SO^2), Carbon Monoxide (CO) and Ozone. No known monitoring data for the HMC site area were found through a review of New Mexico ambient air monitoring data within the past five years (New Mexico Air Quality, October, 2002). The nearest monitoring sites are located in Albuquerque.

Total suspended particulate matter (TSP) is an additional regulated air pollutant in New Mexico. TSP refers to small, solid particles or liquid droplets suspended in the air and having diameters of 25 to 45 microns. The major industrial point source of TSP is the coal-fired Coronado Generating Station approximately 60 miles southwest of the project site.

Peabody Energy's Mustang project is a proposed 300-megawatt project to be located north of Grants, New Mexico, and using coal from the existing Lee Ranch Mine operated by Peabody. An air quality permit application has already been filed and accepted as complete. Peabody recently received approval for a Department of Energy grant. The permit application will likely be revised to reflect changes proposed in the grant application.

Local area TSP sources are wind-blown dust, vehicular traffic on unpaved roads, and wind-blown liquid droplets from the aeration activities in the HMC evaporation ponds Evaporation Pond #1 (EP1) and EP2.

3.7 Noise

The Site is located approximately one-half to three-quarters of a mile from the nearest subdivision. The operational noises generated at the HMC site, are related to reclamation activities. Reclamation activities include vehicle traffic, heavy equipment operation, pump operation and monitoring well drilling activities. No sensitive noise receptors are located near the site.

3.8 Geology and Seismology

The HMC Site is located on the northeast flank of the Zuni Uplift, a tectonic feature, which is characterized by Precambrian crystalline basement rocks overlain by Permian and Triassic sedimentary rocks. Major faults occur along the southwest flank of the Zuni Uplift, with only minor faults mapped in the region surrounding the site. Faults associated with the Zuni Uplift are generally northwest trending, steeply dipping reverse faults. However, the minor, steeply dipping normal and reverse faults in the vicinity of the site generally trend northeast. None of the local faults are considered to be active.

Slope gradients in the area generally range from zero to five percent in valleys and mesa tops, and from five to over 100 percent on the flanks of the mesas and on the nearby volcanic peaks. Where the gradient is steep in the northern San Mateo drainage, intersecting arroyos are commonly incised from 10 to 30 feet (three to nine meters). Where the gradient decreases, such as in the Site vicinity, incision is minimal and flow occurs in wide, shallow, poorly defined, or practically non-existent channels.

The majority of the project area contains soils of the Sparank-San Mateo complex (D'Appolonia 1982; TEC 2006). Sparank and San Mateo soils are well drained and moderately alkaline. Sparank soils are comprised of clay loam overlying silty clay loam; San Mateo soils are loams. Both soils are conducive to agriculture.

In general, the nature of the flat valley exposes it to high winds and shifting aeolian sands. Documentation of mechanical blading of one meter of accumulated Aeolian sediments, and the presence of sand sage (deep sand indicator species) suggest the presence of deep Aeolian overburden in the area, especially areas that have not been subjected to blading (TEC 2006).

The HMC site is located on the Colorado Plateau, a tectonically stable block characterized by a low level of seismicity (D'Appolonia 1982). A number of geologic faults pass near the site; however, they are considered to be inactive since they do not displace nearby lava flows of Quaternary age (less than 1.8 million years) or express youthful geomorphic features indicative of active faults (D'Appolonia 1982).

Earthquakes, which have occurred within 60 miles (96 km) of the site, have typically been of low intensity (D'Appolonia 1982). Based on an analysis conducted in 1981 of the number of earthquakes and their magnitudes, the maximum earthquake in the area is estimated to be a magnitude 4.9 (Richter Scale) during a 100-year period (D'Appolonia 1982). By comparison, the largest historical earthquake recorded in the region is a magnitude 4.1 (Richter Scale).

3.9 Hydrology

The HMC Site is located east of the Continental Divide in the Rio Grande Drainage System of west-central New Mexico. The surface water regime surrounding the HMC Site is influenced by the arid to semiarid climate of the region, the relatively medium to high permeability of the soils, and the exposed bedrocks of the watersheds. The HMC Site is in the San Mateo drainage. In the immediate vicinity of the site, the saturated thickness of the San Mateo alluvium varies between 10 to 60 feet (3 to 20 meters) (D'Appolonia 1982). The Chinle Formation, which is comprised mainly of a massive shale interspersed with some sandstone (approximately 800 feet thick), exists below the alluvium (D'Appolonia 1982). North of the mill, the San Mateo is an ephemeral arroyo and flows in direct response to precipitation or snow melt events. There is no distinct channel near the HMC Site, although there may have been one in formerly more pluvial times. A very large precipitation event could result in flow from the San Mateo drainage entering the Rio San Jose drainage. The Rio San Jose is itself ephemeral and flows only in direct response to local rainstorms or snow melt. The Rio San Jose discharges to the Rio Puerco drainage, which is a tributary of the Rio Grande River.

The San Mateo drainage basin above the HMC Site has a drainage area of approximately 291 square miles. Its shape is roughly circular and it contains a dendritic (tree-branch style) drainage pattern (D'Appolonia 1982). Maximum relief is 4,724 feet with elevations ranging from 6,576 feet above MSL at the

outlet to 11,300 feet above MSL at Mount Taylor. San Mateo Creek reaches from the northeast to the southwest through the HMC property.

The following Lakes and Streams also occur in Cibola County (City–Data 2006a):

- Lakes and reservoirs: Bonita, Dry Lake, Encina, Mason, Laguna, Cactus Lakes, Dough Mountain Lake, Agua Media, and Long Lake.
- Streams, rivers, and creeks: Lorenzo Arroyo, Colorado; Arroyo, Bell Rock Arroyo, Petoch Wash, Piedra Lumbre, San Mateo Creek, Willow Wash, Puertecita, Arroyo, and Zia Arroyo.

Other surface water bodies in the general vicinity of the HMC Site include several stock ponds, some small ephemeral ponds, and an undetermined number of springs on the flanks of Mount Taylor.

Water collected from the alluvial and Chinle aquifers, will continue to be collected and used for re-injection in the initial phase of restoration of some areas. This re-injection will occur in the alluvium where concentrations are greater than those of the injected water until such time as injection with San Andres fresh water or R.O. product water will better complete the restoration.

Irrigation with water from Township 12 north, Range 10 west, Sections 3, 27, 28, 32, 33 and 35 is planned for the entire growing season in 2006. Fresh-water well injection lines in Section 28 will continue to be utilized in 2006 to restore these areas of low level aquifer contamination. Fresh-water injection will be continued in Sections 35 and 3 in 2006 to complement the use of water for irrigation and assist in final aquifer restoration in this area.

3.10 Ecology

The Northwestern New Mexico region provides a wide variety of habitats that support diverse populations of wildlife, including over 30 species of mammals, more than 60 species of birds for at least part of the year, and many species of reptiles, amphibians and invertebrates (NMGFD 2004). The diversity of slope and terrain, vegetation, and rock formations in the area provides important wildlife habitats.

3.10.1 Vegetation

Vegetation in the vicinity of the site consists primarily of Desert Grassland of the Colorado Plateau (TEC 2006). The project area is semi-arid grassland characterized by shrubs and mixed grama-gelleta steppe grasses. A large area in west-central New Mexico is classified as Desert Grassland and is thought to be a new succession-disturbance desert grassland characterized by galleta and blue grama grasses consisting of high shrub and forb densities, with low grass densities (TEC 2006).

blue grama grasses consisting of high shrub and forb densities, with low grass densities (TEC 2006).

Common plants found, include four-wing saltbrush, greasewood, sand sage, and broom snakeweed (*Gutierrezia Sarothrae*). Grasses include blue grama (*Bouteloua gracilis*), sand dropseed (*Sporobolus cryptandrus*), Indian ricegrass (*Achnatherum hymenoides*), and bunch grass species. Some narrowleaf yucca (*Yucca angustissima*) was also observed. Salt cedar (*Tamarix spp.*), an invasive species, is beginning to establish itself in isolated areas along the shallow San Mateo Creek.

Earthen stock tanks within the project area are supporting wetland plants such as Cattail (*Typha lantifolia*). The establishment of wet areas provides water and food for a variety of wildlife including red-winged black birds and coyotes.

Most of the area located around the Site was bladed in 1995 and re-seeded with shrubs, forbs, and grasses. Groundcover varies from 79 percent to 99 percent. No plant species currently listed as rare, endangered, or threatened by the USFWS or the State of New Mexico were observed within the project area (TEC 2006).

3.10.2 Wildlife

Wildlife in the area is generally limited to small mammals and bird species. Characteristic species include mule deer, coyote, rattlesnakes, and many species of birds, small rodents, lizards, and raptors. During the Cultural Resource inventory survey in June 2006, cottontail rabbits and black tailed jackrabbits, ravens, rattlesnakes, horned lizards, blackbirds, and prairie dogs were observed (TEC 2006).

3.11 Rare, Threatened and Endangered Species

The following Federal species of concern are known to occur in Cibola County, New Mexico according to the New Mexico Game and Fish (NMGF 2006).

Table 2 Federal Rare, Threatened and Endangered Species

Common Name	Scientific Name	Status
Zuni Bluehead Sucker	*Catostomus discobolus yarrowi*	Candidate
Bald Eagle	*Haliaeetus leucocephalus*	Threatened
Northern Goshawk	*Accipiter gentilis*	Species of Concern
American Peregrine Falcon	*Falco peregrinus anatum*	Species of Concern
Mountain Plover	*Charadrius montanus*	Species of Concern
Yellow-billed Cuckoo	*Coccyzus americanus*	Candidate
Mexican Spotted Owl	*Strix occidentalis lucida*	Threatened
Burrowing Owl	*Athene cunicularia*	Species of Concern
Southwest Willow Flycatcher	*Empidonax trailii extimus*	Endangered
Cebolleta Pocket Gopher	*Thomomys bottae paguatae*	Species of Concern
Mtn Silverspot Butterfly	*Speyeria nokomis nitocris*	Species of Concern
Pecos sunflower	*Helianthus paradoxus*	Threatened
Zuni fleabane	*Erigeron rhizomatus*	Threatened
Acoma fleabane	*Erigeron acomanus*	Species of Concern
Cinder phacelia	*Phacelia serrata*	Species of Concern
Gypsum phacelia	*Phacelia sp. nov*	Species of Concern

It is unlikely that rare, endangered or threatened plant species occur within the project area due to the surface being significantly altered by blading that had occurred in 1995 as part of HMC's windblown contamination clean-up project.

In 1995 the windblown tailings clean up project began, and involved blading and the removal of tailings imported by wind for placement within the sites tailings pile area. During the 35 years of milling and processing operations at the site, windblown tailings were deposited over approximately 1200 acres immediately surrounding the tailings pile. Deposition of windblown tailing deposits over the HMC property occurred during high wind conditions.

Heavy machinery was utilized in removing the contaminated deposits, which sometimes reached a depth of over three feet (one meter). After removal of the contaminated deposits, seed and mulch was spread on the remaining soils to assist in revegetation efforts.

3.12 Transportation

Interstate-40 (I-40) and State Highway (NM) 605 are the principal highway access routes near the project area. Public highways or railroads do not cross the owner-controlled area of the HMC property. County Road 63, does bisect the proposed boundary expansion to the north. Normal access to the HMC site is from the south via NM 605 then traveling west on County Road 63. The owner-controlled area is fenced and posted by HMC. Currently County Road 63 is not within the current NRC site boundary.

Commercial air traffic into and out of Cibola County is primarily through the Albuquerque International Airport, approximately 87 miles east of the Site. Turbo-prop airplanes which seats fewer than 42 people, and have a gross weight of less than 30,000 pounds access the municipal airport located in Grants, New Mexico. The municipal airport located near Grants is approximately five miles southwest of the HMC site.

Airports certified for carrier operations nearest to Grants:

- ALBUQUERQUE INTL SUNPORT (approximately 87 miles; ALBUQUERQUE, NM; ID: ABQ)
- FOUR CORNERS REGIONAL (approximately 112 miles; FARMINGTON, NM; ID: FMN)
- DURANGO-LA PLATA COUNTY (approximately 138 miles; DURANGO, CO; ID: DRO)

Other public-use airports nearest to Grants:

- GRANTS-MILAN MUNI (approximately five miles; GRANTS, NM; ID: GNT)
- CROWNPOINT (approximately 46 miles; CROWNPOINT, NM; ID: 0E8)
- ALAMO NAVAJO (approximately 61 miles; ALAMO, NM; ID: 3N9).

3.13 Visual Resources

Visual resources and recreational areas found within Cibola County include: El Malpais National Monument, El Morro National Monument, El Morro National Monument Inscription Rock Historical Marker, Old Fort Wingate-Zuni Wagon Road Historic Site, Pueblo Revolt Tricentennial Historical Marker, Petaca Plata Wilderness Study Area, Long Park, San Rafael Historical Marker, and Pueblo of Acoma Historical Marker.

Facility buildings and mill tailings impoundments associated with the Grants site are visible from state highway NM 605 and surrounding residential areas to the south and west of the property boundary. The HMC site can be seen from the following residential areas: Pleasant Valley Estates, Murray Acres, Broadview Acres, Felice Acres and Valle Verde Subdivisions.

3.14 Public and Occupational Health

3.14.1 Air Particulate Monitoring

HMC continuously samples suspended particulate at six locations around the reclamation site (HMC 2005, HMC 2006b). Three sites are down wind from the reclamation activities. Two sites are proximal to the nearest residence and one site is located up wind from the reclamation site. The up wind site is used for background sampling. Energy Laboratories, Inc., analyzes the collected samples quarterly for Natural Uranium (Unat), Radium-226, and Thorium-230.

3.14.2 Radon Gas Monitoring

Radon gas is monitored on a continuous basis at eight locations, with one location located northwest of the site to record background levels. Semi-annually Homestake personnel place new track-etch passive radon monitors (PRMs) at the monitoring locations and the exposed detectors are retrieved and returned to Landauer Corporation for analysis (HMC 2006b).

3.14.3 Direct Radiation

Gamma exposure rates are continuously monitored through the use of optically stimulated luminescence (OSL) dosimeter badges at each of seven locations. One location is considered the background location for direct radiation. The OSL's are exchanged semi-annually and analyzed by an approved independent laboratory (currently Landauer). The levels of direct environmental radiation are recorded for each of the seven locations (HMC 2006b).

3.14.4 Surface Contamination

The aspects of the Occupational Monitoring Program related to contamination are described below.

3.14.4.1 Personnel Skin and Clothing

The monitoring of personnel for alpha contamination is required as part of all radiation work permits using standard operating procedures. No releases of personnel or clothing above administrative limits were reported during the January – June 2006 period (HMC 2006b). Previous project Semi-Annual Environmental Monitoring Reports filed with NRC pursuant to requirements of the project Radioactive Materials License also document non-release of contaminated materials.

3.14.4.2 Survey of Equipment Prior to Release for Unrestricted Use

Equipment Surveys are required for all equipment that is to be removed from contaminated areas as specified in radiation work permits. Standard Operating Procedures are used for these surveys. No releases of contaminated material above NRC release criteria were reported during the January – June 2006 period (HMC 2006b). Previous project Semi-Annual Environmental Monitoring Reports filed with NRC pursuant to requirements of the project Radioactive Materials License also document non-release of contaminated materials.

4.0 ENVIRONMENTAL IMPACTS

4.1 Issues

Issues that are related to the proposed project are summarized under three general categories: natural resource issues, cultural resource issues, and human environment.

4.1.1 Natural Resource Issues.

This category includes issues that would relate to soils, geology, natural soundscapes, vegetation, wildlife, threatened and endangered species, water resources, and wildlife habitats.

- Soils. Soils disturbed by excavation and construction could be vulnerable to wind and water erosion.

- Natural Soundscape. Changes in sound in the vicinity of the HMC facility may cause noise impacts to the natural soundscape. Construction activity may temporarily affect natural soundscapes.

- Vegetation. Land disturbance associated with some construction activities could remove or modify native vegetation and leave unvegetated disturbed areas. Disturbed areas are vulnerable to invasive, non-native plant species that potentially would hinder reestablishment of native species. The placement of EP3 will temporarily disturb approximately 33 acres of soils for a 10-year period.

- Water Resources. Changes in storm water runoff and deposition of hydrocarbons on access roads, parking lots, and other surfaces may increase pollution of surface waters and affect water quality. The addition of a third evaporation pond could potentially increase odors released during the evaporation process. Additionally, a third evaporation pond increases the potential chances of contaminating the San Mateo Creek should the liner fail and result in a release of pond water.

- Wildlife and Habitats. The proposed alternatives could cause the loss of some wildlife or could change habitat distribution or species diversity. Effects could include disrupted behavior, temporary or permanent displacement of wildlife.

4.1.2 Cultural Resource Issues.

Cultural resources were divided into historic buildings and structures, and museum collections; archeological resources (prehistoric and historic); cultural landscapes; and ethnographic and traditional cultural properties, which includes Native American concerns and ethnographic landscapes.

TEC recommends that the proposed project avoid six sites with eligible or undetermined eligibility status (LA 153552, LA 153553, LA 153556, LA 153557, LA 153559 and LA 108856). Construction activities should remain at least 50 feet from the boundaries of these sites.

The six ineligible archaeological sites (LA 153549-153551, LA 153554, LA 153555, and LA 153558) and the 53 IOs are unlikely to provide additional important information beyond what has already been recorded (TEC 2006). No further investigations or management considerations are recommended for the ineligible sites or the IOs.

According to Figure 1, the proposed pond location will avoid all eligible and undetermined archaeological sites. A small portion of LA 153551 extends into Alternative C in the eastern survey block; however, this site is recommended ineligible for inclusion in the NRHP.

- Historic Buildings and Structures, and Museum Collections. There are no historic structures, buildings, or museum collections within the HMC project area. Therefore, this topic will not be discussed further in this document. See the section entitled "Rationales for Dismissing Impact Topics" for a more detailed explanation of why this was dismissed.

- Archeological Resources. During the construction of EP3, there would be the potential for known archeological resources to be affected or for new sites to be uncovered.

- Cultural Landscapes. The HMC facility has not been determined to be a cultural landscape, thus this topic will not be discussed further in this document.

- Ethnographic and Traditional Cultural Properties. No ethnographic and traditional cultural properties or landscapes have been formally identified within or adjacent to the project area. Therefore this topic has been dismissed from further analysis. See the section entitled "Impact Topics not Warranting Detailed Evaluation."

4.1.3 Human Environment Issues.

This category includes issues that involve land use plans, policies, or controls; economics and socioeconomics; public health and safety. Summaries of the issues that were identified during the consultation process are provided below.

- Land use plans, policies, or controls. How would the temporary closure of County Road 63 be handled during construction?

- Economics and socioeconomics. Would the construction of EP3 devalue the properties adjacent to the HMC facility?

- Public Health and Safety. The odor that is currently associated with the EP1 and EP2 would increase if EP3 were constructed.

4.2 Impact Topics Not Warranting Detailed Evaluation

The guidelines for National Environmental Policy Act compliance include 13 impact topics that must be considered in all environmental evaluations. Other impact topics were identified from sources described in the preceding paragraph. However, NRC guidance recognizes that not all of the candidate impact topics warrant a detailed evaluation. Based on site-specific conditions, several of the impact topics were dismissed from further consideration, including those whose impacts, based on preliminary analysis, were projected to be no greater than negligible for all of the alternatives. The rationales for dismissal of impact topics are provided in the text below.

4.3 Rationales For Dismissing Impact Topics

Land Use

There are no current or long-term restrictions on land use resulting from the construction of EP3. Most of the current land area within the present Site Boundary has been excluded from livestock grazing and other land use.

Socioeconomics

There are no project-induced changes to community, social, political or economic systems.

Air Quality

There would only be temporary, inconsequential impacts on air quality during construction of EP3. Best management practices would be used to minimize

fugitive dust and emissions from construction equipment. In the long term, air quality would not be degraded because there would not be any appreciable change in emissions sources, nor would there be a change in the airshed classification.

Noise

The present site is located approximately one-half to three-quarters of a mile from the nearest residential community. The operational noises generated at the HMC site, are related to the construction of EP3, and other reclamation activities. Reclamation activities include vehicle traffic, heavy equipment operation, pump operation and monitoring well drilling activities. There is no sensitive noise receptors located near the site (i.e. schools, hospitals, etc.). Noise to affected areas would be temporary and short term thus resulting in negligible increase in noise during the construction phase.

Geology

EP3 is considered part of the HMC's developed area where previous disturbance of geological resources has occurred. The pond will be constructed as an at-grade facility, with cut and fill designed to be in rough balance. No significant quantities of soil will be imported or exported from the site. Soils disturbed by excavation and construction could be vulnerable to wind and water erosion; however, sound engineering designs and best management practices would be used to avoid problems associated with expansive soils or erosion during construction.

Hydrology

The only surface water bodies in the general vicinity of the HMC site are several stock ponds, some small ephemeral ponds, and an undetermined number of springs. Sound engineering designs and best management practices would be used to minimize contamination of surface water due to construction activities.

