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URANIUM MILL SITE RESTORATION ACT AND RESIDUAL RADIOACTIVE MATERIALS ACT

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HEARINGS

BEFORE THE

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SUBCOMMITTEE ON

ENERGY PRODUCTION AND SUPPLY

OF THE

COMMITTEE ON

ENERGY AND NATURAL RESOURCES

UNITED STATES SENATE

NINETY-FIFTH CONGRESS

SECOND SESSION

ON

S. 3008

A BILL ENTITLED THE "URANIUM MILL SITE RESTORATION ACT OF 1978"

S. 3078

A BILL TO AUTHORIZE THE SECRETARY OF ENERGY TO ENTER INTO COOPERATIVE ARRANGEMENTS TO CONTAIN AND TO REDUCE POTENTIAL RADIATION EXPOSURE FROM RESIDUAL RADIOACTIVE MATERIALS, AND FOR OTHER PURPOSES

S. 3253

A BILL TO AUTHORIZE THE SECRETARY OF ENERGY TO ENTER INTO COOPERATIVE ARRANGEMENTS TO CONTAIN AND TO REDUCE POTENTIAL RADIATION EXPOSURE FROM RESIDUAL RADIOACTIVE MATERIALS AND FOR OTHER PURPOSES

JULY 24 AND 25, 1978

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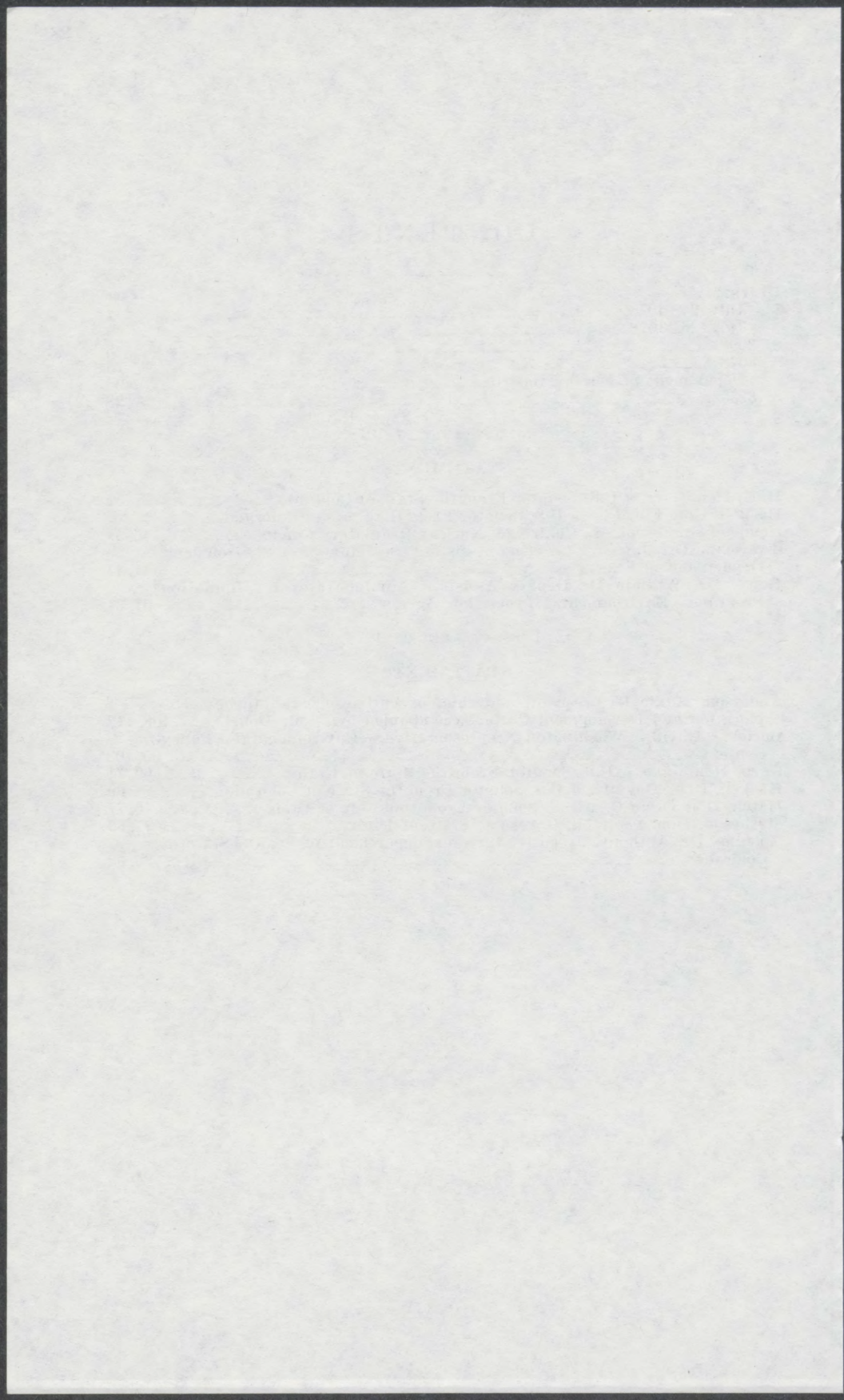
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URANIUM MILL SITE RESTORATION ACT AND RESIDUAL RADIOACTIVE MATERIALS ACT

MONDAY, JULY 24, 1978

U.S. SENATE,
SUBCOMMITTEE ON ENERGY PRODUCTION AND SUPPLY,
OF THE COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Washington, D.C.

The subcommittee met, pursuant to notice, at 10 a.m., in room 3110, Dirksen Office Building, Hon. Floyd K. Haskell, presiding.

Present: Senator Haskell.

Also present: Tom Laughlin, professional staff member.

OPENING STATEMENT OF HON. FLOYD K. HASKELL, A U.S. SENATOR FROM THE STATE OF COLORADO

Senator HASKELL. The hearing will come to order. This morning's hearing is the first of two to consider legislation that would clean up abandoned uranium mill tailing sites in several Western States and Pennsylvania.

The danger to public health caused by these sites has been called to the attention of the American public in recent news reports. But, for many people living in the Rocky Mountain States, these dangers are all too familiar. The Department of Energy has identified 20 sites in the States of Arizona, Colorado, Idaho, New Mexico, Oregon, Texas, Utah, Wyoming, and Pennsylvania for remedial action under their proposal. In each case, the problem is caused by uranium mill tailings found in abandoned mines that produced uranium for the Federal Government.

Congress first took action to remedy this problem in 1972. At that time it authorized \$5 million for a mill tailings removal program in Grand Junction, Colo., and in 1976 I introduced an amendment to make another \$3 million available.

That situation was unique. Uranium mill tailings were used in the actual construction of homes and places of business prior to knowledge that these tailings might present a severe health hazard.

According to a 1976 Colorado Department of Health survey, approximately 600 structures had radiation readings sufficiently high to be classified as "possibly eligible" for removal efforts. The citizens of Grand Junction were so concerned about the dangers to their health that they did not wait for Federal aid. In many instances they began the tailing removal process before Congress took any action.

Studies since 1974 have demonstrated the need for corrective action at a number of other mill tailing sites. It is these sites that are covered by the legislation before the subcommittee today.

We do not need to recount the horror stories raised by the news media. What we need is action to correct this situation. The thousands of families living in the vicinity of these sites are not interested in how busy the Congress is at this time of the year.

They have only one concern, and that is to make sure they don't have to worry anymore about the prospect of severe health hazards from uranium mined for the Federal Government. It is my hope that we can enact some form of legislation this year and get the cleanup underway.

Today we will hear from my colleague from Colorado, Senator Gary Hart, the author of one of the bills under consideration, and from the Department of Energy, the Chairman of the Nuclear Regulatory Commission and the Environmental Protection Agency.

I will insert in the record at this point copies of the bills before us today.

[The texts of S. 3008, S. 3078, and S. 3253 follow:]

S. 3008

IN THE SENATE OF THE UNITED STATES

APRIL 27 (legislative day, APRIL 24), 1978

Mr. GARN (for himself, Mr. HATCH, Mr. DeCONCINI, Mr. McCLURE, Mr. DOMENICI, Mr. LAXALT, Mr. HANSEN, Mr. WALLOP, and Mr. SCHMITT) introduced the following bill; which was read twice and referred to the Committee on Energy and Natural Resources

A BILL

Entitled the "Uranium Mill Site Restoration Act of 1978".

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*
3 That this Act may be cited as "Uranium Mill Site Restora-
4 tion Act of 1978".

5 SEC. 2 (a) The Secretary may make grants to the
6 States of Arizona, Colorado, Idaho, New Mexico, Oregon,
7 Pennsylvania, Texas, Utah, Wyoming, and any other State
8 determined to be in a similar situation to carry out a site
9 restoration plan for abandoned uranium mill sites in those
10 States. Such plan must meet the requirements of section
11 4 of this Act.

1 (b) (1) No grant may be made under this section unless
2 an application thereof has been submitted to and approved
3 by the Secretary. The Secretary may not approve an appli-
4 cation unless—

5 (A) the application contains a site restoration
6 plan which meets the requirements of section 4 of this
7 Act;

8 (B) the application is submitted within three years
9 after the date of the enactment of this Act; and

10 (C) the application is submitted in such form, and
11 in accordance with such procedures, as the Secretary
12 may require, including compliance with regulations set
13 forth in section 10 (a) .

14 SEC. 3. (a) The Secretary shall approve or disapprove
15 any application for a grant under this section within one
16 hundred and twenty days after the submission of such appli-
17 cation to the Secretary, and shall notify the applicant in
18 writing of the decision. The Secretary shall provide the
19 applicant with a detailed written statement of the reasons
20 for the rejection of any application.

21 (b) If the Secretary has rejected an application, the
22 applicant may submit a revised application. The Secretary
23 shall consider such a revised application in accordance with
24 section 2 (b) (1) of this Act.

25 (c) Subject to the availability of funds, the Secretary

1 shall award to any applicant whose application has been
2 approved under this section a grant in an amount equal to
3 the costs of carrying out such applicant's site restoration
4 plan, as estimated in such plan pursuant to section 4 (g) of
5 this Act.

6 SEC. 4. The site restoration plan required under section
7 2 (b) (1) shall—

8 (a) designate the abandoned uranium mill sites
9 (including sites on Federal property) which the appli-
10 cant intends to restore;

11 (b) describe the method by which the applicant
12 shall restore the background radiation level at any site
13 designated under subsection (a) of this section to a
14 level which is no more than twice the background
15 level which existed before milling operations began at
16 such site in order to eliminate any health hazard to
17 residents of the area;

18 (c) describe the method by which the applicant
19 shall restore offsite uranium mill tailings to the original
20 mill site.

21 (d) specify the sites which the applicant shall use
22 for the disposal of the uranium mill tailings removed
23 from the abandoned sites designated under subsection
24 (a) of this section;

25 (e) indicate the manner in which the applicant

1 shall dispose of the tailings so as to prevent any further
2 exposure of individuals to radiation emanating from
3 the tailings;

4 (f) describe the manner in which the applicant,
5 during the fifteen-year period following such disposal,
6 shall monitor the radiation levels at the sites specified
7 under subsection (d) of this section; and

8 (g) contain an estimate of the grant required to
9 carry out the plan.

10 (1) Such grant shall include—

11 (A) 100 per centum of the cost of con-
12 tracting services for engineering, removal, and
13 stabilization at selected sites, monitoring of
14 remedial action to determine that radiation lev-
15 els specified in section 4 (b) of this Act have
16 been achieved, and any other direct costs as-
17 sociated with the site restoration; and

18 (B) an amount not to exceed 75 per
19 centum of the cost of offsite restoration referred
20 to in section 4.

21 (2) Such grant shall not include—

22 (A) costs associated with development of
23 the site restoration plan, personnel, and other
24 administrative costs in administering the plan,

1 or any other indirect costs associated with the
2 site restoration plan; and

3 (B) cost of property acquisition referred
4 to in section 5 of this Act.

5 SEC. 5. (a) The Secretary shall require any State sub-
6 mitting a grant application to acquire the land upon which
7 the tailings and abandoned millsite are located prior to the
8 release of any grant funds to the applicant. However, the
9 State shall not be required to acquire ownership of lands
10 which require remedial action as a result of the incidental
11 offsite spread of the uranium mill tailings, or where such
12 tailings were used as offsite construction materials.

13 (b) Within three years after the completion of site
14 restoration, the States shall—

15 (1) sell the site and remit to the Secretary pro-
16 ceeds from the sale in excess of the State's acquisition
17 costs;

18 (2) transfer title for the site to the Secretary; or

19 (3) pay to the Secretary the difference between
20 the State's acquisition cost and the market value at the
21 time of completion of site restoration.

22 SEC. 6. (a) No grant recipient shall make any change
23 in an approved site restoration plan without the approval
24 of the Secretary, or use a grant awarded under section 3 (c)

1 of this Act for any purpose other than carrying out such
2 plan.

3 (b) If the Secretary determines that any funds awarded
4 to any grant recipient under section 3 (c) of this Act have
5 been used for purposes other than those specified in sub-
6 section (a) of this section, such grant recipient shall be
7 liable for the repayment of such funds to the Federal Gov-
8 ernment. The United States may bring a civil action to
9 recover such funds from such grant recipient. The Secre-
10 tary shall determine whether any additional funds awarded
11 under such subsection shall be paid to such grant recipient.

12 SEC. 7. (a) The abandoned uranium mill sites referred
13 to in section 2 (a) of this Act include, but shall not be
14 limited to, the following areas: Monument Valley, Arizona;
15 Tuba City, Arizona; Durango, Colorado; Grand Junction,
16 Colorado; Maybelle, Colorado; Naturita, Colorado; Rifle,
17 Colorado; Slick Rock, Colorado; Lowman, Idaho; Ambrosia
18 Lake, New Mexico; Shiprock, New Mexico; Lakeview,
19 Oregon; Cannonsburg, Pennsylvania; Falls City, Texas;
20 Ray Pointe, Texas; Green River, Utah; Mexican Hat,
21 Utah; Salt Lake City, Utah; Riverton, Wyoming; Spook,
22 Wyoming.

23 (b) The Secretary, upon request, shall provide the
24 States specified in section 2 (a) of this Act with such tech-

1 nical assistance as the States may require to prepare a site
2 restoration plan satisfactory to the Secretary.

3 (c) There are authorized to be appropriated not more
4 than \$140,000,000 to carry out the purposes of this Act.

5 (d) Any funds which are made available for obliga-
6 tion in any year to carry out this Act and which have not
7 been obligated during that year shall be available for obliga-
8 tion by the Secretary until September 30, 1982.

9 SEC. 8. (a) The provision of sections 2 through 7 of
10 this Act shall not apply to the assessment and performance
11 of restoration of abandoned uranium millsites on lands (1)
12 held in trust by the United States for any Indian, or for
13 any Indian tribe, band, group, pueblo, or community (here-
14 inafter referred to as "Indian tribe"), or (2) owned by
15 any Indian tribe subject to a restriction against alienation
16 imposed by the United States. With respect to the uranium
17 mill tailings, the Secretary is hereby authorized and directed
18 to enter into cooperative arrangements with the Secretary
19 of the Interior and with the Indian tribes residing on such
20 lands, under which the Secretary will provide 100 per
21 centum of all direct and indirect costs in developing and
22 implementing the site restoration plan.

23 (b) The cooperative arrangements referred to in sub-
24 section (a) shall include terms providing that—

1 (1) appropriate site restoration shall be determined
2 by the Secretary, with the concurrence of the Secretary
3 of the Interior, and upon consultation with the Indian
4 tribe, as appropriate and shall be submitted to the Nu-
5 clear Regulatory Commission for review and comment;

6 (2) any site restoration shall be performed by the
7 Department of Energy or its authorized contractor and
8 shall be paid for by the Department of Energy.

9 (c) Unless otherwise determined by the Secretary, the
10 Secretary of the Interior shall have the responsibility for
11 the continued custody of uranium mill tailings involved in
12 any remedial action effort.

13 (d) With respect to Indian lands referred to in subsec-
14 tion (a) of this section, the United States shall be released
15 from any radioactive materials related liability claim thereof
16 from the date of enactment of this Act through and includ-
17 ing the completion of any remedial action authorized by this
18 Act; however, this provision does not apply to other sections
19 of this Act nor affect the trust responsibilities of the Secre-
20 tary of the Interior as described in subsection (a) of this
21 section.

22 SEC. 9. (a) (1) Where a State specifically requests the
23 Secretary to act; or

24 (2) Where a State fails to act within the three-year
25 application period established by section 2 of this Act, the

1 Secretary shall take such action as may be appropriate to
2 provide for the restoration of any abandoned uranium mill-
3 site which is located in a State specified in section 2 (a) of
4 this Act and which is not being restored under a grant
5 awarded under such a section.

6 (b) The Secretary shall be responsible under subsection
7 (a) of this section for—

8 (1) restoring background radiation levels at the
9 sites referred to in subsection (a) of this section to a
10 level which is no more than twice background level
11 which existed before milling operations began at such
12 sites in order to eliminate any health hazard to residents
13 of the area;

14 (2) disposing of the uranium mill tailings removed
15 from the abandoned sites restored under paragraph (1)
16 of this subsection in a manner which prevents any fur-
17 ther exposure of individuals to radiation emanating from
18 the tailings; and

19 (3) monitoring the radiation levels at the sites used
20 to dispose of the uranium mill tailings under paragraph
21 (2) of this subsection.

22 SEC. 10. (a) The Nuclear Regulatory Commission shall
23 within one hundred and twenty days after enactment of this
24 Act establish regulations, and standards to assure that the
25 public safety and health and the environment are not im-

1 paired by the remedial action undertaken pursuant to the
2 terms of this Act.

3 (b) Notwithstanding any other Federal law relating to
4 protection of public safety, health, and environment, other
5 than the National Environmental Policy Act of 1969, as
6 amended, the regulations and standards set forth by the Nu-
7 clear Regulatory Commission shall be the sole requirement
8 regulating remedial action under this Act.

9 SEC. 11. (a) The Secretary shall conduct a pilot study
10 in the city of Salt Lake City, Utah, to—

11 (1) determine to what extent, if any, radiation from
12 uranium mill tailings at abandoned uranium mill sites
13 contaminates structures located within a ten mile radius
14 of such sites;

15 (2) determine whether the radiation referred to in
16 paragraph (1) of this subsection poses a health hazard
17 to individuals living or working in the area described in
18 such paragraph, and examine the types of remedial ac-
19 tions which might be undertaken to limit the exposure of
20 individuals to such radiation.

21 (b) Within one year after the date of the enactment of
22 this Act, the Secretary shall issue a report containing the
23 findings respecting each of the items studied under subsection
24 (a) of this section, together with such recommendations as
25 the Secretary considers appropriate. The Secretary shall sub-

1 mit the report to the President and to appropriate committees
2 of the Congress.

3 SEC. 12. For purposes of this Act—

4 (a) the term “applicant” means any State which
5 submits an application under section 2 of this Act;

6 (b) the term “grant recipient” means any applicant
7 which receives a grant under section 3 (c) of this Act;

8 (c) the term “Secretary” means the Secretary of
9 Energy;

10 (d) the term “abandoned uranium mill site” means
11 a site on which uranium ore was processed but shall not
12 include a site—

13 (1) where the site was owned on January 1,
14 1978, by the United States Government or any
15 agency or department thereof; or

16 (2) where a license issued by the United
17 States Nuclear Regulatory Commission, the Atomic
18 Energy Commission or a State under Section 274
19 of the Atomic Energy Act of 1954, as amended,
20 was in effect on or was issued after January 1,
21 1978, and the production of a uranium product
22 derived from ores other than onsite uranium tailings
23 occurred since February 1, 1973, as hereinafter
24 defined;

25 (e) the term “uranium mill tailings” shall mean

1 the accumulated tailings resulting from processing of
2 ores for extraction of uranium and other valuable con-
3 stituents, and also other radioactive materials such as
4 residual stock of unprocessed ores or low grade mate-
5 rials, and ground in the vicinity of the mill or processing
6 site which has become contaminated with radionuclides,
7 including radium-226, derived from the site.

95TH CONGRESS
2D SESSION

S. 3078

IN THE SENATE OF THE UNITED STATES

MAY 15 (legislative day, APRIL 24), 1978

Mr. JACKSON (by request) introduced the following bill; which was read twice and referred to the Committee on Energy and Natural Resources

A BILL

To authorize the Secretary of Energy to enter into cooperative arrangements to contain and to reduce potential radiation exposure from residual radioactive materials, and for other purposes.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*
3 That this Act may be cited as the "Residual Radioactive
4 Materials Act of 1978".

5 SEC. 2. The Congress recognizes and assumes the com-
6 passionate responsibility of the United States to provide fi-
7 nancial assistance to the States of Arizona, Colorado, Idaho,
8 New Mexico, Oregon, Texas, Utah, Wyoming, Pennsylva-
9 nia, and any other State determined to be in a similar situa-

1 tion by the Secretary of Energy for the purpose of limiting
2 the exposure of the public to radiation emanating from resid-
3 ual radioactive materials, as hereinafter defined, from former
4 uranium ore processing sites situated in such States.

5 SEC. 3. As used in this Act:

6 (a) the term "processing site" shall mean a site on
7 which uranium ore was processed but shall not include
8 a site—

9 (i) where no uranium was produced for sale
10 under contract to the United States Government;

11 (ii) where the site was owned on January 1,
12 1978, by the United States Government or any
13 agency or department thereof; or

14 (iii) where a license issued by the United
15 States Nuclear Regulatory Commission, the Atomic
16 Energy Commission, or by a State under sec-
17 tion 274 of the Atomic Energy Act of 1954, as
18 amended, was in effect on or is issued after Janu-
19 ary 1, 1978, for the production of a uranium product
20 derived from ores other than residual radioactive
21 materials, as hereinafter defined;

22 (b) the term "residual radioactive materials" shall
23 include the accumulated tailings resulting from process-
24 ing of ores for extraction of uranium and other valuable
25 constituents, and also other radioactive materials such

1 as residual stock of unprocessed ores or low grade mate-
2 rials, and ground in the vicinity of the mill or processing
3 site which has become contaminated with radionuclides
4 including radium-226, derived from the site;

5 (c) the term "Secretary" shall mean the Secretary
6 of Energy.

