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John H. Clark,
Director, Office of Council and Panel Operations, National Endowment for the Arts
January 7, 1980.
 (FED. REG. 50-281 FED. 1-10-80 8-16 am)
BILLING CODE 7535-01-W

NATIONAL SCIENCE FOUNDATION

Advisory Committee for Physics; Meeting

In accordance with the Federal Advisory Committee Act, Pub. L. 92-463, the National Science Foundation announces the following meeting:

Name: Advisory Committee for Physics
 Date and time: January 31, February 1-2, 1980, 9:00 a.m. - 5:00 p.m. each day.
 Place: National Science Foundation, 1801 G Street, N.W., Washington, D.C. 20550, Room 540, each day.

Type of meeting: Open.

Contact person: Dr. Laura P. Bautz, Deputy Director, Division of Physics, National Science Foundation, Washington, D.C. 20550, Telephone: (202) 632-4175.

Summary of minutes: May be obtained from Dr. Laura P. Bautz, Division of Physics, National Science Foundation, Washington, D.C. 20550.

Purpose of committee: To provide advice and recommendations concerning support for research in physics.

Agenda: January 31, 1980, 9:00 a.m. - 5:00 p.m.

Overall review of NSF support of experimental elementary particle physics, including presentations by NSF and DOE staff and report of the Subcommittee for the Review of Elementary Particle Physics; Preliminary discussions of FY 1980 and FY 1981 budgets and of priorities for planning in FY 1982-86.

February 1, 1980, 9:00 a.m. - 5:00 p.m.

Further discussion of FY 1980 and FY 1981 budgets and of priorities for subsequent years; Discussion of follow-up previous recommendations of the Advisory Committee for Physics.

February 2, 1980, 9:00 a.m. - 5:00 p.m.

Continuation of discussions from previous two days.

M. Rebecca Winkler,
 Committee Management Chairperson

January 6, 1980

(FED. REG. 50-281 FED. 1-10-80 8-16 am)

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Advisory Committee for Science and Society; Renewal

Pursuant to the Federal Advisory Committee Act, Pub. L. 92-463, it is hereby determined that the renewal of the Advisory Committee for Science and Society is necessary and in the public interest in connection with the performance of duties imposed upon the

National Science Foundation by the National Science Foundation Act of 1950, as amended, and other applicable law. This determination follows consultation with the Committee Management Secretariat Staff, General Services Administration, pursuant to section 14(a)(1) of the Federal Advisory Committee Act and OMB Circular No. A-63, Revised.

Authority for this Advisory Committee shall expire on January 16, 1982 unless the Director of the National Science Foundation formally determines that continuance is in the public interest.

Richard C. Atkinson,

Director

January 7, 1980

(FED. REG. 50-281 FED. 1-10-80 8-16 am)

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NUCLEAR REGULATORY COMMISSION

Abnormal Occurrence: Mill Tailings Impoundment Dam Failure

Section 208 of the Energy Reorganization Act of 1974, as amended, requires the NRC to disseminate information on abnormal occurrences (i.e., unscheduled incidents or events which the Commission determines are significant from the standpoint of public health and safety). The following incident was determined to be an abnormal occurrence using the criteria published in the *Federal Register* on February 24, 1977 (42 FR 10950).

Appendix A (Example III.B.1) of the Policy Statement notes that an event which seriously compromised the ability of a confinement system to perform its designated function can be considered an abnormal occurrence. The following description of the event also contains the remedial action taken.

Date and Place—On July 16, 1979 a uranium mill tailings impoundment dam failed at the United Nuclear Church Rock Uranium Mill, located near Gallup, New Mexico. This United Nuclear Corporation facility is licensed by the State of New Mexico under the provisions of the NRC State Agreements Program. At the time of the incident the uranium mill tailings of the Church Rock Uranium Mill were also under general license from the NRC pursuant to the Uranium Mill Tailings Radiation Control Act of 1978.

Action and Possible Consequences—As a result of the dam failure mill tailings solution and sand is poured through the trees into a catchment area below the dam. The catchment embankment was subsequently breached and tailings solution flowed

into an arroyo (water-carved gully) and on into the Rio Puerco River which flows past Gallup, New Mexico.

The break in the dam allowed approximately 100 million gallons of tailings solution and 1100 tons of tailings solids (sand) to flow out of the impoundment before it could be closed. Most of the solids were deposited in an area very near the impoundment in a backup containment area on United Nuclear Corporation property and in an adjacent stream, the "Pipeline Arroyo." The tailings solutions travelled in the Pipeline Arroyo to the Rio Puerco which flows through Gallup, New Mexico, a town about 20 miles southwest of the mill site, and into Arizona. The spilled solutions eventually dissipated at a point estimated to be about 30 miles into Arizona. (See Figure 1.)

The radioactive isotopes in the mill tailings and tailings solutions are those which naturally occur in the soil of the area but which have been concentrated by the milling process. These isotopes, primarily thorium-230 and radium-226, did not present any immediate health hazard when released by the dam failure. The concentrated contamination of normally dry areas of the Pipeline Arroyo and the tailings solids in the Arroyo would contribute a relatively small increment¹ to the estimated normal background dose rate of 140 mrem/year for persons living near the Arroyo. However, cleanup of these sources has been undertaken in accordance with maintaining doses as low as reasonably achievable and lowering the potential for radiological contamination of groundwater.