Ground water quality restoration is an ongoing process involving a combination of fresh-water and R.O. water collection, near the tailings piles. A larger collection rate and use of the very good quality R.O. product water for injection will continue to enhance the progress in restoration.

Vegetation

No plant species currently listed as rare, endangered or threatened by the USFWS, or the State of New Mexico were observed within the project area. The affected area is temporary and limited to activities associated with the construction of EP3. Further, these disturbances will be mitigated when the site is reclaimed, and affected areas are returned to their pre-milling condition.

Cultural Landscapes

No cultural landscapes have been determined to exist within the area of potential impact and the proposed action would have no affects on cultural landscapes.

Subject to comment by the New Mexico State Historic Preservation Officer (SHPO), the proposed undertaking will have *no effect* on any resources that are eligible or potentially eligible for inclusion in the NRHP.

Ethnographic and Traditional Cultural Properties, including Native American concerns, and Ethnographic Landscapes

To date, no ethnographic concerns or traditional cultural properties within the proposed project area have been identified. A survey to identify these concerns on the property area was conducted 5 June 2006. To date no ethnographic landscapes have been designated; therefore this topic was dismissed.

Historic Structures and Museum Collections

There are no historic structures or museum collections within the project area; therefore this topic was dismissed.

Ecologically critical areas

The HMC property area does not contain any designated ecologically critical areas, wild and scenic rivers, or other unique natural resources, as referenced in 40 Code of Federal Regulations 1508.27. Therefore the project would have no affect on these resources.

Endangered or Threatened Species and Critical Habitats

There are no rare, endangered or threatened species known to occur in the project area, thus there would be no potential to directly affect any listed species. Based on HMC's existing and planned water conservation measures and the more efficient use of water associated with the action alternatives, there would be no increase in water consumption, and no affect on listed species downstream of the San Mateo Creek tributary.

4.3.1 Threatened and Endangered Species

Zuni Bluehead Sucker, *Catostomus discobolus yarrowi* (Candidate)

Zuni bluehead sucker historically inhabited headwater streams of the Little Colorado River in east central Arizona and west-central New Mexico (NMGFD 2003). The species most frequently occurs in streams with

cobble and bedrock substrates with slow to moderate velocity water (NMGFD 2004). Currently, the species is limited to the upper reaches of the Río Nutria drainage, a headwater tributary of the Zuni River in New Mexico (NMGFD 2004).

No change in listing status is recommended. A Zuni Bluehead Sucker Conservation and Recovery Plan, per guidelines of New Mexico Wildlife Conservation Act, is being developed with participation of various stakeholders (e.g., Pueblo of Zuni, U.S. Forest Service, The Nature Conservancy, and private landowners).

Based upon the lack of suitable habitat and known locations, this species or its habitat will not be affected by the proposed project.

Bald Eagle, *Haliaeetus leucocephalus* (Threatened)

The bald eagle species is widespread in North America, occurring from Alaska and Newfoundland south to northern Mexico and the Gulf Coast. The bald eagle migrates and winters in suitable habitat throughout New Mexico (NMGFD 2003). Beginning in the late 1980s, bald eagles have nested at four sites in two counties: three sites in Colfax County New Mexico, and one site in Sierra County New Mexico (NMGFD 2004). The bald eagle's preferred habitat is lakes, rivers, marshes, and seacoasts. The bald eagle winters along coasts and large rivers in much of United States.

Mid-winter surveys conducted annually by the Department show that the number of bald eagles wintering in New Mexico has steadily increased since the late 1970s, from an annual average of 220 birds then to 450 by the mid-1990s (NMGFD 2004). With the abandonment of the Sierra County territory in 1999, however, only three pairs of bald eagles nested in the state each year during 1999-2003, and these and their habitats warrant the protection of continued state listing as threatened.

Based upon the lack of suitable habitat and known locations, this species or its habitat will not be affected by the proposed project.

Northern Goshawk, *Accipiter gentiles* (Species of Concern)

This species occurs from Alaska east through Mackenzie Canada and northern Quebec and from Newfoundland, south to New Mexico. The goshawk is known to occur from the Great Lakes to New England and southward towards the northern Appalachians. This species is known to winter south to Virginia and Southwest. The northern goshawk nests in coniferous forests and winters in farmlands, woodland edges, and open country throughout it range. This big raptor is mainly a resident of

mountainside coniferous forests. It has recently begun extending its range to the south and now breeds in small numbers in deciduous forests (NMGFD 2004).

Based upon the lack of suitable habitat and known locations, this species or its habitat will not be affected by the proposed project.

Peregrine Falcon, *Falco peregrinus anatum* (Species of Concern)

This species occurs almost worldwide (NMGFD 2004). In New Mexico, the American subspecies *F. p. anatum* breeds locally in mountains and river canyons and migrates essentially statewide (NMDFD 2004). Its habitat also consists of open country, especially along rivers; also near lakes, along coasts, and in cities.

The *anatum* subspecies was federally delisted in 1999; based on available data, the Department of the Interior (DOI) argued that down listing from endangered to threatened was warranted but that delisting was not. The DOI was encouraged by the gradually increasing occupancy of breeding sites observed after 1980, and in recognition of that, the DOI down listed the species from endangered to threatened status in 1996. However, occupancy has changed little since 1997 and has not yet achieved the level of a healthy, self-sustaining population, which generally is recognized as 85% occupancy of known sites (NMGFD 2004).

In New Mexico, occupancy rates by any peregrine averaged 81% during 2001-2003; occupancy by pairs averaged 78% during the same period (NMGFD 2003). Of even greater concern, however, has been a long-term decline in productivity by the species in New Mexico and elsewhere in the southwestern United States. New Mexico data demonstrates that although productivity recovered from historic lows by the early 1980s, it began trending lower after 1984 and has yet to stabilize; through 2003, productivity remained 39% below its 1960-64 level and 19% below its 1984-88 average (NMGFD 2004).

Based upon the lack of suitable habitat and known locations, this species or its habitat will not be affected by the proposed project.

Mountain Plover, *Charadrius montanus* (Species of Concern)

This species occurs in Montana, Wyoming, Colorado, New Mexico, and from the Texas Panhandle east to Nebraska. The mountain plover winters from central California and southern Arizona southward into Mexico. Its preferred habitat is arid plains, short-grass prairies, and fields. With its range centered on the short-grass prairie, a region subject to heavy grazing and cultivation, the Mountain Plover has been drastically reduced

in number. It feeds singly or in small flocks, mostly on insects (NMGFD 2003).

Based upon the lack of suitable habitat and known locations, this species or its habitat will not be affected by the proposed project.

Yellow-billed Cuckoo, *Coccyzus americanus* (Candidate)

In the West, cuckoos are closely associated with broadleaf riparian (i.e. streamside) forests. Logging, cattle grazing, dams, water diversions, and water pumping have decimated the West's rivers and riparian forests.

The Yellow-billed cuckoo is also called the Raincrow or Stormcrow because its call heralds the coming of summer rains. This habit, combined with its beauty and ability to eat enormous quantities of defoliating caterpillars, has made the Yellow-billed cuckoo a popular bird in North America. Unlike European cuckoos, it rarely lays its eggs in the nests of other birds. It is a neo-tropical migrant, which winters in South America. Before its precipitous decline, it summered and bred in most of the United States, southernmost Canada, and northern Mexico (NMGFD 2004).

Based upon the lack of suitable habitat and known locations, this species or its habitat will not be affected by the proposed project.

Mexican Spotted Owl, *Strix occidentalis lucida* (Threatened)

The Mexican spotted owl occurs from southern Utah and Colorado south through the mountains of Arizona, New Mexico, and west Texas into the mountains of central Mexico (NMGDF 2004). Gaps remain in the distributional pattern of the Mexican spotted owl within this range. In the northern part of the range, including southern Utah, southern Colorado, and far northern Arizona and New Mexico, owls occur primarily in rocky canyons (NMGFD 2004). The Mexican spotted owl inhabits diverse forest types scattered across an even more physically diverse landscape.

Spotted owls nest and roost primarily in closed-canopy forests or rocky canyons. They nest in these areas on cliff ledges, in stick nests built by other birds, on debris platforms in trees, and in tree cavities. In southern Utah, Colorado, and some portions of northern New Mexico, most nests are in caves or on cliff ledges in rocky canyons. Elsewhere, they also use caves and cliffs, but the majority of nests appear to be in trees. Forests used for roosting and nesting often contain mature or old-growth stands with complex structure, are typically uneven-aged, multistoried, and have high canopy closure. A wider variety of trees are used for roosting, but Douglas Fir is the most commonly used by this species.

Based upon the lack of suitable habitat and known locations, this species or its habitat will not be affected by the proposed project.

Burrowing Owl, *Anthene cunicularia* (Species of Concern)

Burrowing Owls feed on a wide variety of prey, changing food habits as location and time of year determine availability. Large arthropods, mainly beetles and grasshoppers, comprise a large portion of their diet. Small mammals, especially mice, rats, gophers, and ground squirrels, are also important food items. Other prey animals include: reptiles and amphibians, scorpions, young cottontail rabbits, bats, and birds, such as sparrows and horned larks. These owls are quite versatile in the ways they capture prey. They chase down grasshoppers and beetles on the ground, use their talons to catch large insects in the air, or hover in mid-air before swooping down on unsuspecting prey. They also watch from perches, and then glide silently toward their target. Burrowing Owls are primarily active at dusk and dawn, but will hunt throughout a 24-hour period, especially when they have young to feed. Unlike other Owls, they also eat fruits and seeds, especially the fruit of Tesajilla and prickly pear cactus.

Burrowing owls are generally active at dusk and dawn, but sometimes at night also. They are highly terrestrial, and are often seen perched on a mound of dirt, telegraph or fence post - frequently on one foot. They bob up and down when excited. Flight is with irregular, jerky wingbeats and they will frequently make long glides, interspersed with rapid wingbeats. They hover during hunting and courtship, and may flap their wings asynchronously (not up and down together) (NMGFD 2004).

Based upon the soil composition of windblown sand deposits of up to three feet in depth, no suitable habitat occurs within the area of potential impact. Additionally, previous windblown tailings material blading and cleanup limits suitable habitat within the area of potential impact.

Southwestern Willow Flycatcher, *Empidonax traillii extimus* (Endangered)

The Southwestern Willow Flycatcher breeds in dense riparian habitats along rivers, streams, or other wetlands. The vegetation can be dominated by dense growths of willows (*Salix* sp.), seepwillow (*Baccharis* sp.), or other shrubs and medium-sized trees. There may be an overstory of cottonwood (*Populus* sp.), tamarisk (*Tamarix* sp.), or other large trees, but this is not always the case. In some areas, the flycatcher will nest in habitats dominated by tamarisk and Russian olive (*Eleagnus angustifolia*). One of the most important characteristics of the habitat appears to be the presence of dense vegetation, usually throughout all vegetation layers present.

Almost all Southwestern Willow Flycatcher breeding habitats are within close proximity (less than 20 yards) of water or very saturated soil. This water may be in the form of large rivers, smaller streams, springs, or marshes. At some sites, surface water is present early in the nesting season, but gradually dries up as the season progresses. Ultimately, the breeding site must have a water table high enough to support riparian vegetation (NMGFD 2004).

Based upon the lack of suitable habitat and known locations, this species or its habitat will not be affected by the proposed project.

Cebolleta Southern Pocket Gopher, *Thomomys umbrinus paguatae* (Species of Concern)

The distribution of the Southern pocket gopher is restricted to the Animas Mountains in New Mexico (NMGFD 2003). In New Mexico, the species is found mostly at elevations above 7,200 feet above MSL in the Animas Mountains as well as Indian Creek, Upper Deer Creek, and Lower Deer Creek reaches (NMGFD 2003). The New Mexico Department of Game and Fish listed the southern pocket gopher as endangered in 1975 (NMGFD 2003). The primary reasons for listing the species were endemism and its restricted distribution in New Mexico. There are no population estimates for this species. No change in listing status of the southern pocket gopher is recommended. Population surveys should be conducted to determine population status in New Mexico.

Based upon the lack of suitable habitat and known locations, this species or its habitat will not be affected by the proposed project.

New Mexico Silver Spot Butterfly, *Speveria Nokomis nitocris* (Species of Concern)

Some taxonomists consider this subspecies to be a narrowly endemic subspecies found only at a few locations in Colorado and eastern Utah. Other taxonomists consider it a more broadly distributed taxon found in Colorado, Arizona, Utah, New Mexico and perhaps even Nevada (AZGF 2006).

For the species *Speveria nokomis* the caterpillar host plant is a violet (*Viola ephropphylla).* The adults feed on flower nectar including that from thistles. The preferred habitat for this species is streamside meadows and open seepage areas with an abundance of violets in generally desert landscapes. The colonies are often isolated (AZGF 2006).

Based upon the lack of suitable habitat and known locations, this species or its habitat will not likely be affected by the proposed project. If any effects were to occur within the project area, these effects would be minimal.

Pecos Sunflower, *Helianthus paradoxus* (Species of Concern)

The Pecos sunflower (Helianthus paradoxus) is an annual that looks much like the common sunflower seen along roadsides and other disturbed areas throughout North America. This plant is also called the puzzle sunflower or paradox sunflower. It flowers from July to October, generally later in the year than the common sunflower.

Pecos sunflower is the only sunflower in the Southwest that requires permanent wetlands for its survival. It grows around the outflow of springs, in marshes, or sometimes at the edges of lakes or streams in soils that are usually somewhat saline. The abundance of plants at each location depends on the availability of water; the sunflowers will disappear if a site dries out.

The Pecos sunflower is found at 25 sites within five areas in New Mexico and Texas. In New Mexico, it grows near the town of Grants, along the Rio San Jose, in and around the town of Santa Rosa, and near the Pecos River from just north of Roswell to just north of Dexter. In Texas, it is found just north of Fort Stockton and in Balmorhea. Most sites contain only a few acres of wetland habitat, but several are more extensive. The number of plants at each site varies from only a few to many thousands (NMGFD 2004).

Based upon the lack of suitable habitat and known locations, this species or its habitat will not be affected by the proposed project.

Zuni Fleabane, *Erigeron rhizomatus* (Threatened)

Zuni fleabane grows in selenium-rich red or gray detrital clay soils derived from the Chinle and Baca formations. Plants are found at elevations from 7,300-8,000 feet above MSL in pinyon-juniper woodland. Zuni fleabane prefers slopes of up to 40 degrees, usually with a north-facing aspect. Although the overall vegetative cover is usually high, there are few other competing plants on the steep easily erodible slopes that are Zuni fleabane's primary habitat.

Zuni fleabane is found only in areas of suitable soils. These soils occur most extensively in the Sawtooth Mountains and in the northwestern part of the Datil Mountains in Catron County, New Mexico (NMGFD 2004).

Based upon the lack of suitable habitat and known locations, this species or its habitat will not be affected by the proposed project.

Acoma fleabane, *Erigeron acomanus* (Species of Concern)

Acoma fleabane habitat exhibits sandy slopes and benches beneath sandstone cliffs of the Entrada Sandstone Formation in piñon-juniper woodland at elevations of 6,900-7,100 feet above MSL. A Cibola County population is known to occur at Bluewater Canyon. This plant is a very narrow endemic plant, but current land uses do not significantly threaten its habitats. May occasionally be impacted by mining operations (NMGFD 2004).

Based upon the lack of suitable habitat and known locations, this species or its habitat will not be affected by the proposed project.

Cinder phacelia, *Phacelia serrata* (Species of Concern)

This plant is endemic to volcanic cinders in only two disjunct regions, approximately 260 miles apart, in Arizona and New Mexico (El Malpais NM). In New Mexico, this taxon can be found in the Zuni-Bandera Volcanic Field south of the Zuni Mountains in Cibola County, while in Arizona, it grows in the San Francisco Volcanic Field, Coconino County.

Its habitat is primarily in volcanic cinder areas associated with volcanic cones, but also roadcuts and abandoned quarries in open, exposed sunny locations. In Arizona, this species also colonizes large "cinder lakes." These flat areas have no underlying clay and are approximately 50 acres in size. It occupies an elevation range from 5,000 - 7,200 feet above MSL on generally open slopes of 0-15 degrees (NMGFD 2004).

Based upon the lack of suitable habitat and known locations, this species or its habitat will not be affected by the proposed project.

Gypsum phacelia, *Phacelia sp. nov* (Species of Concern)

Habitat requirements include weathered gypsum outcrops and gypsiferous and pure gypsum soils in the Great Basin region. It is associated with conifer woodland at elevations of 5,500-7,500 feet above MSL, in the Great Basin desert scrub. Species is highly habitat specific (NMGFD 2004).

Based upon the lack of suitable habitat and known locations, this species or its habitat will not be affected by the proposed project.

Prime and Unique Farmland

Prime farmland has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. Unique agricultural land is land other than prime farmland that is used for production of specific high-value food and fiber crops. Both categories require that the land is available for farming uses. Lands within HMC are not available for farming and, therefore, do not meet the definitions.

Wetlands and Floodplains

The project area occurs within significantly disturbed arid lands. However, "Waters of the United States" (WUS), wetlands pursuant to the Clean Water Act (CWA) of 1977, and floodplains exist within the project area. According to Section 404 of the CWA, work in navigable waters and the placement of fill or dredge material into WUS, including intermittent streams and wetlands, requires authorization by the US Army Corps of Engineers (USACE). The type of authorization (e.g., individual permit, nationwide permit, regional permit, or letter of permission) depends on the location, volume, and purpose of the fill or dredge. The USACE requires that discharged dredged or fill material into WUS be minimized or avoided to the maximum extent practicable. The USACE also requires consideration of feasible alternatives to avoid or minimize potential impacts to WUS. If impacts can be avoided, under the guidance of Best Management Practices (BMPs), then no formal action or permitting is required. The Nationwide Permit (NWP) program streamlines the permitting process, usually affording a significant reduction in time and cost. If the proposed project activities cannot feasibly meet the conditions for an NWP, the project will require an Individual Permit from the USACE to authorize the project.

Based upon preliminary construction plans and consultation with USACE (2006), the proposed project does not have the potential to impact natural, USACE jurisdictional wetlands or floodplains within the project site boundaries. Furthermore, proper BMPs will be used throughout the project area to prevent WUS and floodplains from being impacted. A brief discussion of proposed BMPs for the proposed development activities is presented below.

Wilderness

The HMC does not contain, nor is it adjacent to any designated or proposed wilderness areas.

Conflicts with Land Use Plans, Policies, or Controls

This project would not conflict with the Cibola County Comprehensive Plan policy statement on multiple uses. None of the alternatives would conflict with the planning goals for federal lands in Cibola County.

Environmental Justice

None of the alternatives would have disproportionate health or environmental effects on minorities or low-income populations as defined in the Environmental Protection Agency's (1996) Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analysis.

Indian Trust Resources

Indian trust assets are owned by Native Americans but held in trust by the United States. According to HMC personnel and tribal consultation completed in July 2006, there are no Indian trust resources within the permitted boundary or the proposed expansion boundary.

Public and Occupational Health

The HMC effluent monitoring program for January – June 2006, submitted to NRC on August 30, 2006 indicates that data collected in the HMC's effluent monitoring programs did not exceed the 10 CFR Part 20 values for Air Particulate, Radon Gas, Direct Radiation and Surface Contamination (HMC 2006b). See also previous Semi-Annual Environmental Monitoring Reports for the Grants site filed with NRC pursuant to the project Radioactive Materials License.

4.4 Impact Topics as they relate to Alternatives A-D

Commonalities with Alternatives B-D:

- Disturbance area associated with the Evaporation Pond (30-33 acres). The 30 - 33 acres includes the evaporation pond (26.5 surface acres) and +/- nine acres for related impoundments and pumping facilities.
- Construction timelines for EP3 are similar.
- Leak detection and HDPE liners are similar.
- Construction of EP3 will allow HMC to meet current reclamation timelines.
- Reclamation of the HMC property is scheduled for completion by 2015.
- No Rare, Threatened or Endangered species would be affected with construction of EP3.

Commonalities with Alternative B and C

- Both Alternatives B and C require the expansion of the operations boundary.
- Alternative B requests the operations boundary be expanded 185 acres.
- Alternative C requests a boundary expansion of 68 acres.

Commonalities with Alternative A and D

- Alternative A or D does not require a change to the existing operations boundary.

4.4.1 Impacted Resources

Soils

Under the No Action Alternative (Alternative A) no soil disturbing activities would occur. Soils disturbed by excavation and construction in Alternatives B-D could be vulnerable to wind and water erosion. The impact to soils would be limited to the time and duration of the excavation and construction of EP3.

Under Alternative B, impacts to soils would be minimal. The proposed access corridor is to be constructed as a 50-foot wide access corridor approximately 1800 feet in length. Excavation and trenching would occur for the placement of piping and utilities. Additionally, under this alternative blading did not occur during the 1995 windblown tailings clean up activity in this area. Therefore, disturbances to unbladed soils would be increased.

Under Alternative C, the construction of EP3 along County Road 63 and in close proximity to state highway NM 605, (Alternative C), would have less of an impact on undisturbed soils.