7 SEC. 4. The Secretary is hereby authorized and directed
8 to enter into cooperative arrangements with any State iden-
9 tified in or pursuant to section 2 of this Act under which the
10 Secretary will provide not in excess of 75 per centum of the
11 costs of joint Federal/State programs to assess radiation
12 levels and to perform appropriate remedial action to limit
13 exposure of individuals to radiation emanating from residual
14 radioactive materials.

15 SEC. 5. Each cooperative arrangement referred to in
16 section 4 of this Act shall include, but not be limited to,
17 terms which provide that—

18 (a) the selection of appropriate remedial action
19 shall be determined by the Secretary upon consultation
20 with the State, the Environmental Protection Agency,
21 and others, as appropriate and shall be submitted to
22 the Nuclear Regulatory Commission for review and
23 concurrence;

24 (b) the Secretary may determine that, for some
25 sites, the appropriate remedial action is to move the

1 residual radioactive materials to a more suitable location
2 for long-term stabilization or other disposition. Unless
3 otherwise determined by the Secretary, State ownership
4 of the residual radioactive materials and the land upon
5 which those materials are originally located must be
6 accomplished before a remedial action is undertaken
7 involving the removal of tailings from an existing site.
8 The requirement for State ownership shall not apply
9 to lands in the general vicinity of the processing site
10 which may require decontamination activities as a result
11 of incidental spread of radioactive substances, or to lands
12 or structures where radioactive materials removed from
13 the processing site have been used for construction-
14 related purposes. Subject to the Secretary's approval,
15 the requirement for State ownership of the land may
16 be met by means of a purchase option exercisable at
17 any time within two years after remedial work is
18 completed;

19 (c) unless otherwise determined by the Secretary,
20 any remedial action shall be performed by the Depart-
21 ment of Energy or its authorized contractor and shall be
22 paid for in accordance with the provisions of section 4
23 of this Act;

24 (d) the Secretary shall have a right of approval of
25 any disposal or custody plan;

1 (e) in the event that any lands are acquired by a
2 State as required by subsection (b) of this section, and
3 the proceeds of subsequent sale or disposal in any man-
4 ner exceed the cost of acquisition, the Secretary shall be
5 reimbursed out of such proceeds by the State in pro-
6 portion to the Secretary's share of the total costs involved
7 in the program of assessment and performance of re-
8 medial action on such lands; and in the event the State
9 does not dispose of the lands within two years after the
10 acquisition thereof or the completion of remedial action,
11 whichever comes later, the Secretary shall be so reim-
12 bursed by the State on the basis of the increase in value
13 of the lands over the acquisition costs;

14 (f) the United States shall be released from any
15 radioactive materials-related liability or claim thereof
16 related to any remedial action from the date of enact-
17 ment of this Act through and including the comple-
18 tion of any remedial action authorized by this Act. The
19 United States as used herein includes the executive de-
20 partments, the military departments, the independent
21 establishments of the United States, and corporations
22 primarily acting as instrumentalities or agencies of
23 the United States, but does not include any contractor
24 with the United States;

25 (g) unless otherwise determined by the Secretary

1 in consultation with the Nuclear Regulatory Commis-
2 sion and the Environmental Protection Agency, the
3 State shall have responsibility for the designation of
4 the disposal site within the State and ownership of any
5 residual radioactive materials involved in any remedial
6 action effort pursuant to subsection (b) of this section,
7 and shall retain ownership of the land on which they
8 are located;

9 (h) the law of the State in which the processing
10 site is located shall be applied to determine all ques-
11 tions of title, rights of heirs, and trespass; and

12 (i) the Secretary will be provided such reports,
13 accounting, and rights of inspection as the Secretary
14 deems appropriate.

15 SEC. 6. The provisions of sections 2, 3, 4, and 5 of
16 this Act shall not apply to the assessment and performance
17 of remedial action in connection with residual radioactive
18 materials resulting from uranium ore processing operations
19 formerly conducted on lands (a) held in trust by the United
20 States for any Indian, or for any Indian tribe, band, group,
21 pueblo, or community (hereinafter referred to as "Indian
22 tribe"), or (b) owned by any Indian tribe subject to a
23 restriction against alienation imposed by the United States.
24 With respect to such materials, the Secretary is hereby
25 authorized and directed to enter into cooperative arrange-

1 ments with the Secretary of the Interior and with the Indian
2 tribes residing on such lands, under which the Secretary
3 will provide 100 per centum of the costs of a program to
4 assess radiation levels and to perform appropriate remedial
5 action to limit the exposure of individuals to radiation
6 emanating from residual radioactive materials.

7 SEC. 7. The cooperative arrangements referred to in
8 section 6 shall include, but need not be limited to, terms
9 which provide that—

10 (a) the need for and selection of appropriate reme-
11 dial action shall be determined by the Secretary, with
12 the concurrence of the Secretary of the Interior, and upon
13 consultation with the Indian tribe, the Environmental
14 Protection Agency, and others, as appropriate and shall
15 be submitted to the Nuclear Regulatory Commission for
16 review and concurrence;

17 (b) any remedial action shall be performed by the
18 Department of Energy or its authorized contractor and
19 shall be paid for by the Department of Energy;

20 (c) unless otherwise determined by the Secretary,
21 the Secretary of the Interior shall have the responsibility
22 for the continued custody of any residual radioactive
23 materials involved in any remedial action effort;

24 (d) the United States shall be released from any
25 radioactive materials-related liability or claim thereof

1 related to any remedial action from the date of enact-
2 ment of this Act through and including the comple-
3 tion of any remedial action authorized by this Act; how-
4 ever, this provision does not affect the trust responsibili-
5 ties of the Secretary of the Interior as described in sec-
6 tion 6 of this Act. The United States as used herein
7 includes the executive departments, the military depart-
8 ments, the independent establishments of the United
9 States, and corporations primarily acting as instru-
10 mentalities or agencies of the United States, but does
11 not include any contractor with the United States;

12 (e) the Secretary will be provided such reports,
13 accounting, and rights of inspection as the Secretary
14 deems appropriate.

15 SEC. 8. The Secretary may prescribe such rules and
16 regulations as he deems necessary and appropriate to carry
17 out the provisions of this Act. Notwithstanding the provi-
18 sions of subsection (a) (2) of section 553 of title 5, United
19 State Code, such rules and regulations shall be subject to
20 the notice and public participation requirements of that
21 section.

22 SEC. 9. (a) Not later than one hundred and eighty days
23 after enactment of this Act, the Environmental Protection
24 Agency shall by notice of proposed rulemaking and oppor-

1 tunity for oral presentation of views, data, and arguments,
2 prescribe standards and criteria to assure that the public
3 health, safety, and the environment are adequately pro-
4 tected in connection with remedial actions selected pur-
5 suant to sections 5 (a) and 7 (a) of this Act.

6 (b) Prior to the promulgation of any rule pursuant to
7 subsection (a) of this section the Administrator of the
8 Environmental Protection Agency shall consult with the
9 Nuclear Regulatory Commission.

10 (c) The Environmental Protection Agency shall mini-
11 mize duplication of effort and conserve administrative re-
12 sources in the establishment of the standards and criteria
13 developed pursuant to subsection (a) of this section by
14 ensuring that applicable standards and criteria, if any, de-
15 veloped by the Environmental Protection Agency under
16 other authorities, including the Resource Conservation and
17 Recovery Act of 1976, the Clean Air Act of 1970, as
18 amended, or any other Federal law relating to the protection
19 of the environment and standards and criteria developed pur-
20 suant to subsection (a) of this section are consistent, to the
21 maximum extent practicable. The Nuclear Regulatory Com-
22 mission, shall, pursuant to sections 5 (a) and 7 (a), be
23 responsible for enforcement of the standards promulgated
24 under subsection (a) of this section and for ensuring that

1 the remedial actions are performed in conformance with
2 the plan selected pursuant to sections 5 (a) and 7 (a) of
3 this Act.

4 (d) Judicial review of the Environmental Protection
5 Agency's rulemaking pursuant to subsection (a) of this
6 section may be had by any interested person in the United
7 States Court of Appeals for the Federal judicial circuit in
8 which such person resides or transacts business only upon
9 petition for review by such person filed within ninety days
10 from the date of such rulemaking, or after such date only
11 if such petition is based solely on grounds which arose after
12 such ninetieth day.

13 (e) The Department of Energy shall not commence any
14 remedial action pursuant to sections 5 (a) and 7 (a) of this
15 Act until ninety days following the promulgation of the
16 standards and criteria established pursuant to subsection (a)
17 of this section.

18 SEC. 10. There are hereby authorized to be appropriated
19 to the Department \$3,000,000 in fiscal year 1979, and in
20 subsequent years such sums as may be necessary to carry
21 out the purposes of this Act, to remain available until
22 expended.



Department of Energy
Washington, D.C. 20461

APR 27 1978

Honorable Walter F. Mondale
President of The United States Senate
Washington, D.C. 20510

Dear Mr. President:

I am transmitting herewith a proposed bill to authorize the Secretary of Energy (Secretary) to enter into cooperative arrangements with States to clean up residual radioactive materials in and around inactive uranium mill tailings sites.

This legislation would provide financial assistance to the States of Arizona, Colorado, Idaho, New Mexico, Oregon, Texas, Utah, Wyoming, Pennsylvania and any other State as determined by the Secretary to aid in the stabilization or disposal of such radioactive residues.

These residues resulted from the operation of private plants under procurement contracts with the Federal Government for processing uranium ore for the Manhattan Engineering District and the Atomic Energy Commission ("AEC") from the mid-1940's to 1970. The costs for stabilization or disposal of the radioactive residues or tailings were either not included in the procurement contracts, or were not accomplished to meet current standards for unrestricted use of the sites. Neither the AEC nor its regulatory successor, the Nuclear Regulatory Commission ("NRC") exercised regulatory jurisdiction over these radioactive residues. Licenses which were obtained have been allowed to expire.

As agency regulations and procurement contracts did not require more stringent measures to stabilize or dispose of such residues, neither the Federal Government nor the States have clear legal responsibility for cleaning up the sites. The owners are either unwilling or financially unable to clean up the sites, and the Federal Government does not have the contractual or regulatory authority to require them to do so. However, the radioactive residues

at these sites pose a possible threat to the public through exposure to low levels of radioactivity. For this reason, a joint effort should be undertaken by the Federal Government and the involved States to protect the public health.

The proposed legislation provides for a cooperative Federal/State program in which the Federal Government would pay 75 percent of the direct cost of remedial action, and the States would pay 25 percent. Where the sites are located on Indian lands, the legislation provides for Federal payment of 100 percent of the costs and also for the management of the cleanup program.

The proposed legislation excludes the following classes of sites:

1. Mills licensed by either the NRC or "agreement States", under Section 274 of the Atomic Energy Act. Under NRC's interpretation of the National Environmental Policy Act, NRC has the responsibility under the Atomic Energy Act of 1954, as amended, to assure that all mills licensed by it to process uranium ore properly clean up and stabilize mill tailings after closure. With respect to mills licensed by "agreement States", control over cleanup and stabilization of mill tailings belongs to the licensing State. This would exclude all mills currently in operation, as well as the inactive Edgemont, South Dakota mill site which is still licensed.

2. Sites owned by the Federal Government. There are two such sites: Monticello, Utah, owned by DOE, and Edgemont, South Dakota, owned by the Tennessee Valley Authority. Since they are federally owned, the States cannot be expected to participate financially in their stabilization.

3. Sites of mills which never had a Government contract. This covers the Ray Point, Texas site owned by Exxon Corporation.

The cost of remedial actions at the inactive uranium mill sites has been estimated to range from \$80 to \$125 million. This variation is due to the remedial alternatives available for the Secretary's determination: Stabilization of the uranium mill tailings on-site, or the more costly removal of the tailings to a more suitable location for long-term stabilization or other disposition.

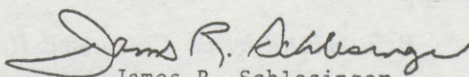
The Department of Energy currently is surveying a number of additional sites which may require remedial action. When these surveys are completed later this year, we will submit additional proposed legislation if necessary to authorize the appropriate remedial actions.

A \$3.50 million budget authority and \$3.0 million budget outlay has been included in the current fiscal year 1979 DOE budget for activities related to this proposal but not requiring new substantive legislation. A request for an additional \$3.0 million budget authority and \$2.0 million budget outlay to implement the program in fiscal year 1979 is being submitted separately.

Requirements of the National Environmental Policy Act will be adhered to throughout this program. The Environmental Protection Agency will be responsible for prescribing standards and criteria to assure the adequate protection of the public health and safety and the environment in connection with the remedial actions. The NRC will be responsible for implementing and ensuring compliance with these standards and criteria.

The Office of Management and Budget has advised that enactment of this proposed legislation would be in accord with the program of the President.

Sincerely,


James R. Schlesinger
Secretary

Enclosure

95TH CONGRESS
2D SESSION

S. 3253

IN THE SENATE OF THE UNITED STATES

JUNE 28 (legislative day, MAY 17), 1978

Mr. HART (for himself, Mr. DOMENICI, Mr. GARN, Mr. HATCH, and Mr. LAXALT) introduced the following bill; which was read twice and referred to the Committee on Environment and Public Works

AUGUST 7 (legislative day, MAY 17), 1978

The Committee on Environment and Public Works discharged, and referred to the Committee on Energy and Natural Resources

A BILL

To authorize the Secretary of Energy to enter into cooperative arrangements to contain and to reduce potential radiation exposure from residual radioactive materials, and for other purposes.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*
3 That this Act may be cited as the "Residual Radioactive
4 Materials Act of 1978".

5 SEC. 2. The Congress recognizes and assumes the com-
6 passionate responsibility of the United States to provide
7 financial assistance to the States of Arizona, Colorado, Idaho,
8 New Mexico, Oregon, Texas, Utah, Wyoming, Pennsylvania,
9 and any other State where remedial action is necessary to

1 limit the exposure of the public to radiation emanating from
2 residual radioactive materials, as hereinafter defined, from
3 former uranium ore processing sites situated in such States.

4 SEC. 3. As used in this Act—

5 (a) the term "Commission" shall mean the Nuclear
6 Regulatory Commission;

7 (b) the term "Indian tribe" shall mean any Indian
8 tribe, band, group, pueblo, or community;

9 (c) the term "processing site" shall mean a site
10 on which uranium ore was processed but shall not include
11 a site—

12 (i) where no uranium was produced for sale
13 under contract to the United States Government;

14 (ii) which was owned on January 1, 1978 by
15 the United States Government or any agency or
16 department thereof; or

17 (iii) where a license issued by the Commission,
18 the Atomic Energy Commission, or by a State pur-
19 suant to section 274 of the Atomic Energy Act of
20 1954, as amended, was in effect on or was issued
21 after January 1, 1978, for the production of a
22 uranium product derived from ores other than
23 residual radioactive materials, as hereinafter defined;

24 (d) the term "residual radioactive materials" shall
25 include those low-level radioactive wastes in the form

1 of accumulated tailings resulting from processing of ores
2 for extraction of uranium and other valuable constit-
3 uents, and also other radioactive materials such as
4 residual stock of unprocessed ores or low grade materials,
5 and ground in the vicinity of the mill or processing site
6 which has become contaminated with radionuclides,
7 including radium-226, derived from the site; and

8 (e) the term "Secretary" shall mean the Secretary
9 of Energy.

10 SEC. 4. The Secretary is hereby authorized and directed
11 to enter into cooperative arrangement with each State de-
12 scribed in section 2 of this Act for the purpose of providing
13 assistance to cover the entire cost of a joint Federal-State
14 program to assess levels of radiation emanating from residual
15 radioactive materials and to perform appropriate remedial
16 action to limit exposure of individuals to such radiation.

17 SEC. 5. Each cooperative arrangement referred to in
18 section 4 of this Act shall include, but not be limited to, terms
19 which provide that—

20 (1) the selection of appropriate remedial action
21 shall be determined by the Secretary upon concurrence
22 of the State and the Commission, and shall be submitted
23 to the Environmental Protection Agency, and others as
24 appropriate, for review and comment;

1 (2) the Secretary shall have a right of approval of
2 any disposal or custody plan;

3 (3) unless otherwise determined by the Secretary,
4 any remedial action shall be performed by the Depart-
5 ment of Energy or its authorized contractor and shall be
6 paid for in accordance with the provisions of section 4 of
7 this Act;

8 (4) unless otherwise determined by the Secretary,
9 prior to the implementation of any remedial action in-
10 volving the removal of residual radioactive materials to a
11 more suitable location, State ownership of the original
12 processing site shall be accomplished. The requirement
13 for State ownership shall not apply to lands in the gen-
14 eral vicinity of the processing site which may require
15 decontamination activities as a result of incidental spread
16 of radioactive substances, or to lands or structures where
17 radioactive materials removed from the processing site
18 have been used for construction-related purposes. Subject
19 to the Secretary's approval, the requirement for State
20 ownership of the land may be met by means of a pur-
21 chase option exercisable at any time within two years
22 after remedial work is completed;

23 (5) in the event that any lands are acquired by a
24 State as required by subsection (4) of this section, and

1 the proceeds of subsequent sale or disposal in any manner
2 exceed the cost of acquisition, the Secretary shall be
3 reimbursed out of such proceeds by the State in propor-
4 tion to the Secretary's share of the total costs involved
5 in the program of assessment and performance of re-
6 medial action on such lands; and in the event the State
7 does not dispose of the lands within two years after the
8 acquisition thereof or the completion of remedial action,
9 whichever comes later, the Secretary shall be so re-
10 imbursed by the State on the basis of the increase in
11 value of the lands over the acquisition costs;

12 (6) prior to the commencement of any remedial
13 action under the terms of this Act, the United States
14 shall be required to obtain ownership of the land to be
15 designated as a disposal site. The Secretary, upon con-
16 currence by the State and the Commission, shall be re-
17 sponsible for the designation of such sites, as well as for
18 their perpetual care. Ownership of residual radioactive
19 materials involved in any remedial action effort under
20 subsection (b) of this section shall be transferred to the
21 United States;

22 (7) the law of the State in which the processing
23 site is located shall be applied to determine all questions
24 of title, rights of heirs, and trespass; and

1 (8) the Secretary will be provided such reports,
2 accounting and rights of inspection as the Secretary
3 deems appropriate.

4 SEC. 6. The provisions of sections 2, 3, 4, and 5 of this
5 Act shall not apply to the assessment and performance of
6 remedial action in connection with residual radioactive ma-
7 terials resulting from uranium ore processing operations for-
8 merly conducted on lands (a) held in trust by the United
9 States for any Indian or Indian tribe or (b) owned by any
10 Indian tribe subject to a restriction against alienation im-
11 posed by the United States. With respect to such materials,
12 the Secretary is hereby authorized and directed to enter into
13 a cooperative arrangement with the Secretary of the Interior
14 and with each Indian tribe residing on such lands, for the
15 purpose of providing assistance to cover the entire cost of a
16 program to assess levels of radiation emanating from residual
17 radioactive materials and to perform appropriate remedial
18 action to limit the exposure of individuals to such radiation.

19 SEC. 7. Each cooperative arrangement referred to in
20 section 6 shall include, but need not be limited to, terms
21 which provide that—

22 (1) the need for and selection of appropriate reme-
23 dial action shall be determined by the Secretary, with
24 the concurrence of the Secretary of the Interior and the
25 Commission, and upon consultation with the Indian

1 tribe, the Environmental Protection Agency, and others
2 as appropriate;

3 (2) any remedial action shall be performed by the
4 Department of Energy or its authorized contractor and
5 shall be paid for by the Department of Energy;

6 (3) the Secretary shall be responsible for the con-
7 tinued custody of any residual radioactive materials in-
8 volved in any remedial action effort; and

9 (4) the Secretary will be provided such reports,
10 accounting and rights of inspection as the Secretary
11 deems appropriate.

12 SEC. 8. The Secretary may prescribe such rules and
13 regulations as he deems necessary and appropriate to carry
14 out the provisions of this Act. Notwithstanding the provisions
15 of subsection (a) (2) of section 553 of title 5, United States
16 Code, such rules and regulations shall be subject to the notice
17 and public participation requirements of that section.

18 SEC. 9. (a) Within one hundred and eighty days after
19 enactment of this Act, the Commission shall establish regula-
20 tions and standards with respect to all phases of handling and
21 disposal of residual radioactive materials to assure that the
22 public safety and health and the environment are adequately
23 protected by the remedial actions undertaken pursuant to the
24 terms of this Act.

25 (b) The Commission shall minimize the duplication of

1 effort in the establishment of the standards and criteria
2 developed pursuant to subsection (a) of this Section by
3 insuring that such standards and criteria are consistent, to
4 the maximum extent possible, with the applicable provisions
5 of the Resource Conservation and Recovery Act of 1976,
6 the Clean Air Act of 1970, the National Environmental
7 Policy Act of 1969, each as amended, and any other Federal
8 law relating to the protection of the environment.

9 (c) The Commission shall be responsible for enforce-
10 ment of the standards promulgated under subsection (a) of
11 this section and for insuring that the remedial actions are
12 performed in conformance with the plan selected pursuant to
13 sections 5 (a) and 7 (a) of this Act.

14 (d) Judicial review of the Commission's rulemaking
15 pursuant to subsection (a) of this section may be had by
16 any interested person in the United States court of appeals of
17 the United States for the Federal judicial circuit in which
18 such person resides or transacts business only upon petition
19 for review by such person filed within ninety days from the
20 date of such rulemaking, or after such date only if such peti-
21 tion is based solely on grounds which arose after such
22 ninetieth day.

23 (e) The Department of Energy shall not commence any
24 remedial action pursuant to sections 5 (a) and 7 (a) of this
25 Act until ninety days following the promulgation of the

1 standards and criteria established pursuant to subsection (a)
2 of this section.

3 SEC. 10. The Secretary, in consultation with the Com-
4 mission and the State, shall be responsible for the prepara-
5 tion of all environmental impact statements that may be re-
6 quired by the National Environmental Policy Act of 1969,
7 as amended, for remedial actions undertaken pursuant to this
8 Act.

9 SEC. 11. There are hereby authorized to be appropriated
10 to the Department of Energy \$125,000,000 to carry out the
11 purposes of the Act to remain available until expended.

Senator HASKELL. I would like to welcome Senator Hart to the subcommittee hearing.

STATEMENT OF HON. GARY HART, A U.S. SENATOR FROM THE STATE OF COLORADO

Senator HART. Thank you, Mr. Chairman. I appreciate the opportunity to testify on the subject here today. As your opening statement properly suggested, this is a very serious problem, not only for the State of Colorado but our sister States across the country. On its face, it is in fact an issue of waste disposal, one of the more serious issues facing our country, not only in the energy area but across our society today, but even more deeply and profoundly I think it is an issue of government responsibility. It is that theme I would like to address a few brief remarks here.

