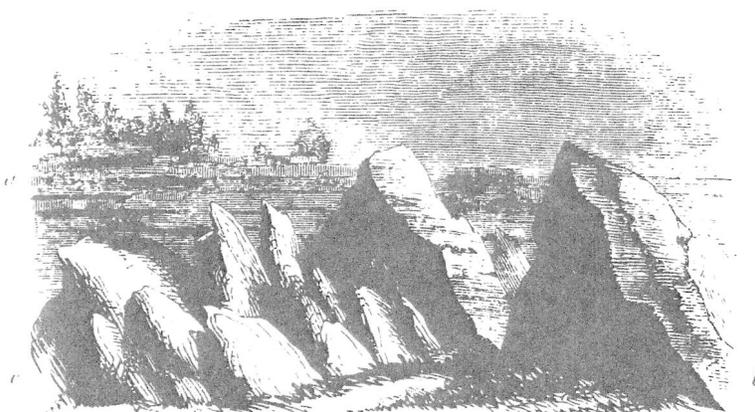


State of California
Department of Conservation
MINING AND GEOLOGY BOARD

ANNUAL REPORT

1981



LIMESTONE AND TRAP DYKE NEAR SONORA.

a. Superficial detritus. *b.* Trap dyke. *c.* Limestone.

State of California
MINING AND GEOLOGY BOARD

ANNUAL REPORT
1981

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ACKNOWLEDGEMENT

THE STATE MINING AND GEOLOGY BOARD WOULD LIKE TO
ACKNOWLEDGE THE CONTRIBUTIONS TO THE STATE OF
CALIFORNIA DURING THE 1980-81 FISCAL YEAR OF THE
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ABSTRACT

The State Mining and Geology Board has policy responsibilities for the implementation of California's Surface Mining and Reclamation Act (SMARA). During the 1980-81 fiscal year, the Board took a number of actions which address the Act's mineral resource conservation and mined lands reclamation objectives.

The Board designated regionally significant sand and gravel deposits in the San Fernando Valley area of Los Angeles County and initiated the designation process for aggregate deposits needed to supply Ventura County's future needs. Classification of construction quality aggregate resources in the Los Angeles and in the San Francisco Bay metropolitan areas also were reviewed.

Priorities for classifying threatened mineral deposits in nonurban areas of the state, specifically in the Sierra Nevada and California Desert areas, were established by the Board, and classification studies were initiated in these areas by the Division of Mines and Geology. In addition, five petitions for classifying threatened mineral deposits were also accepted and a completed classification report on a petitioned limestone deposit was sent to the affected lead agency for planning action.

The application of SMARA to federal lands was reviewed by the Board in a workshop with representatives from the mining industry, local, state, and federal agencies, and environmental protection groups. The Board is concerned about how a 1979 agreement between state and federal land managing agencies is being implemented to assure that SMARA's reclamation requirements are being applied to federal lands.

The Board also reviewed ordinances from 71 lead agencies which regulate surface mining in the state. Sixty-two (62) of these ordinances, which complied with the Act and Board policy, were certified.

A policy exempting emergency excavations from SMARA's reclamation requirements was considered to clarify the Act's application in such situations. The Board also reviewed its State Policy for Surface Mining and Reclamation Practice to assure its conformance with requirements of AB 1111, requiring that regulations be clearly written and properly authorized.

A number of mining operations were visited by the Board to gain firsthand knowledge about the problems and opportunities associated with mined lands reclamation. Issues involving solid waste fill techniques, groundwater and surface water management, revegetation of mine spoils, and reclamation of dredger tailings were discussed with operators and

local planners at sites in Los Angeles, Orange, Alameda, Del Norte, and Sacramento Counties.

In fulfilling the Board's policy responsibilities under SMARA for geohazards and, under the Alquist-Priolo Special Studies Zones Act (APSSZA), for identifying areas subject to surface fault rupture, the Board took a number of actions during the 1980-81 fiscal year. Mitigation of unstable slope hazards were considered in a workshop with representatives of local government, state and federal geological surveys, academia, and the State Legislature. Forty (40) special studies zones maps, showing areas underlain by recently active faults, were also reviewed by the Board and forwarded to the State Geologist, pursuant to APSSZA. In addition, the Board reviewed its regulations which implement this Act pursuant to the requirements of AB 1111.

The Board also recommends that: (1) information on California's potential for strategic mineral resources be developed and that nonurban classification be accelerated to aid future land use decisions; and (2) hazardous abandoned mines should be identified to aid local agencies in mitigating associated hazards.

MINING AND MINERAL FACTS

- California's \$1.9 billion of non-fuel mineral production is the second highest of all states in the nation.
- About 950 mines are active in the state which employ over 40,000 persons.
- Value of leading mineral commodities produced in the state:

cement	\$555 million
sand & gravel	\$430 million
boron	\$333 million

- California leads the nation in the production of:

asbestos
boron
sand and gravel
tungsten

- The State is a leading producer of:

cement
gypsum
magnesium
saline minerals

SOURCE: California Division of Mines and Geology

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Part I.