Under Alternative D, the construction of EP3 adjacent to existing ponds (EP1 and EP2) would have minimal impact on undisturbed soils.

Natural Soundscape

Changes in sound in the vicinity of the HMC facility may cause noise impacts to the natural soundscape. The impact on the natural soundscapes will be temporary. The increase will be related to equipment operation and other activities associated with the construction of EP3.

Alternative A (No Action Alternative) would not contribute to increases in noise.

Alternative B, C, and D will temporarily disturb natural soundscapes in the vicinity of the construction. Although the disturbance would be minimal and temporary, Alternative D would contribute to the disturbance more than Alternative B or C.

Alternative D would contribute more to the noise disturbance due to its location south of the tailing impoundment and proximity to the residential subdivisions that border the HMC property.

Alternative B and C are located north of the tailings impoundment and furthest from the residential subdivisions that border the HMC property. Additionally, the tailing impoundment being located between Alternatives B and C and the residential subdivisions would provide a sound barrier.

Vegetation

Land disturbance associated with some construction activities would remove or modify native vegetation and leave unvegetated disturbed areas. Disturbed areas are vulnerable to invasive, non-native plant species that potentially would hinder reestablishment of native species. The placement of EP3 will temporarily disturb approximately 33 acres of soils for a 10-year period.

Under Alternative A (No Action Alternative), no new ground disturbing activities would occur.

Under Alternative B, the construction of a 50-foot wide access corridor, as well as excavation in an undisturbed section of the HMC facility site, this alternative would have the greatest disturbance on existing vegetation. Existing vegetation would be permanently lost.

Under Alternative C, the construction of EP3 along County Road 63 and in close proximity to state highway NM 605, (Alternative C), would have less of an impact on vegetation. Existing established vegetation is successional and the area was bladed in 1995 for windblown tailings cleanup and then reseeded.

Under Alternative D, being that it is located in an already disturbed section of the HMC facility, adjacent to the existing EP1 and EP2, only a minimal amount of native vegetation would be disturbed.

Water Resources

Under Alternative A (No Action Alternative) no new water sources would be required and no increases to storm water runoff or deposition are anticipated.

Under Alternative B, during the construction phase, storm water runoff could lead to the deposition of hydrocarbons on highways, access roads and other surface areas, increasing the potential for surface water contamination from vehicular traffic and construction equipment. Continued use of the access corridor for operation and maintenance purposes will contribute to negligible increases in deposition of hydrocarbons related to vehicular traffic.

Under Alternative C, the construction of EP3 along County Road 63 and in close proximity to state highway NM605, is likely to contribute to negligible hydrocarbon deposition from vehicular traffic and related storm water runoff.

Under Alternative D, placement of EP3 adjacent to existing ponds EP1 and EP2 is least likely to affect water resources. Current operations and maintenance of EP1 and EP2 will continue to contribute to the deposition of hydrocarbons from vehicular traffic.

Wildlife and Habitats

Under Alternative A (No Action Alternative) no new disturbances are anticipated.

Under Alternative B, 33 acres of wildlife habitat would be lost. Some species would be disrupted and others displaced with the construction of EP3. The construction of EP3 would disrupt animal behavior and temporarily or permanently displace wildlife. Disruptions to wildlife habitat would be negligible and temporary.

Under Alternative C, 30 acres or wildlife habitat would be lost. Some species would be disrupted and others displaced with the construction of EP3. The construction of EP3 would disrupt animal behavior and temporarily or permanently displace wildlife. The quality of wildlife habitat in Alternative C is lower than Alternative B due to surface blading that occurred in 1995. Therefore, the loss of wildlife habitat under this alternative is less than Alternative B.

Under Alternative D, 30 acres of wildlife habitat would be lost. However, under this alternative the 30 acres is located in a highly disturbed area, which does not support wildlife.

Air Quality

During the construction of EP3, air quality in the vicinity EP3 will be temporarily affected. Dust particles and fossil fuel emissions released into the air from machinery, and other construction activities, could cause a temporary increase in airborne pollutants. Best management practices related to fugitive dust will be employed to reduce dust emissions.

Under Alternative A (No Action Alternative), no affect on the air quality in the neighboring towns, and residential communities above current levels is anticipated.

Under Alternative B, EP3 being located the furthest away in a northerly direction from neighboring towns, and residential communities, the affect from air borne pollutants and air quality would be minimal. Additionally, odors released during the evaporation process will disperse more readily due to the predominant wind direction and the air dispersal properties associated with the tailings impoundment being located between the proposed pond location and the neighboring communities.

Under Alternative C, EP3 being located the furthest away in a northeast direction from neighboring towns, and residential communities, the affect from air borne pollutants and air quality would be minimal. Additionally, odors released during the evaporation process will disperse more readily due to the predominant wind direction and the air dispersal properties associated with the tailings impoundment being located between the proposed pond location and the neighboring communities. Additionally, during high wind events surface spray could potentially cross NM 605.

Under Alternative D, locating EP3 next to the already existing ponds EP1 and EP2 would contribute to the existing odors released from the evaporation process and contribute minimally to the existing odor released. Therefore, air quality could decline during certain metrological and air movement conditions.

4.5 Adverse Impacts

Section 102(2) (C) of NEPA requires consideration of potentially unavoidable adverse impacts should the proposed action be implemented. Based upon the above listed resource areas that could be affected by constructing EP3, no significant unavoidable adverse impacts are anticipated in the short term or long term. Beneficial impacts are anticipated in the long term by increasing evaporation capacities thus allowing HMC to meet reclamation clean up timelines. No increases are anticipated in radiological or non-radiological sources.

The construction of EP3 in Alternative B – D is anticipated to be temporary. Reclamation of the HMC property is anticipated to be complete in 2015 with the evaporation ponds being reclaimed to generally pre-existing conditions.

4.6 Cumulative Impacts

Cumulative impacts are defined as; environmental affects due to past, present and foreseeable future activities associated with the project site.

An evaluation of the impacts from the proposed HMC Project in terms of other past, present, and foreseeable future actions to the environment has been conducted. Past and present actions at and around the project site, have dealt with the mining and milling operations, and the subsequent reclamation of the affected site. Reclamation of the former site, which is ongoing, will have a beneficial impact on the environment. The affect to the environment from the construction of EP3 will be temporary. These disturbances will be corrected when the site is reclaimed, and affected areas are returned to their pre-disturbance condition.

4.7 Mitigation Measures

4.7.1 Construction Best Managements Practices (BMPs)

Inspections of the BMPs and storm water control practices shall take place before and after storm events to ensure that each BMP or control is functioning properly. Project BMPs shall be constructed such that sediment and other pollutants are contained within the project site.

1. Install and maintain silt fences, sediment traps, or straw bale dikes around all areas with disturbed or exposed soil. A silt fence sediment barrier is required at a distance of 30 feet around the perimeter of all jurisdictional wetlands, in order to create an impact buffer zone. Hay bales may be used where continuous relocation of the silt fence would otherwise be necessary.

2. Store construction equipment at the off-site staging areas at the end of each work period. Divert concentrated runoff around equipment, vehicle, and materials storage areas. Diversion of concentrated runoff shall be accomplished through shallow earthen swales and methods described in BMP #1 above.

3. Minimize the amount of construction materials stored on-site.

4. Designate areas of the site for the delivery and removal of construction materials. Construction materials shall not be stored beyond the silt fence.

5. Store materials in a manner that limits exposure to precipitation and controls storm-water runoff.

6. Handle construction materials (e.g., concrete) in a manner that minimizes direct discharges into jurisdictional wetlands and drainage channels. The discharge or creation of potential discharge of any soil material including concrete, cement, silts, clay, sand, or any other materials to the Waters of the United States is prohibited.

7. Provide pallets or secondary containment areas for chemicals, drums, or bagged materials. Should material spills occur, materials and/or contaminants should be cleaned from the project site and recycled or disposed to the satisfaction of the NMED.

8. Cover waste dumpsters with plastic sheeting at the end of each workday and during storm events. All sheeting shall be carefully secured to withstand weather conditions.

9. Train/instruct on-site personnel in spill prevention practices, and provide spill containment materials near all storage areas. All contractors are responsible for familiarizing their personnel with the information contained in the Storm Water Pollution Prevention Plan (SWPPP).

10. Separate wastes and recycle or dispose of wastes in compliance with regulations.

11. Sprinkle water on earth fill and disturbed ground surfaces as necessary to minimize wind-blown dust.

4.7.2 Cultural Resources

Cultural resources have been identified within the project area according to the survey completed by TEC in June 2006.

No significant impacts will be associated with on-site cultural resources. The sites that were addressed from the TEC survey should be monitored to confirm that these sites are not being impacted. Furthermore, if any additional cultural resources are uncovered during excavation activities, the New Mexico Historical Society should be notified immediately to evaluate and initiate appropriate mitigation measures.

4.7.3 Wildlife

No significant impacts will be associated with on-site wildlife populations. General on-site activities will slightly disturb and displace certain species of

wildlife. However, after on-site activities are completed it is likely that displaced wildlife populations will return to their historic ranges.

Mitigation measures would be implemented if it is determined that wildlife or migratory bird mortality is occurring.

EP1 began operating in 1990, with EP2 operating since 1994. Although migratory birds and waterfowl visit the ponds frequently (especially during migration seasons), no mortality has been observed in or around EP1 or EP2.

Site operation crews are onsite during the day, and pond operations are among their primary duties. Site personnel observe these ponds throughout the day looking for operational problems or abnormalities. To date, no mortality of wildlife has been reported by site personnel.

Water chemistry varies over time and as the crews move water around between ponds, operate different wells, and run or shut off the R.O. plant. The absence of bird mortally in or around the ponds over the years indicates that the water in the evaporation ponds do not contain contaminants at levels toxic to birds.

The proposed EP3 will be operated like EP1 and EP2 and will receive the same water; no measures to prevent birds from landing on the EP3 are anticipated.

Threatened and Endangered Species

Based upon information collected from current scientific literature, no threatened or endangered species or their habitat is present within the project area. Therefore, no mitigation measures are required at this time in order to prevent impacts to threatened and endangered species. However, if threatened or endangered species or their habitat is identified within the project area during on-site activities then the New Mexico Fish and Game and Kleinfelder, Inc. must be notified immediately to initiate and evaluate mitigation measures.

Wetland and Floodplains

Inspections of the BMPs and storm water control practices shall take place before and after storm events to ensure that each BMP or control is functioning properly. Project BMPs shall be constructed such that sediment and other pollutants are contained within the project site.

1. Install and maintain silt fences, sediment traps, or straw bale dikes around all areas with disturbed or exposed soil. A silt fence sediment barrier is required at a distance of 30 feet around the perimeter of all jurisdictional wetlands, in order to create an impact buffer zone. Hay bales may be used where continuous relocation of the silt fence would otherwise be necessary.

2. Store materials in a manner that limits exposure to precipitation and controls storm-water runoff.

3. Handle construction materials (e.g., concrete) in a manner that minimizes direct discharges into jurisdictional wetlands and drainage channels. The discharge or creation of potential discharge of any soil material including concrete, cement, silts, clay, sand, or any other materials to the Waters of the United States is prohibited.

4. Train/instruct on-site personnel in spill prevention practices, and provide spill containment materials near all storage areas. All contractors are responsible for familiarizing their personnel with the information contained in the Storm Water Pollution Prevention Plan (SWPPP).

5. Sprinkle water on earth fill and disturbed ground surfaces as necessary to minimize wind-blown dust.

6. Maintain and inspect regularly all construction equipment and vehicles to prevent oil or fluid leaks, and use drip pans or other secondary containment measures as necessary beneath vehicles during storage

7. Place wastes (e.g., grease, oil or oil filters, antifreeze, cleaning solutions, batteries, and hydraulic or transmission fluid) in proper containers, store the containers in designated storage areas, and ultimately recycle the materials.

8. Fuel and wash vehicles and equipment at an off-site location.

9. Equipment used to make and pour concrete shall be washed at an off-site location. Concrete fine material or aggregate shall not be allowed to wash into the jurisdictional wetlands or other associated drainage channels. Concrete application equipment must be parked over drip pans or absorbent material at all times. Any bare ground created by materials storage shall be restored following construction.

4.7.4 Soils

No significant impacts will be associated with on-site soils. The only measurable impact to soils will be from excavation activities within the project area. If soil contamination is identified in on-site soils then proper cleanup standards must be followed. These cleanup standards would be in accordance with the Environmental Protection Agency (EPA) and the NMED.

4.7.5 Security

Security mitigation measures need to be implemented around the ponds in order to prevent unwanted access. This security fence can also be part of a fencing system that will be used to deter wildlife from entering the ponds.

4.8 Monitoring

During ground disturbing activities monitoring for archaeological artifacts should be completed in the unbladed portions of Alternative B. In 1995, mechanical blading of up to three feet (one meter) of aeolian sediments exposed a number of new archaeological sites in the immediate area. The unbladed portions of Alternative B contain older aeolian sediments that appear to be stabilized by increased vegetative cover. Given the high density of sites in the bladed portion of the survey area, and the lack of sites in the non-bladed portion (save LA 153557), it is likely that aeolian deposits are covering intact subsurface archaeological remains in the unbladed portions of the survey area. Therefore, the design and implementation of an archaeological monitoring plan is recommended if the proposed pond is to be located in Alternative B. If buried cultural deposits are encountered at any point during construction activities, work should cease immediately and the New Mexico SHPO should be contacted.

A groundwater-monitoring program associated with the EP3 site, should be implemented. Groundwater monitoring wells shall be installed down gradient of EP3. Baseline water quality will be established from samples collected prior to completion of construction. The collected samples will be analyzed for the parameters listed in HMC's current groundwater protection standards. The system of monitoring wells will provide the capability to help detect pond liner failure resulting in the contamination of local groundwater. The activities involved in the reclamation and decommissioning effort will include well plugging and abandonment in accordance with state and county regulations.

HMC's monitoring and surveillance program for radioactive effluent releases have been designed to ensure the project compliance with 10 CFR 40, Part 20 U.S. NRC Standards for Protection Against Radiation and closely approximates programs as described in NRC's Regulatory Guide 4.14 Radiological Effluent and Environmental Monitoring at Uranium Mills (HMC 2006b). Some effluent monitoring activities differ from those presented in Regulatory Guide 4.14 as specified and required by HMC's Radioactive Materials License (SUA-1471).

HMC groundwater monitoring program, as outlined in License Condition No. 35 (LC-35) continues. The requirements set forth in LC-35 include reporting of both radiological and non-radiological water quality parameters for specified wells. LC-35 also requires the documentation of water injection and collection volumes of the groundwater cleanup system.

4.9 EP3 Reclamation and Decommissioning

Upon completion of reclamation and groundwater cleanup activities at the project requiring the use of EP3, the pond will be decommissioned and the pond site area reclaimed to the standards required, to return the land to present unrestricted use. At present, the proposed EP3 pond site area is utilized for livestock grazing.

All evaporation concentrates remaining within the EP3 pond liner at the end of the EP3 use period, will be removed and relocated to EP1 for final incorporation with final reclamation of EP1 and the small tailings pile. The pond liner, piping and other related infrastructure associated with EP3 will also be relocated to EP1, incorporated with other project demolition and decommissioning waste, and final reclamation completed as part of the process of final reclamation of the small tailings pile that presently underlies EP1 pond.

The area occupied by EP3 along with the access corridor, piping and utility corridors will be seeded and revegetated. The security fencing will be removed to allow agricultural grazing land use. Upon completion of the reclamation and decommissioning, the permitted license boundary associated with the EP3 pond location will be adjusted back to the present project site boundary.

5.0 CONCLUSION

This ER has been prepared to evaluate the environmental impacts associated with expanding the operations boundary and the construction of EP3 under three Alternatives (B, C and D) including the No Action Alternative (A). The outcome of the ER is that Alternative B is the preferred alternative.

Based upon the foregoing evaluation it has been determined that the proposed action will not have a significant impact on the environment. Accordingly, it is recommended that NRC issue a Finding of No Significant Impact (FONSI). This determination is supported by the following evaluation findings:

- The evaporation pond constructed for the temporary storage of process waste streams will be provided with both primary and secondary liners and leakage detection and collection capabilities.
- The proposed groundwater-monitoring program is sufficient to detect both horizontal and vertical contamination.
- There will be no significant adverse impact to the regional surface water or groundwater.
- As a primary goal, groundwater impacted by uranium recovery operations will be restored to background water quality conditions.
- The expansion of the operation boundary and construction of EP3 will aid in expediting the groundwater reclamation processes.
- The Grants site Semi-Annual Environmental Monitoring Reports for 2005 and 2006, as well as previous semi-annual reports on file with NRC, document that the HMC monitoring programs at the Grants site for Public and Occupational Heath effluents have not shown exceedances of the 10 CFR Part 20.1301 and 20.1302 values established for the protection of individual members of the public in unrestricted areas.

6.0 CONSULTATION AND COORDINATION

This ER evaluates the environmental impacts associated with the HMC proposal. The environmental effects that were considered include anticipated impacts related to HMC construction, operation, decommissioning, and reclamation of EP3. In developing this ER, communications or consultation was held with the following agencies or persons:

Tribal Resources

Leigh Kuwanwisiwma
Director of Hopi Cultural Preservation Office
The Hopi Tribe
P.O. Box 123
Kykotsmovi, Arizona 86039

President Joe Shirley, Jr.
The Navajo Nation
P.O. Box 9000
Window Rock, Arizona 86515

Governor Robert Benevides
Pueblo of Isleta
P.O. Box 1270
Isleta, New Mexico 87022

Chairman Dallas Massey, Sr.
White Mountain Apache Tribe
P.O. Box 700
White River, Arizona 85941

Governor Jason Johnson
Pueblo of Acoma
P.O. Box 309
Acoma, New Mexico 87034

President Mark Chino
Mescalero Apache Tribe
P.O. Box 227
Mescalero, New Mexico 88340

Governor Arlen P. Quetawki, Sr.
Pueblo of Zuni
P.O. Box 339
Zuni, New Mexico 87327

Nuclear Regulatory Commission
Ron Linton
Uranium Processing Section
Fuel Cycle Facilities Branch
Division of Fuel Cycle Safety and Safeguards
Office of Nuclear Material Safety and Safeguards
11545 Rockville Pike
Two White Flint North
Rockville, Maryland 20852-2738

Bill Von Till
C/o Document Control Desk, Chief of Fuel
Cycle Facilities (Mailstop T8-A33)
US Nuclear Regulatory Commission
Office of Nuclear Materials Safety & Safeguards
11545 Rockville Pike
Two White Flint North
Rockville, Maryland 20852-2738

Environmental Protection Agency
Sai Appaji
US EPA, Region VI
Superfund Division
Suite 1200, 6SF-LP
1445 Ross Ave.
Dallas, Texas 75202-2733

US Fish and Wildlife Service
Eric Mein
New Mexico Ecological Field Office
NMESFO
2105 Osuna Rd.
Albuquerque, New Mexico 87113

US Army Corps of Engineers
James Wood
RE: Action No. 2006-0029
4101 Jefferson Plaza N.E.
Albuquerque, New Mexico 87109-3435

New Mexico Environmental Department
Jerry Schoeppner
Groundwater Quality Bureau
P O Box 26110
Santa Fe, New Mexico 87502

Dana Bahar
Superfund Oversight Section
NMED
Suite N2300
1190 St. Francis Dr.
Santa Fe, New Mexico 87505

Glen Saums
New Mexico Environmental Department
P O Box 26110
Santa Fe, New Mexico 87502

New Mexico State Engineer
John D' Antonio
New Mexico Office of the Engineer
P O Box 75102
Santa Fe, New Mexico 87504-5102

Cibola County
RE: Action No. 2006-00209
Floodplain Management Office
515 West High Street
Grants, New Mexico 87020-2526

New Mexico Game and Fish Department
Brian Gleadle
New Mexico Game & Fish Department
3841 Midway Place N.E.
Albuquerque, New Mexico 87101

6.1 Comments Received

Cibola County Commission

Bennie Cohoe, Chairman
Elmer Chavez, 1st Vice Chair
Jane Pitts, 2nd Vice Chair
W. Frank Emerson, Commissioner
Fred J. Scott, Commissioner

Cibola County

515 West High Street
Grants, New Mexico 87020
Phone (505) 287-9431 – Fax (505) 285-5434

David Ulibarri
County Manager

September 13, 2006

Kleinfelder Inc.
c/o Dr. Louis Bridges
25493 North Road
Hotchkiss, CO 81419

Re: Homestake Mining Co. Evaporation Pond #3 and Site Boundary Expansion

Dear Mr. Bridges,

We recently received your letter regarding the above pond and expansion. The only comment we would have is that Cibola County would require you to give public notice prior to start of construction. You would also need to disclose the anticipated dates of closure of County Road C-63.

If you have any further questions, please give me a call at (505)287-9431.