Mr. Chairman, in our State and others, there are millions of tons of wastes from uranium mining and milling operations that have not been disposed of. They have been abandoned and left exposed, and they pose a serious threat to health and safety of potentially millions of people of this country.

The legislation before your committee responds to one part of this threat; namely, the radiation from 22 abandoned uranium mining and milling sites in eight States. Nine of these sites are in our State. The rest are located in Arizona, Idaho, New Mexico, Wyoming, Oregon, Texas, and Pennsylvania.

In terms of the quantity of the volume of waste, we are talking about, the General Accounting Office says it is about 125 million cubic feet of tailings weighing more than 25 million tons abandoned at these 22 sites.

Mr. Chairman, mill tailings are just as radioactive as the original uranium ore from which they come. In fact, if tailings are not properly controlled, they can be more dangerous than radioactive wastes generated by powerplants and nuclear weapons programs. The people do not need to come into direct contact with tailings to be exposed to this radioactive hazard, because the radiation from tailings escapes and travels in the form of radon gas which can cause leukemia and other forms of cancer.

Despite this threat to public health, tailings, as I have indicated, have been left dangerously exposed near several populated areas. You have mentioned our situation in Grand Junction. Salt Lake City is another example. In both of these sites and other sites, uranium mill tailings have been left unattended near schools, homes, and offices and have in fact been used on some occasions for construction purposes. People living in and around these sites are daily exposed to radiation levels as much as seven times greater than the levels permitted inside uranium mines.

As you have rightly indicated, the Colorado Department of Health has looked into this issue and they are conducting a study exposed to mill tailings. The evidence is only preliminary. But the evidence collected to date indicates the incidence of leukemia in these areas is almost double that in any other part of Colorado. Although the direct connection to the radon gas from tailings has not yet been scientifically proved, this high incidence of leukemia is rightfully alarming.

Furthermore the General Accounting Office has concluded in a report issued just last month, that radiation from the five worst sites will cause as many as 1,000 cases of cancer in the next century. Obviously, if these tailings are not properly disposed of, that trend will continue for hundreds of thousands of years, resulting in perhaps hundreds of thousands of cases of cancer.

Mr. Chairman, with the support of my colleagues from the States of Utah, New Mexico, and Nevada, I have introduced legislation which would authorize and direct the Federal Government to assume responsibility for this serious health hazard. This legislation was drafted in cooperation with and the assistance of relevant State agencies in both our States of Colorado and Utah and has the endorsement of both of those States.

The bill is similar in intent to legislation proposed by the administration and introduced by request by Senator Jackson. Although the administration should be commended, I think, for focusing attention on the issue, its proposal has several serious deficiencies which my bill, S. 3253, seeks to remedy. First, that bill requires the Federal Government to pay the entire cost of cleaning up the mill tailings of the 22 sites that I mentioned. In contrast, the administration's proposal requires the Federal Government to pay only 75 percent of the costs of this remedial action, leaving the remaining 25 percent to be paid by the respective States.

Although the administration cost-sharing formula is similar to formulas used to previous legislation, I think it is totally unjustified in this case.

The remedial action called for in this legislation is necessary only because past Federal administrations and programs have failed to adequately protect public health and safety by providing some program of proper disposal of the uranium mill tailings.

As you and the committee well know, Mr. Chairman, the abandoned mill tailings at these sites resulted from mining and milling operations of private companies which processed uranium ore for the Atomic Energy Commission during the 1950's and 1960's. Processed uranium ore was delivered under fixed price contracts written by the Federal Government. Now because of the hazard from mill tailings was neither realized nor properly understood, these Government contracts did not provide for disposal of this residual radioactive waste.

I think it is very unfortunate the Atomic Energy Commission did not have the foresight at that time, and that the States did not have the authority, to require proper disposal of these mill tailings. It could have been simply included in the cost of disposal in those fixed price contracts just as we did with many if not all of the costs incurred by the contractors. But that was not done and because of that failure, there are now these millions of tons of dangerously radioactive materials which have to be cleaned up.

Mr. Chairman, since the Federal Government created the hazard it seems to me only just the Federal Government should pay the full cost of its elimination and furthermore, it is my strong opinion, failure to pay the cost 20 years ago in no way exonerates the Federal Government from assuming full financial responsibility in the late 1970's.

Mr. Chairman, the administration proposal would unjustly place serious financial burdens on individual States. Under the Department

of Energy proposal, our own State of Colorado would have to pay about \$20 million. That is about 2 percent of the State's annual budget and is equal to the cost of running all of the programs under the Colorado Department of Health with the exclusion of medicare.

I think there are several other important differences between S. 3253 and the legislation proposed by the administration. S. 3253 provides for a simpler, and I think more streamlined regulatory process. This simplicity will insure expeditious action to resolve this problem quickly and efficiently.

The bill does not set limits on Federal liability for health and safety hazards resulting from remedial action. Since the Department of Energy and the Nuclear Regulatory Commission will have concurrent role in determining the actions taken, it is totally inappropriate to limit, as the administration proposal does, the Federal liability for mistakes which could be the result of bad judgment by these agencies.

In my bill, the States are given a greater role in determining what kind of remedial action should be taken. Rather than merely serving in an advisory capacity as the administration bill suggests, the respective States should be given the role in formulating the cleanup plan. Since it is the health and safety of the people in the area that is at issue, it is only right it seems to me that they should play a large role in determining the action to be taken.

Mr. Chairman, I think Congress should move as quickly as possible in adopting legislation in this area. I think it would be inappropriate for Congress to enact this legislation without providing assurances that this tragic situation will not arise again.

The Senate Environment and Public Works Subcommittee on Nuclear Regulation has been looking at whether existing law provides that assurance. Our preliminary conclusion is that current law is not adequate.

Our committee is drafting legislation to correct this situation. Since there is a logical connection between efforts to correct past mistakes and the need to regulate possible future hazards, I would hope that our respective committees can work very closely together as mill tailings legislation proceeds through the Congress.

Mr. Chairman, almost exactly 30 years ago a very famous military leader, still alive, Gen. Omar Bradley, commented we had produced a nation of nuclear giants and ethical infants. I think that has been the problem that has plagued not only the military application of nuclear energies since World War II but also the domestic and civilian application of civilian power.

We are nuclear giants but ethical infants; this is an ethical issue, it is not a legal issue. It is not a question of jurisdiction between the States and the Federal Government. It should not really be a question of jurisdiction between the Department of Energy and the Nuclear Regulatory Commission, although those departmental-agency jealousies do occur. It is a question of responsibility of the Federal Government. Administrations come and go and Members of Congress come and go. But it has been a premise of common law for centuries that the sovereign once responsible for an action continues to be responsible even after the reign of that particular sovereign and that particular principle has applied throughout the history of this country.

In this case, the sovereign created the problem and I think the sovereign has got the responsibility to clean it up. We are talking about the lives and safety of many, many people. We are talking about what I think is bureaucratic, congressional, and administrative ignorance. I think we have an ethical responsibility to correct that, just as it was created by that agency.

By quibbling about whether the Federal Government should pay 75 percent or 90 percent, what the percent to be paid by the States is, I think we are overlooking the fundamental problem. That is, when the Government of the United States makes a mistake, it is going to be responsible for it. That is the issue I think before this committee and that is the issue my legislation attempts to address.

Senator HASKELL. Thank you very much, Senator Hart. I would like to ask a couple of questions. In your view should the Department of Energy's remedial actions be licensed by the Nuclear Regulatory Commission?

Senator HART. Yes, Mr. Chairman, I think this is the direction we should go, and that is the direction which the subcommittee which I chair is headed. I have been prepared and will introduce legislation to clarify the jurisdiction for the licensing of waste disposal. My own view is the Nuclear Regulatory Commission should have predominant influence in that area and responsibility and that will be the course that legislation takes. I certainly think that applies to uranium mill tailings which are in our discussion here today.

There is a difference between me and others in the Congress and the administration on that issue and even agencies of the administration. The testimony we have taken indicates in this case the Department of Energy—I am sorry, the Environmental Protection Agency, if it were to have responsibility for setting criteria and standards, it would take several years, perhaps 6 or 7, to establish those standards whereas the Nuclear Regulatory Commission is prepared and I think have so testified and perhaps will comment on that here today, that it has the ability and I think the background and staff capability to establish those criteria and standards in a much, much shorter period of time.

Senator HASKELL. Then that basically answers another question, as to why the EPA in your legislation has a minimal role; you feel the NRC is in a better position to make the determinations.

Senator HART. Certainly on the issue of expeditiousness. The fact is as far as we are able to tell in testimony before our committee there will be considerable delay if this were a matter left to the Environmental Protection Agency to handle in terms of establishing the standards. I don't think we can or should wait.

I think most experts agree those people's safety and lives are in jeopardy while they are debating this. Any program to put off resolution of the matter for another half decade, I think is unjustified, perhaps immoral.

Senator HASKELL. I concur with that. We will hear from EPA later on. Senator Hart, I think those are the basic questions I wanted to ask. I think your legislation is very thoughtful. We are considering your legislation, S. 3253, along with the one Senator Jackson introduced for the administration by request and along with the one Senator Garn introduced.

Yours seems like a good middle ground. I appreciate very much your coming to testify.

The last word I heard, Dr. Liverman was stuck on the Key Bridge.

Dr. LIVERMAN. I am here, sir.

Senator HASKELL. Fine. If you will come forward, sir.

STATEMENT OF DR. JAMES L. LIVERMAN, ACTING ASSISTANT SECRETARY FOR ENVIRONMENT, DEPARTMENT OF ENERGY

Dr. LIVERMAN. It is a pleasure to be here on behalf of the administration. As Senator Hart has pointed out, I think the legislation is pretty important, particularly in the Western States but it is not limited to that region.

I can handle the testimony two ways: I can read it or summarize it.

Senator HASKELL. It seems to me it would expedite things, Dr. Liverman, if you would submit it for the record and summarize it and we could get into some questions.

Dr. LIVERMAN. Thank you very much. Basically, the whole program started in 1974 in hearings before then—Senator Moss regarding the desired cleanup of the Salt Lake City pile. Over the course of the intervening 4 years, we did a general survey study which was reported to the Congress and subsequently submitted, finally, in January of this year.

The final reports were made on the study of those 22 sites that we felt should be considered all at one time in order that the Congress and the administration would have an overall feeling for the magnitude of the problem. Because of our look at the contracts, and other things, we feel neither the States nor the Federal Government are responsible in the sense of legal responsibility.

We are unable to show that the companies that produced the materials, under contract with the Government, are responsible. Some of the companies over the years have tried to maintain order. Others have abandoned the sites. Others have sold them to other people.

We are confronted today with somewhere between \$80 million and \$126 million worth of cleanup costs, in order to bring this problem under reasonable control.

The principal features of the administration's bill is it would authorize DOE to provide financial assistance to those States, the municipalities, that have the problem. It provides that DOE would provide 75 percent of the cost, and the States providing the remainder. It specifies the need for appropriate remedial action and, as Senator Hart just mentioned, in the particular bill before you from the administration, the EPA would set across-the-board general guidelines; the Nuclear Regulatory Commission would see to compliance with those.

We feel in order to prevent windfall profits to someone, the States or the Federal Government, preferably the States, should own the piles before they are cleaned up and the land before it is cleaned up, and should also own the land on which they are to be relocated.

With respect to Indian lands, the DOE would provide 100 percent.

I would like to comment on something which is not in my statement regarding the EPA development of standards. We have had under study, under my sponsorship for about 3 years, the question of cleanup

criteria for levels of radium in the soils. We have provided the EPA a very detailed report which can serve in a large measure as a basis for putting in place those regulations.

So I believe that the 5- to 6-year estimate of the Senator is perhaps a little too long; EPA could move more aggressively on it.

We requested \$3 million in fiscal year 1979 and such sums in following years as they might be needed. The reason for the \$3 million in 1979 was simply the environmental impact statements and related things will have to be put in place, agreements for the States put in place. We don't believe we can accelerate very much the rate of clean-up until those things are worked out.

Obviously, there is some disagreement on the part of Members of Congress as to whether that sharing ratio should be 75-25 or some other number, and the number, at least in the case of the House in the markup, turns out to be 90 percent by the Federal Government, 10 percent by the States.

In any case, we believe because of the tax benefits and other things the States would have derived over the time that the uranium mills were working, that the States should put up some of the cost. Furthermore, this provides an incentive for financial constraints and restraints on the part of the States in the selection of sites and putting the tailings in place.

The Garn bill has some interesting ideas, such as making grants to the States, but we do not believe this would be an appropriate mechanism because we believe we should know what it is going to cost to do it beforehand, and that no more than the actual cost should be paid for.

The administration's bill does not provide for a particular termination date because of the vagaries of when funds become available and when they can be expended. In the Grand Junction experience, where a 5-year period was thought to be adequate, it has now been extended to 8 years.

We would have no objection, however, if the Congress chose to put a termination date in the legislation. We think the important thing is that the job be done and it be cleaned up.

There are one or two other issues in the Garn bill and others that call for the States to do the cleanup. We believe these are the kind of things that should be left to the discretion of the Secretary. Provided that the States are willing to do it and are qualified to do it, then I believe we would have no objection whatsoever for their doing it.

The Garn bill provides for additional study in Salt Lake City and we think this really could lead to a delay as opposed to an acceleration. We would propose not to have an additional year of studies since the piles in Salt Lake City, in particular, have been studied in some detail.

I would like to mention one additional point which has only been touched on in passing in this bill, and that is that there is a whole other series of sites that were utilized by the Manhattan Engineer District cleaned up under regulations in effect at that time, and then turned back over to the public for use.

Beginning about 4 years ago, Dr. Ray, then Chairman of the Atomic Energy Commission, and I, decided to go back and relook at the record on those sites to see if, in fact, under today's current regulations and guidelines there was need for an added cleanup. We have finished the

first look at those sites and find something on the order of 25 to 30 of them that are probably contaminated beyond what current guidelines would allow for use by the general public.

We believe we have sufficient authority now to proceed to investigate and clean up those sites if they constitute a health hazard. However, if this is proven after further investigation, a more detailed study, and a closer estimate of the cost of cleanup that we do need additional legislation, we will be back before the Congress to request it.

But we believe we have the authority. That bill, too, would seem to be, for a rough, first estimate, somewhere between \$75 and \$150 million to clean up those sites that were left contaminated and turn them back over for public use.

With that, Mr. Chairman, I conclude my statement and will be glad to answer any questions.

Senator HASKELL. You got into some of the things I asked you about in your bill or the bill that Senator Jackson introduced by request. The term "tailings" is used; does that exclude what sometimes is known as "slag" which is the term assigned to waste materials resulting from a refining operation, or does it include—

Dr. LIVERMAN. My feeling is it does not include slag. The phrase "tailings" is meant to apply to the tailings piles themselves plus the attendant activities carried out around the mill.

Senator HASKELL. In other words, it would include not only material left at the mine but the material that was left after extracting the U_3O_8 ?

Dr. LIVERMAN. No; that is not correct.

Senator HASKELL. DOE studied 22 sites and the bill recommends cleanup of 20. Can you identify the other two sites?

Dr. LIVERMAN. One of the sites in Texas was owned by the Exxon Corp. It was never really involved in the sale of uranium to the Federal Government. We believe that is one the company should clean up. The other site is under license by the Nuclear Regulatory Commission. I believe it is in South Dakota. We undertook a study of that site at their request to see what the current situation was. I don't believe it is an active mill. But it is still under license. Perhaps Chairman Hendrie could talk more effectively to that. There are some provisions in the license for the company that was doing the milling or has done it, to put those tailing piles in suitable, safe conditions.

Senator HASKELL. Would you consider mined wastes, for example, should be considered within the purview of this bill, or are you just looking at the so-called tailings from the mills?

Dr. LIVERMAN. I believe that in all of the discussions we have had, the tailings related to the mines, specifically, have not been incorporated into the bill's coverage.

Senator HASKELL. Do you have any views on this either as to the hazards to the public presented by those wastes or the role the Department of Energy should take?

Dr. LIVERMAN. Senator, it seems to me that is a question that needs more study. We did not take that into consideration in our studies. We were more concerned about tailings piles per se because it is very clear to us that those, in general, are located nearer to population areas than are the mines themselves.

I think from the administration's standpoint, we would have to go back and address that as a separate question and not as a piece of this particular legislation. The degree of responsibility there is not very clear.

Senator HASKELL. Would I be correct in saying this is something the DOE will address, or is this something you feel some other Department would address, (a) as to the danger to the public from the mines, and (b) should OSHA do something about it. Is this going to be something you proceed to look at?

Dr. LIVERMAN. This is not something I believe DOE has had time to look at, but the Federal Government among all its Departments should address this question or perhaps do it jointly with the States.

Senator HASKELL. We are going to hear tomorrow from the Department of Health in my State of Colorado, and I might just ask him what his views are as to the degree of danger to the public resulting from this and perhaps we could work up some material on it.

Thank you very much, sir. I have no further questions. I appreciate your being here.

[The prepared statement of Dr. Liverman follows:]

STATEMENT OF DR. JAMES L. LIVERMAN, ACTING ASSISTANT SECRETARY FOR ENVIRONMENT, DEPARTMENT OF ENERGY

Mr. Chairman and members of the subcommittee; I am pleased to appear before you today to discuss S. 3078, the proposed "Residual Radioactive Materials Act of 1978," and S. 3008, a bill entitled the "Uranium Mill Site Restoration Act of 1978," sponsored by Senator Garn of Utah and others. S. 3078, filed by Mr. Jackson, I shall refer to as the Administration's bill.

A full scale investigation of the inactive uranium mill tailings site situation began as a result of hearings held in March 1974 on bills introduced by Senator Frank Moss and Congressman Wayne Owens of Utah for remedial action of the Vitro site in Salt Lake City. At these hearings both the Environmental Protection Agency (EPA) and the Atomic Energy Commission (AEC) recommended a study of all inactive uranium mill tailings sites in the Western States in order to provide the Congress with information concerning the full implications of undertaking the cleanup program. In that hearing, I proposed a two phase study. The initial or rapid survey phase was completed and a report was sent to the Congress in October 1974. It outlined the situation on each site and pointed out the site problems needing particular attention.

The second phase, which was a detailed engineering assessment of 22 sites in 8 Western States, was initiated in 1975; the reports have been sent to Congress as they were completed. The final group of reports was forwarded in January 1978.

On the basis of these studies, the Administration has proposed legislation to authorize a remedial action program to clean up these inactive uranium mill tailing sites and to reduce, to the greatest extent practicable, possible public exposure to radiation from the waste residues left behind from the ore processing operations.

This legislation was necessary because it has been difficult to fix legal responsibility for the tailings problem. The Federal Government and States do not appear to be legally responsible since they exerted neither operational control nor regulatory jurisdiction over the tailings. The Federal Government was simply a purchaser of product from a number of privately-owned companies.

Insofar as the companies that operated the mills are concerned, we have a rather mixed bag of circumstances. Some companies have acted responsibly and endeavored to establish and maintain a cover of vegetation on the tailings to stop wind of water erosion. Others have sold the properties or simply allowed the lease on the land to expire. Some of the corporations no longer exist. There were no requirements in the Government contracts for tailings stabilization and the companies were not aware of the potential health and safety risks resulting from exposure to the tailings. It, therefore, is questionable whether any companies are legally responsible. In any event, the government has no authority

to require past or present owners to perform remedial action. If the work is to be undertaken promptly, and we believe the circumstances justify it, then we see no practicable alternative to undertaking the remedial action as a matter of compassionate responsibility of the United States to its citizens in order to remedy an unforeseen situation where no other remedy under the law is apparent.

In addition to the above mentioned studies, we are currently in the process of evaluating a number of additional sites at which a variety of materials from uranium and thorium ores to refined products were handled or processed. Most of these properties were released from Federal control in the period 1943 to 1970. However, once this survey is completed, the need for remedial action determined, and issues of legal responsibility settled, DOE will be in a position to determine which, if any, of these properties could be included in this legislation.

The principal features of the Administration's bill (S. 3078) are:

1. It authorizes the DOE to provide financial assistance to 9 named States, and others if they are found to have similar situations.

2. It provides that DOE will provide 75 percent of the cost of a joint Federal/State remedial action program.

3. It specifies that the need for and selection of appropriate remedial action will be determined by DOE in consultation with the States, EPA, and other appropriate parties, and submitted for review and concurrence to the Nuclear Regulatory Commission (NRC).

4. If the remedial action selected requires the tailings to be removed from an existing site, it requires (unless otherwise determined by the Secretary of Energy) State ownership of the tailings, the land on which they are located, and the land to which they are relocated.

5. With respect to Indian land, DOE will provide 100 percent of the costs.

6. EPA, in consultation with NRC, will prescribe standards and criteria within 180 days of enactment; NRC will be responsible for their implementation and enforcement.

7. DOE would not begin any remedial action until 90 days after promulgation of standards and criteria.

8. \$3 million are authorized for FY 1979, and in subsequent years such sums as are necessary to carry out the purposes of the Act.

9. The bill releases the United States from any radioactive materials-related liability from the date of enactment through the completion of any remedial action. This provision does not release any contractor from liability for negligence or work performed not in conformance with the regulations to be prescribed by EPA.

The Administration's bill is similar in many respects to S. 3008 sponsored by Senator Garn of Utah. However, there are some fundamental differences—the most significant of which is program funding. Under S. 3008, the States would pay 25 percent of the cost of remedial action on only those structures built with mill tailings in locations away from the tailings piles. The Federal Government would be expected to pay all other costs. Aside from the Grand Junction, Colorado, site, there are very few locations characterized by a similar use of tailings for construction purposes. For example, seventeen such locations were identified in Salt Lake City. There are approximately 700 in Grand Junction. The view of the DOE is (a) because the cleanup of the uranium mill tailings sites does not reflect purely a Federal interest but benefits the States as well, and (b) as the States are to have a voice in the selection of the remedial action alternative and other responsibilities, a cooperative Federal/State partnership is the most equitable means of financing the program. Otherwise, there is little incentive for financial constraints on part of the States. The States also had employment and tax benefits while the plants were operating, and still do from continuing operations of the uranium industry. The affected States will also benefit from the program because, in many cases, once the remedial action is completed, the land will be available for unrestricted use.