INTRODUCTION

We herein present the highlights of the Mining and Geology Board's activities during the past year, particularly in implementing the Surface Mining and Reclamation Act of 1975 (SMARA) and the Alquist-Priolo Special Studies Zones Act of 1972.

This report combines the Board's report to the Legislature on actions taken during the preceding fiscal year pursuant to SMARA and a report to the Governor and the Legislature on needed earth science research (Sections 2717 and 674 of the Public Resources Code).

Part II.

MAJOR BOARD ACTIONS

The Mining and Geology Board hereby submits its Annual Report on actions taken during the 1980-81 fiscal year.

A. Mineral Resource Conservation

1. Introduction

During the past year, the Board has taken a number of actions to achieve the mineral resource conservation objectives of the Surface Mining and Reclamation Act (SMARA). It completed designation in the San Fernando Valley region of Los Angeles County and began the designation process for the Western Ventura County and Simi Valley regions. Completed classification reports were transmitted to affected lead agencies in the Orange County region and priorities established for the Division's nonurban classification program.

The establishment of a state policy for mined lands reclamation as well as the conservation of mineral resources are the twin and interrelated objectives of SMARA. The Act's program for mineral resource conservation, termed the classification-designation process, is directed at identifying mineral resources which are available and needed for future use. This information can then be used by local governments to protect those mineral resources through informed land use planning to assure their future availability.

The first phase of this program, called classification, is undertaken by the State Geologist and the Division of Mines and Geology. Lands are classified in defined study areas as to the presence or absence of important mineral resources.

Following classification, the Mining and Geology Board may consider, under the second phase of this program, designating all or portions of those deposits classified as significant (Mineral Resource Zone-2) as being of regional or of statewide

importance. This action indicates to local government that such designated lands contain mineral resources that are available and needed to supply future demand.

Both the classification report and designation information are transmitted to lead agencies as they are completed. Lead agencies, pursuant to SMARA, are required to incorporate this information into their general planning process and to develop mineral resource management policies that emphasize the conservation of these deposits.

SMARA also requires that a lead agency's land use decisions involving designated areas must be in accord with its mineral resource management policies. In addition, the lead agency, in balancing mineral values against alternative land uses, must consider the importance of the mineral resource to its market region.

Currently, the Division has completed classification projects covering aggregate deposits in the Los Angeles and San Francisco Bay metropolitan areas, with other projects nearing completion in the San Diego, San Bernardino, and Monterey areas.

A program addressing other areas of California of high mineral potential and experiencing rapid urbanization such as the Sierra Nevada foothills is also underway. This program follows authorization and funding by a recent amendment to SMARA (SB 1300, Nejedly, 1980 Statutes).

2. Sand and gravel deposits in the San Fernando Valley, Los Angeles County, were designated as regionally significant.

The Board completed its first designation, in the San Fernando Valley region, in January of 1981. This followed a public hearing in December of 1980, as required by SMARA.

Based on the classification report, an Environmental Impact Report (EIR) prepared pursuant to the California Environmental Quality Act, and public testimony, the Board designated portions of the Tujunga and Pacoima Wash areas to be of regional significance. These areas consist of approximately 2,500 acres of land underlain by construction quality aggregate (sand and gravel) deposits in the eastern San Fernando Valley area of Los Angeles County.

This action was taken to alert local government, primarily the City of Los Angeles, to the need to assure the future availability of aggregate resources in the area.

Sand and gravel from these deposits have supplied the region with low cost construction quality aggregates for a number of decades. The region encompasses a highly urbanized area stretching from the San Gabriel Mountains eastward to the Coast between Malibu Beach and Redondo Beach.

The California Division of Mines and Geology estimated in 1978 that ten years of permitted reserves existed in this area, at current rates of consumption. The areas designated by the Board contained aggregate resources that were available and adequate for the region's 50-year needs.

3. Designation of regionally significant sand and gravel deposits in Ventura County considered.

Following receipt of a report classifying sand and gravel deposits in the Western Ventura County and Simi regions, the Board scheduled a November, 1981, public hearing to consider designation. The Division's report showed that in 13 years, at current rates of consumption, existing permitted reserves of construction quality aggregates would be depleted in the Western Ventura County region. Because of permit conditions which restrict the amount of sand and gravel that can be mined, there is actually less time left before these reserves are depleted.

The Board felt it imperative that information on available aggregate resources in both the Western Ventura County region and in the adjacent Simi region, upon which the Ventura County region must rely when its own reserves are depleted, be provided to affected local jurisdictions. This would assist local planners and land use decision-makers in these regions in managing these resources before they are irrevocably committed to other uses which would preclude their future utilization.