The immediate health hazard arose from the acidic nature of the tailings solution which could cause chemical burns if ingested or brought in contact with skin. The potential for acute chemical effects persisted for approximately 2 days until water from the upstream mining operations and the natural alkalinity of the stream bed neutralized the tailings solution. Chemical contamination (e.g., elevated trace metal concentrations) of groundwater presents a long-term problem.

Causes or Causes—The tailings impoundment dam failed as a result of differential settlement and direct exposure of the dam to tailings solution. The first factor was the result of the manner in which the dam was constructed. The second factor was the result of failure of the operator to maintain a buffer of mill tailings

¹Estimated values are 1.7 rem/year in the white tail, 2.0 rem/year in the brown bear from all exposure pathways.

between the dam and the tailings solutions.

The dam is located on a site containing alluvial soils overlying bedrock having an irregular surface. Depths of this relatively loose soil ranged from less than 20 feet up to a maximum of 100 feet. During design and construction of the dam, tests were conducted to determine how much the alluvial soil would compress under a load. These tests indicated that settlement of about 5 percent would result from the loading of the embankment under dry conditions. With water in the impoundment, additional settlement ranging from 1 1/4 percent to 13 percent was experienced due to collapse of the soil structure. As a result of this high compressibility of the alluvial soil and the irregular bedrock surface, large differential settlement of the dam occurred. As a result of differential settlement, cracks developed in the embankment. These cracks coupled with the lack of a buffer of solid tailings between water and the dam allowed tailings water to penetrate and weaken the embankment.

Actions Taken To Prevent Recurrence

Licensee—The United Nuclear Corporation (UNC) performed an evaluation of the dam failure and examined the serviceability of the remaining portions of the dam. UNC is also performing a study of alternate sites for the tailings impoundment. UNC is conducting cleanup operations to standards established by the State of New Mexico and the NRC. Cleanup of contamination has been completed in the most heavily affected areas near the mill. Cleanup in the remaining sections of the Arroyo will probably take several more months to complete.

State of New Mexico—Soon after the spill, State officials arrived at the site to begin an investigation. The State requested aerial surveillance of the site and began an extensive sampling program along the route of the spill.

On July 16, 1979 the Environmental Improvement Division (EID) issued an order requiring termination of operations. EID issued a second order on July 19 requiring the licensee to take steps to minimize dispersion of materials. The State engineer also issued an order on July 19 requiring an investigation of the cause of the dam failure prior to any repair and resumption of tailings discharge to the impoundment. New Mexico officially subsequently met on July 20 with representatives of the NRC, the Army Corps of Engineers and UNC to discuss the dam failure.

New Mexico amended its July 18 order on October 23, 1979 to allow operation of the facility subject to provisions for monitoring tailings solution levels and impoundment dam integrity. The October 23 amendment also required a study of alternative sites for long-term disposal of tailings solution and solids.

On November 9, 1979 a State engineer again ordered the facility to stop the generation of tailings because the licensee was not maintaining the required beach of tailings solids between the tailings solution and the dam. Operations were allowed to resume on November 13, 1979.

NRC—The NRC has worked in conjunction with numerous other State and Federal organizations in responding to the accident and formulating longer-term corrective action, including cleanup of contamination and continued monitoring of groundwater quality.

The NRC issued an order on October 12, 1979 banning generation of additional tailings until a review provided adequate assurance that all causes of the dam failure had been identified and that the remaining portions of the embankment were free of deficiencies. The NRC reviewed the licensee's evaluation of the dam failure, concurred in the findings with regard to the major causes, and determined that limited generation and storage of uranium tailings could be conducted with reasonable assurance of protection for the public and the environment. The staff issued an order to this effect on October 24, 1979. The order allowed operation for a limited time subject to continued demonstration of dam integrity by documented inspection, prohibited planned expansion of the current tailings area until NRC staff approval was given, and required that UNC submit a proposal for development of a new tailings site for ultimate disposal. Direct NRC regulatory authority over tailings in Agreement States was subsequently removed by an act of Congress amending the Uranium Mill Tailings Radiation Control Act of 1970 (Public Law 96-100, November 9, 1979), and the NRC order can no longer be enforced. However, a State of New Mexico order which imposes essentially the same terms and conditions remains in effect. NRC is continuing to provide technical assistance to New Mexico.

The staff reviewed docket files on the tailings dams of operating mills in non-Agreement States and in all but one case found that differential settlement was satisfactorily addressed. The exception was a dam authorized in 1971 and documentation does not indicate that differential settlement was

addressed. However, no evidence of excessive differential settlement leading to cracking has shown up in routine inspection of the dam.

An NRC summary report on the dam failure at Church Rock will be completed in the near future. The report will address the cause of the failure, what aspects the States should look at for tailing impoundments in their States and an offer of technical assistance by the NRC. The report will be provided to all Agreement States so that they can take appropriate action.

The NRC had also proposed prior to the accident regulations which specify requirements for mill tailings disposal. These regulations identify certain siting and design features which must be incorporated into tailings disposal programs to assure long-term isolation and containment of tailings without continuing active maintenance. The regulations identify burial of tailings below the surrounding grade as the preferred mode of tailings disposal. In this way, dams such as the one which failed at the Church Rock mill would be avoided.

Dated at Washington, D.C., this 4th day of January 1980.

For the Nuclear Regulatory Commission,
Samuel J. Chalk,
Secretary of the Commission

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