Sincerely,

David Ulibarri
County Manager

THE HOPI TRIBE

Ivan L. Sidney
CHAIRMAN
Todd Honyaoma, Sr.
VICE CHAIRMAN

August 22, 2006

Dan Kump, Senior Project Manager
Homestake Mining Company of California
Highway 605, P.O. Box 98
Grants, New Mexico 87020

Dear Mr. Kump,

Thank you for your August 17, 2006, response, on behalf of the Nuclear Regulatory Commission, to our July 17th letter, regarding a proposal to build an evaporation pond on a 33-acre site north of Grants in Cibola County, New Mexico. As you know from our letter, the Hopi Tribe claims ancestral and cultural affiliation to prehistoric cultural groups in New Mexico, and therefore we appreciate your continuing solicitation of our input and your efforts to address our concerns.

As you also know from our letter, the Hopi Cultural Preservation Office supports the identification and avoidance of archaeological sites and Traditional Cultural Properties. We have reviewed the enclosed copy of the cultural resources survey of the project area by Taschek Environmental Consulting that identifies twelve prehistoric sites, three of which are recommended as National Register eligible, and three of which are recommended as potentially eligible. We understand the six eligible or potentially eligible sites will be avoided by project activities.

However, we support the survey report recommendation that archaeological monitoring be conducted during all construction activities in the unbladed portions of Alternative B. If this recommendation is implemented, we concur that this project should result in no effect to prehistoric National Register eligible properties.

If the proposed pond is to be located in Alternative B, please provide us with a copy of the draft monitoring report for review and comment. Should you have any questions or need additional information, please contact Terry Morgart at the Hopi Cultural Preservation Office. Thank you again for your consideration.

Respectfully,

Leigh J. Kuwanwisiwma, Director
Hopi Cultural Preservation Office

xc: New Mexico State Historic Preservation Office

STATE OF NEW MEXICO
DEPARTMENT OF GAME & FISH

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Visit our website at www.wildlife.state.nm.us
For basic information or to order free publications: 1-800-862-9310.

August 7, 2006

Kleinfelder Inc.
c/o Dr. Louis Bridges
25493 North Road
Hotchkiss, CO 81419

Re: Homestake Mining Company of California, Construction of Evaporation Pond #3 and Site Boundary Expansion; NMGF Project No. 10949

Dear Dr. Bridges:

In response to your letter dated June 26, 2006, (received at this office July 24) the New Mexico Department of Game & Fish (NMGF) has developed the following recommendations for issues to be included in the Environmental Assessment (EA) for this project. Homestake Mining Company of California (HMCo) operated a uranium mill at the site from the 1950's to 1990's. The current restoration program is designed to remove target contaminants from the ground water by flushing the alluvial aquifer beneath the tailings pile with deep-well or reverse osmosis treated fresh water. Contaminated water is either treated in the reverse osmosis system or reported to a series of evaporation ponds. HMCo proposes to construct an additional evaporation pond to expand and enhance water evaporation capacity. Four alternatives are proposed: Alternative A is the no-action alternative, Alternatives B and C comprise alternative locations for the new pond, each of which would involve expansion of the current licensed site boundary, and Alternative D would be construction of the pond within the existing licensed boundary. Each of the action alternatives would impact approximately 33 acres, including the pond, access corridor and earthen containment dike.

Please find enclosed a copy of the NMGF trenching guidelines, for use when installing pipe. The guidelines should be included in the EA as a mitigation measure, and transmitted to the construction contractor in the plan of work. Please also find enclosed a list of state and federal wildlife species of concern for Cibola County. For more information on listed and other species of concern, contact the following sources:

1. BISON-M Species Accounts, Searches, and County lists (use "Database Query" option): http://www.bison-m.org
2. Habitat Handbook Project Guidelines: http://wildlife.state.nm.us/conservation/habitat_handbook/index.htm

3. For custom, site-specific database searches on plants and wildlife. Go to Data then to Free On-Line Data and follow the directions go to: http://nmnhp.unm.edu
4. New Mexico State Forestry Division (505-827-5830) or http://nmrareplants.unm.edu/index.html for state-listed plants
5. For the most current listing of federally listed species always check the U.S. Fish and Wildlife Service at (505-346-2525) or http://www.fws.gov/ifw2es/NewMexico/index.cfm .

The letter we received did not include information regarding the identity and concentration of contaminants expected to be present in the proposed evaporation pond. Any open water in an arid environment will attract wildlife of all kinds. Wildlife need to be protected from contacting and ingesting harmful liquids. Where ponds, pits or open-top tanks contain potentially hazardous liquids, they should be netted to protect flying animals (birds and bats), fenced or otherwise protected. The US Fish & Wildlife Service provides technical guidance on protective netting on the internet at http://www.r6.fws.gov/contaminants/contaminants1c.html. Wildlife exclusion fencing may be appropriate for some situations. Exclusion fences must be a minimum eight feet in height, constructed of chain link or woven or welded wire mesh. They should be secured at the ground or preferably buried to prevent animals digging under, and should be wrapped around the base with a durable finer mesh material to deter small mammals and reptiles and amphibians. Fences which are intended to exclude only livestock should be designed to minimize potential for causing injury or death to large wildlife attempting to cross over or under.

Non-toxic liquid filled ponds, pits and trenches may also present a trapping hazard for wildlife, if they are steep-sided and/or lined with smooth-surfaced material. Textured liner material is available which can be attached to create escape ramps. Depending on the configuration of the trapping hazard, earthen ramps, floating rafts and ladders may also be appropriate solutions. NMGF can provide consultation and design specifications on the appropriate technology. If the evaporation pond can be rendered neither chemically nor physically hazardous, it may provide a valuable drinking water source for local wildlife populations.

The letter we received did not include information on current and historic use of the site by wildlife, vegetative cover type or other habitat variables. Without further information and/or a site visit we are unable to distinguish the potential effects of the various design alternatives. In general, it is preferable to minimize the area of surface disturbance.

Thank you for the opportunity to comment on this project. If there are any questions please contact Rachel Jankowitz at (505) 476-8159 or rjankowitz@state.nm.us.

Sincerely,

Lisa Kirkpatrick

Lisa Kirkpatrick, Chief
Conservation Services Division

cc: Wally Murphy, Ecological Services Field Supervisor, USFWS
Brian Gleadle, NW Area Supervisor, NMGF
Mark Olson, NW Area Habitat Specialist, NMGF

ATTACHMENT B

New Mexico Administrative Code, Title 19, Chapter 25, Part 12, Rules and Regulations Governing Dam Design, Construction, and Safety

TITLE 19 NATURAL RESOURCES AND WILDLIFE
CHAPTER 25 ADMINISTRATION AND USE OF WATER - GENERAL PROVISIONS
PART 12 DAM DESIGN, CONSTRUCTION AND DAM SAFETY

19.25.12.1 ISSUING AGENCY: New Mexico Office of the State Engineer
[19.25.12.1 NMAC - N, 3/31/2005]

19.25.12.2 SCOPE: These regulations apply to the design and construction of all jurisdictional dams in New Mexico and are intended to facilitate the continued safe operation and maintenance of all non-federal jurisdictional dams. These regulations govern the review and acceptance of plans for construction, alteration, modification, repair, enlargement and removal of a jurisdictional dam. These regulations ensure the continued safe operation, maintenance, site security and emergency preparedness for existing non-federal jurisdictional dams. These regulations do not authorize the appropriation or use of water pursuant to 19.26 NMAC and 19.27 NMAC.
[19.25.12.2 NMAC - N, 3/31/2005]

19.25.12.3 STATUTORY AUTHORITY: Section 72-5-32 NMSA requires any person, association or corporation, public or private, the state or the United States that is intending to construct a jurisdictional dam to submit detailed plans to the state engineer. Sections 72-5-9 and 72-5-10 NMSA establish the state engineer's authority over the construction of works and issuing certificates of construction. Sections 72-5-8 and 72-5-14 NMSA require construction to be completed in a time limit set by the state engineer and procedures for requesting an extension of time. Sections 72-5-11, 72-5-12 and 72-5-13 NMSA gives the state engineer jurisdiction over unsafe works, penalties for failure to comply with state engineer orders and priority of liens. Section 72-2-6 NMSA gives the state engineer the authority to assess fees. Section 72-2-8 NMSA gives the state engineer authority to adopt regulations and codes to implement and enforce any provision of any law administered by him. Section 72-8-1 NMSA gives the state engineer the authority to enter upon private property for the performance of his duties. Nothing in these rules shall be construed so as to limit the state engineer's authority to take lawful alternative or additional actions relating to the design, construction and safety of dams.
[19.25.12.3 NMAC - N, 3/31/2005]

19.25.12.4 DURATION: Permanent.
[19.25.12.4 NMAC - N, 3/31/2005]

19.25.12.5 EFFECTIVE DATE: March 31, 2005 unless a later date is cited at the end of a section.
[19.25.12.5 NMAC - N, 3/31/2005]

19.25.12.6 OBJECTIVE: To establish minimum design requirements, minimum submittal requirements and dam site owner responsibilities that shall be addressed to the state engineer's satisfaction in order to ensure a dam is designed, constructed, operated, maintained and secured in a safe manner.
[19.25.12.6 NMAC - N, 3/31/2005]

19.25.12.7 DEFINITIONS: Unless defined below or in a specific section of these regulations, all other words used herein shall be given their customary and accepted meaning.

A. Abutment: That part of the valley side against which the dam is constructed. The left and right abutments of dams are defined with the observer viewing the dam looking in the downstream direction.

B. Alteration, modification, repair, rehabilitation or enlargement of an existing dam: To change from the state engineer accepted construction drawings and specifications or current condition.

C. Appurtenant structure: Auxiliary features of a dam such as outlets, spillways, access structures, tunnels and related housing at a dam.

D. American society for testing and materials (ASTM): An accepted standard for testing the properties of materials. Methods cited in these regulations include laboratory compaction characteristics of soils.

E. Breach: An opening through a dam or spillway that is capable of draining a portion of the reservoir or the entire reservoir. A controlled breach is a constructed opening. An uncontrolled breach is an unintentional discharge from the reservoir.

F. Consequences of failure: Potential loss of life or property damage downstream of a dam caused by waters released at the dam or by waters released by partial or complete failure of dam; includes effects of landslides upstream of the dam on property located around the reservoir.

G. Crest width: The thickness or width of a dam at the crest level (excluding corbels or parapets). In general, the term thickness is used for gravity and arch dams and width is used for other dams.

H. Dam: A man-made barrier constructed across a watercourse or off-channel for the purpose of storage, control or diversion of water.

(1) Jurisdictional dam: A dam that is more than 10 feet in height measured from the lowest point on the downstream toe to the dam crest or impounds more than 10 acre-feet of water as measured from the lowest point on the downstream toe to the spillway crest. Dams constructed under the supervision of the U.S. army corps of engineers before May 19, 2004, become jurisdictional when such supervision by the U.S. army corps of engineers is terminated. For purposes of these regulations, reference to a dam means a jurisdictional dam unless otherwise noted.

(2) Non-jurisdictional dam: Any dam less than or equal to 10 feet in height and having storage less than or equal to 10 acre-feet of water. The state engineer does not regulate the design, construction and operation of a non-jurisdictional dam unless the dam is unsafe and there is a threat to life or property, as determined by the state engineer. Waters impounded by a non-jurisdictional dam may not be exempt from water right permit requirements; therefore a separate state engineer water right permit for the water impounded in the reservoir created by a non-jurisdictional dam may be required. Non-jurisdictional dams shall meet the requirements of 19.26.2.15 NMAC unless otherwise exempt. The structures listed below are considered non-jurisdictional dams:

(a) Stock dam: A stock dam constructed prior to May 19, 2004 with a storage capacity of 10 acre-feet or less regardless of the height of the dam.

(b) Erosion control dam: A dam for the sole purpose of erosion control constructed on a naturally dry watercourse as determined by the state engineer, with a storage capacity of 10 acre-feet or less as measured from the lowest point on the downstream toe to the spillway crest and the reservoir drains in 96 hours unless a quicker drain time is required by court decree.

(c) Levee or diversion dike: A structure where water flows parallel to the length of the levee or diversion dike as determined by the state engineer.

(d) Roadway embankment: A structure across a watercourse designed for the sole purpose of supporting a roadbed or other means of conveyance for transportation as determined by the state engineer; where the area upstream has not been enlarged to increase flood storage; and where the embankment is provided with an uncontrolled conduit of sufficient capacity to satisfy requirements of the appropriate state or local transportation authority. If no transportation authority has jurisdiction over the structure, the current drainage design criteria of the New Mexico department of transportation shall apply.

I. Dam crest: The lowest elevation of the uppermost surface of a dam, usually a road or walkway excluding any parapet wall, railing, etc.

J. Dam failure: The breakdown of a dam, characterized by the uncontrolled release of impounded water. There are varying degrees of failure.

K. Dam height: The vertical distance from the lowest point on the downstream toe to the dam crest.

L. Dam incident: An event at a dam that interrupts normal procedures and performance, affects the safety of the dam or results in a potential loss of life or damage to property.

M. Fetch: The straight-line distance across a body of water subject to wind forces. The fetch is one of the factors used to calculate wave heights in a reservoir.

N. Freeboard: The vertical distance between the spillway crest and the lowest point of the dam crest not including camber.

O. Functional exercise: A meeting in a conference room environment involving the dam owner and state and local emergency personnel with responsibilities in the emergency action plan. The exercise takes place in a stress-induced environment with time constraints and involves simulation of a dam failure and other specific events. The exercise is designed to evaluate both the internal capabilities and responses of the dam owner and the workability of the information in the emergency action plan used by emergency management officials.

P. High water line: The highest water level elevation in the reservoir as determined from routing the spillway design flood or inflow design flood.

Q. Inflow design flood: The flood flow above which the incremental increase in downstream water surface elevation due to failure of a dam is no longer considered to present an unacceptable additional downstream threat. The upper limit of the inflow design flood is the flood resulting from the probable maximum precipitation and the lower limit is the flood resulting from the 100-year precipitation.

R. **Inundation map:** A map delineating the area that would be flooded by a particular flood event.

S. **Length of dam:** The length measured along the dam axis at the dam crest. This also includes the spillway, powerplant, navigation lock, fish pass, etc., where these form part of the length of the dam. If detached from the dam these structures should not be included.

T. **Loss of life:** The likely number of human fatalities that would result from a dam failure flood event. No allowances for evacuation or other emergency actions by the population should be considered.

U. **Naturally dry watercourse:** A watercourse or portion thereof, which under normal conditions is dry, which flows only in direct response to precipitation and whose channel is at all times above the groundwater table.

V. **Normal operating level:** The water level elevation corresponding to the maximum storage level that excludes any flood control or surcharge storage.

W. **North American vertical datum 1988 (NAVD88):** The current vertical control datum in use in North America established from nine space geodetic stations. This basis of establishing elevation provides a precise surface, whereas the North American vertical datum 1927 (NAVD27) is elevation established from mean sea level.

X. **One-hundred year flood:** A flood that has 1 chance in 100 of being equaled or exceeded during any year.

Y. **Owner:** The individual, association or corporation, public or private, the state or the United States, owning the land upon which a dam is constructed; having a contractual right to construct, operate or maintain a dam; or the beneficiary of an easement to construct, operate or maintain a dam.

Z. **Probable maximum precipitation:** Theoretically, the greatest depth of precipitation for a given duration that is physically possible over a given size storm area at a particular location during a certain time of year.

AA. **Spillway:** A structure over or through which excess flow is discharged from a reservoir. If the rate of flow is controlled by mechanical means such as gates, it is considered a controlled spillway. If the geometry of the spillway is the only control, it is considered an uncontrolled spillway. For purposes of these regulations, an uncontrolled outlet conduit that is used to drain the reservoir is not considered a spillway.

BB. **Spillway crest:** The lowest level at which water can flow over or through the spillway.

CC. **Spillway design flood:** The required flood that a spillway must pass without failure of the dam.

DD. **Storage:** For purposes of determining whether a dam is jurisdictional, the storage is the volume of water impounded by the dam above the lowest elevation of the downstream toe to the elevation of the spillway crest. For dams with no spillway, storage is measured to the dam crest. Definitions of specific types of storage in reservoirs are:

(1) Dead storage is the storage volume of a reservoir that lies below the invert of the lowest outlet and therefore, cannot readily be withdrawn from the reservoir.

(2) Flood surcharge storage is the storage volume between the maximum operating level and the maximum water level during the spillway design flood.

(3) Live storage is the storage volume of a reservoir that is available for use and lies above the invert of the lowest outlet.

(4) Reservoir storage capacity is the sum of the dead and live storage of the reservoir.

(5) Maximum storage is the sum of the reservoir storage capacity and flood surcharge storage.

EE. **Tabletop exercise:** A meeting in a conference room environment involving the dam owner and state and local emergency personnel with responsibilities in the emergency action plan. The format is a discussion of an emergency event, response procedures to resolve concerns regarding coordination and responsibilities.

FF. **Toe:** The contact line between the outer shell of the dam and the natural ground surface.

GG. **Wave runup:** Vertical height above the water level to which water from a specific wave will run up the face of a structure or embankment.

[19.25.12.7 NMAC - N, 3/31/2005]

19.25.12.8 **FEE SCHEDULE:** The state engineer assesses fees for filing forms, reviewing plans and specifications for dams and appurtenant structures and construction inspections.

A. For filing an application for permit to construct and operate a dam the fees shall be $25.

B. For each review of design plans, construction drawings and specifications for a dam the fee shall be $2 per $1000 or fraction thereof of the estimated construction cost. For determination of fees, inclusion of contingencies, taxes and other permit fees is not required. Assessment of multiple review fees for the same application is at the sole discretion of the state engineer.

C. For issuing an extension of time for construction of a dam the fee shall be $50.

D. For inspecting construction of a dam the fee shall be $100/8-hour day and actual and necessary traveling expenses.

E. For filing a proof of completion of works for a dam the fee shall be $25.

F. For filing a change of ownership for a dam the fee shall be $5.

G. For copies of dam safety records up to 11 inches by 17 inches the fee shall be $0.20 per copy.

H. For copies of dam safety records greater than 11 inches by 17 inches the fee shall be $3.00 per copy.

[19.25.12.8 NMAC - N, 3/31/2005]

19.25.12.9 SIZE CLASSIFICATION: A dam shall be less than or equal to the maximum height and storage to qualify for the size classification.

A. Small: A small dam is greater than 10 feet but less than or equal to 40 feet in height, or greater than 10 acre-feet but less than or equal to 1000 acre-feet of storage.

B. Intermediate: An intermediate dam is greater than 40 feet but less than or equal to 100 feet in height, or greater than 1000 acre-feet but less than or equal to 50,000 acre-feet of storage.

C. Large: A large dam is greater than 100 feet in height, or greater than 50,000 acre-feet of storage.

[19.25.12.9 NMAC - N, 3/31/2005]

19.25.12.10 HAZARD POTENTIAL CLASSIFICATION: The hazard potential classification is a rating for a dam based on the potential consequences of failure. The rating is based on loss of life, damage to property and environmental damage that is likely to occur in the event of dam failure. No allowances for evacuation or other emergency actions by the population should be considered. The hazard potential classification is not a reflection of the condition of the dam.

A. Low hazard potential: Dams assigned the low hazard potential classification are those dams where failure or misoperation results in no probable loss of life and low economic and/or environmental losses. Losses are principally limited to the dam owner's property.

B. Significant hazard potential: Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in populated areas with significant infrastructure.

C. High hazard potential: Dams assigned the high hazard potential classification are those dams where failure or misoperation will probably cause loss of human life.

[19.25.12.10 NMAC - N, 3/31/2005]

19.25.12.11 DESIGN OF A DAM: Any person, association or corporation, public or private, the state, or the United States that is intending to construct a dam shall submit an application to construct and operate a dam and supporting documentation acceptable to the state engineer. This section primarily addresses the design and construction of embankment dams. Other types of dams shall conform to sound engineering principles and current state of the practice. Because each site, design and operating practice is unique, waivers of specific requirements in this section will be considered on a case-by-case basis. Request for waiver shall be in writing accompanied with documentation justifying the request. If the request is not justified to the satisfaction of the state engineer the request will be denied. Construction shall not begin until the state engineer has accepted the supporting documentation and approved the application with construction and operation conditions. The application and supporting documentation shall include:

A. Application: An application form shall be completed with original signature of the dam owner and accompanied with a filing fee in accordance with Subsection A of 19.25.12.8 NMAC. The form will be the only information available to the public before the project is approved for construction. All other supporting documentation is considered draft until accepted by the state engineer. A plan review fee in accordance with Subsection B of 19.25.12.8 NMAC shall accompany the submittal of the design report, construction drawings and specifications. A detailed estimate of the construction cost for the proposed dam and appurtenant structures shall be submitted in support of the plan review fee.

B. Water right: A water right is required for water impounded by the dam. If the dam owner has a permit for the diversion of water, documentation addressing the necessity for storage, diversion periods and release conditions for the reservoir may be required. This requirement is waived for flood control dams that do not detain

water longer than 96 hours in accordance with Subparagraph (b) of Paragraph (7) of Subsection C of 19.25.12.11 NMAC or provide documentation that a waiver by the state engineer has been granted. Flood control dams that do not drain within 96 hours require a water right for water permanently stored beyond the 96-hour drain time requirement and for associated losses due to evaporation and other potential depletions to the system unless a waiver in accordance with 19.25.12.11 NMAC is obtained.