4. Board responds to the need to classify threatened mineral deposits in nonurban areas of California.

The future availability of mineral commodities to California's economy may be affected by land use decisions in areas outside California's major urban centers. This problem has been long recognized by the Board.

The initial focus of SMARA's classification-designation process was on urban areas, and thus principally on construction material minerals. Under a recent amendment to the Act (SB 1300, Nejedly, 1980 Statutes), nonurban areas of the state can now be addressed by this process.

The Board has taken a number of actions during the past year to extend the classification process to nonurban areas of California and to address threatened mineral resources in these areas.

a. Classification of mineral lands in the Sierra Nevada and the California Desert begun under priorities established by the Board.

Field work by the Division of Mines and Geology launched the new nonurban SMARA program in May of 1981. Following priorities established by the Mining and Geology Board in March of 1981, the Division began work in the foothills of the Sierra Nevada Mountain Range (Placerville 15' quadrangle map sheet, USGS) and in the eastern California Desert (Kingman 1⁰ x 2⁰ map sheet, USGS).

In developing priorities for the nonurban classification program, the Board recognized the importance of prioritizing classification projects so that mineral lands most likely to be converted to uses incompatible with mining are classified first. Based upon the relative mineral importance of various regions of the state and pending land use policy decisions which could threaten mineral resource availability, the Board directed the Division to begin classifying mineral lands in the Sierra Nevada, California Desert, and Klamath Mountain areas.

b. Classification of Pfizer's Lucerne Valley limestone deposit is accepted and transmitted to San Bernardino County.

Following acceptance of a report classifying certain high grade (whiting quality) limestone deposits in Lucerne Valley, the Mining and Geology Board transmitted this information to San Bernardino County in March of 1981. This action requires that the County incorporate this information into its general plan and develop policies to manage the identified mineral resources.

The Division of Mines and Geology classified Pfizer Corporation's Bonnicamp limestone deposit as being significant (MRZ-2) and indicated that an excess of 2 million tons of whiting quality limestone was present in this deposit. Limestone deposits are considered significant and hence classifiable as a Mineral Resource Zone-2 (MRZ-2) if the value of the first marketable product from the deposit exceeds \$2 million.

A petition for classifying these deposits was submitted by the Pfizer Corporation because urbanization and local land use decisions in the valley were perceived as threatening future mining of this deposit. This petition, the first accepted by the Board, was initiated under a process designed to provide a means for bringing threatened mineral deposits to the Board's attention.

c. Classification of five petitioned deposits proceeding.

With the exception of the Pfizer petition, previously submitted petitions for classification could not be acted upon because of funding and staffing constraints. Following passage of Senate Bill 1300 in July of 1980, and the subsequent organization of the Division of Mines and Geology's nonurban classification program, these petitions could be acted upon.

Following a review of these petitions, the Board, in September of 1981, asked the Division to proceed with classifying the following deposits:

- Gladding McBean & Company, shale deposit, Corona, Riverside County
- Pacific Clay Products, Inc., clay deposit, Alberhill, Riverside County
- Riverside Cement Company, kaolinitic sandstone deposit, Trabuco Canyon, Orange County
- Graniterock Company, limestone deposit, Big Sur, Monterey County
- Edward Ordway, limestone and dolomite deposit, Placer County

5. Reports classifying sand and gravel deposits in the Los Angeles and San Francisco metropolitan areas reviewed by the Board.

Preliminary reports classifying sand and gravel resources in the San Francisco Bay region and in the San Gabriel Valley region of Los Angeles County were reviewed by the Mining and Geology Board. These reports were prepared by the California Division of Mines and Geology (CDMG) pursuant to guidelines and priorities established by the Board.

The final classification report on the Orange County-Temescal Valley region (CDMG Special Report 143, Part III) was transmitted by the Board in May of 1981 to eight affected lead agencies.

The Division pointed out in this report that a significant percentage of construction quality aggregate is now being shipped into this region from deposits in adjacent regions. These regions include the San Gabriel Valley, the Claremont-Upland area, and the San Bernardino area. With the exception of the San Bernardino region, these other regions are also facing aggregate supply shortfalls over the next 50 years. The Division further noted that though the San Bernardino region has a 65-year supply of permitted reserves of aggregate, this represents an expensive alternative source of supply for the Orange County region.

Alerting local government to this situation by transmitting classification information assists in their management of their available aggregate resources to assure an adequate future supply.

6. SMARA's application to federal lands reviewed.

The problem of assuring that the reclamation provisions of the Surface Mining and Reclamation Act (SMARA) are applied to mining on federal lands has been of longstanding concern to the Mining and Geology Board. This concern is based on the fact that large, highly mineralized areas of the state are managed by such federal agencies as the U. S. Forest Service (USFS) and U. S. Bureau of Land Management (BLM). Mining and the attendant need for reclamation is probable in such areas.