Finally, Title II of Public Law 92-314 established a precedent in this regard by authorizing a cooperative Federal/State program in connection with the use of tailings at Grand Junction. That legislation established the 75:25 funding ratio that is reflected in the Administration bill.

The Garn bill has some very interesting ideas such as the making of grants to the States to carry out remedial action, and the development by the applicant States of detailed site restoration plans. However, the bill would involve difficult

administrative problems as it lays down detailed procedures to be followed which we feel would be better left for development by administrative regulations such as remedial action standards and criteria. Moreover, we have difficulty with the grant provision. Grants should relate to actual program costs rather than preliminary estimates.

Because of the many uncertainties affecting time of performance, the Administration's bill has no termination date; we, however, have no objection to the inclusion of one if the Committee so desires. We suggest 8 years from enactment of authorizing legislation as a reasonable target date.

The Garn bill specifies that the States must perform the remedial action. However, if any State either fails to act within 3 years, or indicates it prefers DOE to do the work, then site restoration becomes a DOE responsibility. The Administration's bill leaves to the discretion of the Secretary whether to contract with the State or a well qualified contractor to carry out the work. Where the States are qualified and interested in carrying out the work, they may well be requested to do so.

The Garn bill calls for a pilot study in Salt Lake City to determine the contamination of structures within 10 miles of the mill site and to determine the health hazard and types of remedial action that might be used. A report on the findings of this study is required to be submitted to the President and appropriate committees of the Congress within 1 year of enactment.

We can appreciate the concern that generated this provision. However, based on our experience in the Grand Junction, Colorado, remedial action program, and the studies already completed in Salt Lake City, we do not feel another study is warranted. We need only to make such further measurements of the radiation levels in structures built with tailings as are required to determine whether or not they exceed the guidelines established by the Surgeon General for Grand Junction, Colorado.

If the structures qualify and the owners desire, we believe that the remedial action should be undertaken as soon as possible rather than delaying action until the conclusion of another study. This can be done under the Administration's bill. Since structure built with tailings result in the highest radiation levels to individuals likely to be encountered in the program, these will receive the highest priority under the Administration's bill.

There is one other bill which appears to deal in part with the areas of responsibility set out in S. 3078. This is S. 3146, the "Nuclear Waste Regulation Act of 1978" introduced by Mr. Hart of Colorado. The bill directs and authorizes the Nuclear Regulatory Commission (NRC) to license and regulate the storage and disposal of all forms of radioactive waste regardless of source of ownership. The purposes of the Act also include the establishment of "minimum Federal standards for disposal and storage of uranium mill tailings and low level radioactive wastes which may be regulated by the States."

This approach differs from S. 3078 under the EPA would prescribe the standards and criteria, while NRC would be responsible for their enforcement.

During the FY 1979 authorization and appropriation hearings, the Department of Energy provided its estimate of \$80 to \$126 million in 1977 dollars as the range of probable cost for the remedial programs depending on the particular alternative selected for each site. For the first year, \$3,000,000 is requested since the remedial work is likely to be small that year.

Mr. Chairman, this concludes my statement. I will be happy to respond to any questions you may have.

Thank you.

Senator HASKELL. Dr. Hendrie.

STATEMENT OF DR. JOSEPH M. HENDRIE, CHAIRMAN, NUCLEAR REGULATORY COMMISSION

Dr. HENDRIE. Good morning, Mr. Chairman, we thank you for this opportunity to comment on the legislation proposals to deal with the disposal of uranium mill tailings at inactive ore processing sites.

I will submit the Commission's full statement for the record and read sections of it.

Historically, the NRC and its predecessor agency have not had regulatory jurisdiction over uranium mill tailings after mill operations are terminated because tailings themselves are not licensable material. Regulatory control over tailings is exerted indirectly as part of the Commission's licensing of ongoing milling operations pursuant to licensing authority over source materials.

Therefore, after operations had ceased at the 22 inactive sites being considered and all licensable quantities of source material were removed, the regulatory staff had no further role. In addition, during the 1950's and early 1960's when operations at the sites were phased out, the AEC did not consider that the tailings posed a significant health and safety problem. With the advent of NEPA in 1970, additional authority was provided that enabled operating uranium mill licenses to be conditioned to require proper disposition and stabilization for environmental reasons after operations had ceased. Under this authority, NRC has obtained commitments from currently licensed active uranium mill operators for proper long-term disposition of mill tails.

The role of the NRC in the evaluation of the 22 inactive sites has been only peripheral. Studies of the inactive mill tailings were initiated as a result of 1974 hearings held by the Subcommittee on Raw Materials of the Joint Committee on Atomic Energy. Through these hearings, Congress assigned responsibility for the studies to the operating arm of the Atomic Energy Commission (AEC) and its successor ERDA, now DOE, with a supporting role by EPA and involved States.

NRC has concentrated its mill tailings efforts on presently operating uranium mills and proposed new mills that are subject to NRC jurisdiction. We have been working with DOE staff since 1976 on the general subject of mill tailings. We have kept DOE informed of our actions and criteria being used to upgrade and obtain decommissioning plans from uranium mills currently under license.

The NRC's position on the issue of mill tailings disposal may be summarized as follows:

1. The NRC believe that long-term release from tailings piles may pose a radiation health hazard if the piles are not effectively stabilized to minimize radon releases and prevent unauthorized use of the tailings.

2. It is important that remedial actions reflect a conservative approach to reduce the likelihood that additional efforts will be needed in the future.

3. Because of the potential long-term hazards associated with tailings piles, remedial action should be subject to review and concurrence by the Nuclear Regulatory Commission.

With these views in mind, let me now turn to the remedial action bills before the subcommittee.

We believe that the administration bill, S. 3078, lays a foundation for an effective remedial action program. An important reason for our support of S. 3078 is that this bill clearly provides for review and concurrence by the NRC before a proposed remedial action may be implemented. As we interpret the bill, this review and concurrence will assure that remedial action at a particular processing site will be per-

formed in a manner the NRC considers adequate and also consistent with general environmental standards that S. 3078 directs the Environmental Protection Agency to prescribe.

Because of the diversity of the abandoned tailings sites, a remedial action program must deal with many site specific problems and cannot, as a practical matter, adequately be regulated solely by requiring conformance to general standards. To provide site specific regulatory guidance, we believe the individual remedial action plans should be subject to NRC review and concurrence as would be required by S. 3078.

We interpret S. 3078 to establish roles for the NRC and EPA that are consistent with the complementary responsibilities of the agencies under the Atomic Energy Act pursuant to Reorganization Plan No. 3 of 1970. Under this division of responsibility, EPA sets standards to protect the general environment for radiocative hazards while the NRC regulates activity at specific remedial action sites and assures that EPA's standards will not be exceeded. We note that S. 3078 provides a consulting role by NRC to assist EPA in the development of standards applicable to the remedial actions. The experience and guidelines that NRC has developed in dealing with active mill sites should be useful to EPA in deriving these standards.

S. 3008 would assign the standard-setting task to the NRC, omitting any reference to an EPA role. In our view this exclusion ignores the substantial expertise developed by the EPA. Accordingly, we would not support this feature of S. 3008.

In contrast, we believe that S. 3078 provides for standard setting and for individual project review in a manner that provides appropriate participation by DOE, EPA, NRC, and the States themselves. In our view this approach of involving all concerned parties in developing the remedial action is most likely to assure that a satisfactory solution will be achieved. Public participation will be obtained through the Environmental Impact Statement process as carried out by DOE.

The provision in S. 3078 that DOE or its contractors shall perform the remedial action is also a strength of this proposal, and assures that the work will be carried out with a uniform degree of quality under capable and experienced supervision. NRC has found DOE personnel to be competent and dedicated. S. 3008 would assign responsibility for the actual reclamation work somewhat differently. That bill would provide for States to plan and perform remedial action, as another alternative to DOE reclamation of sites.

Each State would develop and submit its own site restoration plan as part of its application for a grant, and the Secretary's approval of each plan would be a prerequisite to its funding. We are concerned that this process could delay and extend the restoration process. The various States would be likely to present DOE with plans differing in significant respects. DOE's acceptability review of each plan could consume substantially more time and resources than DOE initiated action.

Accordingly, we do not support S. 3008 in its present form. We believe that this potential for delay is substantially avoided by S. 3078, which provides that the Secretary will select the appropriate remedial action in consultation with each State and the EPA, and then obtain NRC review and concurrence before proceeding. This procedure would

permit the Secretary to reach expeditious decisions by developing standardized plans for common site problems and limiting site-specific actions to site-unique conditions.

Having noted these advantages of the proposed legislation, I would now like to move to some other aspects of these bills which we believe need closer attention.

Both bills require State ownership of disposal sites during the period of remedial action. In addition, S. 3078 requires the State to obtain the Secretary's approval before selling any restored site. Such approval is not provided for in S. 3008. We believe that the Secretary's approval should be required before a State could sell a restored site, and the continued government ownership of disposal sites, either Federal or State, would be desirable in view of the long-term need to avoid disturbance or excavation that might undo part of the remedial action.

We believe the "enforcement" role set out for the NRC in S. 3078 needs clarification both as to its scope and with regard to the mechanism by which the NRC is expected to implement this enforcement. Normally, NRC exerts enforcement powers in a licensing context, where notice of violation, civil penalties, or license suspensions provide an ascending order of sanctions.

In the mill tailings disposal program that would be set in motion by S. 3078, the parties would be the Department of Energy and the States rather than NRC licensees.

In this situation conventional enforcement tools appear inappropriate. More congressional guidance is needed on this point and could include NRC authority to make studies and inspections and conduct monitoring to insure continuing adequate control by the custodian of a mill tailings disposal site.

Next, we note that section 5 (g) of S. 3078 gives the NRC only a consulting role in the designation of disposal sites. In our view, the selection of the disposal site for the tailings is an integral element of the remedial action plan for each site and, therefore, should be subject to NRC review and concurrence.

In the matter of financing proposed remedial work there is a significant difference between S. 3078 and S. 3008. Under S. 3008, DOE would be authorized to provide 100 percent of the cost of the on-site portion of a remedial Federal-State program. Under these circumstances the State could develop a plan largely free from any practical restraints relating to costs.

In contrast, S. 3078 provides for a 75-percent Federal contribution to the cost of assessment and remedial actions, with the States in which the inactive sites are located expected to contribute the remaining 25 percent. It would certainly seem that the Federal role in the origin of the tailings and the local and State benefits of remedial actions could justify a Federal-State cost-sharing arrangement. We note, however, that the State contributions requirement could prevent remedial action in a State that, due to financial stringency or other reasons, would rather forego the 75-percent Federal share than contribute its 25 percent. (This comment does not apply to Indian lands where both the administration bill and S. 3008 provide for full financing.)

Finally, both bills define uranium mill tailings to include accumulated tailings not only resulting from the processing of ores for the extraction of their uranium and thorium content, but also for "other valuable constituents."

This phrase introduces some ambiguity into determining what materials would be covered by the bills. For example, this language might be read to include tailings resulting from the processing of phosphate and copper ores which are also contaminated with small quantities of radioactive elements.

We, therefore, recommend that uranium mill tailings be more narrowly defined by deleting the broad phrase "other valuable constituents."

Mr. Chairman, this concludes my statement and I and my fellow commissioners would be happy to try to respond to any questions you or others on the committee may have.

I should note on behalf of Commissioner Bradford, who was not able to be with us this morning, he would like to enter a separate comment on the subject of Federal cost sharing.

Senator HASKELL. That will be received in the record, sir, if you care to submit it.

Let me ask you. How do you clean this stuff up? Do you have to run it through a mill again or what do you have to do?

Dr. HENDRIE. No, I don't think trying to process out the radioactive materials is likely to be a very cost-effective procedure, Senator. The proposals that have been made and the sort of plans that are considered and going forward here are to simply stabilize and cover the piles over—

Senator HASKELL. What do you mean by stabilize? Is that stabilized from what viewpoint?

Dr. HENDRIE. If you have a pile and you are worried about a creek upstream overflowing with spring rains and carrying that material somewhere downstream, you want to prevent such things. You want to stabilize in the sense that you move the tailings into a shallow pit. You could go back deep underground but I think for most of the disposal sites we are talking about here, that won't be practical.

You would like to pack them down so you are pretty confident they will not move around or be washed out. Then put a fairly thick earth and clay cover over them so the covering material limits the diffusion of the radon up out of the pile.

It simply cuts the atmospheric burden that otherwise would come from the radon coming up out of the pile.

Senator HASKELL. I see. Are you reasonably confident from a scientific viewpoint if you put enough earth over the radon material it won't go out through the earth?

Dr. HENDRIE. Yes, sir.

Senator HASKELL. That is a reasonably established fact?

Dr. HENDRIE. Yes, sir.

Senator HASKELL. So in some cases it would mean removal and putting them in a different place and in other cases it would mean leaving them in place and covering them with material.

Dr. HENDRIE. Just so.

Senator HASKELL. This is the reason for the Federal Government or the State owning the site, so somebody doesn't go around digging?

Dr. HENDRIE. Yes, sir. We believe Government ownership is an important part of the long-term aspect for these things.

Senator HASKELL. Let's say this radon gets covered. I presume it burns itself out or something like that. How long would it take before it was safe to go in and start digging around?

Dr. HENDRIE. Unfortunately, a very long time, Senator.

Senator HASKELL. How long?

Dr. HENDRIE. Hundreds of thousands of years. The progenitors of the radioactive material trace back to the uranium isotopes and more particularly to the thorium content in these ores. When you take the uranium out, the thorium continues to be there in the tailings material. The thorium has a long half-life, some 80,000 years. That is the source of the extremely long life. It decays through radium-236, in turn, with a 1,600-year half-life, decays to the radon gas, which is the troublemaker because the gas gets out into the atmosphere. The other materials are solid materials at ordinary temperatures and stay in the tailings pile. The radon has a short half-life.

Senator HASKELL. Is this material created in the milling process or does it exist in the ore that comes out of the mine?

Dr. HENDRIE. It is a naturally occurring material which is in the ores that are processed to obtain the uranium source material.

Senator HASKELL. When people mine, as you and I both know, all of the ore does not necessarily get to the mill. Only ore of a certain grade would get to the mill, and large piles are left outside the mine usually, from my observation.

Do these present a danger to the public?

Dr. HENDRIE. Senator, I am sorry to say I am not sure what the situation is, with what I will call mine tailings piles as contrasted to mill tailings piles. I would like to get back to you with something for the record on that point. I would say it has not been a subject of much discussion that I can recall.

But it is a valid point. I would like to have one of our experts who, I am sorry to say, are in New Mexico at a fuel cycle symposium this morning, get back to you.

Senator HASKELL. I don't feel we should delay this particular piece of legislation for that, but I would like the views of your experts. I guess I forgot to ask Dr. Liverman to put in his opinion on this subject.

But I think it would be well to have something in the hearing record for which perhaps future legislation might or might not be necessary.

[Subsequent to the hearings, NRC supplied the following:]

The NRC has not specifically addressed the question of the potential dangers of mine tailings. However, the Environmental Protection Agency was directed by the Resource Conservation and Recovery Act to perform a study of the effects of mine tailings. This study is scheduled to be completed this fall.

Senator HASKELL. Can you tell me this, Dr. Hendrie: Let's take a tailings of any mill that has processed ore of uranium-238. What is the evidence of damage to the public as of now? I guess you can ask it in several ways. How long does it take before you know damage has been done to a given individual? Then what evidence do you have of damage to human beings?

Dr. HENDRIE. We have no way of knowing these health effect things. As I understand these matters, Senator, it is not a very clear-cut matter to connect health effects to the sorts of radiation exposure that would occur from radon. You have asked, how do you know when you have a health effect? Clearly, when a cancer develops. That is a very clear-cut phenomenon.

But then the problem is, can you clearly connect that with a given radiation exposure, and I think in general you cannot. It occurs probably many years later. So far as I know, there is no way to connect the occurrence of a particular cancer with a particular radiation exposure.

Senator HASKELL. Perhaps I am asking the wrong gentleman this question. But I have read anyway there was evidence, admittedly it is not conclusive, that people living in the vicinity of some of these tailings, the incidence, for example, of leukemia was considerably higher than the national average which, of course, would be reasonable evidence. Perhaps I should ask the director of the Colorado State Health Department tomorrow or EPA.

If you have direct knowledge or indications in your files perhaps you could submit that for the record.

Dr. HENDRIE. We would be glad to, Senator. I would not want to leave the impression from my previous remark there is no way connection could be established. I should note the sort of studies that are done are ones in which you try to compare groups of the population who have overall different radiation exposures and then you try to see if there are different health effects in the two groups and establish statistical correlations.

These are very complex things. I must say there could be an argument over the way in which the statistics are done, the correlations established.

Senator HASKELL. But it can be done?

Dr. HENDRIE. Yes; and we would be glad to supply a statement for the record.

[Subsequent to the hearings, NRC supplied the following:]

The Department of Energy, in conjunction with its program identifying abandoned uranium mill tailings sites, has done a health effects assessment of each site so identified. These assessments should provide information as to the potential health effects on people living in the vicinity of uranium mill tailings.

Senator HASKELL. One further thing, in the administration's bill EPA sets the standards for cleanup. It is my understanding in the testimony of the EPA before Senator Hart's Subcommittee on Environment and Public Works the EPA said it might take them several years to get such standards together. I will ask the gentleman from EPA whether in fact that is EPA's position at the moment. But how long do you think it would take your organization to set standards?

Dr. HENDRIE. I would think less than that, Senator. We are after all now conditioning the licensing of active mills with regard to stabilization and covering of the piles when their operations are finished on a basis that we believe does provide adequate long-term control of the radon emission.

So the staff engaged in that has some basis for believing what they are doing makes good sense and I think we could work from that basis to set up site-specific guidelines for these sites we are talking about today and do it in a reasonable time.

Senator HASKELL. All right, sir. Now, in your written testimony you indicate 140 million tons of these tailings we are talking about have accumulated in the West. Yet the General Accounting Office report Senator Hart referred to in his testimony says there are 25 million tons. Are we comparing oranges and apples or is there a true conflict in the evidence here, so to speak?

Dr. HENDRIE. No, sir, I don't believe there is a conflict in the evidence. The GAO report, referring to 25 million tons refers to mill tailings at these abandoned sites, the 22 abandoned sites. The much larger number in our testimony refers to that 25 million tons at the abandoned sites plus all of the other mill tailings that are piled up since then by active mills. The 22 abandoned sites relate to activities that go back a long time ago, and there have been active mining and milling operations going on since.

Senator HASKELL. On the active mills, your people have already set standards for stabilization?

Dr. HENDRIE. The regulatory staff has done that, using its NEPA authority and NRC has specifically been doing it in the last couple of years. I would not want to leave the impression, Senator, if you subtract the 25 million tons at the old abandoned sites from the 140 and get 115 million tons that NRC has provided for adequate stabilization to cover all of that material, I believe that is not the case.

Part of that material was laid down before we got the NEPA authority and before the regulatory staff began to implement it in an aggressive way. A good deal of that material will come from mills licensed under our agreement-States program in which we turn over the regulating authority to the individual State.

I don't believe the States are requiring or did not for a long time require the same sort of stabilization conditions we now require and that most States are going along with us on and also requiring.

Senator HASKELL. Then we may have something of a gap here in the legislation.

Dr. HENDRIE. It is possible. I would like to, in order to make the record clear, since I am unable to be quite distinct on it, I would like for us to be able to submit something for the record that speaks to that interval between the abandoned sites and the time we began to fully condition licenses.

Senator HASKELL. I think you should. That possibly could be incorporated into this legislation. That is the problem we are talking about. The mine situation is a separate problem.

Dr. HENDRIE. Yes, sir.

[Subsequent to the hearings, NRC supplied the following:]

The GAO figure of 25 million tons of mill tailings refers to the mill tailings at the 22 abandoned sites identified by DOE. The 140 million tons of mill tailings includes the 25 million tons at the abandoned sites as well as active sites. The 115 million tons at the active sites are regulated by the NRC or by a state under NRC's Agreement States Program. The NRC has commitments from mill owners to stabilize the approximately 35 million tons of tailings at mills under its jurisdiction. The Agreement States have indicated that they are seeking similar commitments regarding the mill tailings under their jurisdiction.

Studies of the inactive mill tailings were initiated as a result of 1974 hearings held by the Subcommittee on Raw Materials of the Joint Committee on Atomic Energy. Through these hearings, Congress assigned responsibility for the studies to the operating arm of the Atomic Energy Commission (AEC) and its successor ERDA, now DOE, with a supporting role by EPA and involved states. NRC has been only peripherally involved in the studies of the inactive tailings sites and has concentrated its efforts on presently operating uranium mills and proposed new mills that are subject to NRC jurisdiction.

NRC has provided to DOE the staff's interim performance objectives it is using to evaluate mill tailings waste management programs at operating and proposed new mills but has not been asked to review the studies of the inactive sites. Although the adequacy of these studies has been criticized, it is the NRC's im-

pression that they have served the initial purpose of scoping some of the problems associated with each site and estimating costs for certain remedial actions. However, most of these studies were completed before the NRC interim performance objectives were made available. More detailed evaluations will be required before a remedial action plan can be developed for each site.

The NRC has no statutory jurisdiction for mine wastes and consequently has not addressed the question of their potential dangers. However, the Environmental Protection Agency is directed by the Resources Conservation and Recovery Act (RCRA) to perform a study of the effects of mine wastes. We understand that EPA has done preliminary studies that indicate that the radium content of uranium mine wastes is approximately 10% of the content of uranium mill tailings per pound. While mine wastes are substantially less radioactive than mill tailings, the material would be unlikely to be acceptable for unrestricted use and, according to EPA, will probably require some regulatory control.

EPA has informed us that they are presently performing a study on how to implement this regulatory control under this RCRA authority and that they expect to have a decision in early 1979 regarding mine wastes in general. This would be followed shortly thereafter with a decision specifically related to uranium mine wastes.

Senator HASKELL. I think that concludes the questions we have, Dr. Hendrie. Thank you for your cooperation. You have helped us a lot.

[The prepared statement of Dr. Hendrie and separate remarks of Commissioner Bradford follow:]

STATEMENT OF DR. JOSEPH M. HENDRIE, CHAIRMAN, NUCLEAR
REGULATORY COMMISSION

Mr. Chairman, thank you for this opportunity to comment on the legislative proposals to deal with the disposal of uranium mill tailings at inactive ore processing sites.