C. Design report: A design report, which includes information to evaluate the safe design of the dam and appurtenant structures, shall be submitted in a form acceptable to the state engineer. The design report shall contain the information described below and any other additional information determined necessary by the state engineer. A professional engineer licensed in the state of New Mexico qualified in the design and construction of dams shall prepare or supervise the preparation of the design report. The front cover shall show the name of the dam (identical to the application), the county in which the dam is located and type of report. The first page behind the front cover shall show the name of the dam (identical to the dam name on the application), the county in which the dam is located and the signed certifications for the engineer and state engineer in accordance with Subsections B and E of 19.25.12.12 NMAC. The design report shall include:

(1) Hazard potential classification. A hazard potential classification shall be based on the dam failure condition that results in the greatest potential for loss of life and property damage. If the state engineer concurs, the classification may be based on the judgment and recommendation of the professional engineer. For all other cases, a low or significant hazard potential classification shall be supported by a dam breach analysis, which includes calculations and data that supports the predicted dam failure flood. This analysis shall also address the potential for foreseeable future development. Evaluation of the effects of flooding from dam failure shall extend at least to the location downstream where the classification can be properly identified. The dam breach analysis shall include, but not be limited to:

(a) dam failure inundation maps;

(b) map of the water surface profiles;

(c) cross-sections drawn to scale showing water surface elevation at critical sections where structures are impacted and showing discharge in cubic feet per second, average velocity in feet per second, flood wave travel times, rate of rise and structures located in the flooded sections;

(d) a tabulation and justification of assumed parameters used in the analysis;

(e) a sensitivity analysis of the assumed parameters used in the analysis;

(f) references to all computer models, data and supporting justification used in the analysis; and

(g) appropriate data sheets and computer program output computations from computerized analysis shall be provided.

(2) Hydrologic analysis. The hydrologic analysis shall include a discussion of methodology used to calculate the spillway design flood for determining the available flood storage and spillway capacity. Consideration of how the dam will perform under these hypothetical flood conditions shall be evaluated. The hydrologic analysis shall include, but not be limited to:

(a) a topographic map of the drainage area above the dam with the drainage area and sub-basins delineated and presented on a map of appropriate scale and size;

(b) a description of the topography, soils and vegetative cover of the drainage area;

(c) a discussion of the depth, duration and distribution of the spillway design storm;

(d) a tabulation, discussion and justification of all hydrologic parameters and methodology used to calculate runoff from rainfall;

(e) a discussion of the peak inflow, volume of runoff and maximum reservoir water level elevation for the inflow hydrograph;

(f) a plot of the reservoir inflow and outflow hydrographs extended until flow is negligible and plotted on the same figure of appropriate size and scale;

(g) a table showing the reservoir area (in acres) and storage capacity (in acre-feet) for each foot of elevation above the bottom of the reservoir to the dam crest; the table shall be determined from the reservoir topography map; indicate the amount of dead storage, elevation of the invert of the outlet and elevation of the crest of each spillway; all elevations shall be based on North American vertical datum 1988 or more recent adjustment; and

(h) appropriate data sheets and computer program output computations from computerized analysis shall be provided.

(3) Spillway design flood. The spillway design flood is the flood that a spillway must be capable of conveying without dam failure. For perimeter embankment dams with no spillway and no external drainage area, the dam must be capable of impounding the spillway design flood without dam failure. A spillway design flood less than these requirements is acceptable to the state engineer if an incremental damage analysis is presented to justify the inflow design flood in accordance with Paragraph (4) of Subsection C of 19.25.12.11 NMAC. The spillway design flood is based on size classification and hazard potential classification of the dam as follows:

(a) Dams classified as low hazard potential, regardless of size, shall have spillways designed to pass a flood resulting from a 100-year precipitation event expressed as a percentage of the probable maximum precipitation.

(b) Dams classified as small and intermediate, with a significant hazard potential rating shall have spillways designed to pass a flood resulting from 50 percent of the probable maximum precipitation.

(c) Dams classified as large, with a significant hazard potential rating shall have spillways designed to pass a flood resulting from 75 percent of the probable maximum precipitation.

(d) Dams classified as high hazard potential, regardless of size, shall have spillways designed to pass a flood resulting from the probable maximum precipitation.

(4) Incremental damage assessment. Where spillways are not in compliance with Paragraph (3) of Subsection C of 19.25.12.11 NMAC an incremental damage assessment shall justify the inflow design flood used to size the spillway. The assessment shall evaluate the consequences of dam failure. The assessment shall compare the impact of with-failure and without-failure conditions on downstream water levels and existing and known future development. The assessment shall include a dam breach analysis in accordance with Subparagraphs (a) through (g) of Paragraph (1) of Subsection C of 19.25.12.11 NMAC for the failure and non-failure conditions. Methods for assessing the damage between failure and non-failure conditions shall be fully documented.

(5) Spillway capacity. The spillway capacity shall be adequate to pass the spillway design flood in accordance with Paragraph (3) of Subsection C of 19.25.12.11 NMAC or accepted inflow design flood in accordance with Paragraph (4) of Subsection C of 19.25.12.11 NMAC without failure of the dam. If design calculations show that overtopping will occur, an erosion study of the embankment documenting that the dam will not breach is required. If the outlet works are gated, the design discharge of the outlet works shall not be considered when routing the spillway design flood through the reservoir and spillway. The water level shall be at the normal operating level at the beginning of the spillway design storm. A spillway rating curve and table showing elevation in one-foot increments versus maximum discharge capacity shall be prepared. The rating curve and table shall include data from the crest of the spillway to the dam crest. The parameters used to calculate the spillway capacity shall be justified and appropriate data sheets and computer program output computations from computerized analysis shall be provided. Elevations shall be based on North American vertical datum 1988 or more recent adjustment.

(6) Spillway design. Spillways shall be evaluated for erosion potential during normal operation and the design flood event. Damage to a spillway during the design flood event is acceptable; however, a breach of the spillway is unacceptable. The spillway design shall address the following minimum requirements:

(a) The material required for spillway lining depends on the spillway location, frequency of discharge and velocity of discharge to adequately address erosion and breach potential. The design shall provide adequate justification for the material selected.

(b) The design shall provide aeration of the nappe for cavitation control where control weirs are used at the spillway crest.

(c) The spillway must discharge away from the toe of the dam and abutment slopes.

(d) The potential for the accumulation of debris that may block the spillway shall be addressed.

(e) Energy dissipation to control erosion of the natural channel due to spillway discharge shall be addressed.

(f) Channel lining shall be placed on a suitably prepared, stable subgrade. All edges and joints in channel lining material must be designed to prevent undermining and erosion. Concrete channel lining must be provided with adequate jointing to permit thermal expansion and contraction and adequate reinforcing to control thermal cracking. Adequate water stops are required at joints in the spillway lining. Concrete lining shall be adequately anchored against displacement and uplift and shall be provided with adequate subdrainage to relieve hydrostatic pressure and prevent frost heave.

(g) Where training dikes are used to divert the water away from the dam, the dike shall be designed with a compaction to at least 95% of the maximum standard Proctor density, ASTM D 698, or at least 90% of the maximum modified Proctor density, ASTM D 1557, or at least 70% relative density if Proctor testing is not

appropriate. Erosion protection for the dike shall be addressed in accordance with Paragraph (16) of Subsection C of 19.25.12.11 NMAC.

(7) Outlet works capacity. Dams shall be designed with a low level outlet to drain the entire contents above the elevation of the downstream toe of the dam. If environmental consequences prevent draining of the reservoir, the state engineer will grant a waiver if written justification is provided to the satisfaction of the state engineer. The outlet shall be sized to provide adequate capacity to satisfy water rights of downstream priority users. A stage discharge curve and table showing elevation in one-foot increments versus discharge capacity shall be prepared. The rating curve and table shall be from the invert of the outlet to the dam crest. The parameters used to calculate the outlet works capacity shall be justified and appropriate data sheets and computer program output computations from computerized analysis shall be provided. Elevations shall be based on North American vertical datum 1988 or more recent adjustment. The outlet works capacity shall meet the following minimum requirements:

(a) Outlets for water storage reservoirs shall drain in 45 days with supporting calculations provided.

(b) Outlets for flood control dams shall drain the reservoir in 96 hours unless a waiver is granted by the state engineer. The 96-hour time frame begins once the reservoir storage drops to the emergency spillway crest or reaches its peak during the 100-year, 24-hour event. Documentation supporting the waiver shall include the time to drain more frequent events.

(8) Outlet works design. The outlet works design includes the intake structure, conduit and terminal structure. The outlet works design shall meet the following minimum requirements:

(a) Minimum conduit diameter is 18 inches unless a waiver is granted by the state engineer. Documentation supporting a waiver shall include identification of methods to inspect the interior of the conduit.

(b) Metal conduits used in dams that are classified as significant hazard potential where the sole purpose of the dam is flood control, or in dams classified as low hazard potential, shall have adequate strength after corrosion for a minimum of 200 years, based on corrosivity testing of onsite soils. Cathodic or other protection of metal conduits is permissible and may be considered in this analysis. Metal conduits are not acceptable for dams classified as high hazard potential or dams classified as significant hazard potential with permanent water storage except as interior forms for cast-in-place concrete conduits.

(c) Outlet conduits for storage reservoirs shall be gated at the upstream end unless a waiver is granted by the state engineer. Where gates are located other than at the upstream end of the conduit, a guard gate or bulkhead shall be provided at the upstream end to allow draining of the conduit for inspection, maintenance and repair.

(d) Outlet conduits shall be adequately vented. Where the outlet conduit ties directly to a downstream pipe, a by-pass valve shall be provided.

(e) Outlet controls and equipment shall be properly designed to be secure from damage due to vandalism, weather, ice, floating debris, wave action, embankment settlement and other reasonably foreseeable causes. The outlet control operators shall remain accessible during outlet works and spillway releases.

(f) Outlets for flood control structures shall be ungated. Where a gate is required to satisfy downstream release restrictions, a waiver from the state engineer is required. The written request for waiver shall include a plan for timely release of the floodwater.

(g) Outlet works intake structures shall be provided with trash racks or grates to prevent clogging with debris. Grate opening size or bar spacing shall be adequate to satisfy applicable public safety requirements, if appropriate. Total size of grate openings must be at least three times the cross-sectional area of the outlet conduit.

(h) The design of the outlet works terminal structure shall address energy dissipation to prevent erosion and shall include supporting calculations.

(i) Outlet conduits shall be designed for full embankment loading and for hydrostatic pressure equal to the maximum reservoir head, acting separately and in combination, with an adequate factor of safety for the conduit material. If future increases in embankment height and/or reservoir head are foreseeable, allowance shall be made in the design.

(j) The conduit together with all joints and fittings shall be watertight at the design pressure and shall be pressure tested prior to backfilling. Conduits shall be designed for all reasonably foreseeable adverse conditions including corrosion, abrasion, cavitation, embankment settlement and spreading, thermal effects and seismic loading. The ability of the conduit to withstand deflection and separation at the joints shall be addressed in the design of the outlet conduit.

(k) Outlet works shall be supported by stable, well-consolidated foundation materials. Where the conduit is placed in embankment fill or native overburden materials, settlement analysis shall be performed.

(l) Minimizing seepage along conduits shall be addressed including the methods for ensuring compaction of backfill around and beneath the conduit.

(m) All supporting documentation and calculations for the outlet works design shall be provided. The outlet works design shall include all foreseeable loading conditions, including but not limited to ice loading, debris buildup, wave action and embankment settlement. Structural design calculations for the intake structure, conduit and outlet structure shall be submitted.

(9) Geological assessment. A geological assessment of the dam and reservoir site is required for all dams classified as high or significant hazard potential. The geological assessment may be included in the geotechnical investigation or seismic study, or may be submitted as a separate document. The geological assessment shall address regional geologic setting; local and site geology; geologic suitability of the dam foundation; slide potential of the reservoir rim and abutment areas; and seismic history and potential.

(10) Geotechnical investigation. A geotechnical investigation shall assess site conditions and support the design. A professional engineer licensed in the state of New Mexico qualified to provide geotechnical expertise in the design and construction of dams shall prepare, stamp and sign the geotechnical investigation, which may be submitted as a separate report. The scope of the geotechnical investigation is dependent on the size classification, hazard potential classification, anticipated materials and construction methods, site geology and seismicity, anticipated soil strata and other site-specific conditions. The geotechnical investigation shall include a field investigation and laboratory testing. Results of field and laboratory testing shall be presented in a report, including recommended parameters to be used in design and construction of the dam and appurtenant structures. The field investigation and laboratory testing shall include but not be limited to the following:

(a) test borings in the footprint of the embankment, spillway excavations and appurtenant structures extending to bedrock or to a depth equal to at least the height of the dam; where appropriate, borings may include coring of bedrock materials to determine the quality and character of the rock;

(b) standard penetration tests or other field-testing to assess soil character and consistency;

(c) "undisturbed" sampling for further tests such as insitu density, shear strength and compressibility;

(d) supplemental test pits, if deemed necessary, to obtain bulk and undisturbed samples, assess soil layering and measure bedrock orientation;

(e) measurement of water level in drill holes;

(f) field permeability testing, if feasible;

(g) logs of test borings and test pits, location map and profile along dam axis with soil information shown;

(h) testing to determine the relevant properties of the material to be used in construction, including but not limited to shear strength, permeability, compressibility and filter characteristics; the testing method shall conform to accepted industry standards and be appropriate for the material being tested;

(i) evaluation of liquefaction potential and dynamic shear strength testing if deformation analysis is required; and

(j) identification of the location of the borrow material to be used during construction.

(11) Seepage and internal drainage. The effects of seepage and potential for internal erosion shall be evaluated. A seepage analysis shall be performed to address the performance of the embankment under steady-state conditions for dams classified as high or significant hazard potential. All parameters and assumptions used in the analysis shall be summarized in a table and justified in the seepage analysis. A waiver may be requested in writing for flood control dams or reservoirs with synthetic liners. The seepage analysis and internal drainage design shall include but not be limited to the following:

(a) Flow nets of appropriate size and scale shall be prepared. The effects of anisotropy with respect to permeability shall be addressed. Ratios of horizontal to vertical permeability of less than 4 for constructed embankments and less than 9 for native deposits shall be supported by field and laboratory permeability tests. Appropriate data sheets and computer program output computations from computerized analysis shall be provided.

(b) The design shall address the effects of anticipated seepage beneath, around and through the dam. Seepage shall not exit on the dam face and excessive exit seepage gradients are unacceptable. All filter, transition and drainage zones within earth dams shall have a thickness adequate to address constructability and enhance seismic stability with a minimum thickness of 3 feet for each zone.

(c) Collector pipes and conduits for internal drains shall be made of non-corrodible material capable of withstanding the anticipated loads. If possible, pipes shall be located where they can be exposed for repair or replacement without threatening the stability of the dam. Collector pipes for drains shall be enveloped in a free-draining medium meeting filter criteria for adjacent embankment or foundation zones. Where surging or hydraulic gradient reversal is likely, perforation size must be less than the diameter at which 15 percent of the surrounding medium is finer. Where surging or hydraulic gradient reversal are unlikely, the perforation size must be less than the diameter at which 85 percent of the surrounding medium is finer.

(d) Drain pipes shall be sized to provide a flow depth no more than ¼ of the pipe diameter when carrying the anticipated discharge. Drain pipes shall be at least 6 inches in diameter unless the availability of technology for inspection and maintenance can be demonstrated. Individual pipes shall discharge to a gallery, well, manhole, or to daylight such that the flow of each pipe can be monitored and measured. Manifold connections, tees and wyes are not permitted. If the anticipated flow from a drain line exceeds 10 gpm, a measuring flume or weir shall be provided for that line. If the anticipated flow from a drain line is less than 10 gpm, the outfall shall be designed to allow a 5 gallon bucket to be used to collect and measure discharge. Where pipes from internal drains are discharged to daylight, a rodent screen shall be provided.

(12) Stability analysis. Cross-sectional design for dams shall be supported by slope stability analysis. Dams classified as low hazard potential with upstream slopes no steeper than 3 horizontal to 1 vertical, downstream slopes no steeper than 2 horizontal to 1 vertical and which are 25 feet or less in height will not require slope stability analysis. The analysis model shall adequately represent the geometry and zoning, shear strength parameters, material unit weights, pore pressure and seepage conditions, external loading and other relevant factors of the critical cross section or sections. Manual computations in the analysis will be accepted if judged to be sufficiently rigorous. Where appropriate, the analysis shall consider noncircular or block and wedge type failure surfaces as well as circular failures. All parameters and assumptions used in the analysis shall be summarized in a table and justified in the geotechnical investigation. A scale drawing, utilizing the same scale for vertical and horizontal dimensions, shall be provided for each cross-sectional model used in the analysis, with the critical failure surface(s) identified. Appropriate data sheets and computer program output computations from computerized analysis shall be provided. Dams shall be designed to provide the following minimum factors of safety from the stability analysis:

(a) 1.5 for steady state long-term stability;

(b) 1.5 for operational drawdown conditions;

(c) 1.2 for rapid drawdown conditions; and

(d) 1.2 for end of construction.

(13) Seismic design and analysis. Dams classified as high or significant hazard potential shall be analyzed for seismic stability. Seismic analysis for water storage dams shall be based on full reservoir under steady state seepage conditions. Flood control dams with ungated outlets that satisfy Subparagraph (b) of Paragraph (7) of Subsection C of 19.25.12.11 NMAC without waiver shall be designed for earthquake loads under empty reservoir conditions and need not consider steady-state seepage. Dams sited on active faults shall obtain a waiver from the state engineer. To obtain a waiver the analysis shall show that the location of the dam is unavoidable and the dam must be designed to withstand anticipated fault movement without compromising its integrity. Appropriate data sheets and computer program output computations from computerized analysis shall be provided. The seismic analysis shall meet the following minimum requirements:

(a) A seismological investigation for the dam area and reservoir area. This study may be part of the geological or geotechnical report for the structure, or may be a separate effort. The study shall determine and justify the appropriate seismic parameters to be used for design. The seismic parameters shall be based on the following design earthquake:

(i) Dams classified as high hazard potential other than flood control structures shall be designed for the maximum credible earthquake or for an earthquake with a 5000-year return frequency.

(ii) Dams classified as significant hazard potential or high hazard potential dams whose sole purpose is for flood control shall be designed for a 2% chance of occurrence in 50 years (approximately 2500-year return frequency).

(b) An analysis of materials in the foundation, reservoir area and proposed embankment shall be completed to determine the potential for liquefaction, earthquake-induced sliding, or other seismic sensitivity, which may be accomplished as part of the geotechnical investigation.

(c) Pseudostatic analysis will be acceptable for the following cases:

(i) the embankment is to be mechanically compacted to at least 95% of the maximum standard Proctor density, ASTM D 698, or at least 90% of the maximum modified Proctor density, ASTM D 1557 or

at least 70% relative density if Proctor testing is not appropriate; no materials prone to liquefaction are present in the foundation and peak bedrock acceleration is 0.20g or less; or

(ii) the embankment is to be mechanically compacted to at least 95% of the maximum standard Proctor density, ASTM D 698, or at least 90% of the maximum modified Proctor density, ASTM D 1557; potentially submerged portions of the embankment except for internal drain elements are constructed of clayey material; the dam is constructed on clayey soil or bedrock foundation and peak bedrock acceleration is 0.35g or less; and

(iii) all safety factor requirements in accordance with Subparagraphs (a) through (d) of Paragraph (12) of Subsection C of 19.25.12.11 NMAC are met;

(iv) minimum freeboard requirements in accordance with Subparagraphs (a) through (e) of Paragraph (15) of Subsection C of 19.25.12.11 NMAC are met; and

(v) the pseudostatic coefficient selected for analysis must be at least 50% of the predicted peak bedrock acceleration, but not less than 0.05g and the factor of safety under pseudostatic analysis shall be 1.1 or greater. In determining the factor of safety for pseudostatic analysis, a search for the critical failure surface shall be made.

(d) For dams not satisfying the requirements for pseudostatic analysis, a deformation analysis is required. The resulting embankment must be capable of withstanding the design earthquake without breaching and with at least 3 feet of freeboard remaining after deformation. The analysis shall also assess the potential for internal erosion as a result of cracking during deformation.

(e) The seismic assessment shall also address the stability of appurtenant structures to the dam during the design earthquake as appropriate, unless failure of an appurtenance due to earthquake does not represent an immediate threat to the dam, in which case the operating basis earthquake may be used.

(14) Dam geometry. The dam geometry shall be supported by the stability and seismic analysis and meeting the following minimum requirements:

(a) The crest width shall be at least equal to the dam height in feet divided by 5 plus 8 feet, with the minimum permissible crest width being 10 feet and the maximum required crest width being 24 feet.

(b) Roads located on the crest shall have appropriate surfacing to provide a stable base that resists rutting and provides adequate friction for safety in wet conditions.