About 45% of California consists of federally managed lands. These lands occur in such areas as the Klamath Mountains, Sierra Nevada, and California Desert, known for their great mineral potential. A number of overlapping federal and state laws and regulations govern mining in these areas.

In 1978, following advice from the Attorney General (Opinion SO 76/14, June 29, 1977), the Board took the position that SMARA applies to all lands in California. This position was reaffirmed by resolution of the Board in May of 1981.

To both assure that reclamation requirements at least equivalent to SMARA's are applied to federal lands and to avoid regulatory overlap, a state/federal agreement was developed under Board auspices. This agreement was signed in early 1979 by the California Resources Agency, the USFS, and BLM. It provides for coordination between local, state, and federal land managing agencies in fulfilling their respective regulatory responsibilities for surface mining and reclamation.

Adoption of new mining regulations by the BLM (CFR 3809) and recent amendments to SMARA (SB 1300, Nejedly, 1980 Statutes) focused the attention of the Board on how this agreement was working. Accordingly, the Board hosted a workshop to discuss the agreement and its implementation.

- a. Workshop on SMARA's application to federal lands in California hosted by Board's Intergovernmental Relations Committee.

The Mining and Geology Board's Intergovernmental Relations Committee hosted a workshop in June, 1981, to discuss the application of California's Surface Mining and Reclamation Act to federally managed lands in the state. Representatives from local, state, and federal agencies, industry, and the environmental community participated.

The following conclusions were reached at the workshop:

- The counties and federal agencies represented have worked out informal processes for coordinating regulatory requirements under SMARA and federal regulations applicable to mining on federal lands.

- The state/federal agreement fails to address the key issue of when in the development of a mine on federal lands permits under SMARA must be obtained. This problem is related to some inconsistencies between SMARA and federal regulations which establish different thresholds of disturbance where a permit is required.
- It is unclear whether obtaining a permit under SMARA on federal lands is discretionary, but it is clear that under the 1872 Mining Act, both the U. S. Forest Service and the U. S. Bureau of Land Management do not have discretion over mining activities.

Based on these conclusions, it was recommended that the agreement be revised.

- b. Revision of state/federal agreement coordinating surface mining and reclamation regulation recommended.

Following the workshop, the Intergovernmental Relations Committee recommended that a revised agreement be developed to deal with the following issues:

- the difference between the threshold of disturbance used by SMARA and federal regulations should be clarified;
- provisions should be made to allow counties to work out formalized agreements or informal relationships with federal agencies in implementing SMARA; and
- counties should be notified by the appropriate federal agency of mining projects which are likely to go beyond the exploratory phase to actual development.

The Board forwarded these recommendations to the Department of Conservation in August of 1981 for further action.

B. Mined Lands Reclamation

1. Local SMARA ordinances reviewed and certified.

Currently 85 local agencies (cities and counties) regulate approximately 950 active mines in

California. These agencies' regulatory control is exercised under ordinances which implement the Surface Mining and Reclamation Act (SMARA).

The Mining and Geology Board is required by a recent amendment to the Surface Mining and Reclamation Act (Sections 2774-2774.5) to review these SMARA ordinances and to certify those which are in accordance with the Act and state policy. This review is to be completed by January 1, 1982. In jurisdictions without a certified ordinance, mine operators, after securing a permit from the lead agency, must then have their mining project's reclamation plan approved by the Board prior to beginning operation. The Act affords ample opportunity for lead agencies to comply with the certification process prior to the Board assuming reclamation plan approval authority.

On February 6, 1981, the Board notified all of the 481 cities and counties in California of the above requirements and requested that those agencies considered to be lead agencies submit their SMARA ordinances to the Board for review and certification. Local jurisdictions with active mines are considered to be lead agencies by the Act.

To provide standards for certification, the Board adopted, by resolution, the following minimum requirements: (1) the ordinance shall establish procedures for the review and approval of reclamation plans and the issuance of permits to conduct surface mining operations; (2) the ordinance shall establish procedures requiring at least one public hearing and periodic inspections of surface mining operations; and (3) the ordinance shall neither contradict the Surface Mining and Reclamation Act of 1975 nor the State Policy for Surface Mining and Reclamation as adopted by the Board.

Initially, the Board reviewed 71 ordinances and certified 39 as meeting the above requirements. Fourteen of the 84 known lead agencies' ordinances were in the process of being adopted and hence were not reviewed. Staff did work with these lead agencies to assure that when adopted, these ordinances would be certifiable.

Personal contacts between staff and affected lead agencies, as well as written communications detailing deficiencies and offering suggested changes, were well received by local government. The result is that the lead agencies are moving

forward in adopting or amending their surface mining ordinances which can be certified by the Board.