Before I discuss the Commission's views on the bills now before the Subcommittee, I think it would be useful to describe briefly the nature of the potential health hazard associated with uranium mill tailings piles. As a result of many years of uranium ore processing, about 140 million tons of tailings have now accumulated at milling sites in the western United States. Unlike high-level radioactive waste from the back end of the nuclear fuel cycle, which contains products of the fission reaction, mill tailings contain only naturally occurring radioactive elements, in small quantities. The radioactive decay of these elements leads to production of radon, a radioactive gas with a half-life of about four days, which can diffuse from a tailings pile into the atmosphere and subsequently expose persons to radiation far away from the pile. The increased exposure compared to exposure from radon already in the atmosphere from other sources is exceedingly slight, but this increase is in effect permanent. This is because radon production in mill tailings continues for times of the order of a hundred thousand years, so the tailings pile becomes a perpetual source injecting a small amount of radon into the atmosphere, unless some action is taken to keep the radon from escaping.

The health effects of this radon production are tiny as applied to any one generation, but the sum of these exposures can be made large by counting far into the future, large enough in fact to be the dominant radiation exposure from the nuclear fuel cycle. Whether it is meaningful to attach significance to radiation exposures thousands of years in the future, or conversely, whether it is justifiable to ignore them, are questions without easy answers. The most satisfactory approach is to require every reasonable effort to dispose of tailings in a way that minimizes radon diffusion into the atmosphere.

Historically, the NRC and its predecessor agency have not had regulatory jurisdiction over uranium mill tailings after mill operations are terminated because the tailings are not themselves licensable material. Regulatory control over tailings is exerted indirectly as part of the Commission's licensing of on-going milling operations pursuant to licensing authority over source materials. Therefore, after operations had ceased at the 22 inactive sites being considered and all licensable quantities of source material removed, the regulatory staff had no further role. In addition, during the 1950's and early 1960's when operations at the sites were phased out, the AEC did not consider that the tailings posed

a significant health and safety problem. With the advent of NEPA in 1970, additional authority was provided that enabled operating uranium mill licenses to be conditioned to require proper disposition and stabilization for environmental reasons after operations had ceased. Under this authority, NRC has obtained commitments from currently licensed active uranium mill operators for proper long-term disposition of mill tails.

The role of the NRC in the evaluation of the 22 inactive sites has been only peripheral. Studies of the inactive mill tailings were initiated as a result of 1974 hearings held by the Subcommittee on Raw Materials of the Joint Committee on Atomic Energy. Through these hearings, Congress assigned responsibility for the studies to the operating arm of the Atomic Energy Commission (AEC) and its successor ERDA, now DOE, with a supporting role by EPA and involved states. NRC has concentrated its mill tailings efforts on presently operating uranium mills and proposed new mills that are subject to NRC jurisdiction. We have been working with DOE staff since 1976 on the general subject of mill tailings. We have kept DOE informed of our actions and criteria being used to upgrade and obtain decommissioning plans from uranium mills currently under license. NRC has not been asked to review the studies of the inactive sites.

The adequacy of these studies has been criticized by others. In particular, the Ford, Bacon and Davis Utah study of the inactive site of Ambrosia Lake, New Mexico was found unsatisfactory by the state. Although NRC has the impression that these studies have served the initial purpose of scoping some of the problems associated with each site and estimating costs for certain remedial actions, we agree that the Ambrosia Lake study falls short of identifying options for remedial actions that the NRC would be likely to view as adequate. Most of these studies were completed before the NRC interim performance objectives were made available. Consequently there may be similar problems with remedial options identified for other inactive tailings sites.

The NRC's position on the issue of mill tailings disposal may be summarized as follows:

1. The NRC believes that long-term release from tailings piles may pose a radiation health hazard if the piles are not effectively stabilized to minimize radon releases and prevent unauthorized use of the tailings.

2. It is important that remedial actions reflect a conservative approach to reduce the likelihood that additional efforts will be needed in the future.

3. Because of the potential long-term hazards associated with tailings piles, remedial action should be subject to review and concurrence by the Nuclear Regulatory Commission.

With these views in mind, let me now turn to the remedial action bills before the subcommittee.

We believe that the Administration bill, S. 3078 lays a foundation for an effective remedial action program. An important reason for our support of S. 3078 is that this bill clearly provides for review and concurrence by the NRC before a proposed remedial action may be implemented. As we interpret the bill, this review and concurrence will assure that remedial action at a particular processing site will be performed in a manner the NRC considers adequate and also consistent with general environmental standards that S. 3078 directs the Environmental Protection Agency to prescribe.

Because of the diversity of the abandoned tailings sites, a remedial action program must deal with many site specific problems and cannot, as a practical matter, adequately be regulated solely by requiring conformance to general standards. To provide site specific regulatory guidance we believe the individual remedial action plans should be subject to NRC review and concurrence as would be required by S. 3078.

We interpret S. 3078 to establish roles for the NRC and EPA that are consistent with the complementary responsibilities of the agencies under the Atomic Energy Act pursuant to Reorganization Plan No. 3 of 1970. Under this division of responsibility, EPA sets standards to protect the general environment from radioactive hazards while the NRC regulates activity at specific remedial action sites and assures that EPA's standards will not be exceeded. We note that S. 3078 provides a consulting role by NRC to assist EPA in the development of standards applicable to the remedial actions. The experience and guidelines that NRC has developed in dealing with active mill sites should be useful to EPA in deriving these standards.

S. 3008 would assign the standard-setting task to the NRC, omitting any reference to an EPA role. In our view this exclusion ignores the substantial expertise developed by the EPA. Accordingly, we would not support this feature of S. 3008.

In contrast, we believe that S. 3078 provides for standard-setting and for individual project review in a manner that provides appropriate participation by DOE, EPA, NRC, and the states themselves. In our view this approach of involving all concerned parties in developing the remedial action is most likely to assure that a satisfactory solution will be achieved. Public participation will be obtained through the Environmental Impact Statement process as carried out by DOE.

The provision in S. 3078 that DOE or its contractors shall perform the remedial action is also a strength of this proposal, and assures that the work will be carried out with a uniform degree of quality under capable and experienced supervision. NRC has found DOE personnel to be competent and dedicated. S. 3008 would assign responsibility for the actual reclamation work somewhat differently. That bill would provide for states to plan and perform remedial action, as another alternative to DOE reclamation of sites. Each state would develop and submit its own site restoration plan as part of its application for a grant, and the Secretary's approval of each plan would be a prerequisite to its funding. We are concerned that this process could delay and extend the restoration process. The various states would be likely to present DOE with plans differing in significant respects. DOE acceptability review of each plan could consume substantially more time and resources than DOE initiated action. Accordingly, we do not support S. 3008 in its present form. We believe that this potential for delay is substantially avoided by S. 3078, which provides that the Secretary will select the appropriate remedial action in consultation with each state and the EPA, and then obtain NRC review and concurrence before proceeding. This procedure would permit the Secretary to reach expeditious decisions by developing standardized plans for common site problems and limiting site-specific actions to site-unique conditions.

Having noted these advantages of the proposed legislation, I would now like to move to some other aspects of these bills which we believe need closer attention.

Both bills require state ownership of disposal sites during the period of remedial action. In addition, S. 3078 requires the state to obtain the Secretary's approval before selling any restored site. Such approval is not provided for in S. 3008. We believe that the Secretary's approval should be required before a state could sell a restored site, and the continued government ownership, of disposal sites, either federal or state would be desirable in view of the long-term need to avoid disturbance or excavation that might undo part of the remedial action.

We believe the "enforcement" role set out for the NRC in S. 3078 needs clarification both as to its scope and with regard to the mechanism by which the NRC is expected to implement this enforcement. Normally, NRC exerts enforcement powers in a licensing context, where notice of violation, civil penalties, or license suspensions provide an ascending order of sanctions. In the mill tailings disposal program that would be set in motion by S. 3078, the parties would be the Department of Energy and the states rather than NRC licensees. In this situation conventional enforcement tools appear inappropriate. More congressional guidance is needed on this point and could include NRC authority to make studies and inspections and conduct monitoring to ensure continuing adequate control by the custodian of a mill tailings disposal site.

Next, we note that Section 5(g) of S. 3078 gives the NRC only a consulting role in the designation of disposal sites. In our view, the selection of the disposal site for the tailings is an integral element of the remedial action plan for each site and, therefore, should be subject to NRC review and concurrence.

In the matter of financing proposed remedial work there is a significant difference between S. 3078 and S. 3008. Under S. 3008 DOE would be authorized to provide 100 percent of the cost of the on-site portion of a remedial Federal-State program. Under these circumstances the state could develop a plan largely free from any practical restraints relating to costs. In contrast, S. 3078 provides for a 75 percent federal contribution to the cost of assessment and remedial actions, with the states in which the inactive sites are located expected to contribute the remaining 25 percent. It would certainly seem that the Federal role in the origin of the tailings and the local and state benefits of remedial actions could justify a Federal-state cost-sharing arrangement. We would note, however, that the state contributions requirement could prevent remedial action in a state that, due to financial stringency or other reasons, would rather forgo the 75 percent federal share than contribute its 25 percent. (This comment does not apply to Indian lands, where both the Administration bill and S. 3008 provide for full financing).

Finally, both bills define uranium mill tailings to include accumulated tailings not only resulting from the processing of ores for the extraction of their uranium and thorium content, but also for "other valuable constituents." This phrase introduces some ambiguity into determining what materials would be covered by the bills. For example, this language might be read to include tailings resulting from the processing of phosphate and copper ores which are also contaminated with small quantities of radioactive elements. We therefore recommend that uranium mill tailings be more narrowly defined by deleting the broad phrase "other valuable constituents."

Mr. Chairman, this concludes my statement, and I and my fellow Commissioners would be happy to try to respond to any questions you or others on the Committee may have.

SEPARATE REMARKS OF COMMISSIONER BRADFORD

I concur in the Chairman's testimony with one exception. That exception relates to the matter of Federal-State cost-sharing discussed on page 10 of the prepared remarks. I do not believe that the cost-sharing proposal of 75 percent Federal contribution and 25 percent state contribution is necessarily the correct one. I do not feel that NRC is in a position to decide on or endorse any particular formula. In any case we would certainly need more information to make a reasoned endorsement of any specific figures.

Senator HASKELL. Dr. Rowe.

STATEMENT OF DR. WILLIAM D. ROWE, DEPUTY ASSISTANT ADMINISTRATOR FOR RADIATION PROGRAMS, ENVIRONMENTAL PROTECTION AGENCY

Dr. ROWE. Mr. Chairman, I would like to submit my whole testimony for the record and I will try to shorten the time by addressing the key problems you are interested in; the standards activities and activities other than mills.

Senator HASKELL. That will be fine. Your full statement will be included in the record.

Dr. ROWE. Let me say at the outset that EPA is involved with a very broad range of sources of radium and radon in the natural environment of which mill tailings is one such source. We have broad authority in these areas under the Atomic Energy Act as well as under the Clean Air Act (CAA) and the Resources Conservation and Recovery Act (RCRA). We have therefore an interest that is very wide.

In the next 6 weeks we will propose guidance for the reclamation of lands built on reclaimed phosphate mine lands which have a very high content of radium in them. We are well on our way to developing standards for these. Furthermore, under our Clean Air Act studies, we are investigating both operating and inactive uranium mines. We have completed some studies on these, and, for operating mines we have found the biggest source of radon comes from the air ventilation shafts of the mines. As we look at the existing uranium mines we are getting some idea of what the problems might be. We do have authorities to address these under our present legislative authorities under the Clean Air Act and RCRA. Funds to take care of them is another story.

In approaching standards for the 22 particular abandoned mines under consideration here, there has been confusion in Senator Hart's committee of the fact we are talking of two different things with two

different kinds of standards. First, we are developing standards for the 22 existing inactive mill tailings piles which presently exist. We really think something has to be done about these expeditiously.

Second, the new mills which are going to be built are going to be creating new sets of mill tailing problem. We feel very strongly, because these will be around for a very long time, we ought to do the best job possible of disposing of these tailings.

We feel we will have no problem in terms of time setting expeditious standards for the existing 22 inactive mills.

Senator HASKELL. For the new mills?

Dr. ROWE. For the old abandoned sites. We believe they can be set well within the 180 days prescribed. We think standards proposed for phosphate lands will generally be applicable to these situations. Furthermore, we have input from the DOE, and the Nuclear Regulatory Commission which we have already taken into account.

I see no problem with us setting standards expeditiously well within the 180 days for the 22 abandoned sites. We also feel there is a real lack in the evaluation of new technology available to stabilize or to bury tailings to take care of these sites. We found that the present methods used at the 22 sites are certainly unacceptable.

A number of different techniques are going to be tried by DOE in correcting the 22 existing sites. We feel the research and development aspects that are involved in the different types of disposal we will undergo with these 22 mill site problems will be very valuable in determining what we might want to do finally for new mills when they are implemented. We feel this information is the kind of thing that ought to be used as we focus further downstream in addressing the standards for new mills. I think keeping the standards for the 22 sites separate from standards for new mills is very important.

Senator HASKELL. Basically what you are telling me, or I am asking this as a question, are you telling me we are not yet certain that the putting of overburden—for lack of a better word—on a tailings site that is emitting radon, are you telling me we are not absolutely sure that will get the job done?

Dr. ROWE. Yes, sir, at this time, that is the case. In fact, some of the methods that have been prescribed for taking care of some of these 22 piles have been to move them and put them into other locations, which would be better than just covering them with overburden.

Senator HASKELL. Let's assume no stream was going down, as Dr. Hendrie mentioned. Let us assume they are just sitting out on dry ground. If I visualize it right, the tailings spread out, there could be considerable overburden placed upon them and that would be a method of stabilization. I guess what you are telling me is, we are not sure we should not be doing something else.

Dr. ROWE. Let me put it this way, Senator: Suppose I was going to start a new mill and I was going to determine the location of where I was going to put the tailings. I would like to immediately find a location where I would not have that stream that might at some time cut into the pile. I might find a depression in the ground, to put the tailings into and cover them with overburden, so that erosion and things of this type would tend to help stabilize the pile as opposed to wearing it away.

Senator HASKELL. I think, at least I got from Dr. Hendrie, to make sure there would not be any stream around, any disturbance, so it could get into any underground aquifer, there wouldn't be any erosion—I guess what I am getting at is suppose you get the ideal place on Earth's surface. Are you confident that putting sufficient overburden on top would in fact contain the radon gas?

Dr. ROWE. I think it would probably attenuate the radon gas to levels that would be acceptable. You cannot totally contain it, but I think it would probably reach acceptable levels of disposal; yes.

Senator HASKELL. What you are saying is the work on these 20 or 22 abandoned sites, you would use the best technology we know of now, but we may learn something from that in the future. Have you indicated that?

Dr. ROWE. Exactly my point, Senator.

Senator HASKELL. What would be other ways of disposal?

Dr. ROWE. One way that has been suggested is to put the tailings back into the mines they came from. I think this is premature since we do not know what happens when these mines become flooded.

Senator HASKELL. Right.

Dr. ROWE. We think before we find the ultimate solution there is considerable work to be done, but first we consider taking care of these 22 abandoned mines as of the utmost priority.

Senator HASKELL. Senator Garn, in his bill, S. 3008, sets specific standards. He says no more than twice the naturally occurring background level. When you see that, you have got to do something. What is your comment on that portion of his bill?

Dr. ROWE. I feel, although that might be the direction we are going to consider going, there are many site specific problems that require a little bit more flexibility. We are also finding that there are variations in background in terms of location such that a rigid standard may not always be the best.

I think we would prefer being able to set a standard which can take all factors into consideration. The standard in the Garn bill might be too rigorous.

Senator HASKELL. We will hear tomorrow from a private corporation that is interested in remilling some of the tailings at the sites. What is your reaction to that?

Dr. ROWE. I believe to do any remilling, would certainly require a license.

Senator HASKELL. Well, that is for sure.

Dr. ROWE. Then, I would expect the licensing would be carried out in such a way that the tailings would then become a new waste, which would then be disposed of in a proper way. In fact, it might help support some of the costs of the remedial actions.

Senator HASKELL. Basically, if they did that, reprocess some of the tailings, then it would come under the existing regulations Dr. Hendrie referred to I assume.

Dr. ROWE. I believe that would be the case.

Senator HASKELL. I would like to have for the record your comments on two things. There are two questions that have come up. One, I think, would come within the purview of this legislation. That is, the gap between the NRC and the GAO, the 25 million and the 140 million, and Dr. Hendrie said it was not necessarily a matter of subtracting 25 from 140.

Perhaps we should consider the tailings that have been generated by active mills but prior to the regulations of the NRC. Do I make myself clear on that?

Dr. ROWE. Yes, sir.

Senator HASKELL. I would like to have your views on this subject. That would be No. 1. Then, I would also like to have your views and this probably comes outside the purview of this legislation because I guess we do not know enough about it, and that is the dangers inherent in what I will call slag from the mine, low-grade ores that were never processed.

I would like to have your views on that particular situation, even though it may be outside the scope of this particular piece of legislation.

Dr. ROWE. Yes, sir.

Senator HASKELL. I guess also the EPA should address itself to the adverse health effects resulting from these open tailing piles and the emission of radon gas. I would assume you must have within your organization somebody who has made some correlation between certain forms of cancer occurring by people who either work there or live there and the public generally, or any other information you may have that pertains to the health effects.

Dr. ROWE. I will comment on that directly and I will also submit data for the record. Most of the data we have on lung cancer, which is associated with exposure to radon, comes from data on uranium miners in the United States and Czechoslovakia as well as Canada. There have been significant increases in lung cancer found in miners for various levels of exposures.

The problem then is using this data to estimate the effects on the general population. The general population breathes air differently than miners at work who are also exposed to other kinds of contaminating atmospheres. We have made some estimates of what the effects might be. The best one I have heard so far is one being considered by the International Radiological Protection Community (ICRP). They estimate that for the general population somewhere between 100 and 200 lung cancers would occur for an exposure of 1-million working levels months. To provide perspective of what I mean a working level month, our present standards allow uranium miners to be exposed only to four working level months per year. Thus, a risk of being exposed for a working level month represents about a one or two in 10,000 chance of getting lung cancer.

This is the kind of information we use to estimate the impact around these piles. We think the levels although relatively high would be low enough to make it very difficult to get epidemiological data since large numbers of people are not exposed.

For example, in Colorado, there are people in Grand Junction who have been exposed and other similar places, but the numbers who have received relatively high exposure are relatively small. Such epidemiological studies are being looked at and the data being obtained is being analyzed. I suspect the best near term projections will be those which are made from the uranium mine data properly adjusted.

Senator HASKELL. Do you have any information as to how long it takes between excess exposure and contraction of disease?

Dr. ROWE. For lung cancer there is some new evidence that has come up based upon some reanalyses of—

Senator HASKELL. I could not get that.

Dr. ROWE. There is new evidence made available on reexamination of atomic bomb victims who have had lung cancer in Japan. Instead of having a latency period as does leukemia, there is a certain time in everybody's life they become more prone to lung cancer. What happens for lung cancer is the probability at that time of life is increased by exposure to radon or other radiological contaminants. If the ages of 55 to 60 years old is the most expected period for lung cancer, then this is the time a lung cancer would occur, regardless of when the exposure took place. But it would be at a much higher rate than it would be for a normally exposed person.

This evidence has not been confirmed in other studies but it is beginning to indicate that some of the cancer-causing mechanisms are different than we first thought.

Senator HASKELL. Do we have any evidence, for example, I think perhaps one of the earliest mills I am aware of in the country was at Edgemoor, S. Dak. I think located reasonably close to a town. Do you have any evidence how it affects people not necessarily who work in the mines—I mean work in the mill, but who lived adjacent?

Dr. ROWE. I think the population level there was relatively small. I think the most population for exposure exists for the Grand Junction pile and the Vitro piles. I suspect that they are the best places for us to look for epidemiological data.

Senator HASKELL. Do you have any information on Grand Junction?

Dr. ROWE. We have the same data everyone else has. We have analyzed it. We have not found any major correlations yet. All of the information is not completed yet.

Senator HASKELL. Thank you, Dr. Rowe, very much indeed. I have asked for certain submissions for the record. I would ask you and DOE and the NRC if 2 weeks would be adequate to keep the record open?

Dr. LIVERMAN. Yes.

Dr. ROWE. Yes, sir.

Dr. HENDRIE. We will certainly try to do that.

[The prepared statement of Dr. Rowe and subsequent information follows:]

STATEMENT OF DR. WILLIAM D. ROWE, DEPUTY ASSISTANT ADMINISTRATOR FOR RADIATION PROGRAMS, ENVIRONMENTAL PROTECTION AGENCY

Mr. Chairman and Members of the Subcommittee, I am Dr. William D. Rowe, Deputy Assistant Administrator for Radiation Programs, Environmental Protection Agency (EPA). I am pleased to be here today to testify on S. 3078, S. 3008 and S. 3253, three alternative bills which would provide authorization and funds for the Department of Energy (DOE) to conduct remedial actions in cooperation with the involved States on former uranium ore processings sites in these States.

The Environmental Protection Agency (EPA) has been working with this potential problem for many years. Before providing specific comments on each bill some background on our involvement is necessary.

On March 12, 1974, I testified on a proposed bill to limit the exposure of persons to radiation emanating from the Vitro uranium mill tailings site in Salt Lake City. At that time we felt that additional studies were needed of all the inactive uranium mill tailings sites to assure that adequate data were available on the extent of the total environmental impact, potential future health problem and the possible remedial actions and their costs.

Our office has been working with the Department of Energy (DOE) and the involved States on a study to provide a cost estimate of remedial actions neces-

sary to alleviate the potential environmental problem from these sites. During the period April-October 1974, EPA, Energy Research and Development Administration (ERDA), and State representatives conducted a phase I study of 21 inactive pile sites to define the extent of the problem and to recommend possible solutions. The phase I findings formed the basis for the initiation of engineering assessments constituting phase II for 21 mill sites plus Riverton, Wyoming (a Nuclear Regulatory Commission (NRC) licensed facility at that time), which would include evaluation of the problems, examination of alternative solutions, and the preparation of cost estimates for the remedial action measures. The EPA also provided interim clean-up criteria for use in preparing these assessments. Funds from the EPA energy fund (\$900,000) were transferred to ERDA, which in turn entered into a contract with an architect-engineering company to begin phase II. ERDA, the lead agency in these program efforts, has received additional funds from Congress to continue the study. In addition to the funds provided by EPA, our office in Las Vegas has conducted gamma surveys around these sites to determine the extent of tailings spread by wind and water erosion. We assisted ERDA in developing the scope of the study and have reviewed each draft report on the engineering assessment of each site.