(c) The crest design shall provide a minimum of 2 feet of cover or the depth of frost penetration; whichever is greater, above clay cores to prevent cracking of the core due to desiccation or frost penetration.

(d) Turnarounds should be provided on dead-end service roads on dam crests, located in such a manner that backing maneuvers longer than 300 feet are eliminated.

(e) The crest shall be provided with adequate cross slope to prevent ponding.

(f) The slope or slopes to which crest drainage is directed must be provided with adequate erosion protection to accept the crest drainage.

(g) The crest longitudinal profile shall be provided with adequate camber to maintain the profile after embankment settlement. Camber should be based on settlement analysis and shall be at least 2 percent of the total embankment height, with a minimum of 1 foot at the highest point of the dam. The tops of internal core zones shall also be provided with camber in a similar manner to the crest of the dam.

(h) In the event that safety berms, street curbs, or other longitudinal features which block, control, or concentrate drainage are required on the dam crest, the design shall provide for collection and conveyance of accumulated water to discharge away from the embankment without erosion.

(15) Freeboard. Dams shall be provided with adequate freeboard. Wave runup shall be determined taking into consideration wind speed, reservoir fetch, embankment slope and roughness of the slope surface. Freeboard shall satisfy the following conditions:

(a) Anticipated wave runup resulting from a 100 mph wind with reservoir level at the spillway crest will not overtop the dam.

(b) Anticipated wave runup resulting from a 50 mph wind with maximum reservoir level from routed spillway design flood will not overtop the dam.

(c) Clay core cover and capillary rise requirements in accordance with Subparagraph (c) of Paragraph (14) of Subsection C of 19.25.12.11 NMAC are satisfied.

(d) A minimum of 3 feet of freeboard remains after seismic deformation.

(e) In any case, at least 4 feet of freeboard shall be provided. The minimum of 4 feet of freeboard may be waived for perimeter embankments with no spillway, provided a written request is made to the state engineer accompanied with supporting justification.

(16) Erosion protection. Erosion protection shall be addressed to protect the dam and appurtenant structures from erosion that can threaten the safety of the structure. At a minimum, the following areas of erosion shall be addressed:

(a) Wave erosion. The upstream slope shall be protected from wave erosion. The material selected and area of coverage shall be appropriate for the protection required with justification provided. Flood control dams in compliance with Subparagraph (b) of Paragraph (7) of Subsection C of 19.25.12.11 NMAC without waiver are exempt from wave protection.

(b) Surface erosion. The slope, crest, abutment and groins, toe areas and any other constructed areas associated with the dam and appurtenant structures shall be protected from surface erosion and concentrated flows. The material selected and area of coverage shall be appropriate for the protection required with justification provided.

(17) Geotextile design. Geotextiles are an acceptable material for use in dam design if the geotextile is placed so that it does not jeopardize the dam or appurtenant structures during repair or failure of the geotextile. The geotextile material shall be used in accordance with the manufacturer's recommendations and intended use for the product. Installation shall be by certified personnel and the completed installation certified by installer or manufacturer, if required by the manufacturer.

(18) Structural design. The structural design information for all appurtenant structures, addressing water, earth, ice and any other applicable load shall be provided. Reinforced concrete design including assumptions for loads and limiting stresses and sample calculations shall be provided. Appropriate data sheets and computer program output computations from computerized analysis shall be provided.

(19) Utilities design. Utility placement or relocation shall be addressed as applicable. Utilities located in the vicinity of the proposed embankment footprint should be relocated and trenches backfilled and compacted with suitable material to the satisfaction of the state engineer. If utilities are allowed to remain, they will be required to satisfy applicable provisions for outlet conduits in accordance with Paragraph (8) of Subsection C of 19.25.12.11 NMAC.

(20) Miscellaneous design. Because each design is unique, all design elements not specifically addressed in these regulations shall be documented and justified with sample calculations and appropriate data sheets and computer program output computations from computerized analysis shall be included in the design report.

D. Construction drawings: A professional engineer licensed in the state of New Mexico qualified in dam design and construction shall prepare the construction drawings. Illegible, mutilated, careless or otherwise poorly prepared drawings are not acceptable for filing with the state engineer. Plan drawings and maps prepared with the aid of a computer require the submittal of the digital data files in tagged image file format or other format acceptable to the state engineer. The preparation of construction drawings is described below and shall include the following items:

(1) Quality. Construction drawings and maps shall be made from actual field or photogrammetric surveys of an accuracy acceptable to the state engineer. Construction drawings and maps shall be prepared with permanent black ink on mylar. All original signatures, dates and acknowledgments appearing on the sheet(s) shall be in permanent ink. Plan drawings and maps shall always be rolled, never folded, for transmittal.

(2) Scale and size. Sheets shall be twenty-four (24) inches by thirty-six (36) inches with one (1) inch margins on all sides. The scale(s) used on the drawings may vary according to requirements and space available to show all necessary data in detail clearly in feet and decimals and to be clearly legible when the drawings are reduced to eleven (11) inches by seventeen (17) inches. Detailed dimensions of appurtenant structures shall be given in feet and inches. All sheets shall have bar scales in order to allow scaling of reduced drawings.

(3) Sheet numbers. Each sheet shall be numbered sequentially with the first sheet being sheet number one in conjunction with the total numbered sheets (example Sheet 1 of 5). The sheet number on the last sheet shall equal the total number of sheets.

(4) Engineer's seal and signature. Each sheet shall have the responsible engineer's seal and signature.

(5) Orientation and date. The direction of north and the basis of bearings shall be shown on all maps. The date that field surveys are made or the date of the aerial photography used shall be shown on the maps.

(6) Title sheet. The first sheet of a set of plans is the title sheet. The title sheet shall only contain sufficient information to summarize the scope of the project, the title of the project and signed certifications for the

dam owner, engineer and state engineer in accordance with Subsections A, B and E of 19.25.12.12 NMAC. The title sheet shall summarize the properties of the dam and shall include the following information, as appropriate:

(a) name of the dam (same as shown on the application);
(b) type of dam (material);
(c) hazard potential classification;
(d) maximum height above the downstream toe in feet;
(e) maximum length in feet;
(f) crest width in feet;
(g) slope of the upstream face (horizontal to 1 vertical);
(h) slope of the downstream face (horizontal to 1 vertical);
(i) elevation of the dam crest;
(j) elevation of spillway crest;
(k) elevation of outlet conduit flow line;
(l) freeboard in feet;
(m) maximum spillway discharge capacity in cubic feet per second;
(n) type of outlet conduit (give size and material);
(o) maximum outlet conduit discharge capacity in cubic feet per second; and
(p) location of the outlet works intake structure (using latitude and longitude or to the New Mexico state plane coordinate system).

(7) Vicinity map. A vicinity map of sufficient scale and size to locate the pertinent area shall be shown on the title sheet or second sheet of the drawings.

(8) Site topography. A detailed topography of the dam site including sufficient area upstream and downstream and at the abutments shall be provided. Elevations shall be based on North American vertical datum 1988 or more recent adjustment.

(9) Design details. Detailed information of the various construction features including plan view, elevations, cross-sections at the maximum section and along the outlet works, profile along and section through the centerline of the dam showing construction features and cross-sections and a profile of the emergency spillway with dimensions and construction details shall be provided. Any other information necessary for the state engineer to determine the feasibility and safety of the dam shall be required.

(10) Reservoir area, capacity and high water line traverse. The topography of any proposed reservoir site shall be determined to industry standards and a contour map with a contour interval of 1 foot shall be prepared. Elevations of the contours shall be tied to the North American vertical datum of 1988 or more recent adjustment. The high water line at the elevation of the dam crest will be highlighted on the contour map. A curve or table of elevation versus area and storage capacity for the reservoir shall be prepared from the contour map. The curve or table shall be from the bottom of the reservoir to the dam crest. Area shall be provided in acres and storage capacity in acre-feet.

(11) Point of outlet. A location of the outlet works shall be referenced using latitude and longitude or to the New Mexico state plane coordinate system.

(12) Permanent bench mark. A permanent bench mark shall be established above the high water line at a location unlikely to settle or be disturbed. The North American vertical datum of 1988 or more recent adjustment and latitude and longitude or the New Mexico state plane coordinate system for the bench mark elevation and location shall be provided. A detail of construction of the permanent bench mark shall be provided.

E. Specifications: Specifications shall be prepared for each project describing work to be done and materials to be used to supplement construction drawings. Specifications must be clear and concise and include detailed methods of construction, qualities and sizes of materials, unit amounts to be used and methods of testing and quality control, construction supervision and inspection. Specifications shall be prepared by a professional engineer licensed in the state of New Mexico qualified in the design and construction of dams. The specifications shall meet the following requirements:

(1) The front cover of the specifications shall show the name of the dam (identical to the application) and the county in which the dam is located. The first page behind the front cover shall show the name of the dam (identical to the dam name on the application), the county in which the dam is located, signed certifications for the engineer and state engineer in accordance with Subsections B and E of 19.25.12.12 NMAC and a statement recognizing the authority of the state engineer. An approved model statement recognizing the authority of the state engineer is provided below. Changes to the model statement require prior approval of the state engineer.

"All construction shall be performed in strict accordance with the accepted plans and specifications. Representatives of the state engineer shall have full authority to perform inspections during construction and shall have full power to act pursuant to the law and in accordance with Title 19, Chapter 25, Part 12, Dam Design, Construction and Dam Safety of the New Mexico Administrative Code if plans and specifications are not followed."

(2) The specifications shall be indexed.

(3) The specifications shall be bound and submitted on a good grade of white 8 1/2-inch by 11-inch paper.

(4) The general conditions shall include statements that the construction drawings and specifications cannot be significantly changed without the prior written approval of the state engineer.

F. Boundary, easement or right of way plat of survey: A professional surveyor licensed in the state of New Mexico shall prepare a plat of survey showing the dam owner's property boundaries or easement and/or right of way granted by the land owner. The plat of survey shall be prepared in conformance with the requirements as set forth in the Minimum Standards for Surveying in New Mexico, 12.8.2 NMAC. The plat of survey shall clearly state to whom an easement is granted and what rights are conveyed with the easement. The plat of survey shall show the footprint of the dam and appurtenant structures and the high water line in the reservoir. The plat of survey shall be submitted with the construction drawings and recorded with the county clerk of the county or counties in which the survey is located. A certificate signed by the surveyor in accordance with Subsection C of 19.25.12.12 NMAC shall appear on the plat of survey. A certified copy of the recorded plat of survey bearing the recorded page and endorsement of the county clerk shall be submitted to the state engineer for filing upon completion of construction. Adequate property ownership, easement or right of way shall be required for the following conditions:

(1) to access the dam and outlet controls during normal and flood events;

(2) to prevent development encroachment into the reservoir area defined by normal operation and the spillway design flood;

(3) to prevent development in the approach, control and discharge section of the spillway that may restrict flow through the spillway;

(4) to return outlet works and spillway discharge to the natural drainage and allow the outlet works to discharge freely; and

(5) to perform maintenance on the dam, appurtenant structures and surrounding areas to ensure the safe performance of the dam.

G. Dam site security: Dams classified as high or significant hazard potential shall address security at dams to prevent unauthorized operation or access. If in the opinion of the state engineer, the failure of the dam will result in catastrophic consequences, a security and risk management program for the dam will be required. Elements of a security and risk management program are:

(1) threat, vulnerability and risk assessments;

(2) physical security plans; and

(3) integration of security operational procedures.

H. Instrumentation plan: An instrumentation plan providing the ability to monitor and evaluate the performance of a dam is required for dams classified as high or significant hazard potential. The instrumentation plan may be submitted as a separate report or part of the operation and maintenance manual. Minimum requirements of the instrumentation plan shall include:

(1) general description of instrumentation;

(2) reading schedule;

(3) identification of critical readings;

(4) specifics for each installation including:

(a) detailed description of installations;

(b) purpose of the instrumentation;

(c) reading and maintenance schedule instructions; and

(5) special instrumentation or monitoring requirements.

I. Operation and maintenance manual: An operation and maintenance manual is required for dams classified as high or significant hazard potential. The operation and maintenance manual identifies activity necessary to address the continued safe operation, maintenance and overall performance of the dam. Any restrictions imposed by the design shall be addressed in the operation and maintenance manual. The operation and maintenance manual shall conform to the requirements set forth in 19.25.12.17 NMAC.

J. Emergency action plan: An emergency action plan is required for dams classified as high or significant hazard potential. The emergency action plan identifies potential emergency conditions at a dam and specifies preplanned actions to be followed to minimize property damage and loss of life. The emergency action plan shall conform to the requirements set forth in 19.25.12.18 NMAC.
[19.25.12.11 NMAC - N, 3/31/2005]

19.25.12.12 CERTIFICATIONS: Signed certifications by the dam owner, engineer, surveyor, state office of emergency management and the state engineer are required by these regulations on specific documents. Approved model certifications for the dam owner, engineer, surveyor, state office of emergency management and state engineer are provided below. Changes to the model certifications require prior approval of the state engineer.

A. DAM OWNER'S CERTIFICATE: A certificate followed by the dated signature of the dam owner and notary public acknowledgment is required on the title sheet of the construction drawings and first page behind the front cover of the operation and maintenance manual and emergency action plan. The following model certification is considered to be an example of the minimum that the dam owner shall certify. If the dam owner is a corporation, political subdivision or other governmental entity a model certificate is also provided.

state of _____)
) ss.
county of _____)

I, (dam owner's name), being first duly sworn, upon my oath, state that I have read and examined the accompanying _____ (construction drawings consisting of ____ sheets, operation and maintenance manual, or emergency action plan) and know the contents and representations therein for _____ dam and all that is shown herein is done with my free consent and in accordance with my wishes and state that the same are true and correct to the best of my knowledge and belief.

_____
Dam owner signature Date

Subscribed and sworn to before me this _____ day of _____ , 20__.

_____
Notary public

My commission expires _____ (SEAL)

If a claimant is a corporation, political subdivision or other governmental entity the following shall be used:

state of _____)
) ss.
county of _____)

I, (representative's name), being first duly sworn, upon my oath, state than I am the _____ (officer) of the _____, a corporation duly organized under the laws of the state of _____, that the accompanying _____ (construction drawings consisting of ____ sheets, operation and maintenance manual, or emergency action plan) for _____ dam were made under authority of the board of directors of said corporation and that, in their behalf, I have read and examined the statements and representations and all that is shown herein is done with their free consent and in accordance with their wishes and state that the same are true and correct to the best of my knowledge and belief.

_____
Representative signature, title Date

Subscribed and sworn to before me this _____ day of _____ , 20__.

_____
Notary public

My commission expires _____ (SEAL)

B. ENGINEER'S CERTIFICATE: A certificate followed by the dated signature, license number and seal of the engineer responsible for preparing the design report, construction drawings, specifications, operation and maintenance manual and engineering elements of the emergency action plan is required. The certificate shall be placed on the title sheet of the construction drawings and first page behind the front cover of the design report, specifications, operation and maintenance manual and emergency action plan. The following model certification is considered to be an example of the minimum that the engineer should certify to:

state of _____)
) ss.
county of _____)

I, (engineer's name) , hereby certify that I am a professional engineer licensed in the state of New Mexico, qualified in _____ (civil, geotechnical, etc.) engineering; that the accompanying _____ (design report, construction drawings consisting of ____ sheets, specifications, operation and maintenance manual, or _____ elements of the emergency action plan) was prepared by me or under my supervision; that the accompanying _____ (design report, construction drawings consisting of ____ sheets, specifications, operation and maintenance manual, or _____ elements of the emergency action plan) is in compliance with the Dam Design, Construction and Dam Safety Regulations (19.25.12 NMAC) and that the same are true and correct to the best of my knowledge and belief.

(Engineer's signature) _____ , License number _____, (SEAL)
Engineer's name

Date submitted _____

C. SURVEYOR'S CERTIFICATE: The professional surveyor licensed in the state of New Mexico preparing the plat of survey showing property boundaries, acquired easements or rights-of-way shall include a certificate on the plat of survey as modeled in Paragraph (2) of Subsection J of 12.8.2.9 NMAC, the Minimum Standards for Surveying in New Mexico. The following model certificate is considered to be an example of the minimum that the surveyor should certify to:

I, (surveyor's name) , New Mexico professional surveyor no. (surveyor's license number), do hereby certify that this (boundary, easement, or right of way) plat of survey and the actual survey on the ground upon which it is based were performed by me or under my direct supervision; that I am responsible for this survey; that this survey meets the Minimum Standards for Surveying in New Mexico; and that it is true and correct to the best of my knowledge and belief. I further certify that this survey is not a land division or subdivision as defined in the New Mexico Subdivision Act and that this instrument is a (boundary, easement, or right of way) plat of survey of _____ dam.

(Surveyor's signature) _____ , License number _____, (SEAL)
Surveyor's name

Date submitted _____

D. STATE OFFICE OF EMERGENCY MANAGEMENT: A certificate form for the state office of emergency management acceptance shall be placed on the first page behind the front cover of the emergency action plan. This certificate is to be signed by state office of emergency management after all necessary corrections or additions, if any, have been made.

state of _____)
) ss.
county of _____)

I hereby certify that the accompanying emergency action plan for _____ dam has been duly examined by me and accepted for filing on the _____ day of _____, 20__.

_____
State office of emergency management

E. STATE ENGINEER'S CERTIFICATE: A certificate form for the state engineer acceptance shall be placed on the title sheet of the construction drawings and first page behind the front cover of the design report, specifications, operation and maintenance manual and emergency action plan. This certificate is to be signed by the state engineer or his representative after all necessary corrections or additions, if any, have been made.

state of _____)
) ss.
county of _____)

I hereby certify that the accompanying _____ (design report, construction drawings, specifications, operation and maintenance manual or emergency action plan) for _____ dam and appurtenant structures has been duly examined by me and accepted for filing on the _____ day of _____, 20__.

_____
State engineer

[19.25.12.12 NMAC - N, 3/31/2005]

19.25.12.13 CONSTRUCTION AND OPERATION CONDITIONS: After reviewing the required documentation, the state engineer will notify the dam owner if any deficiencies are found with the submittal to construct and operate a dam. The dam owner will be given an opportunity to correct any deficiencies noted in the review process. Once all deficiencies have been addressed the state engineer will approve the application for permit to construct and operate a dam with conditions under which construction and operation shall occur. Failure to comply with conditions of the approved permit may result in the state engineer issuing an order to redesign, reconstruct or restrict operation of the dam and reservoir until conditions are met. Construction must be completed within two years of approving the application unless an extension of time for the construction is requested and approved by the state engineer. The conditions of construction and operation shall include, but not be limited to the following:

A. Engineer supervising construction: Prior to initiation of construction, the dam owner shall designate a professional engineer licensed in the state of New Mexico qualified in the design and construction of dams to supervise construction. If the state engineer finds the engineer acceptable, an order is issued approving the engineer and setting forth conditions under which the engineer will supervise construction. Conditions shall include, but shall not be limited to:

(1) The engineer supervising construction shall submit monthly progress reports including summary of test results, problems encountered and their solutions.

(2) Construction shall be in accordance with accepted drawings and specifications. State engineer approval of any modifications to the accepted drawings or specifications is required prior to undertaking the modifications. Requests for changes or modifications by the engineer supervising construction shall be submitted in writing, supported with appropriate documentation.

(3) The engineer supervising construction shall provide the state engineer a minimum of 72 hours notice to perform inspections as specified in the conditions of construction.

(4) Upon completion of construction, the engineer supervising construction shall submit to the state engineer the following items:

(a) a completion report, which shall include descriptions of problems and their solutions;

(b) a summary of materials test data and labeled and dated construction photographs;

(c) record mylar construction drawings including signed certifications on the title sheet; and

(d) a certificate that the dam was constructed in accordance with the accepted drawings and specifications and is in satisfactory condition. An approved model certificate for the engineer supervising construction is shown below. Changes to the language in the certification require prior approval by the state engineer.

state of _____)
) ss.
county of _____)

I, _____, (engineer's name) state that I am a qualified professional engineer licensed in the state of New Mexico, that I have inspected the _____ dam and appurtenant structures and find them to be completed in accordance with the record construction drawings and specifications and are now in a satisfactory condition for acceptance.

(Engineer's signature) License number _____, (SEAL)
Engineer's name

Date submitted _____

B. State engineer's authority during construction: The state engineer may perform inspections at any time during construction of the dam and appurtenant structures. Inspections will vary with each project, based on the complexity of the design. Inspection of specific construction items are standard construction conditions in the permit and require the engineer supervising construction to provide the state engineer with a minimum of 72 hours advanced notice. If the state engineer receives a minimum of 72 hours advanced notice, a delay of construction to schedule a state engineer inspection is not required. State engineer inspection fees are charged in accordance with Subsection D of 19.25.12.8 NMAC. Fees for inspection of construction by the state engineer not paid on demand shall become a lien on any land or other property of the dam owner and may be recovered by the state engineer.