To date, December 1981, 62 ordinances have been certified. It is expected that the majority of the 84 lead agencies' ordinances will be certified by the first of the year.

It should be noted that, pursuant to the Act and state policy, lead agencies should have adopted implementing ordinances by April 1978. Failure to comply with this requirement by a number of cities and counties led to the Legislature's amendment of SMARA to provide for the ordinance certification process.

2. Policy on "emergency" excavations or grading developed to clarify SMARA's application in such situations.

Alameda County's exemption of a 120,000 cubic yard excavation from the requirements of their surface mining ordinance was brought to the Board's attention as a possible misinterpretation of the statutory exemption provisions of the Surface Mining and Reclamation Act (SMARA).

Material from this particular excavation was to provide fill material to a slide damaged area. The slide occurred in the winter of 1979 while restoration activities were being proposed for the fall of 1980.

Section 2714(a) of the Public Resources Code provides that the provisions of SMARA shall not apply to excavations or grading conducted for the purposes of restoring land following a flood or natural disaster. The County viewed the slide as a natural disaster; hence, excavations supplying fill to restore the area were considered exempt.

The Mining and Geology Board felt it necessary to clarify its position on this exemption to assure: (1) that SMARA's mined lands reclamation objectives are not circumvented; (2) that the statutory exemptions are applied uniformly throughout the state; and (3) that the exemption is reasonable in its application to the emergency situations accompanying floods or natural disasters as covered by the Act.

The Board developed a draft policy statement on this issue which found that this exemption shall

apply to such excavations and grading involving a flood or other natural disaster only when an emergency is involved. An emergency was defined as an unforeseen occurrence or combination of circumstances which calls for immediate action or remedy, and that under these circumstances, it would not be reasonable to wait for the normal processing of a use permit for mining when such mining is needed to correct the "emergency" situation.

The Board advised that the operator shall utilize, whenever feasible, materials from permitted mining sites. The operator shall also notify the affected lead agency in advance, if possible, or otherwise within 72 hours, of beginning such exempted mining activities.

Final determination of whether a given situation warrants exemption or not was left to the lead agency's discretion based upon these general guidelines.

Formal adoption of this policy into regulation will require a public hearing to be scheduled in 1982.

3. Policy for Surface Mining and Reclamation Practice reviewed for conformance with requirements of AB 1111.

Regulations implementing the Surface Mining and Reclamation Act's (SMARA) reclamation provisions were reviewed as required by AB 1111 (Chapter 567, Statutes of 1979). The purpose of the review was to remove any unnecessary or unauthorized regulations and to simplify and improve their overall quality.

Lead agencies, operators, and interested persons were invited to participate in the review. A September 11, 1981, public hearing was also held. Based upon comments received and the Board's own review, no substantive changes were made to these regulations.

4. Reclamation technology and related land use planning practices discussed with operators and local planners at several important mining sites.

To further its knowledge of the diverse reclamation practices being used in California, the Board, from time to time, tours mines and reclamation sites. This provides an opportunity for Board members to discuss practical aspects of

reclamation technology and post-mining use of the land with operators, local planners, state regulatory agencies, and consultants at project sites. Insights gained from these tours aid the Board in fulfilling its responsibility for maintaining an effective and up-to-date state policy for surface mining and reclamation.

During the past year, Board members toured a number of reclamation projects in the Los Angeles metropolitan area, in the Livermore-Amador Valley area, in Del Norte County, and in Sacramento County.

a. Restoration of sand and gravel pits accomplished through land-fill techniques -- Los Angeles and Orange Counties.

A sand and gravel pit which is concurrently being mined and utilized as a solid waste disposal site was visited by the Board in May of 1981. Both Class II (putrescibles) and Class III (inert) wastes were being disposed of in the pit. In addition, "land-fill gas" (methane) from waste decomposition is being collected, purified, and transported to nearby industrial customers. When the land filling operations are completed, the reclaimed site will be used for industrial development.

Associated technologic, environmental, and land use issues were discussed with operators and local officials.

In Orange County, the Board visited a condominium development built on a reclaimed sand and gravel pit. High land values and a nearby source of inert material enabled the developer to reclaim the pit to its original contour. Engineered compaction techniques were employed at this site to provide a stable building site.

The Board also visited groundwater recharge and recreation facilities, Orange County Water District, which were former sand pits. These areas had been mined to the District's specifications to create these facilities. A mobile home project where specialized compaction techniques were being used to stabilize a reclaimed sand and gravel pit for development was also visited.

- b. "Chain of Lakes" water management plan -- aggregate mining in the Livermore-Amador Valley area, Alameda County.

Sand and gravel deposits in the Livermore-Amador Valley area provide an important source of construction quality aggregates for the San Francisco Bay Area. Three companies produce between eight and ten million tons of aggregate annually from these deposits. The Board visited these deposits in March of 1981 to discuss the joint reclamation plan for the pits with operators and local planners.