We should also mention that the environmental problems in this situation are in many ways similar to those of other extraction industries where EPA has been deeply involved, especially in the phosphate industry in Florida and Idaho.

From our review of the Phase II reports we feel there is an adequate data base for making a legislative decision on whether to conduct remedial actions on the inactive sites covered under this bill. However, before a final decision can be made on which remedial action to select for certain sites it is felt that further studies will be necessary. It is recognized in these Phase II reports that each study is only "an engineering assessment to determine the relative magnitude of the hazards associated with each site, and to estimate the remedial action costs". We have already informed the DOE about our thinking on these matters but I would like to briefly mention the areas where we feel further evaluation is required.

No assessment has been made in any of the reports of the amount of exposure which might be received via the food pathway. This is of particular significance if an option for a remedial action is chosen that leaves the pile in approximately its present condition. We know that animals such as cattle, sheep, and pigs are found on or near some sites.

No measurements were made during the ERDA contractor studies to assess the amount of exposure received via the airborne particulate pathway. Since measurable levels of ground deposition due to windblown tailings have been found at all sites, we believe this pathway should have been evaluated. There would not be a problem if the pile is properly stabilized, but all the options do not include this remedial action.

Due to study limitations adequate hydrological studies were not conducted during the Phase II studies. The water pathway is an extremely important one since groundwater contamination may be a principal determining factor in a decision to move a particular pile. Additional hydrogeological evaluations will have to be conducted on certain piles before a final remedial action is initiated. The EPA Safe Drinking Water Standards provide an ultimate control for limiting exposure to people and would be used as a basis in these evaluations.

For those sites where pile removal was considered as an option, one or more alternate long-term storage sites were selected. Further assessments of these alternate sites will have to be done before an actual relocation is started.

The EPA has reviewed S. 3078, the Administration bill. This proposed legislation would call for EPA to prescribe radiation protection standards and criteria within 180 days to assure that the public health and the environment are adequately protected in connection with remedial actions selected pursuant to this Act. EPA is committed to carry out this mandate once the legislation is enacted and sees no obstacles in meeting this requirement. This charge is commensurate with those of EPA under the Clean Air Act and Resource Conservation and Recovery Act (RCRA) and every effort will be made to assure consistency in approach with these acts. The NRC shall then be responsible for enforcing these standards while DOE will implement the remedial actions. We feel this division of responsibility is commensurate with each Agency's basic functions.

The general scheme for radioactive wastes has EPA setting criteria and standards, NRC licensing and regulating specific sites and mill tailings, and DOE carrying out the research, operations, and remedial actions. This approach is presently working properly.

Therefore, we believe the regulatory scheme proposed in S. 3078 (with EPA, DOE, and NRC involvement) will insure the accomplishment of these evaluations. Accordingly we support S. 3078, the Administration bill.

The most significant difference between the Administration bill and the other bills is in designating which Agency shall establish standards and criteria for this program. While the Administration bill gives this responsibility to the EPA, the Hart bill delegates this responsibility to the NRC. The Garn bill establishes a level of decontamination in the bill itself.

To attempt to devise a system for these specific radioactive wastes in a way which would limit EPA's authority under the Resource Conservation and Recovery Act and the Clean Air Act may create an anomalous division of responsibility for management of radioactive materials. At the present time the NRC has no authority over these particularly residual radioactive materials. Furthermore, these materials are of the same nature as residual radioactive materials, such as phosphate tailings, from other extraction industries. All of these materials have the same potential hazards although uranium mill tailings are probably at the high end of the hazard spectrum. It is EPA's evaluation that the random gas that emanates from these materials and their radioactive decay daughters may constitute one of the most severe radiation problems in the nation both as to its individual exposure and the number of people exposed. To propose such a standard setting authority for the NRC in this context could lead to inconsistency and duplication in the handling of naturally occurring radioactive waste materials in general. The attempt to set specific numbers in a legislative framework also seems to us to be inappropriate, considering the number of factors involved, the impact of ongoing research and development for better control of existing and new tailings piles, and the need for regulatory flexibility.

Other notable differences of the Hart bill (S. 3253) and the Garn bill (S. 3008) from the Administration bill are related to funding formula, ownership of land and specific studies. Both of these bills provide 100% funding by the Federal Government while the Administration bill designates that the respective State for each uranium mill tailings site will provide 25% of the funding. The Garn bill limits the expenditure of funds to \$140,000,000 while the Hart bill has a limitation of \$125,000,000. Several States feel that the Federal Government should provide all the funding since the original milling program was not the responsibility of the State. EPA supports the Administration bill's position that States should share in the responsibility for remedial actions, since they were also beneficiaries of this program at an earlier date.

The Hart bill requires the Federal Government to own the land and material after the remedial action is completed. The other two bills require the State to own the land if the pile is moved. It should be recognized that whoever has the responsibility for the tailings pile also has to conduct a maintenance and monitoring program several years after the remedial action is completed, and therefore, ownership of the residual radioactive materials by either State or Federal Government would be appropriate.

It is noted that the Garn bill has a specific provision for a further pilot study of the Vitro pile in Salt Lake City. It is not clear what this study would accomplish in view of the already completed Phase II study and the further requirements necessary for arriving at the selection of a specific remedial action. There is some concern that such a specific requirement for a study could delay the start of a remedial program at this site which is one that EPA feels should have the highest priority.

Thank you Mr. Chairman. I would be pleased to answer any questions which you and the Members of this Subcommittee may have.

U.S. ENVIRONMENTAL PROTECTION AGENCY,
Washington, D.C., September 20, 1978.

Hon. FLOYD K. HASKELL,
Chairman, Subcommittee on Energy Production and Supply, Committee on Energy and Natural Resources, U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: This letter is in response to several questions you raised at hearings held by your Subcommittee on Energy Production and Supply on July 24, 1978. The hearings concerned several bills to provide authorization and funds for the Department of Energy to conduct remedial actions in cooperation with the involved States on former uranium ore processing sites in these States.

Attachment I responds to a question concerning the health risk from inactive

uranium mill tailings piles. Attachment II addresses the question of the radiological significance of uranium mining wastes. The third attachment discusses whether there is a need for additional legislative requirements in this area.

I hope you will find these answers responsive to your questions and helpful in evaluating legislation to authorize the important and necessary remedial action for uranium mill tailings at inactive sites.

Sincerely yours,

CHARLES S. WARREN,
Director, Office of Legislation.

Attachments.

ATTACHMENT I

THE HEALTH RISK FROM INACTIVE URANIUM MILL TAILINGS PILES

Because of the differences in regional exposures, the EPA estimates of health effects are presented in two parts. The first pertains to national exposures, i.e., those occurring more than 50 miles from the source, which can be analyzed on a generic basis. Within 50 miles of the source, only specific cases can be considered.

The risk estimates are based on lifetime exposure to a calculated concentration of radon daughter products in units of working levels (WL). The population exposure is then the number of persons exposed times the population weighted average concentration of inhaled radon daughters, i.e., person WL.

These estimates are confined to the impact from radon-222 and its short half life daughter products. The principal health risk due to the inhalation of radon daughters is lung cancer. The dose to organs other than the bronchial epithelium is relatively small. Impacts on health due to airborne particulates from tailings piles and the risk from the long half life radon daughter products, lead-210 and polonium-210 are not expected to increase these risks substantially.

NATIONAL POPULATION EXPOSURES

EPA has estimated the population weighted exposure from radon daughters using two different models for atmospheric transport. The simplest which treats radon diffusion on the basis of gross meteorology yields an annual exposure of 6.5×10^{-4} person WL per curie/yr released. A more detailed meteorological model developed for EPA by NOAA and largely financed by the NRC has been used to calculate the exposure due to radon daughters from four release sites in the Western U.S. These exposures range from 4.2×10^{-4} to 7.6×10^{-4} person WL per curie per year released, yielding an average of 5.6×10^{-4} . A population exposure due to radon daughters of 6×10^{-4} person WL per curie released per year is used in this analysis. It is based on the assumption that exposure from the emitted radon and its daughters occur at seven tenths of the equilibrium concentration and that the population at risk is 218 million persons.

The individual exposures to persons working or residing near the point of release are of course substantially larger than the national average. Because the local population density is markedly different near various tailings piles, the regional impact from each should be considered on a site specific basis. When it is arbitrarily assumed that tailings piles are located in a low population area, 7.5 persons per square mile, the population exposure to a uniformly distributed local population is about 1×10^{-4} person WL per curie/yr released so that regional health impact appears to be only one-sixth of that occurring nationally. However, a preliminary EPA analysis of the actual population distribution around tailings piles located at Salt Lake City, Utah and Grand Junction, Colorado indicates that the regional population exposures from these sources exceed that to the rest of the nation by a considerable amount, see below.

ACCURACY OF RISK ESTIMATES

Risk estimates of health effects (lung cancer) due to radon emissions are not very accurate for two reasons. First, they are based on epidemiological studies of uranium miners which have only a fair degree of accuracy. Secondly, the results of these studies may not be fully applicable to a general population which has very different exposure conditions. The uncertainty in these risk estimates is at least a factor of two (high or low) and is probably larger. It should be noted also that the application of these risk estimates to background levels of radon daughters would infer that about ten percent of the current rate of lung cancer mortality in the U.S. may be due to the effects of naturally-occurring

radon working in conjunction with other carcinogens in the atmosphere, i.e., cigarette smoking, etc. Many persons believe that it is unlikely that such a large fraction of the current lung cancer rate is associated with environmental radon. Nevertheless, a straight forward application of observed cancers in uranium miners exposed to radon daughters indicate this could be the case.

These risk estimates are based on the assumption that the same percentage increase in lung cancer per unit exposure occurs at environmental levels as occurred to uranium miners at higher exposure levels. While a less conservative model (absolute risk) yields mortality estimates about a factor of two smaller than those calculated here, the years of life lost predicted by either method are about the same.

NATIONAL EXPOSURE FROM TAILINGS PILES

In 1974, EPA estimated the annual release from all twenty two inactive uranium mill tailings piles as about 80,000 Ci per year. The population exposure from this release is estimated as

$$6 \times 10^{-4} \frac{\text{person WL}}{\text{Ci/y}} \times 10^4 \text{ Ci/y} = 48 \text{ person WL}$$

If these releases continue so that the continental U.S. population undergoes lifetime exposures about 70 excess lung cancer deaths are predicted.¹ On an annual basis, this is an estimated risk of 1 lung cancer death per year in the U.S. The impact outside the Continental U.S. is much smaller—about 0.2 deaths per year.

REGIONAL POPULATION EXPOSURE

In a few cases, where the local population density is high and the tailings pile large, the magnitude of regional health impact projections approach those for the national total from all inactive tailings piles. For example, the Vitro pile in Salt Lake City, which produces a large fraction (16%) of the total radon emissions in the U.S. from inactive piles, results in an exposure of about 100 person working levels to the 800,000 persons who reside locally. The estimated impact of these exposures is 0.8 excess lung cancer deaths per year (assuming lifetime exposure). For Grand Junction, Colorado, the estimated risk to the regional population is about 0.3 excess lung cancers per year. These estimates take into account the relatively low current incidence of lung cancers in these States, particularly Utah.

While EPA has not analyzed the regional health impact from all inactive tailings piles, it is estimated that the sum of the impact both national and regionally is about 3 excess lung cancers per year. It should be noted again that these risk estimates are not precise and the actual impact could be substantially larger or smaller. In view of the small change in the estimated lung cancer mortality due to radon emissions from inactive tailings piles, epidemiological studies of the general population to quantitate the predicted risk would undoubtedly be inconclusive.

MAXIMUM RISK TO EXPOSED PERSONS

Monitoring data indicates the maximum yearly average concentration of radon daughters at the boundary of an inactive tailings piles ranges from 0.007 to 0.07 working levels. The maximum exposed person is one who lives adjacent to the boundary. Assuming a local lung cancer incidence equal to the U.S. average; the estimated risk from lifetime exposure to 0.07 WL is 1.4×10^{-3} per year. For an average life time of 71 years, this means a ten percent chance of death due to lung cancer in addition to the 3% chance now current in the U.S. This estimate does not take into account the remedial actions contemplated under the proposed legislation. Such actions would substantially reduce this estimated maximum risk (one chance in ten of dying of lung cancer due to lifetime exposure) as well as reduce population exposures.

ATTACHMENT II

RADIOLOGICAL SIGNIFICANCE OF URANIUM MINING WASTES

During open-pit mining large quantities of overburden are removed from above the uranium ore body in order to gain access to the commercial grade ore. The

¹ This assumes child sensitivity to radon daughter exposures is no greater than adult sensitivity. If children are three times more sensitive, this risk estimate should be increased by a factor of 1.5.

ratio of the overburden to the uranium ore ranges from about 8:1 to 35:1, resulting in much larger quantities of mine waste than uranium mill tailings waste. Underground mines produce much less total waste than do open-pit mines. The concentration of uranium in this overburden ranges up to about 0.02% which is about the lower cutoff value for ore that can be milled economically. The concentration of radium-226 in residential material would be about 50 pCi/g, or about 10% of the concentration in uranium mill tailings. At the present time, we have little data on the distribution of radium-226 in the total mine overburden, however, we would expect that large quantities of this waste would contain concentrations of radium-226 in the 50-50 pCi/g range. Although these concentrations are significantly lower than the concentrations in mill tailings, they are still higher than the levels we would consider acceptable for unrestricted use. These uranium mining wastes, therefore, may present a potential radiological hazard which needs to be properly managed and controlled. Of particular concern would be the use of such material in construction of buildings and the construction of buildings on land where it is used as fill.

At the present time, no regulations exist which address the radiological hazards associated with these mine wastes. EPA, under RCRA, has the authority to designate these materials as hazardous wastes and to develop regulations governing their disposal. The Agency is also now in the process of determining how to implement this authority with respect to mining waste.

A decision on the general applicability of RCRA to all mining wastes is expected in early 1979 and the approach to handling uranium mine tailings should be forthcoming after that. EPA is also studying the need to establish air emission standards for those wastes under the authorities of the Clean Air Act. A listing of radioactive materials on sources for which Clean Air Act Standards are to be developed is to be issued by August 1979.

ATTACHMENT III

ADDITIONAL LEGISLATIVE REQUIREMENTS

The question was raised at the July 24, 1978, hearings on the proposed "Residual Radioactive Materials Act of 1978" as to whether there was any legislative gap to be filled beyond that addressed in the Alternative Bills under consideration, relative to the total matter of Uranium Mill Tailings. It was noted during these hearings that while the proposals under consideration dealt with some 25 million tons of residual uranium mill tailings at inactive mill sites, there is a total of 140 million tons of uranium mill tailings already in existence. The question then relates to the adequacy of the legislative base to control the 115 million tons not covered in the proposed legislation that was the subject of these hearings.

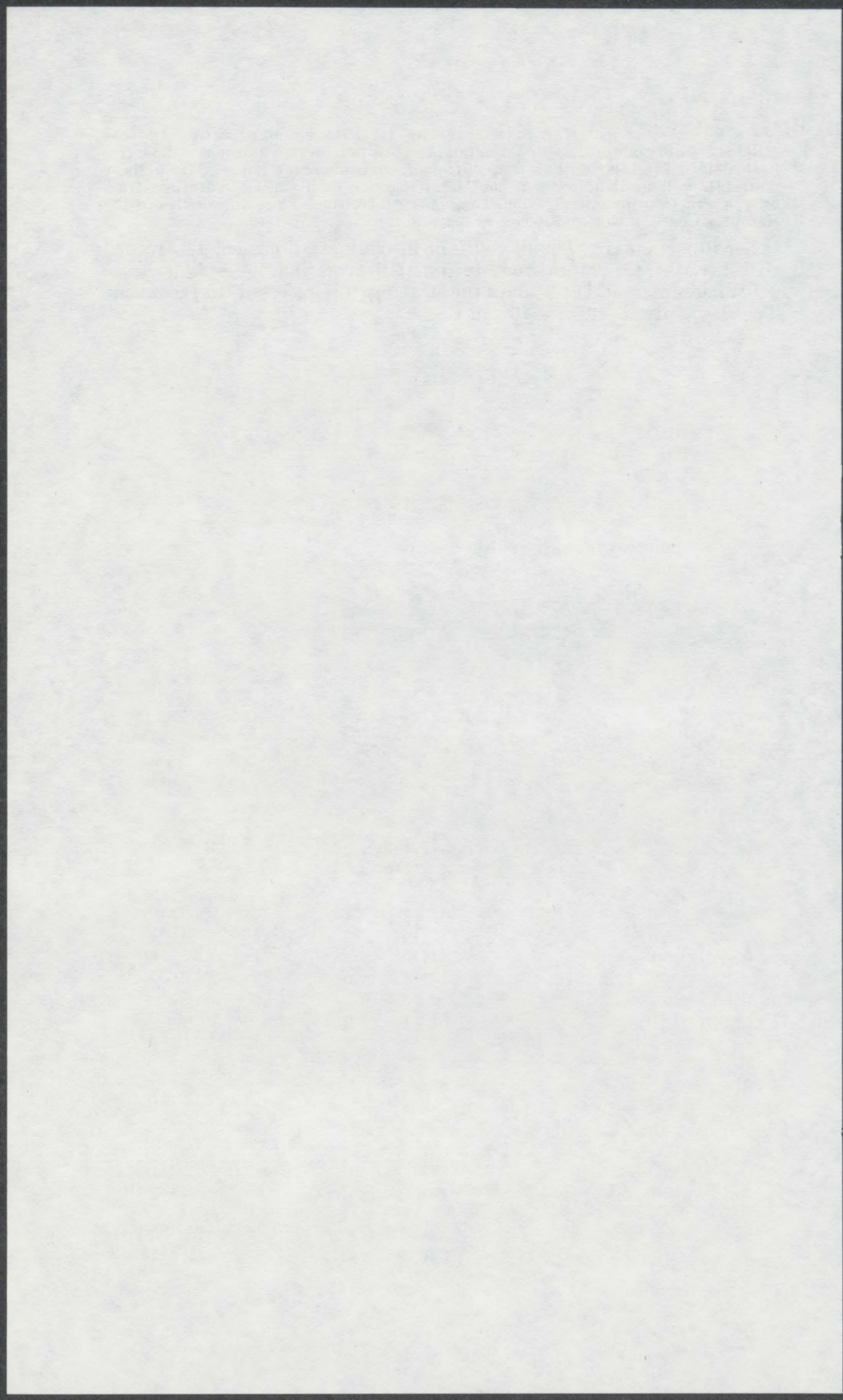
The approximately 115 million tons of uranium mill tailings not subject to the proposed Residual Radioactive Materials Act of 1978 exist at facilities that are licensed by the Nuclear Regulatory Commission (NRC), or its Agreement States. At present, the Commission regulates the design and siting of uranium mill tailings disposal areas as part of its licensing and regulation of source material milling under the National Environmental Policy Act of 1969, and the Atomic Energy Act of 1954. Environmental issues regarding reclamation and stabilization of tailings disposal areas and the provision of some kind of surety to assure the completion of reclamation and stabilization work prior to termination of the source material license, are currently being resolved in the source material licensing process. However, this has not always been the case and there are uranium mills licensed in the past which have accumulated large volumes of tailings for which the authority to require the licensee to invoke surety and stabilization requirements is in question. If these facilities should cease their production of source material handled at the sites over which they have authority.

To better assure the control of uranium mill tailings, we recommend that they themselves be named as licensable material under the Atomic Energy Act. This could be done by specifically naming residual radioactive materials from the production of source material as licensable, or by broadening the definition of by-product material to include uranium mill tailings. Any such legislative proposal should also include authority for the Environmental Protection Agency (EPA) to promulgate general environmental standards for such material so that there will be consistency with the present authority of the Atomic Energy Act and Reorganization Plan 3 of 1970 which gives EPA such authority over

present licensable material. Such authority for EPA standard-setting and the NRC regulatory authority should extend to both radioactive and non-radioactive hazardous materials so that the control of environmental impacts from these materials will be handled in a consistent manner with similar materials from other extraction industries which EPA may control under the authorities of the Resource Conservation and Recovery Act and the Clean Air Act.

Senator HASKELL. Thank you. The hearing is adjourned. The record will stay open for 2 weeks for additional information.

[Whereupon, at 11:21 a.m., the hearing was recessed, to reconvene Tuesday, July 25, 1978, at 10 a.m.]



URANIUM MILL SITE RESTORATION ACT AND RESIDUAL RADIOACTIVE MATERIALS ACT

TUESDAY, JULY 25, 1978

U.S. SENATE,
SUBCOMMITTEE ON ENERGY PRODUCTION AND SUPPLY,
OF THE COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Washington, D.C.

The subcommittee met, pursuant to notice, at 10 a.m., in room 4200, Dirksen Office Building, Hon. Floyd K. Haskell, presiding.

Present: Senators Haskell and Domenici.

Also present: Tom Laughlin, professional staff member.

OPENING STATEMENT OF HON. FLOYD K. HASKELL, A U.S. SENATOR FROM THE STATE OF COLORADO

Senator HASKELL. The hearing of the Subcommittee on Energy Production and Supply will commence. I would like to extend my apologies to the Governor of Utah and my two colleagues, Senator Garn and Senator Hatch. We have had a bus strike going on as you may know and things have been somewhat delayed. My apologies.

I look forward to hearing from you and your distinguished colleagues.

STATEMENT OF HON. JAKE GARN, A U.S. SENATOR FROM THE STATE OF UTAH

Senator GARN. Good morning, Mr. Chairman. I do have some testimony, however, I would like to cover just one area, a brief part of it, and then ask unanimous consent the remainder be placed in the record as well as an article from the Washington Post and two letters if they could be included in the record.

The main thing I wanted to cover and emphasize for the subcommittee is my bill proposes dividing the cleanup costs into two parts, which I call "direct" and "indirect." The indirect costs are the costs of administrative, personnel, site acquisition, and collection of stray tailings. My bill provides that these indirect costs will be shared by the Federal and State governments on a 75-25 percent ratio.

Direct costs include the actual permanent stabilization of the piles, or their removal and burial, where that is deemed appropriate. Under this bill, the Federal Government would bear 100 percent of these direct costs.