C. Completion of construction: Upon completion of construction, a proof of completion of works form for the dam shall be submitted in accordance with 19.25.12.14 NMAC. Owners of dams classified as high or significant hazard potential shall submit to the state engineer an updated operation and maintenance manual in accordance with 19.25.12.17 NMAC and an updated emergency action plan in accordance with 19.25.12.18 NMAC incorporating any modifications made during construction. Upon the satisfactory completion of all conditions in the permit, pending the issuance of a certificate of construction and license to operate a dam, use of the reservoir shall require written permission from the state engineer. Use of the dam and reservoir are restricted until the state engineer accepts the updated operation and maintenance manual and emergency action plan, if required.

D. Extension of time for construction: The state engineer will grant an extension of time for completing construction upon proper showing by the dam owner of due diligence or reasonable cause for delay and accompanied with a fee in accordance with Subsection C of 19.25.12.8 NMAC. An affidavit by a professional engineer licensed in the state of New Mexico qualified in the design and construction of dams shall be filed with the state engineer providing evidence that the design of the dam meets or exceeds the design requirements in accordance with 19.25.12.11 NMAC. An extension of time may be granted for a period not to exceed five (5) years. No extension of time shall be granted which in combination extend the time allowed by the permit beyond ten (10) years from the initial date of approval of the application, unless the state engineer in his discretion expressly waives this limitation pursuant to NMSA 1978, Section 72-5-14. Failure to request an extension of time shall result in cancellation of the permit by the state engineer.
[19.25.12.13 NMAC - N, 3/31/2005]

19.25.12.14 PROOF OF COMPLETION OF WORKS: Upon completion of all construction conditions a proof of completion of works for the dam shall be filed on a form provided by the state engineer with appropriate fees in accordance with Subsection E of 19.25.12.8 NMAC. The proof of completion of works for the dam shall be filed with original signature of the dam owner and engineer supervising construction.
[19.25.12.14 NMAC - N, 3/31/2005]

19.25.12.15 CERTIFICATE OF CONSTRUCTION OF A DAM: Upon receipt of the proof of completion of works form, the state engineer will determine if all construction conditions of the permit were met. Upon a

determination by the state engineer that all construction conditions have been complied with, the state engineer shall issue a certificate of construction. The certificate of construction shall address the general properties of the dam and appurtenant structures. The dam owner shall record the certificate of construction with the county clerk of the county within which the works are located.
[19.25.12.15 NMAC - N, 3/31/2005]

19.25.12.16 LICENSE TO OPERATE A DAM: Upon issuance of a certificate of construction the state engineer shall issue a license to operate a dam. The license to operate a dam shall address operation conditions and dams shall be operated in accordance with the operation conditions. In addition, dams classified as high and significant hazard potential shall operate in accordance with the operation and maintenance manual and emergency action plan prepared in accordance with Sections 17 and 18 of 19.25.12 NMAC. Failure to comply with the conditions of the license to operate a dam may result in a state engineer order that limits operation, requires specific action by the owner and if necessary the license to operate a dam may be revoked by the state engineer. If a license to operate a dam is revoked the state engineer may order the dam breached in accordance with Subsections B or C of 19.25.12.19 NMAC.
[19.25.12.16 NMAC - N, 3/31/2005]

19.25.12.17 OPERATION AND MAINTENANCE MANUAL: Owners of dams classified as high or significant hazard potential shall prepare, maintain and adhere to an operation and maintenance manual that addresses the continued safe operation, maintenance and performance of the dam. Because each site, design and operating practice is unique, waivers of specific requirements in this section will be considered on a case-by-case basis. Request for waiver shall be in writing accompanied with documentation justifying the request. If the request is not justified to the satisfaction of the state engineer the request will be denied. A professional engineer licensed in the state of New Mexico qualified in the design and construction of dams shall prepare the operation and maintenance manual. The front cover shall show the name of the dam (identical to the application), the county in which the dam is located and type of report. The first page behind the front cover shall show the name of the dam (identical to the dam name on the application), the county in which the dam is located and signed certifications for the dam owner, engineer and state engineer in accordance with Subsections A, B and E of 19.25.12.12 NMAC. Operation or maintenance of the dam in violation of the procedures presented in the accepted operation and maintenance manual that affect the safety of the dam will result in an order being issued requiring the dam owner to address the problem. Failure to comply with orders issued by the state engineer may result in the license to operate the dam being revoked and the dam being ordered breached in accordance with Subsection B or C of 19.25.12.19 NMAC. Generally, the operation and maintenance manual shall address the following, with modification depending on the specific dam application:

A. Project information: General information on the project including the purpose, location, history, responsibilities and description and properties of the dam and appurtenant structures shall be required.

B. Operation: Operation instructions for the project shall include but not be limited to the following:

(1) Reservoir:
- **(a)** storage allocations;
- **(b)** spillway design flood water level;
- **(c)** emergency reservoir evacuation procedures and maximum discharge rate; and
- **(d)** first filling criteria and monitoring requirements.

(2) Outlet works:
- **(a)** first operation;
- **(b)** seasonal startup;
- **(c)** seasonal shutdown;
- **(d)** installation and removal of bulkhead;
- **(e)** operation procedures for specific equipment; and
- **(f)** electrical systems and controls.

C. Instrumentation: The following elements for monitoring instrumentation shall be addressed

(1) general description;
(2) purpose;
(3) critical readings;
(4) reading and maintenance procedures; and
(5) reading schedule.

D. Maintenance: Maintenance requirements and schedule shall be included.

E. Inspection: Inspection requirements, schedule and recommended checklist shall be included.

F. Updates and revisions: An update and revision procedure shall be included.

G. Appendices: Appendices to include any design consideration and the instrumentation plan to ensure any restrictions imposed by the design are incorporated into the operation and maintenance manual shall be included. Copies of inspections forms and any other information that supports and supplements the material used in the development and maintenance of the operation and maintenance manual.

[19.25.12.17 NMAC - N, 3/31/2005]

19.25.12.18 EMERGENCY ACTION PLAN: Owners of dams classified as high or significant hazard potential shall prepare, maintain and exercise an emergency action plan for immediate action in the event of a potential dam failure. The emergency action plan shall follow the format provided by the state engineer or a format that has prior approval of the state engineer. Because each site and operating practice is unique, waivers of specific requirements in this section will be considered on a case-by-case basis. Request for waiver shall be in writing accompanied with documentation justifying the request. If the request is not justified to the satisfaction of the state engineer the request will be denied. The front cover shall show the name of the dam (identical to the application), the county in which the dam is located and type of report. The pages immediately behind the front cover shall show the name of the dam (identical to the dam name on the application), the county in which the dam is located and signed certifications for the dam owner, engineer, state office of emergency management and state engineer in accordance with Subsections A, B, D and E of 19.25.12.12 NMAC. The dam owner shall coordinate with the local emergency management office in preparing the emergency action plan. The coordination is required to ensure that there is an agreement on responsibilities. The dam owner shall submit a copy to the state office of emergency management for acceptance prior to submittal to the state engineer. The dam owner shall review the emergency action plan annually, update as necessary and furnish a copy of updates to the state engineer, state office of emergency management and all copyholders. The dam owner shall exercise the emergency action plan to verify those involved in its implementation know their roles and responsibilities. It is recommended the dam owner conduct a functional exercise of the emergency action plan every 5 years with a table top exercise conducted 2 to 3 years before the functional exercise. The exercise may result in updates to ensure the emergency action plan maintains operational readiness, timeliness and responsiveness. Failure to act in accordance with the accepted emergency action plan that affects the safety of the dam will result in an order being issued requiring the dam owner to address the problem. Failure to comply with orders issued by the state engineer may result in the license to operate the dam being revoked and the dam being ordered breached in accordance with Subsection B or C of 19.25.12.19 NMAC. A professional engineer licensed in the state of New Mexico qualified in the design and construction of dams shall prepare engineering elements of the emergency action plan as specified below. An emergency action plan shall contain the following minimum elements:

A. Notification flowchart: A notification flowchart showing who is to be notified, by whom and in what priority.

B. Emergency detection, evaluation and classification: Procedures for reliably and timely identifying an emergency situation to ensure that an appropriate course of action is implemented. A professional engineer licensed in the state of New Mexico qualified in the design and construction of dams shall prepare this element.

C. Responsibilities: A list designating responsibilities for the emergency action plan related tasks including, but not limited to developing, maintaining, exercising, implementing, warning, evacuation and termination of the emergency.

D. Preparedness: A list of materials, equipment and manpower available to moderate or alleviate the effects of a dam failure or spillway release. A professional engineer licensed in the state of New Mexico qualified in the design and construction of dams shall prepare this element.

E. Inundation map: An inundation map delineating the areas that will be flooded as a result of dam failure. The dam breach analysis shall be prepared in accordance with Subparagraphs (a) through (g) of Paragraph (1) of Subsection C of 19.25.12.11 NMAC for the failure with the water level at the reservoir storage capacity and at the maximum water level during the spillway design flood event. If a dam is located upstream, failure scenarios with the upstream dam shall also be evaluated. Flood control dams that have not experienced a fill to the spillway crest shall prepare a failure scenario with the water level at the spillway crest. Flood inundation maps shall also be prepared for the maximum release without failure of the dam. Evaluation of the effects of flooding from dam failure shall extend at least to the location downstream where the flood no longer poses a threat to life or property. A

professional engineer licensed in the state of New Mexico qualified in the design and construction of dams shall prepare this element.

F. Appendices: All information that supports and supplements the material used in the development and maintenance of the emergency action plan.

[19.25.12.18 NMAC - N, 3/31/2005]

19.25.12.19 CHANGES TO AN EXISTING DAM: A dam owner proposing to reconstruct, enlarge, modify, restore reservoir capacity, repair, remove or breach an existing dam must make application to and receive approval from the state engineer prior to undertaking any such action. The current condition of the dam, the type of repair or modification and the proposed means to achieve the repair or modification shall dictate the detail of the information provided to the state engineer in order to obtain approval. Because each site, design change and operating practice is unique, waivers of specific requirements in this section will be considered on a case-by-case basis. Request for waiver shall be in writing accompanied with documentation justifying the request. If the request is not justified to the satisfaction of the state engineer the request will be denied. Existing dams present the same hazards to life and property downstream as new dams. Therefore, owners of dams classified as high or significant hazard potential shall evaluate the current condition of the dam and address in the submittal to the state engineer whether the dam is in compliance with the design requirements in Subsection C of 19.25.12.11 NMAC. If the state engineer determines compliance with requirements in Subsection C of 19.25.12.11 NMAC are critical to the safety of the dam, the state engineer shall issue an order requiring the deficiency be addressed as part of the proposed change. Owners of dams classified as low hazard potential shall comply with the design requirements in Subsection C of 19.25.12.11 NMAC for the proposed change only. Maintenance activity performed in accordance with 19.25.12.17 NMAC does not require prior state engineer approval. Dam owners shall not abandon a dam without breaching or removing the dam to ensure the dam no longer poses a risk to life, property, the environment surrounding the dam or downstream of the dam. In the event of any changes of ownership affecting the title to a dam, the new owner shall file a change of ownership form for a dam with the state engineer. Recognition of the responsibility and liability associated with dam ownership is required along with fees for filing the change in ownership form for a dam in accordance with Subsection F of 19.25.12.8 NMAC. This section exempts federal dams if no change to the water storage permit is required. In general, the following minimum submittal is required to make changes to an existing dam:

A. Proposed changes to an existing dam: For dam owners proposing to reconstruct, enlarge, modify, restore reservoir capacity, or repair an existing dam, the following supporting documentation is required prior to undertaking any such action:

(1) An amended application if properties of the dam and appurtenant structures change. Fees for filing the amended application and for reviewing drawings and specifications shall be in accordance with Subsections A and B of 19.25.12.8 NMAC. Fees are waived if the state engineer requires the change to address a dam safety deficiency.

(2) Documentation of sufficient water rights if changes in storage or release requirements are proposed in accordance with the requirements of Subsection B of 19.25.12.11 NMAC.

(3) A design report addressing the proposed change in accordance with the requirements of Subsection C of 19.25.12.11 NMAC. Owners of dams classified as high or significant hazard potential shall submit a design report addressing whether the existing condition of the dam is in compliance with the design requirements listed in Subsection C of 19.25.12.11 NMAC. Where the existing condition of the dam is not in compliance with the design requirements of Subsection C of 19.25.12.11 NMAC, the design report shall propose changes to address compliance with the design requirements of Subsection C of 19.25.12.11 NMAC or request a waiver that the deficiency is not critical to the safety of the dam and provide adequate justification for the waiver.

(4) Construction drawings and specifications addressing the proposed change in accordance with the requirements of Subsections D and E of 19.25.12.11 NMAC.

(5) A plat of survey showing the dam owner's property boundaries, easement, or right of way. The plat of survey shall be in accordance with the requirements of Subsection F of 19.25.12.11 NMAC.

(6) For dams classified as high or significant hazard potential, a dam site security assessment in accordance with the requirements of Subsection G of 19.25.12.11 NMAC.

(7) For dams classified as high or significant hazard potential, an instrumentation plan in accordance with the requirements of Subsection H of 19.25.12.11 NMAC.

(8) For dams classified as high or significant hazard potential, an updated operation and maintenance manual and emergency action plan in accordance with the requirements of Sections 17 and 18 of 19.25.12 NMAC.

B. Removal or breach of dams classified as high or significant hazard potential: Dam owners intending to breach or remove a dam classified as high or significant hazard potential shall submit a plan to the state engineer for approval prior to breaching or removing the dam. The plan shall evaluate the potential effects of the dam removal or breach on life, property and the environment downstream. A professional engineer licensed in the state of New Mexico qualified in the design and construction of dams shall prepare the plan. The state engineer will revoke the license to operate a dam upon completion of all construction conditions. The plan shall meet the following conditions:

(1) The reservoir shall be emptied in a controlled manner, which will not endanger lives or damage property downstream.

(2) The dam or breach area shall be excavated down to the level of natural ground and the breach shall be of sufficient width to safely pass the 100-year, 24-hour flood.

(3) The side slopes of the breach shall be excavated to a stable angle.

(4) The breach shall be armored as necessary to prevent erosion of the breach area.

(5) The plan shall control sediment previously deposited in the reservoir.

(6) Drawings and specifications shall be prepared in accordance with the appropriate requirements listed in Subsections D and E of 19.25.12.11 NMAC and shall include a title sheet with required certifications and signatures, the location, dimensions and lowest elevation of the breach and any other detail to sufficiently describe the proposal.

(7) Designation of the professional engineer licensed in the state of New Mexico qualified in the design and construction of dams that will supervise construction of the breach or dam removal. Submittal of the professional engineer's qualifications for state engineer approval is required.

C. Removal or breach of dams classified as low hazard potential: Owners of dams classified as low hazard potential shall submit a written notice to the state engineer of intent to breach the dam. The state engineer will revoke the license to operate a dam upon completion of all construction conditions. The breach notice shall meet the following minimum requirements:

(1) The bottom width elevation of the breach shall be to original ground.

(2) The bottom width of the breach shall be a minimum of one-half the height of the dam but not less than 10 feet.

(3) The side slopes not steeper than one horizontal to one vertical.

(4) The excavated material shall not be placed in the streambed.

D. Closure of a tailings facility. A closure plan is prepared to address the closure of a tailings facility. State engineer approval is required before any modification occurs to a jurisdictional tailings dam. A professional engineer licensed in the state of New Mexico qualified in the design and construction of tailings dams shall prepare the closure plan, which shall include a design report, drawings and specifications prepared in accordance with the appropriate requirements listed in Subsections C, D and E of 19.25.12.11 NMAC. The state engineer will revoke the license to operate a dam upon completion of all construction conditions. The plan shall address the following issues:

(1) long-term stability under static and dynamic conditions;

(2) control of surface runoff to avoid erosion;

(3) plan for long term monitoring, if appropriate; and

(4) identification of an engineer licensed in the state of New Mexico qualified in tailings dam design and construction to supervise implementation of the closure plan. Submittal of the engineer's qualifications for state engineer approval is required.

E. Construction and operating conditions: After reviewing the required documentation, the state engineer will notify the dam owner if any deficiencies are found with the submittal. The dam owner will be given an opportunity to correct any deficiencies noted in the review process. Once all deficiencies have been addressed the state engineer will approve the amended application or proposed change with conditions under which construction and operation shall occur. Action by the state engineer will be in accordance with 19.25.12.13 NMAC, appropriately modified to address the proposed changes.

F. Proof of completion of works, certificate of construction and license to operate: Requirement for a proof of completion of works form for the dam, certificate of construction and license to operate a dam for changes to a dam shall be in accordance with the Sections 14, 15 and 16 of 19.25.12 NMAC, appropriately modified to address the proposed changes. If the dam is breached, the state engineer will cancel the permit and revoke the license to operate a dam.

[19.25.12.19 NMAC - N, 3/31/2005]

19.25.12.20 CHANGES TO AN EXISTING NON-JURISDICTIONAL DAM: A dam owner proposing to reconstruct, enlarge, or modify a non-jurisdictional dam, resulting in a jurisdictional dam after construction is completed, shall comply with 19.25.12.11 NMAC before construction begins. If the purpose of a non-jurisdictional dam changes, resulting in a jurisdictional dam, or if ownership changes, resulting in a jurisdictional dam, the owner shall comply with 19.25.12.11 NMAC. The state engineer will give the owner a reasonable amount of time to comply with 19.25.12.11 NMAC. If the owner fails to comply with 19.25.12.11 NMAC, the dam will be ordered breached in accordance with Subsection B or C of 19.25.12.19 NMAC.
[19.25.12.20 NMAC - N, 3/31/2005]

19.25.12.21 EXISTING DAMS: The state engineer inspects existing dams to verify dams are operated and maintained in a safe manner. Access to the dam site shall be made available to the state engineer upon request. If a critical dam safety problem is observed by the state engineer or reported to the state engineer, an order will be issued requiring the dam owner to address the problem. If a dam incident occurs at a dam, the dam owners shall report the incident to the state engineer within 72 hours. If a major repair is required at an existing dam, the plan to repair the dam shall be in accordance with 19.25.12.19 NMAC. Minor repairs not identified as maintenance activity in accordance with 19.25.12.17 NMAC require state engineer approval. Failure to comply with orders issued by the state engineer may result in the license to operate a dam being revoked and the dam ordered breached in accordance with Subsection B or C of 19.25.12.19 NMAC. Owners of existing dams shall comply with the following:

A. Owners acquiring property with a dam shall promptly notify the state engineer on a form provided by the state engineer of the change in ownership. Recognition of the responsibility and liability associated with dam ownership is required along with fees for filing the change in ownership form for a dam in accordance with Subsection F of 19.25.12.8 NMAC.

B. Owners of dams classified as low or significant hazard potential shall evaluate the hazard classification if downstream development occurs. The dam owner shall submit the results of the hazard potential evaluation prepared in accordance with Paragraph (1) of Subsection C of 19.25.12.11 NMAC to the state engineer for approval and a plan for addressing design deficiencies. If the hazard potential classification changes due to downstream development, the state engineer shall give the dam owner a time limit to address deficiencies. Deficiencies shall be addressed in accordance with Paragraphs (3), (12) and (13) of Subsection C of 19.25.12.11 NMAC and Sections 17 and 18 of 19.25.12 NMAC. If the dam owner fails to address a deficiency, the state engineer may revoke the license to operate the dam and order the dam breached in accordance with Subsection B or C of 19.25.12.19 NMAC.

C. Dams classified as high or significant hazard potential shall be inspected on an interval no greater than 5 years by a professional engineer licensed in the state of New Mexico qualified in the design and construction of dams. The owner is responsible for securing the services of the professional engineer. The professional engineer shall provide a signed and sealed report to the state engineer describing the findings of the inspection and recommendations for corrective action or changes to the operating procedures. Routine inspection by the state engineer as described in 19.25.12.21 NMAC satisfies this requirement.

D. Owners of dams classified as high or significant hazard potential in an unsafe condition may receive an order from the state engineer to address the deficiency pursuant to NMSA 1978, Section 72-5-11 (1979). The state engineer may also issue an order to an owner of a non-jurisdictional dam if the dam is unsafe and a threat to life or property, as determined by the state engineer. Owners shall comply with orders issued by the state engineer pursuant to NMSA 1978, Section 72-5-12 (1979).

E. Owners of dams classified as high or significant hazard potential shall comply with 19.25.12.17 NMAC requiring an operation and maintenance manual. Upon compliance with 19.25.12.17 NMAC the state engineer will issue a license to operate the dam. Dams classified as high hazard potential shall comply by December 31, 2008. Dams classified as significant hazard potential shall comply by December 31, 2010.

F. Owners of dams classified as high or significant hazard potential shall comply with 19.25.12.18 NMAC requiring an emergency action plan. Dams classified as high hazard potential shall comply by December 31, 2008 unless the dam is for flood control purposes with no permanent storage, then compliance by December 31, 2010 is required. Dams classified as significant hazard potential shall comply by December 31, 2010 unless the dam is for flood control purposes with no permanent storage, then compliance by December 31, 2012 is required. Owners of 5 or more dams classified as high or significant hazard potential may propose a schedule for compliance with the emergency action plan requirement. The schedule must be submitted by the owner to the state engineer by December 31, 2005 and is subject to review and approval or modification by the state engineer. The schedule must

propose compliance dates for each dam. The first dam must be in compliance by December 31, 2008 and at least an additional dam must be in compliance each year thereafter. All dams must be in compliance by December 31, 2015. Upon failure to meet an approved compliance schedule all dams will revert to compliance dates shown above.