The plan proposes that the mined-out pits, which ultimately will cover about 2100 acres, be used as a chain of interconnected lakes to provide flood control, water storage, and groundwater recharge facilities. The plan also addresses agricultural, recreational, and industrial uses for filled and undisturbed areas.

Development of this plan involved the coordination of the producers, Alameda County, the Cities of Livermore and Pleasanton, regional park and flood control districts, and several local, state, and federal agencies. It is considered to be an example of a reclamation plan that addresses a number of mining operations and meets the objectives of many overlapping local, state, and federal jurisdictions.

- c. Reclamation plan development for a proposed nickel laterite operation in Del Norte County discussed with the operator.

In September of 1981, Board members visited the exploration operations of California Nickel Corporation, which may portend a major surface mining operation in the Six Rivers National Forest. This operation is on public lands adjacent to areas recommended by the Governor for inclusion under the provisions of the federal Wild and Scenic Rivers Act.

About 5.2 million tons per year of ore containing nickel, cobalt, chromium, and magnesium oxide is expected to be mined if the project is approved. The mine site will ultimately cover an estimated 3000 acres in an area known for its high recreational, scenic, and wildlife values. The Smith River, a state-designated wild and scenic river, drains the area.

One of the principle objectives of the Board in visiting the project was to learn firsthand about the reclamation techniques to be employed. Of particular interest were the operator's proposed plans for revegetation of disturbed laterite soils, stabilization of slopes, and protection of groundwater quality.

- d. Dredger tailings reclaimed to residential building sites near Folsom, Sacramento County.

Board members visited the Natomas Company's residential project near Folsom to discuss with company representatives their reclamation program. Here a 936 acre site, dredged for gold decades ago, is being stabilized and converted to building sites.

C. Geohazards

1. Mitigation of unstable slope hazards addressed.

- a. Workshop on landslide hazard mitigation hosted by the Board's Geohazards Committee.

The problem of unstable slope hazards has been of long-standing concern to the Mining and Geology Board. The Division of Mines and Geology has estimated that cumulative property damage losses from this hazard during the period 1970 to 2000 could be \$9.8 billion. Such failures in the Los Angeles metropolitan area in 1978 resulted in loss of life as well as an estimated \$150 million in damages. High land value and the need for buildable sites, coupled with the potential for slope failure, set the stage for such losses.

The need for identifying landslide hazard localities and showing them on suitable maps so that these hazards can be mitigated or otherwise dealt with is widely recognized by local officials, land use planners, soil scientists, and developers. In the past decade, the Division has identified and mapped such hazards in a number of counties, under cooperative agreements. This activity has addressed only a small part of the landslide-prone areas of the state. Funding constraints of the past few years have now virtually eliminated this activity.

In an attempt to find ways to mitigate this problem, the Board's Geohazards Committee hosted

a workshop in April of 1981. Representatives from the State Legislature, state and federal geological surveys, local government, and academia met to discuss the need for legislation to mitigate the hazard of unstable slopes.

Workshop participants agreed that the most useful purpose future legislation could serve would be to provide support for a statewide mapping program aimed at identifying areas of potential unstable and hazardous slopes. Of the kinds of slope failures that could be considered in such a program (landslides, mudslides, debris flows, slumps, soil creeping, etc.), mudflows represented the greatest danger to public safety. Mapping of all these hazards would need to be done at a scale suitable for planning purposes.

It was also recommended that efforts by the state to begin a mapping program should focus on urbanizing areas with a long history of unstable slope problems and where geotechnical expertise is present at local jurisdictions.

b. Proposed legislation dealing with unstable slope hazards approved.

Based on suggestions from the April workshop, a draft entitled, "Proposed Unstable Slope Hazard Legislation," was developed and approved by the Board at its July 17, 1981, meeting. This draft proposal for legislation recommends that there be established in the Department of Conservation's Division of Mines and Geology a slope instability hazard identification and evaluation program. Under this program, slope instability hazards would be mapped under priorities and guidelines established after a public hearing and in consultation with the State Mining and Geology Board. Mapping priorities developed by the Division would reflect urbanizing areas of the state which have high slope instability potential and which would benefit most from the identification of this potential.

The proposed legislation was transmitted to the Director of the Department of Conservation for consideration and further action in August of 1981.

2. Preliminary maps of new and revised Special Studies Zones showing recently active faults in the San Francisco Bay reviewed.

The Mining and Geology Board, pursuant to Section 2622 of the Public Resources Code, reviewed preliminary maps of new and revised special studies zones at a September 11, 1981, public hearing. In addition, two zone maps proposed for withdrawal were reviewed. These maps identify active fault zones which are subject to the requirements of the Alquist-Priolo Special Studies Zones Act (APSSZA).