The 75-25 formula has already been adopted by the Federal Government, under Public Law 92-314, which provided, with respect to Grand

Junction, Colo., for the same kinds of activities which I am calling "indirect costs" here today. It seems appropriate to me to extend that formula to similar activities at other sites. The total Federal responsibility for the direct cost seems appropriate to me because the existence of the piles themselves is an exclusively Federal responsibility. The State and local governments had no control whatever over the operation and licensing of the mills in question and had no regulatory authority under local police power. In fact, the Atomic Energy Act of 1954 preempted any regulatory authority the local governments might have wanted to exercise.

I just wanted to explain that feature, why it was divided into the indirect cost of 75-25, which I think is fair. On the actual costs themselves, I think that has been proven that is the Federal responsibility and 100 percent of the costs should be taken care of by the Federal Government.

In one of the letters I would like to have included in the record, I would like to read just part of it. It came to me just yesterday and I was surprised, this is a very dear, old friend of mine and I had no idea this had happened to him. He has been working for a long, long time on trying to get the Vitro tailings site removed from Salt Lake City because he has property adjacent to it.

He says:

Jake, I'm still on the Vitro tailing bandwagon trying to get this thing moved, and I wanted to throw in a little piece of personal information that you may not have had by this time.

On May 22, 1978, I went to the University of Utah Hospital and they removed my right eye because of a malignant tumor.

I have since that time had all kinds of tests and they have found no other malignancy in my body, which I am grateful for; however, in my discussions with the doctors that removed the eye, I asked them if it was possible that the radioactive dust flying around from the Vitro Tailing Pond could have caused this, and they said there was a very good possibility, but they could not say 100 percent because no one knows what causes cancer.

However, they also explained to me that there was no way anyone could prove that Vitro didn't cause it. With me working in this area as much as I have in the past 8 years, it is highly possible that this was the cause.

Senator, I'm not crying over spilled milk. I have to personally feel that this was a blessing that they found it and removed it as quickly as they did. I'm happy to tell you that I have a clean bill of health, but if this is happening to me, it could be happening to a good many other people that are involved in this situation down here, and I think 10 or 11 years of fighting is long enough to get some action from the Federal Government.

I know you are working with Representative Dan Marriott in working on a bill through Congress at this time, and * * * I'm writing you again to let you know how serious I believe this problem to be, and that it is getting more serious rather than less serious. Jake, this thing has to be moved out of the center of downtown Salt Lake.

Senator HASKELL. Is that one of the Vitro pilings, in the middle of Salt Lake?

Senator GARN. Right in the center. It is totally surrounded—not in the center of the downtown business district but right in the center of the population of Salt Lake Valley. It is totally surrounded by the vast majority of population of Salt Lake Valley. It has been roped off. A freeway goes right by it, formerly Highway 91, there is traffic, massive amounts of traffic going all around the site every day.

They have prohibited further building in addition to it but there are people, this gentleman, my friend and the Governor's, has worked, and

has property adjacent to it, near the site every day. The fire station, they have found a fire station was built with some of the material underneath with 30 to 50 times the radiation level that is acceptable under a brand new fire station.

So that is the point we have been trying to make for a long, long time. There are a lot of sites around the country. This is the only one of this size that is right in the middle of a major metropolitan area. I think Mr. Well's attitude is much better than mine. He feels grateful he only lost an eye.

We have to get on with it. He has been a leader for a long, long time before this ever happened to him, trying to get rid of it. With that, Mr. Chairman, I would ask that the remainder of my remarks, the article and letters, be placed in the record.

Senator HASKELL. They will be so included.

[The prepared statement of Senator Garn, the article and letters follow:]

STATEMENT OF HON. JAKE GARN, A U.S. SENATOR FROM THE STATE OF UTAH

Mr. Chairman, it is a very great pleasure for me to be here this morning, to introduce Governor Matheson, and to say a word or two about pending legislation designed to deal with the problem of orphan uranium mill tailings piles, located at several locations around the United States. Senator Hatch and I, along with a number of other Senators, have introduced legislation, S. 3008, which embodies our approach to a solution of the problem of the orphan piles. This legislation is very similar to H.R. 12938, introduced with 19 co-sponsors by Congressman Marriott in the House. I know that the subcommittee has other proposals before it, including the Administration's own approach, and I feel sure that the subcommittee will be able to mark up these various proposals to get and adequate and acceptable bill.

It may be of interest to the subcommittee to have my own opinion on the extent of the federal responsibility. My bill proposes dividing the cleanup costs into two parts, which I call "direct" and "indirect." The indirect costs are the costs of administration, personnel, site acquisition, and collection of stray tailings. My bill provides that these indirect costs will be shared by the federal and State governments on a 75-25% ratio.

Direct costs include the actual permanent stabilization of the piles, or their removal and burial, where that is deemed appropriate. Under this bill, the federal government would bear 100% of these direct costs.

The 75-25 formula has already been adopted by the federal government, under Public Law 92-314, which provided, with respect to Grand Junction, Colorado, for the same kinds of activities which I am calling "indirect costs" here today. It seems appropriate to me to extend that formula to similar activities at other sites. The total Federal responsibility for the direct costs seems appropriate to me because the existence of the piles themselves is exclusively a Federal responsibility. The State and local governments had no control whatever over the operation and licensing of the mills in question, and had no regulatory authority under local police power. In fact, the Atomic Energy Act of 1954 preempted any regulatory authority the local governments might have wanted to exercise.

I am a supporter of nuclear power, and I am confident that acceptable disposal techniques can be found for both low and high level nuclear wastes. As our knowledge grows, we are better able to guard against future occurrences of the kind that has produced these orphan tailings piles. Unfortunately, cleanup is always more expensive than prevention, but in this case, the cleanup is necessary. We do not have accurate information on the long-term effects of exposure to radiation of this kind, but there is reason to suspect that there are real dangers. Incidentally, one provision of my bill would be for a study to investigate the long-term effects of low level radiation.

A week ago Sunday, the Washington Post carried a story about leukemia in Utah and its links to the mill tailings at Monticello, Utah. This story itself should cause us to suspect a close link between low-level exposures, over a long period of time, and cancer. If the subcommittee has no objection, I would like to have this article appear in the hearing record.

Sometimes it takes a personal tragedy to bring home to us the reality of a situation. In my case, I would like to mention a dear friend, Dick Wells, and his experience. Just last May, Dick's right eye was removed because of a malignant tumor. There is a direct connection between Dick Wells and the Vitro tailings site, one of the sites at which this legislation is directed. Dick owns property adjacent to the Vitro site, and has been in the area every day for the last eight years. As he notes in a letter to me, radioactive dust flies around his property, coming from the Vitro site. No one can prove that Dick's cancer was caused by radioactive dust from Vitro, though doctors will not rule it out. I would not argue that Vitro caused Dick's problem, but we have had enough evidence that even these low levels are dangerous, and I simply see no reason why we should not move immediately. Vitro is located in downtown Salt Lake City, and it simply must be moved.

No one should misread my intensity on this question. I reiterate that I support nuclear power. Even if Dick's tumor and numerous other deaths and cancers could be directly tied to Vitro, it would not change the fact that nuclear energy is a relatively safe form of energy. We need only look at the number of deaths from black lung every year, and at the cave-ins that take hundreds of lives, to recognize that nuclear power has an incredible safety record.

But at the same time, there is no reason for us to understate the danger either. If we are to have nuclear power, and I hope we are, we should recognize clearly the dangers to which we are subjecting our population, and take every step possible to minimize those dangers. In this case, the logical step, the essential step, the humane step, is to move the Vitro tailings pile out of the Salt Lake area. However minimal the risk is, it is greater than it should be, greater than it needs to be.

With that, Mr. Chairman, let me simply introduce Governor Matheson, who is intimately familiar with the history of the problem, and recommend that the subcommittee follow his counsel in this matter.

A SMALL UTAH TOWN AND 4 LEUKEMIA DEATHS

VICTIMS LIVED NEAR URANIUM "TAILINGS" PILE

(By Bill Curry)

MONTICELLO, UTAH.—It takes only a minute to drive past the houses here where the four leukemia victims lived; they're all just a few blocks from each other.

Una Manzanares, 12, was the first to die, Gail Barber, 11, the last. In between were Renae Heaton, 7, and Alan Maughan, 16, the captain of the high school basketball team.

They all lived within a half-mile of the old mill where the Atomic Energy Commission for 11 years processed uranium ore for nuclear weapons. The mill put enough junk in the air, local residents say, to dirty the wash hanging out to dry, enough to corrode the chrome on automobiles and enough to literally dissolve the screens in house windows.

All in the national defense, all to keep other nations at bay with the threat of nuclear death. But some residents here say that when the threat became an actuality, it occurred here in Monticello, where in the 1960s a mysterious incidence of leukemia took four young lives in a town of 1,900 and left a former resident now living in Salt Lake City battling for his life against the disease. Statistically, there should have been only one case in 25 years.

"He was exposed to radiation somewhere or some way along the line," says Alan Maughan's father, Dale, as he cruises the quiet streets at the foot of the San Juan Mountains in southeastern Utah and points to the houses of the victims.

"If I hadn't moved here to Monticello, my boy would still be alive," he says of his move from Logan, Utah. "I firmly believe that."

Instead, Alan died of leukemia on July 5, 1966.

The mill is gone, closed in 1960. Gone, too, are the days when it sent readings of highly dangerous radium in South Creek to more than two times the acceptable levels and gamma radiation levels along the edges of the mill site up to 20 times those of the surrounding area.

But such facilities as this are not a matter of bygone concern, for the mill's radioactive wastes, called "tailings," remain—as they do in bizarre fashion elsewhere in the United States. In Salt Lake City, where an abandoned mill still spreads radiation across the landscape, a firehouse built on fill matter of uranium wastes is so "hot" it would be declared hazardous and closed if it were a uranium mine.

In Grand Junction, Colo., more than 600 buildings built on such fill have construction crews airhammering basements and house slabs to remove radioactivity. In Canonsburg, Pa., 120 industrial workers have been exposed to one form of radioactivity from the wastes under their buildings.

So the off-orange and dead grass on the old uranium mill site here in Monticello is only a marker similar to those elsewhere in the country. In all, the U.S. government has identified 22 locations which, like Monticello, saw the grinding, crushing and extracting of uranium for national defense and remain today as toxic repositories of radioactive leftovers of the atomic age.

Their presence, and those of some 30 other former nuclear facilities, has put uncounted thousands of unwitting people nationwide on an atomic fault line, not knowing when or whether tragedy may rock their lives. Some 5,000 people in South Salt Lake City alone live within what is generally considered the danger zone of a uranium processing site—a half-mile.

There, 100 acres containing millions of tons of uranium tailings stand as a monument to the now-defunct Vitro Chemical Co.'s uranium processing facility. The Won-Door Co. next to the site recently has even abandoned its three-structure manufacturing facility to escape the health threat from the mounds of uranium waste piled up next to the buildings.

Heightened concern over these uranium mill sites comes at a time of new awareness of the delayed but potentially fatal effects of exposure to small amounts of radiation considered acceptable years ago.

For example, the U.S. Department of Health, Education, and Welfare was recently directed to oversee a broad study of civilian and military personnel involved in the nation's atomic bomb tests after a startlingly high number of soldiers at a 1957 test developed leukemia.

HEW is also expected to undertake soon a major reopening of a long-completed study of thyroid abnormalities among southwestern Utah schoolchildren exposed to radioactive fallout in the 1950s bomb tests. The original study concluded there was no increase in the abnormalities, which can lead to cancer, but officials now fear that enough time had perhaps not passed for all abnormalities to become apparent.

The Washington Post recently reported that residents in southwestern Utah and northwest Arizona blame the nuclear tests for a continuing incidence of leukemia and cancer among longtime residents.

And yesterday, health officials in Salt Lake City began examining firemen long exposed to a radiation from five feet of fill hauled in 20 years ago from Vitro.

The firehouse, where about 60 people work, is the one that is so "hot" with radiation that if it were a uranium mine, federal mine safety officials would close it as hazardous. Three towns in southern Utah were studied in 1967 by federal health officials for unexplained increases in leukemia. Findings were inconclusive. Some areas of the firehouse, generally the living and sleeping quarters, record five times the amount of allowable radiation that uranium miners are permitted to be exposed to.

And last week Colorado state health officials were in Grand Junction, Colo., in an effort to determine whether leukemia—occurring at twice the expected rate and concentrated in the elderly—is at all related to the old uranium processing operation there or to the extensive use of its radioactive remnants as fill matter in construction projects in Mesa County.

"We asked the powers-to-be, and he said there were no qualms—the AEC wouldn't let them [give out fill] if it wasn't safe," says Soren Sorensen of Grand Junction, remembering the days in 1966 when he obtained 10, 10-ton truckloads of uranium wastes from the old Climax Mill for the home he was building. "I called the AEC and they said there was no problem."

Seven years later, the fill under his house was removed in a federal and state-funded program that evolved from fear of the possible long-range health effects of the radioactive sand that Sorensen and others had used to level their lots.

"I kind of got scared over the deal," George Biggs said of the tailings that were under the front part of his house. The Biggs family wonders whether the radiation was related to the breast cancer of Mr. Darlene Biggs.

"You don't know," said George Biggs. "But the quicker the tailings were gone, the better I felt. [The radiation] was pretty high, especially right in that corner"—he points to where a visitor is seated—"where the wife always set. That's why we thought maybe it caused the cancer."

All told, 6,000 structures in Grand Junction have uranium tailings deposits not counting the streets and sidewalks. G. A. (Bud) Franz, a senior health physicist with the state health department there, says some 650 buildings have been recommended for removal of the radioactive wastes.

In some houses, he said, residents were receiving as much radiation beyond normal as they would if they were to get two or three unnecessary whole-body X-rays a year.

Some \$12 million is expected to be spent for the removal of the radioactive tailings in the Grand Junction area, three-fourths of the money provided by the federal government and the rest by the state.

Rep. Dan Marriott (R-Utah), citing past federal "neglect" in management of uranium mills and waste disposal, says a "serious health hazard" now exists in Salt Lake City near the Vitro wastes and elsewhere in the country.

The health threat can be either overall radiation to the entire body or from radon gas that deposits radioactive particles in the lungs and can cause cancer there.

Here in Monticello, the old uranium operation was owned by the AEC, which processed ore from 1949 to 1960. The ore was trucked in from mines around the area and stacked in mounds in an open field. After processing, the radioactive leftovers were returned to the field, and the winds, predominantly from the south, carried to the north—where all of the leukemia victims resided.

Jon Lee's mother, April, grew up in the south sector of town, right on the edge of the uranium operation. Although her son was born in 1964—after the mill had been closed and radioactive tailings covered with dirt—she believes his leukemia is somehow related to her exposure over the years to the radioactive uranium site.

Now 16, Jon, who used to live around the corner from Alan Maughan and now is a Salt Lake City resident, has been fighting leukemia for eight years, although he was once given only two years or so to live.

But the other four leukemia victims have long been gone, youngsters who spent most of their brief lives growing up so close to the uranium mill.

So unusual were their deaths that federal health officials investigated them in 1967.

Although all of the children had leukemia that can be associated with radiation, "no relationship" was found with the uranium mill, Dr. Glyn Caldwell, a cancer specialist with the Center for Disease Control, quoted from a final report on the deaths.

Caldwell acknowledged, however, that the investigation focused on viruses then thought to spread cancer.

Monticello was one of three southern Utah towns examined in 1967 for unexplainable increases in leukemia, Caldwell said. The other towns were Parowan and Paragonah in the southwestern part of the state in Iron County, which, along with Washington County, was subjected repeatedly to nuclear fallout from atomic testing in Nevada in the 1950s.

Parowan and Paragonah, with a combined population of 1,800, experienced four cases of leukemia from 1956 to 1967, two to three times the expected rate, Caldwell said. As in the case of Monticello, findings in those two towns were inconclusive.

So today the doubts and fears expressed by relatives of the Monticello victims remain over what impact the processing of uranium for nuclear arms has had on this town. "For a place this small," said Dale Maughan, "there had to be something."

WELLS DISTRIBUTING Co.,
Salt Lake City, Utah, July 14, 1978.

Senator JAKE GARN,
U.S. Senate,
Washington, D.C.

DEAR JAKE: I haven't seen you for a little while, but I hear you on the radio quite often and know you are working very hard, which I appreciate.

Jake, I'm still on the Vitro Tailing band wagon trying to get this thing moved, and I wanted to throw in a little piece of personal information that you may not have had by this time.

On May 22, 1978, I went to the University of Utah hospital and they removed my right eye because of a malignant tumor.

I have since that time had all kinds of tests and they have found no other malignancy in my body, which I am very grateful for; however, in my discussions with the doctors that removed my eye, I asked them if it was possible that the radio-active dust flying around from the Vitro Tailing Pond could have caused this, and they said there was a very good possibility but they could not say 100 percent because no one knows what causes cancer.

However, they also explained to me that there was no way anyone could prove that Vitro didn't cause it. With me working in this area as much as I have in the past eight years, it is highly possible that this was the cause.

Senator, I'm not crying over spilled milk. I have to personally feel that this was a blessing that they found it and removed it as quickly as they did. I'm happy to tell you that I have a clean bill of health, but if this is happening to me, it could be happening to a good many other people that are involved in this situation down here, and I think 10 or 11 years of fighting is long enough to get some action from the Federal Government.

I know you are working with Representative Dan Marriott in working on a bill through Congress at this time, and I know something is coming up on July 17 that may appropriate the money for this. I'm writing you again to let you know how serious I believe this problem to be, and that it is getting more serious rather than less serious. Jake, this thing has to be moved out of the center of downtown Salt Lake.

Hope things are going well for you and your family and that our paths will cross in the near future.

Yours very truly,

RICHARD W. WELLS,
President and General Manager.

WELLS DISTRIBUTING CO.,
Salt Lake City, Utah, July 14, 1978.

Re. Vitro Tailings, Salt Lake City, Utah.

TERRY PRETTLE,

Argonne National Laboratory, EIS Division, Argonne, Ill.

GENTLEMEN: As a request from the Salt Lake Area Chamber of Commerce, I am writing this letter as the past president of the Chamber, as a land owner, and as an employer in the immediate area of the Vitro Tailings, to make a statement on the tailings.

I purchased property and built a new building in the Wagner Industrial Park, which is located very close to the Vitro Tailings Pond. At the time we purchased the property and built the building, no one told us we had any kind of hazard. I am sure you had a chance to look at the Wagner Industrial Park and found it to be a fine, well-kept industrial area; but this hazard is causing everyone a good deal of trouble.

Of all the radioactive tailing piles, Salt Lake City has to be the most critical because it is practically located in the down town area, as you saw when you were here. There are a great many businesses located very near to it, the whole city of South Salt Lake is very close, and there are a great many homes of people who have lived by this radio-active tailing pond for a good many years.

I have had my property tied up by restrictions so that I could not build on it for three or four years. This has just been released in the last twelve months so I could get some of my investment back. I have been working every day in this area for the past eight years. On the 22nd day of May, 1978, I had my right eye removed because of a malignant tumor.

I checked with the doctors and asked them if there was a possibility that radio active dust, which flies around our building, could have caused this by getting into my eye. They said it was a very great possibility.

In all the tests that have been made on my body since then, we have found no other signs of cancer. It certainly makes me wonder if that tailing pond had not been here, maybe I would still have my right eye.

From recent hearings conducted by Representative Dan Marriott in South Salt Lake, we have had many people testify to the loss of loved ones from lung cancer. Most of them believe it was caused from living so close to the Vitro Chemical Tailing Pond.

I am violently opposed to any more surveys being made on the Vitro Tailing situation. I believe we have spent more on surveys than it would have cost to have the tailings removed a few years ago. With inflation and everything else that has happened, it is going to cost us many millions of dollars more to have it removed than it would have when we started this fight eight or ten years ago.

I believe the Ford Bacon Davis report is a good one, and any information you need you should be able to get from their report. Again, let me state that I am violently opposed to spending any more money on surveys. We need the money spent in moving the problem.

Dr. Harry Gibbons, of the Salt Lake County Board of Health, tells us we should warn our people that this danger is here, and if they smoke they stand a 50 percent better chance of contracting lung cancer than if they don't smoke in this particular area. We have had employees actually quit because of the Vitro Tailing situation.

I also believe that this problem was caused by the Federal Government, and that the Federal Government should pay 100 percent of the cost to remedy this problem. This problem has gone on long enough, and immediate action should be taken by the Congress of the United States to appropriate the money to get this big hazard removed from the center of Salt Lake City.

If I can be of any further assistance in bringing the removal of this hazard from this area, I would be most happy to cooperate in any way. Senator Garn and Congressman Marriott know of the campaign we are waging to get this hazard removed. Also our past Governor Rampton and our current Governor Matheson are aware of this campaign. Anything you can do to bring this to a head would certainly be appreciated by a great many people who have to work and live by this radioactive hazard.

Thank you for listening to my problem.

Yours very truly,

RICHARD W. WELLS,
President and General Manager.

Senator HASKELL. Senator Hatch.

STATEMENT OF HON. ORRIN G. HATCH, A U.S. SENATOR FROM THE STATE OF UTAH

Senator HATCH. Good morning, Senator. It is a very great pleasure to be here this morning with our Governor.

As I have said in the Vitro tailings hearings held in Utah last March, these uranium tailings, located in the heart of the Salt Lake Valley, have been studied over and over again and over a long period of time. There is no question now that over a long period of time the radon gas, radium-gamma radioactivity and other active byproducts of the pile pose a hazard to human life that has yet to be fully calculated.

In spite of the millions of dollars that have been spent in studying the pile by nearly every possible Federal agency, no definitive declaration, no clear pronouncement, no final answer has been advanced to tell Utah citizens what kind of a hazard they are really dealing with.

And, in spite of this clear and present danger, no legislative program has yet to come out of Congress to dispose of a waste product which came about as a direct result of congressional programing.

I want to commend you and Senator Hart for assisting us in raising this issue because we have been complaining for years out there, and as Senator Garn has said, and as our Governor will say, this is situated right in the middle of Salt Lake Valley. Homes have been built on that stuff. It has been used as fill. We have had all kinds of complaints and problems. We do have what appear to be a number of health problems that have arisen throughout Utah but particularly in the Salt Lake Valley that may be related to this particular pile right in the center of a very important city there.

Senator HASKELL. Senator, in addition to the pile being in the middle of Salt Lake, did I hear you say some of the fill has been used and houses built on it? This is the Grand Junction situation.

Senator HATCH. Houses built right on top of the radioactive product. These people are very upset. They bought their homes in good faith. The feeling they got a reasonable place and did not realize the scientific problems and health problems related to the Vitro tailings project dumped there in the middle of Salt Lake City.