G. Dam owners that transfer the entire water right out of the reservoir shall have their license to operate a dam revoked and may receive from the state engineer an order to breach the dam in accordance with Subsection B or C of 19.25.12.19 NMAC.

H. Dam owners that fail to obtain state engineer approval prior to construction of a dam shall comply with all conditions imposed by the state engineer within a time limit established by the state engineer or the state engineer may order the dam breached in accordance with Subsection B or C of 19.25.12.19 NMAC.
[19.25.12.21 NMAC - N, 3/31/2005]

19.25.12.22 SEVERABILITY: If any portion of this part is found to be invalid, the remaining portion of this part shall remain in force and not be affected.
[19.25.12.22 NMAC - N, 3/31/2005]

History of 19.25.12 NMAC: [RESERVED]

ATTACHMENT D

Well Boring Drill Logs

0661

Revised June 1972

STATE ENGINEER OFFICE

WELL RECORD

Section 1. GENERAL INFORMATION

(A) Owner of well Homestake Mining Co. of Ca. Owner's Well No. CW-34

Street or Post Office Address Box 98

City and State Grants, N.M. 87020

Well was drilled under Permit No. Monitor Well and is located in the: Mill site area

a. SW ¼ SE ¼ NE ¼ ¼ of Section 22 Township 12 Range 10 N.M.P.M.

b. Tract No. _____ of Map No. _____ of the _____

c. Lot No. _____ of Block No. _____ of the _____
Subdivision, recorded in Cibola County.

d. X= _____ feet, Y= _____ feet, N.M. Coordinate System _____ Zone in the _____ Grant.

(B) Drilling Contractor Garner Drilling Co. License No. WD 595

Address Box 3146 Milan, N.M. 87021

Drilling Began 10/7/1995 Completed 10/7/1995 Type tools Rotary Size of hole ~~63~~ 8 in.

Elevation of land surface or _____ at well is _____ ft. Total depth of well 63 ft.

Completed well is ☒ shallow ☐ artesian. Depth to water upon completion of well _____ ft.

Test Well

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)
40	54	14	white frac. sandstone	Seepage

Section 3. RECORD OF CASING

Diameter (inches)	Pounds per foot	Threads per in.	Depth in Feet Top	Depth in Feet Bottom	Length (feet)	Type of Shoe	Perforations From	Perforations To
5 sch.	40 PVC		+2	63	65	cap	33	63
15 sks.	sand. 2 sks chips.							

Section 4. RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Hole Diameter	Sacks of Mud	Cubic Feet of Cement	Method of Placement

Section 5. PLUGGING RECORD

Plugging Contractor _____

Address _____

Plugging Method _____

Date Well Plugged _____

Plugging approved by:

_____
State Engineer Representative

No.	Depth in Feet Top	Depth in Feet Bottom	Cubic Feet of Cement
1			
2			
3			
4			

FOR USE OF STATE ENGINEER ONLY

Date Received

Quad _____ FWL _____ FSL _____

File No. _____ Use _____ Location No. _____

CW-34

Section 6. LOG OF HOLE

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color and Type of Material Encountered
0	5	5	tan sand
5	20	15	gray & green sandy shale
20	40	20	gray & pink sandstone & shale
40	54	14	white frac. sandstone
54	100	46	red shale
100	120	20	purple shale
			5 in. hole 63-120 ft plugged with 6 sks. Bent. chips.

Section 7. REMARKS AND ADDITIONAL INFORMATION

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described hole.

Driller

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to the appropriate district office of the State Engineer. All sections, ex Section 5, shall be answered as completely accurately as possible when any well is drilled, repaired or deepened. When this n is used as a plugging record, only Section 1(a, d Section 5 need be completed.

Revised June 1972

STATE ENGINEER OFFICE

WELL RECORD

Section 1. GENERAL INFORMATION

(A) Owner of well Homestake Mining Co. of Ca. Owner's Well No. CW-35

Street or Post Office Address Box 98

City and State Grants, N.M. 87020

Well was drilled under Permit No. Monitor Well and is located in the: Mill site area

a. SW ¼ NW ¼ SW ¼ ¼ of Section 23 Township 12 Range 10 N.M.P.M.

b. Tract No. _____ of Map No. _____ of the _____

c. Lot No. _____ of Block No. _____ of the _____
Subdivision, recorded in Cibola County.

d. X= _____ feet, Y= _____ feet, N.M. Coordinate System _____ Zone in the _____ Grant.

(B) Drilling Contractor Garner Drilling Co. License No. WD 595

Address Box 3146 Milan, N.M. 87021

Drilling Began 10/10/1995 Completed 10/12/1995 Type tools Rotary Size of hole 8 in.

Elevation of land surface or _____ at well is _____ ft. Total depth of well 118 ft.

Completed well is ☒ shallow ☐ artesian. Depth to water upon completion of well 90 ft.

Test Well

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)
92	110	18	white & pink sandstone	11

Section 3. RECORD OF CASING

Diameter (inches)	Pounds per foot	Threads per in.	Depth in Feet Top	Depth in Feet Bottom	Length (feet)	Type of Shoe	Perforations From	Perforations To
5 sch.	40 PVC		+ 2	118	120	cap	93	118
10 sks. sand. 1 can pellets. 6 sks. chips.								

Section 4. RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Hole Diameter	Sacks of Mud	Cubic Feet of Cement	Method of Placement

Section 5. PLUGGING RECORD

Plugging Contractor _____

Address _____

Plugging Method _____

Date Well Plugged _____

Plugging approved by:

_____
State Engineer Representative

No.	Depth in Feet Top	Depth in Feet Bottom	Cubic Feet of Cement
1			
2			
3			
4			

FOR USE OF STATE ENGINEER ONLY

Date Received

Quad _____ FWL _____ FSL _____

File No. _____ Use _____ Location No. _____

CW-35

Section 6. LOG OF HOLE

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color and Type of Material Encountered
0	25	25	sand
25	30	5	sand & gravel
30	40	10	purple sandy clay
40	45	5	sand & gravel
45	60	15	purple sandy clay
60	83	23	sand & gravel
83	92	9	gray sandy shale
92	110	18	white & pink sandstone
110	130	20	gray & purple shale
			5 in. hole plugged from 118-130 ft.

Section 7. REMARKS AND ADDITIONAL INFORMATION

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described hole.

J Jones
Driller

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to the appropriate district office of the State Engineer. All sections, ex Section 5, shall be answered as completely accurately as possible when any well is drilled, repaired or deepened. When this n is used as a plugging record, only Section 1(a d Section 5 need be completed.

LITHOLOGIC LOGS FOR VARIOUS TEST HOLES (CONT.)

DEPTH INTERVAL (FT)	DESCRIPTION
	WELL AA
0-6	Fine to Medium Light Colored Blow Sand
6-11	Darker Colored Medium Sand w/small fragments of Light Colored Clay
11-20	Medium Grained Dark Colored Sand w/small fragments of Malpais Lava. Small amounts of Buff Colored Clay.
21-33	Medium Grained Well Sorted Lighter Colored Sand with Lava Fragments and Chert.
35-46	Medium Grained Light Colored Sand
47-60	Bright Red Clay grading to Purpler Color @ 60'-believe this to be Chinle Clay; however, questionable contact (see notes for hole DD) 60' of 4" PVC casing w/lower 20' perforated.
	WELL DD
0-4.5	Fine to Medium Grained Light Colored Blow Sand
4.5-6	Dark Colored Fine Grained Sand-small amounts of Clay
6-32	Fine to Medium Grained, Well Sorted Sand
33-45	Red Clay & Coarse Sand or Gravel (originally thought to be Chinle Clay; however, clay layer is only 10-12' thick. This is probably the same clay layer that was mistakenly identified as Chinle Clay in hole AA).
45-56	Medium Grained Well Sorted, Light Colored Sand

LITHOLOGIC LOGS FOR VARIOUS TEST HOLES (CONT.)

DEPTH INTERVAL (FT)	DESCRIPTION
	WELL DD (CONT.)
56-60	Red Clay w/Coarse Gravel
60-65	Medium to Fine Grained Sand
65-73	Coarse Sand & Gravel w/Red Clay
75-83	Coarser Sand and Gravel w/small amounts of Chert & Limestone fragments. Contact w/Chinle Clay @ 83'. 80' of 4" PVC casing with lower 40' perforated.
	WELL Z
0-5	White to Gray Colored Fine Grained Sand w/small amounts of Dark Clay
5-12	Fine to Medium Buff Colored Sand, decreasing amounts of Clay
15-35	Fine Grained Tan Colored Sand small amounts of Red Colored Clay
35-50	Medium Grained Tan Sand Less Clay
50-65	Medium Sand-Small amounts Dark Clay
65-68	Coarse Sand-Malpais Lava fragments
68	Chinle contact. 75' casing including 5' tailpiece & 10' no. 40 slot PVC screen- centering guides.
	Well Y
0-12	Fine to Medium Sand w/small amounts of Buff Colored Clay
12-22	Grading into Medium Sandy still some Buff Colored Clay.
22-40	Medium Sand
40-50	Fine to Medium Sand
50-57	Med. to Coarse Sand w/broken fragments of Malpais Lava. Contact w/Chinle Clay @ 57' 60' 4" PVC, lower portion: 5' tailpiece, 5' #40 slot PVC screen, centering guides

ATTACHMENT C

New Mexico Office of the State Engineer (OSE)
Permit Approval Letter

RECEIVED DEC 15 2006

STATE OF NEW MEXICO
OFFICE OF THE STATE ENGINEER
SANTA FE

John R. D'Antonio, Jr. P.E.
State Engineer

BATAAN MEMORIAL BUILDING, ROOM 101
POST OFFICE BOX 25102
SANTA FE, NEW MEXICO 87504-5102
(505) 827-6175
FAX: (505) 827-6138

December 13, 2006

Mr. Alan D. Cox, Project Manager
Homestake Mining Company of California
P.O. Box 98
Highway 605
Grants, New Mexico 87020

RE: Evaporation Pond #3

Dear Mr. Cox:

Enclosed is your copy of the approved permit to construct and operate the Evaporation Pond #3 in Cibola County with the attached conditions of approval. Please be advised that the designated professional engineer for the construction supervision must be approved by the Office of the State Engineer Dam Safety Bureau prior to initiation of construction per Subsection A of 19.25.12.13 NMAC. Please submit qualifications of Mr. Dan Kump, P.E. for review and approval.

If further discussion would be helpful, please feel free to contact Sushil K. Chaudhary, D.Eng., P.E. at 505-827-6136.

Sincerely,

Elaine C. Pacheco

Elaine C. Pacheco, P.E., Chief
Dam Safety Bureau

Enclosure

cc: Alan K. Kuhn, Ph.D., P.E., R.G., Kleinfelder Inc., Albuquerque, NM
Jess Ward, Albuquerque District Office

ECP: skc

ds-01 03/05 **OSE File Number:** _____

NEW MEXICO OFFICE OF THE STATE ENGINEER
APPLICATION FOR PERMIT
TO CONSTRUCT AND OPERATE A DAM

1. **NAME OF DAM:** Evaporation Pond #3

2. **DAM OWNER:**

Name: Homestake Mining Company of California Work Phone: 505 287 4456

Title: NA Home Phone: NA

Address: P.O. Box 98

City: Grants State: NM Zip: 87120

3. **PURPOSE:** Evaporation of contaminated ground water

4. **HAZARD POTENTIAL CLASSIFICATION:** Low

5. **LOCATION:**

A. __1/4 SE1/4 NE1/4 Section: 22 Township: 12N Range: 10W N.M.P.M.
in Cibola County.

or X = 2696502 feet, Y = 1547986 feet, N.M. State Plane Coordinate System
_____ Zone Datum of _____ in the _____ Grant.

B. Latitude in decimal degrees: 35.25
Longitude in decimal degrees: 107.87

C. On land owned by: Homestake Mining Company of California

D. Source of Water Supply:

a. Name of Surface Watercourse: NA Tributary of NA

b. Name of Groundwater Basin: San Jose

c. Name of Ditch or Spring (Off Channel Dams): NA

E. Distance to the nearest downstream City/Town (miles): 5

6. **DRAINAGE AREA, PRECIPITATION DATA AND SPILLWAY DESIGN FLOOD RESULTS:**

A. Drainage area: NA acres and NA square miles

B. 100-year, 24 hour precipitation: 3 inches (indicate critical storm)

C. Probable maximum precipitation (PMP), 72 hour storm: 22 inches (indicate critical storm)

D. Peak runoff into the reservoir from NA % of the PMP: NA cubic feet/second

E. Volume of runoff into the reservoir from NA % of the PMP: NA acre-feet

F. Routed peak outflow from NA% of the PMP: NA cubic feet/second

OSE File Number: _____

NEW MEXICO OFFICE OF THE STATE ENGINEER
APPLICATION FOR PERMIT
TO CONSTRUCT AND OPERATE A DAM

7. PROPERTIES OF DAM AND RESERVOIR:

A. Dam length: 4364 feet
B. Crest width: 15 feet
C. Base width: 115 feet
D. Dam height: 10.5 feet
E. Structural height: 10.5 feet
F. Elevation of the dam crest: 6604 feet
G. Slope of upstream face: 3 horizontal to 1 vertical
H. Slope of downstream face: 5 horizontal to 1 vertical
I. Volume of dam: 104882 cubic yards
J. Type of dam: earthfill perimeter embankment
K. Dead storage capacity: 265.7 acre-feet
L. Reservoir storage capacity: 265.7 acre-feet
M. Maximum storage capacity: 319.9 acre-feet
N. Spillway design flood water level elevation: NA feet
O. Reservoir surface area at reservoir storage capacity: 26.5 acres
P. Stage/Area/Storage capacity (elevations at the outlet invert, spillway and dam crest plus others):

Elevation or depth above outlet (Feet)	Area of Water Surface, (Acres)	Storage Capacity (Acre Feet)
6590.3	0	0
6593.6	22.8	38.5
6596	23.8	113.8
6598	24.7	162.7
6600	25.6	213.3
6602	26.5	265.7

8. PROPERTIES OF OUTLET CONDUIT:

A. Outlet conduit is: NA (give size and material)
B. Length of conduit: NA feet
C. Slope of conduit: NA percent
D. Manning coefficient: NA
E. Maximum discharge capacity (at dam crest): NA cubic feet/second
F. Elevation of upstream end of the invert of the outlet conduit: NA feet
G. Size, type and number of gates: NA
H. Time to empty the reservoir: NA hours or NA days

OSE File Number: _____

NEW MEXICO OFFICE OF THE STATE ENGINEER
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9. PROPERTIES OF SPILLWAY:

A. Spillway is: NONE (give type and material)
B. Location: _____
C. Spillway crest elevation: _____ feet
D. Freeboard: __ feet
E. Discharge coefficients: ____ (dependent on type)
F. Effective length: _____ feet
G. Discharge capacity (at the spillway design flood elevation): _____ cubic feet/second
H. Maximum discharge capacity (at the dam crest): _____ cubic feet/second
I. Residual freeboard: __ feet

10. ADDITIONAL STATEMENTS OR EXPLANATIONS:

Dam is perimeter embankment receiving only groundwater collected from on-site gells for evaporation.

11. CONSTRUCTION DATES:

Estimated date to begin construction: 05/07/07
Estimated date to complete construction: 06/30/07

12. Dam will be constructed under the supervision of: Dan Kump (Engineer) 17654 (License No.)

13. ACKNOWLEDGEMENT FOR THE DAM OWNER

ALAN COX
I, _____ affirm that the foregoing statements are true to the best of my knowledge and belief. I fully understand the responsibility and liability related to dam ownership.

Alan D. Cox 12/5/06
(Signature) (Date)

Subscribed and sworn to before me this 5th **day of** December **, 20**06

Brandy Smotts
Notary Public

My commission expires 6/21/2010 (SEAL)

Official Seal
BRANDY SMOTTS
Notary Public- State of New Mexico
My Commission Expires
6/21/2010

Conditions of Approval
Application for Permit to Construct and Operate Evaporation Pond #3 Dam

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Application for construction of Evaporation Pond #3 Dam is approved, provided it is not exercised to the impairment of others having existing water right, and not detrimental to the public welfare of the state nor contrary to the conservation of water within the state, further subject to the following Conditions of Approval:

1. This application is approved as follows:

   Permit No.: Provided upon completion of construction

   Purpose of Use: Evaporation of contaminated ground water

   Place of Use: Dam is located at sections 22 & 23 T12N R10W in Cibola County

   Amount of Water: No appropriation of water is authorized under this permit.

Construction Conditions:

1. The qualifications of a professional engineer registered in New Mexico who will supervise construction must be submitted to and approved by the Office of the State Engineer Dam Safety Bureau prior to undertaking construction.

2. The professional engineer supervising construction shall submit a progress report to the Office of the State Engineer, Dam Safety Bureau by the 10th day of each month describing work performed the previous month. The report shall contain the stamp and signature of the professional engineer and shall include test results.

3. Construction shall be in accordance with accepted construction drawings and specifications. The Office of the State Engineer Dam Safety Bureau must approve any modifications to the accepted construction drawings and specifications or design changes in writing prior to undertaking the modifications.

4. The Office of the State Engineer, Dam Safety Bureau shall be given a minimum of 30 days notice of when construction will begin.

5. During construction of the Evaporation Pond #3 Dam, the Office of the State Engineer Dam Safety Bureau shall be given a minimum of 72 hours notice to enable staff to observe the following items:
   a. Completed foundation preparation for embankment fill.
   b. Embankment fill placement at 50% completion.

Conditions of Approval
Application for Permit to Construct and Operate Evaporation Pond #3 Dam

c. Installation of the double layer HDPE Liner with leak detection/collection system
d. Completion of dam construction.

In accordance with Subsection D of 19.25.12.8 NMAC, fees shall be charged for State Engineer personnel inspections at a rate of $100/8-hour day and actual and necessary travel expenses.

6. Within 90 days of completion of construction, the professional engineer supervising construction shall submit to the Office of the State Engineer Dam Safety Bureau:
   a. A completion report, which shall contain:
      1) summary of activity each month including a descriptions of problems and their solutions;
      2) summary of materials test data;
      3) detailed captioned and dated construction photographs of key features; and
      4) the certification, shown below, shall be filled in and included with the completion report. If the engineer is unwilling to complete the certification, the engineer must notify the Office of the State Engineer Dam Safety Bureau before construction begins and the owner must designate a new engineer.

      State of _____)
) ss.
      County of _____)

      I, _____, (Engineer's Name) state that I am a qualified professional engineer licensed in the State of New Mexico, that I have inspected Evaporation Pond #3 Dam and appurtenances and find them to be completed in accordance with the record construction drawings and specifications and are now in a satisfactory condition for acceptance.

      (Engineer's Signature) License Number _____,
      (SEAL)
      Engineer's Name

      Date Submitted _____

   b. Record construction drawings prepared and completed in accordance with 19.25.12.11.D NMAC including all signatures. Drawings shall be numbered in sequence. The record construction drawings shall also be submitted digitally as a multiple page single file in tagged image file format (TIFF).

7. Proof of completion of works form along with filing fee is due within 90 days of completion of construction or by December 13, 2008, which ever comes first. If

Conditions of Approval
Application for Permit to Construct and Operate Evaporation Pond #3 Dam

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construction is not completed by December 13, 2008 the owner must apply for an extension of time to construct the dam. The application for extension of time and fee must be received by January 13, 2009. If updated design documentation is required to ensure the design complies with the current regulations for dams (19.25.12 NMAC) then plan review fees are required. Failure to request an extension of time will result in a cancellation of the permit.

Operation Conditions:

1. The owner shall obtain permission from the State Engineer Dam Safety Bureau to fill the reservoir. Use of the reservoir is restricted until all construction conditions are met.

2. The maximum storage of the pond shall be controlled so that a freeboard of at least 2 feet is maintained under normal operating condition. If the perimeter embankment settles over time, the maximum storage of the pond shall be reduced or the embankment shall be repaired to the original elevation so that the freeboard of at least 2 feet is maintained.

3. Changes, alterations, modifications or sediment removal requires State Engineer approval prior to making the change.

4. The owner shall provide access to the Office of the State Engineer Dam Safety Bureau personnel for periodic dam safety inspections. Failure to comply with State Engineer safety orders may result in cancellation of this permit and an order to breach the dam.

5. The Owner shall have the hazard classification periodically evaluated by a licensed professional engineer in New Mexico if downstream development occurs to ensure the dam design is not deficient.

6. The Owner shall comply with the Office of the State Engineer rules and regulations for dams.

Witness my hand and seal this 13th day of December 2006.

John R. D'Antonio, Jr., P.E.
State Engineer

By: Elaine C. Pacheco

Elaine C. Pacheco, P.E.
Dam Safety Bureau