These maps, which are listed below, were sent to affected local agencies as well as concerned state agencies by the State Geologist on July 1, 1981. A 90-day review period is provided by APSSZA for submission of comments to the Mining and Geology Board.

- | | |
|--------------------------|---------------------------------------|
| 1. Willits NE | 21. Cedar Mtn. |
| 2. Ukiah | *22. Milpitas |
| 3. Elledge Peak | *23. Calaveras Reservoir |
| *4. Mare Island | *24. Mt. Day |
| *5. Richmond | 25. Eylar Mtn. |
| *6. Oakland West | *26. San Jose East |
| *7. Oakland East | *27. Lick Observatory |
| *8. Diablo | *28. Franklin Point |
| *9. Tassajara | *29. Ano Nuevo |
| 10. Byron Hot Springs | *30. Morgan Hill |
| *11. San Francisco South | *31. Mt. Sizer |
| *12. San Leandro | *32. Gilroy |
| *13. Hayward | *33. Gilroy Hot Springs |
| *14. Dublin | *34. Watsonville East |
| 15. Livermore | *35. Chittenden |
| 16. Altamont | *36. San Felipe |
| 17. Midway | *37. Hollister |
| *18. Montara Mtn. | 38. NW $\frac{1}{4}$ Mt. Morrison 15' |
| *19. Newark | 39. NE $\frac{1}{4}$ Mt. Morrison 15' |
| *20. La Costa Valley | 40. SE $\frac{1}{4}$ Mt. Morrison 15' |

*Revised zone map

Official maps of special studies zones proposed for withdrawal:

A. La Honda

B. San Gregorio

Following the end of the 90-day review period on September 28, 1981, the Mining and Geology Board offered its comments and recommendations on these maps to the State Geologist prior to his issuing them on January 1, 1982.

3. Policy and Criteria of the State Mining and Geology Board with Reference to the Alquist-Priolo Special Studies Zones Act reviewed.

The Board's regulations implementing the Alquist-Priolo Special Studies Zones Act were reviewed as required by AB 1111 (Chapter 567, Statutes of 1979). The purpose of this review was to remove any unnecessary or unauthorized regulations and to simplify and improve their overall quality. Local, state, and federal agencies as well as other interested persons and organizations were invited to participate in this review.

These regulations were recently reviewed and amended, in 1979, following recommendations of a joint subcommittee of the Seismic Safety Commission and the Board. Written comments received advocated changes to the Act itself and not to the Act's implementing regulations. Thus, no substantive changes were made to the regulations.

The Alquist-Priolo Special Studies Zones Act deals strictly with mitigating the hazards of surface fault rupture. The Board recognizes that this phenomenon represents only a small part of the hazards connected with faulting. The effects of seismically induced ground shaking and liquefaction should also be considered.

Part III.

RECOMMENDATIONS FOR NEEDED EARTH SCIENCE RESEARCH

A. Mineral Resource Conservation

1. Information is needed on California's strategic mineral potential and on the alternatives to its development to assure that land use decisions on "public lands" in California are in the state's long-term interest.

The continuing debate on the United States' dependency upon foreign sources for strategic minerals, as well as recent proposals to mine such minerals on federal lands in California, focuses attention on the state's position as a potential domestic supplier of these minerals. The presence of strategic mineral resources in areas of high scenic, recreational, and wildlife values raises the question of whether these other natural resources will be adequately considered in future land use decisions involving these areas.

Over 45 percent of California is under federal ownership. Much of these federal lands -- in the Klamath Mountains, Sierra Nevada, and California Desert -- have potential for such strategic minerals as manganese, nickel, cobalt, chromite, and tungsten. These areas are also noted for their recreational use and wildlife habitats.

The fact that a mining project involves minerals of strategic importance should not "a priori" downgrade the value of other natural resources or cost considerations of mitigating associated adverse impacts in the decision-making process. An understanding of the geologic, economic, and technical characteristics associated with strategic minerals as well as alternative sources of supply is clearly needed if a proper balance is to be struck between national defense needs and local economic benefits versus long-term environmental and social impacts. This understanding is also needed if proper assignment of mitigative costs is to be made, whether to the project, the area of impact, or society at large.

Information on these characteristics and alternatives is not readily available. There is a need to assemble such information into a form which can be used by local, state, and federal decision-makers in considering policies and projects involving strategic mineral development on public lands.

The Mining and Geology Board therefore recommends that the Department of Conservation develop a "white paper" on strategic mineral development on public lands in California. The following issues should be discussed in this paper:

- a. a definition of strategic minerals;
- b. a list of strategic minerals found in California, including their physical and economic characteristics and importance to defense-related industry;
- c. the location and amount of strategic mineral resources in California as well as a geologic description of their environment of occurrence (this inventory should distinguish between those resources found on private lands and on public lands);
- d. the location and size of major sources of supply, both existing and potential, whether on private lands in California or in areas outside the state (include domestic and foreign sources as well as marine deposits); and
- e. the alternatives to mining (substitutes, alternative technology, conservation/recycling, etc.).

The development of this paper should draw not only upon the expertise of the Department's Division of Mines and Geology, but on such federal agencies as the U. S. Geological Survey and the U. S. Bureau of Mines, as well as the mining industry, academia, and the consulting community.

2. Classification of mineral lands in nonurban areas of California should be accelerated.

Mineral lands in nonurban areas of California are currently being classified by the Division of Mines and Geology. Authority and funding for this program was provided in a recent amendment to the Surface Mining and Reclamation Act (SB 1300, Nejedly, 1980 Statutes).

The Division is concentrating its classification activities in the foothills of the Sierra Nevada, the California Desert, and in the Klamath Mountains under priorities established by the Mining and Geology Board. These areas were singled out by the Board for classification because of their high mineral potential and because they are being subjected to land use decisions which may jeopardize the future availability of these mineral resources.

This work program is scheduled for completion in 1992.

The first classification project, under the non-urban program, is nearing completion. This project is directed at a portion of the "Mother Lode" mineral belt in the Placerville area of El Dorado County. This area is characteristic of the Sierra Nevada foothills in terms of its high mineral potential and rapid urbanization.

The foothill area, which includes 13 contiguous counties from Plumas in the north to Madera in the south, has experienced over a 50 percent population increase between 1970 and 1980. Currently, about 160 mines are being operated in this area. The potential for future mineral development is evidenced by its history of past production (for example, over \$1 billion in gold has been produced from these 13 counties) as well as the increase in exploration activity caused by past mineral commodity price increases.

The potential for land use conflicts, as evidenced in the Sierra Nevada foothills, is the sort of situation at which SMARA's classification process was directed. Here the rapid pace of urbanization threatens mineral resource availability. Such conflicts are also inherent in other areas of California noted for their strategic mineral potential. Land use decisions in these areas, whether by federal, state, or local agencies, would benefit from the classification information provided by this program. The Board therefore recommends that the Department of Conservation and its Division of Mines and Geology consider ways to speed up the nonurban classification program.

- B. Abandoned or inactive mine hazards need to be identified and affected lead agencies notified.

Lands mined after January 1, 1976, are required to be reclaimed by the Surface Mining and Reclamation Act

(SMARA). Such reclamation is intended to assure that residual hazards of mining to the public health and safety are eliminated.

Lands mined prior to that date are not covered by the Act unless they are reactivated. That such pre-SMARA mines may hazard the public health and safety or constitute significant environmental impacts is indicated by the following examples:

- Four youths died in an abandoned coal mine (Black Diamond Mine) near Pittsburg, Contra Costa County, last year.
- The Central Valley Regional Water Quality Control Board, assisted by the California Division of Mines and Geology, in 1979 identified 41 abandoned or inactive mines in the Central Valley drainage area which cause water pollution problems. Ten of these mines were characterized as causing severe problems from mine discharges of acid waters with a high concentration of heavy metals.
- The California Resources Agency estimated in 1972 that, of the widespread mining activity that has occurred in the state prior to that date, "A significant number, probably 2000 or more, of..." associated "...shafts, pits, and adits are either open or poorly guarded."

Control of abandoned or inactive mines is exerted through a number of different state and federal laws. In addition, under common law of torts, the land owner has certain legal obligations with regard to keeping his property safe for people who might be reasonably expected to enter upon it. This would seem to apply to hazards from abandoned or inactive mines.

SMARA is implemented by local government through a permit and reclamation plan approval process. Mitigation of abandoned or inactive mine hazards can also be addressed by local government under authority provided in the California Health and Safety Code and the Government Code.

Since the authority to enforce mitigation of abandoned or inactive mine hazard is present, the systematic resolution of this problem requires, as a beginning, that information on the location, associated hazard, and ownership of such mines be collected and disseminated to affected local jurisdictions. These jurisdictions can use this information in conjunction with their enforcement authority to assure that such hazards are eliminated or reduced.

The Mining and Geology Board therefore recommends that ways to address this problem be considered by the Department of Conservation and its Division of Mines and Geology, and that recommendations be made to the Board. These recommendations should include the following considerations:

- (1) criteria and priorities should be developed for addressing those areas of the state with the greatest potential hazard from abandoned or inactive mines;
- (2) the feasibility of inventorying abandoned or inactive mine sites, their associated hazards, and mine ownership in such areas should be determined;
- (3) an assessment should be made of the feasibility of relying on local efforts to assure that such hazards are mitigated; and
- (4) the need for and availability of funding to support a statewide program aimed at identifying and mitigating such hazards should be addressed.