All I would like to say is it has been of particular concern to me. Before I became a Senator I worked specifically on this project with a client of mine which has done the major research and analysis pertaining to this problem and they are very concerned as well.

I would ask the remainder of my statement be placed in the record at this point, and I would be delighted to introduce to you at this time our Governor, Hon. Scott Matheson, who has more to say on this matter, and I think will be able to enlighten us all.

[The prepared statement of Senator Hatch follows:]

STATEMENT OF HON. ORRIN G. HATCH, A U.S. SENATOR FROM THE STATE OF UTAH

As I said in the Vitro Tailings Hearings held in Utah last March, these uranium tailings, located in the heart of the Salt Lake Valley, have been studied over and over again. There is no question now that over a long period of time the radon gas, radium-gama radioactivity and other active by-products of the pile pose a hazard to human life that has yet to be fully calculated. In spite of the millions of dollars that have been spent in studying the pile by nearly every possible federal agency, no definitive declaration, no clear pronouncement, no final answer has been advanced to tell Utah citizens what kind of a hazard they are really dealing with.

And, in spite of this clear and present danger, no legislative program has yet to come out of Congress to dispose of a waste product which came about as a direct result of congressional programming.

Nearly three years ago a Utah company studied the Vitro Uranium Tailings Pile and handed the Governor a comprehensive set of alternatives for disposal of this deadly waste. Ford, Bacon and Davis later contracted to study and make recommendations on uranium tailings throughout the nation. One year after that report was received by the Department of Energy, 50 potentially hazardous sites were identified. The continuing delays, caused by the federal bureaucracy and this Administration, have raised the price tag for disposal of this hazard by hundreds of millions of dollars. Before the Ford, Bacon and Davis study was even conceived, under pressure from his constituents my predecessor in the Senate introduced a bill that looks exactly like the one we are talking about today in these hearings. This is not new legislation. In fact it is so old that it is now an unreasonable answer to the problem. When this bill, and its funding program, were originally introduced the State of Utah might have been able to pay the 25 percent cost of the recommended \$40 million disposal plan. But even then there was reluctance since the federal government was responsible for the tailings in the first place. Now, three years later, the cost of removal has probably more than doubled, and Utah can ill-afford a \$20 million plus cost of disposal heaped on us by the federal government.

Federal government delays in solving a federal government problem must be resolved by the federal government through acceptance of responsibility for the health hazard.

I commend the Administration for finally bringing a bill to Congress to deal with this problem. I would, however, recommend that the Department of Energy and this committee look more thoughtfully at the Garn/Hatch bill or the Hart bill as an answer to this pressing problem. In addition, I would encourage the committee to move forward quickly. Delays have already priced Utah out of the disposal market, and soon even the federal government will have difficulty funding this proposal.

In summary, Utah is reluctant to participate because of a lack of fairness on the part of the federal government and can no longer afford to participate on a 25-75 percent basis in a federally created problem.

Senator HASKELL, Governor Matheson.

STATEMENT OF HON. SCOTT M. MATHESON, GOVERNOR, STATE OF UTAH

Governor MATHESON. Mr. Chairman, I am pleased to have the opportunity to appear before your subcommittee this morning. It is a great pleasure to be flanked by both of our U.S. Senators. Their pres-

ence here today and the support of our Congressman, Dan Marriott, indicates there is unified solid support from the State of Utah regarding the legislation to clean up radioactive tailings, not only in our own State but in all of these States where the problem now exists.

We have mentioned the Vitro tailings site which is the primary site of concern in our State, because it is located in the center of something over one half million people in the Salt Lake Valley. As a matter of fact, we refer to the Vitro tailings site as the largest microwave oven in the West.

We hope we are in a position soon to rectify what we feel is a growing and more serious health problem on a daily basis. I am not only here today, Mr. Chairman, in behalf of the people of the State of Utah but I am also here to speak for other Western States similarly affected and afflicted with the health hazards which are the aftermath of the Government's now-concluded uranium procurement program.

The position which I am espousing was unanimously endorsed by resolution of the Western Governors' Conference which met last month and includes all of the 13 Western States, each of which has an independent concern for the resolution of this problem, even though in some of them there are no radioactive tailings in existence. But the unanimous support of the conference is nevertheless there because of the public need.

We have submitted to prior hearings substantial evidence as to the scope and extent of the health hazards. I have with me this morning Dr. Lyman Olsen, who is our chief health officer for the State of Utah, who is familiar with all of the technical health problems associated with the Vitro site as well as others.

He made a statement in his testimony before the House a week or so ago regarding the presence of radon levels at the Vitro tailings site which he concludes on the basis of the analyses are in excess of 30 times the upper limit prescribed by the Surgeon General for remedial action. A very brief quote from Dr. Olsen's testimony I think graphically portrays the situation.

Total relocation of the radioactive material seems to be the only logical solution. Although many suggestions for stabilization in place have been made in past years they have been discarded as ineffective or impractical. It is significant to us, and a continual worry, that each time new and better scientific information becomes available (as in the case of our new technique for measuring radon and its daughters), the extent of the hazard is concluded to be worse than previously thought . . .

Under these circumstances it is folly to speculate that new knowledge will provide a scientific breakthrough which gives us the techniques to contain radon and other radioactive elements at the tailings site. Utah residents have already suffered more than reasonable exposure and want the pile removed.

If once the public health issue is recognized and established beyond reasonable scientific doubt, which I submit has been established, then there are a multiplicity of issues which this subcommittee must address. I would simply make my remarks in three areas, Mr. Chairman, and three areas of basic concern.

The first is Federal responsibility. The second is cost sharing. And the third is the extent of State involvement.

I prepared remarks today, Mr. Chairman, I have analyzed the history of the development of the radioactive mill tailings in all of the locations operated by the Atomic Energy Commission from the early

days. I will not go into the details except to conclude there is nothing but solid support for Federal responsibility on the basis of any criteria one wishes to examine. I did ask earlier this spring for our attorney general to analyze the question of whether or not there was any legal basis for an argument that cleanup of the uranium tailings is exclusively a Federal responsibility.

I submitted that question to the attorney general in March of this year and in his opinion to me dated March 22, 1978, he concludes that the Federal responsibility in his opinion is established on a legal basis but that the statute of limitations had run on that legal cause of action and therefore, no legal process could be undertaken.

Senator HASKELL. Do you suppose that letter could be submitted for the record?

Governor MATHESON. I was going to request to do so. I was going to ask the full copy of that letter dated March 22, 1978, to me from the Utah attorney general be made a part of the record.

Senator HASKELL. It will be so received.

[The letter referred to above follows:]

STATE OF UTAH,
Salt Lake City, March 22, 1978.

SCOTT M. MATHESON,
Governor,
Building Mail.

DEAR GOVERNOR MATHESON: I have your letter dated March 6, 1978, wherein you state that your office intends to take a position that the radioactive tailings at the old Vitro chemical site are an exclusively federal responsibility and therefore 100% of all remedial action should be funded by the federal government and asking for a memorandum which would indicate the legal feasibility of such a position. Specifically, you have asked:

1. Is there any legal basis for an argument that clean-up of the uranium tailings, is an exclusively federal responsibility; and,

2. Is there any legal basis upon which the state could be held liable for any of the uranium tailings deposited at the Vitro tailings site in Salt Lake County.

During the post World War II era, the increase in nuclear weapons production in the United States created an immediate demand for uranium. The need for expertise in the development of ore refining facilities required technological efforts to be concentrated in that area, and as a result, there was little attention given to problems relating to disposal of the wastes. The tailings piles resulting from those operations are now creating a problem.

The Vitro tailings site in Salt Lake County is but one of 22 such pilings located in various western states. However, it probably constitutes a greater threat than any of the others because of its location in the center of a rapidly growing urban industrial complex of about one half million population. The process used to recover uranium from the ores did not extract the radium. The tailings at the Vitro plant still contain nearly all the radium originally present in the ore. This element gives off potentially harmful radiation. In addition, it decays into radon, a gas which defuses readily through most construction materials including concrete. The radon is also radioactive and fairly rapidly decays through a series of radioactive elements, which if inhaled are potentially hazardous.

There are actually two radiation health hazards present at the tailings site, gamma radiation activity from the pile and radioactive radon and its decay products. Stabilization of the pile could only offer an interim solution and sooner or later the ultimate solution of complete removal must be faced.

A United States Department of HEW, Public Health Service, evaluation of radon 222 near uranium tailings piles issued in March, 1969, stated:

"At distances more remote than one-half mile, radon daughters might more nearly approach equilibrium conditions, but the total concentrations will have been so diluted as to be essentially negligible."

And then went on to conclude:

"Development of point recommendations to control public exposure to radon from uranium tailings piles is not necessary as no significant public exposure was indicated by the results of the study."

The Vitro pile in Salt Lake City was one of the four piles studied by the Public Health Service, however, as a follow-up to the United States Public Health Service study issued in March, 1969, the Environmental Protection Agency (EPA) published a report concerning a 1974-1975 evaluation of ambient radon 222 concentrations in Grand Junction, Colorado. The recent Grand Junction data supports a new conclusion that:

"In the predominant day time wind direction, there was a significant power curve relationship of radon concentrations to distance out to about one and one-half miles from the center of the tailings pile."

Based on this data, the public exposure would certainly be significant. The Vitro tailings site is a 128 acre tract of land located southwest of downtown Salt Lake City, Utah, a distance of approximately four miles. The Atomic Energy Commission (AEC) began purchasing uranium concentrate from Vitro's privately owned and operated plant site in Salt Lake County in 1949. AEC's first contract with Vitro for the purchase of uranium concentrate produced in the Salt Lake City mill was signed on October 25, 1951, and was revised and extended several times thereafter. The last contract for uranium was dated January 1, 1962, and extended to December 31, 1963. This contract provided for extensions but not beyond December 31, 1966. AEC's contractual relationship with Vitro for uranium ceased entirely in 1965 and by January 4, 1967, Vitro had sold and shipped to Atlas Corporations mills in Moab, Utah, most uranium bearing residues other than the tailings. Vitro thereafter utilized the Salt Lake County mill to process ferrophos from the Idaho Phosphate Industry to recover the contained vanadium which it sold to the AEC. The tailings from this operation were then piled on top of the uranium tailings. During the summer of 1967, Vitro arranged with the Salt Lake City sewage plant adjacent to the plant site to pump the sludge onto the tailings pile. This sludge, as it dries, forms a crust and helps to prevent wind erosion.

Early in June, 1968, Vitro shut down the plant entirely. Although I have not had an opportunity to study the contracts between Vitro and AEC, it is my understanding they were cost plus contracts and that they did not allow for any cost for long stabilization or disposal in accordance with state of the art procedures. The AEC licensed Vitro's mill operations from the start of operations in 1949 until the license was terminated in 1968.

The Atomic Energy Act of 1954, subsection 161 B and I(3) of the Act authorized the Commission to:

"B. Establish by rule, regulation or order such standards and instructions to govern the possession and use of special nuclear material, source material and by product material as the commission may deem necessary or desirable to promote the common defense and security or to protect health or to minimize danger to life or property.

I. Prescribe such regulations or orders as it may deem necessary . . . (3) to govern any activity authorized pursuant to this act including standards and restrictions governing the design, location and operational facilities used in the conduct of such activity in order to protect health and to minimize danger to life or property."

Under date of April 15, 1960, L. K. Olson, the then General Counsel to AEC, directed a letter to H. L. Price, the then Director of Division of Licensing and Regulation. In that letter he addressed the question as to the extent of the Commission's jurisdiction over the waste material produced by a uranium (source material) mill when such waste did not constitute a source material as defined in the Commission's regulations because of the concentration of uranium is less than $\frac{1}{20}$ of 1% by weight, in that the use of the waste may present a radiation safety problem because of the presence of radium. The letter, which was made a part of the record, in the hearings before the Subcommittee on Raw Materials of the Joint Committee on Atomic Energy, Congress of the United States, Ninety-Second Congress First Session, October 28th and 29th, 1971, contained the following comments:

"I am advised that a typical uranium milling operations produces, as waste materials: (1) a liquid waste containing dissolved or suspended particles which, during the milling operation, is discharged into a nearby stream or settling pond; (2) solid tailings which accumulate at the site while awaiting disposition.

"Each of these wastes is assumed, for purposes of this opinion, to contain concentrations of uranium below those specified in the regulations as constituting source materials. These discharges of the liquid effluent and accumulations of the solid tailings are integral parts of the milling operations. For this reason, it is my opinion that they are subject to the Commission's regulatory control under the Act."

It seems clear from that opinion that, at least in 1960, the Commission was fully aware of the radiation safety problems created by the milling wastes and of their statutory obligation to properly regulate it. While it may be argued that the regulatory control ceased with the expiration of the license, I would be of the opinion that the regulatory control continues as long as the problem exists at the site. While I would be of the opinion that the failure of the AEC, by regulation, to properly address the radiation safety problem created by the uranium milling operation wastes, might well constitute an act of negligence, I would also be of the opinion that any legal action now would probably be barred by the statute of limitations, which limits the time for filing a complaint in a civil action against the United States to six years after the right of action first accrues and to two years after such claim accrues for tort claims against an agency of the United States. Although legal action may be barred, the negligence to properly regulate, particularly when the power to regulate was exclusively within the Atomic Energy Commission, would seem a proper legal basis for arguing that clean-up of the uranium tailings is an exclusive federal responsibility. I might also point out that the government in this case was the only purchaser of the product and that the purchase price was set at the cost to produce plus a reasonable profit. I would think it could be argued that the government's failure to include disposal costs of the waste generated in the milling operation resulted in their purchasing the product at a lesser price. I would think that the government now should be willing to pay those costs, which are a part of what they should have paid under the original contracts. This was in toto a government project. It was for the benefit of all the people and its cost, which includes disposal of the milling wastes, should be borne wholly by the Federal Government.

You have also raised the question as to whether or not there is legal basis upon which the state might be liable. I do not believe such a basis exists at the present time. The state was not an owner of the land, the state did not participate in the milling operation or the sale of the product, the state was not a party to the contracts, the state could not have regulated tailings even if it had desired to, as the regulatory power was exclusively with the federal government. While the state, under its police power, has a duty to protect the health and well-being of its citizens, the problem could not have been prevented by state action. It could only have been prevented by proper federal action. The state is now seeking a solution in order to properly fulfill its obligation to its people.

In summary, I would conclude that :

1. There is a legal basis for an argument that cleanup of the uranium tailings is an exclusively federal responsibility, however, legal action is probably barred by the statute of limitations.

2. There at present exists no legal basis upon which the state could be held liable.

I might also comment that the Utah Radiation Protection Act found in Title 26, Chapter 25. Utah Code Annotated, 1953 as amended, does not provide the regulatory tools to make the necessary decisions associated with the Vitro site, and that there is a need for promulgated state rules and regulations which clearly establish how radiation problems are to be dealt with.

If there are any questions you would like more closely examined, or if I can be of further assistance to you in any way, please let me know.

Very truly yours,

WILLIAM C. QUIGLEY,
Assistant Attorney General.

Governor MATHESON. The matter, Mr. Chairman, of cost sharing is of great concern to the States involved. S. 3078 which provides for 25 percent of the costs to be assumed by the State involved is a totally unacceptable, and in my view, unfair, way to address the issue. In Salt Lake City, Utah, in Durango, Colo., in Grand Junction, Colo., in Riverton, Wyo., urban encroachment has restricted remedial action to a removal of those tailings which would push the total cost in those cases of \$7.5 million for Wyoming; \$42 million for the State of Utah, and \$64 million for the State of Colorado.

That formula would require a State expenditure in Colorado alone of \$16 million in 1976 dollar values. Colorado has already spent \$2.5

million, according to the information I received from Governor Lamb, and by the end of this calendar year he anticipates that figure will reach \$3 million.

In Utah, I have imposed an austerity program in recent weeks in response to a public outcry over the cost of Government at all levels. The State of Utah simply does not have \$10 million which would be required, which it would be required to appropriate under the cost-sharing provisions of S. 3078.

The Department of Energy has suggested the States should participate in this program because they received benefits from the operation of these mills. When I examine the history of the benefits and take a look at the costs, I can assure you, Mr. Chairman, the States have paid dearly for those few benefits in terms of taxes that came around during those periods of time, and on a fair analysis it has been a negative cost benefit rather than a positive cost benefit.

It is our judgment the cost-sharing issue is one that should be addressed fully by the Federal system on the basis of fairness and equity. In terms of State participation, I happen to be a strong States rights Governor. I don't know of any Governor who is otherwise. But we would like to urge upon the committee that the concurrence of the State be a part of the decisionmaking process in terms of the plan and certainly in terms of the deposit sites.

One of the things we have found in managing our affairs at the local level is that if we have a chance to make the decisions that emanate from our Nation's Capital, we often can provide some valuable decision in making good decisions, so we would request the State have an opportunity to be involved in the process, basically in the manner outlined in the Hart bill, which is S. 3253.

I am pleased both Senators Garn and Hatch are cosponsors of that particular piece of legislation. They individually and collectively have recognized the need for prompt action. Their presence here today and their testimony is further evidence of that.

In conclusion, Mr. Chairman, I would like to express my gratitude to you and of my colleague Governors from the West, for the leadership you have shown in conducting hearings on the three remedial bills before your committee. I have indicated S. 3253, Residual Radioactive Materials Act of 1978, meets the needs of the States as approved in the resolution adopted by the Governors' conference last month.

If I may, Mr. Chairman, I would like to ask this copy of that resolution dated June 17, 1978, also be made a part of the record of these proceedings.

Senator HASKELL. It will be so made.

Governor MATHESON. I would urge the subcommittee's active consideration of the merits of the bill. We are certainly at a point where the homework has been done. The need is established. The awareness factor is at an alltime high. On the basis of testimony similar to that which Senator Garn has provided this morning, I think we all ought to be prepared to move forward with all due haste.

Thank you very much for the opportunity to appear before you.

[The prepared statement of Governor Matheson and the June 17, 1978, resolution follow:]

STATEMENT OF SCOTT M. MATHESON, GOVERNOR, STATE OF UTAH

Mr. Chairman, I am pleased to appear before your Subcommittee on Energy Production and Supply on behalf of the people of the State of Utah as well as those other Western States who are similarly affected and afflicted with health hazards that remain from the government's now concluded uranium procurement program. This position was unanimously endorsed by resolution of the Western Governors Conference at our annual meeting last month. I wish to express our collective gratitude to this Subcommittee and this Administration for your recognition of this threat to the health and well-being of our citizens that these abandoned uranium mill tailing sites represent.

This Subcommittee has received a substantial amount of evidence as to the scope and extent of these hazards. I am accompanied this morning by Dr. Lyman Olsen, the chief health officer of the State of Utah, who testified last month on companion legislation before the House. In his testimony relating to the Vitro site at Salt Lake City, Dr. Olson noted the presence of radon levels in excess of 30 times the upper limit prescribed by the Surgeon General for remedial action. I quote from Dr. Olson's prepared testimony:

"Total relocation of the radioactive material seems to be the only logical solution. Although many suggestions for stabilization in place have been made in past years they have been discarded as ineffective or impractical. It is significant to us, and a continual worry, that each time new and better scientific information becomes available (as in the case of our new technique for measuring radon and its daughters), the extent of the hazard is concluded to be worse than previously thought . . .

Under these circumstances, it is folly to speculate that new knowledge will provide a scientific break-through which gives us the techniques to contain radon with other radioactive elements at the tailings site. Utah residents have already suffered more than reasonable exposure and want the pile removed."

Once this threat to public health is recognized and established beyond reasonable scientific doubt, a multiplicity of issues arises which this Subcommittee must carefully consider. However, I will focus my remarks this morning on three basic issues of major concern to the states that are involved. They are federal responsibility, cost sharing, and the extent of state involvement.

FEDERAL RESPONSIBILITY

In 1974 when the Joint Committee on Atomic Energy held hearings on the problems associated with the radioactive mill tailings in Grand Junction, Colorado the federal government went to great lengths to disclaim any legal responsibility or liability for the uranium tailings because such wastes did not legally fit within the statutory definition of "source materials." However, the introduction of S. 3078 before this committee as a Department of Energy-sanctioned bill indicates that the federal government now recognizes its "compassionate responsibility" to rectify this situation. I believe that the liability of the federal government goes beyond compassionate responsibility and it does so for two reasons.

First, from its beginning in 1949 to its conclusion in 1964, the uranium procurement program was undertaken in the name of national defense. The uranium ore was processed for use in weapons, power development, and research—all in the national interest. Permit me to quote from the "Atomic Energy Commission Annual Report to Congress," July, 1950, in which it states: "The atomic energy industry employs forces that are as yet imperfectly understood; it is being developed at an unprecedented rate without benefit of the years of experience gained in other large industries; it is owned and controlled by the people of the United States; and it promises to be vitally important to the future of mankind."

The federal government, in sponsoring the raw materials procurement program, acted for and in behalf of the American people from whom it derives its purchasing power. The monetary costs were shared by the entire country. However, the environmental risks have not been equally distributed. In view of the disproportionate burden that would be placed on individual states to clean up the radioactive tailings, the cost of remedial action should, in the interests of equity, be assumed by the federal government.

A second factor of major consequence is the degree of control the federal government exercised in operating the raw materials procurement program. From the beginning the Atomic Energy Commission chose the contractors, provided them with the necessary technology, regulated the supply of ores, set the ore prices, and was the exclusive purchaser of the processed uranium.

Furthermore, because the contractors were not required to have a tailings stabilization program, the price set and paid by the federal government for the uranium did not include this important cost of doing business. If, indeed, there had been funds set aside and an understanding of the magnitude of the cost necessary, the federal government would have made different choices in many cases as to contractors, millsite locations, and the price paid for the uranium. This would have allowed for a fund necessary to stabilize or remove the tailings and we would not be appearing before Congress at this time asking for such relief.

An additional aspect of the extent of federal control associated with the uranium procurement program was the security requirement that prevented state and local health departments from being aware of the health hazards resulting from the uranium milling process. In a 1950 publication of the Atomic Energy Commission entitled "Waste Materials in the U.S. Atomic Energy Program," the AEC acknowledged the inability of state and local government to have effective control due to the "security measures and the 'strangeness' of the industry." The report further states:

"By Congressional Act the Atomic Energy Commission has virtually sole power over this important development. In this respect it is unlike any other industry with which the public has hitherto been confronted. Normally the activities of an industry, which potentially may have some public health influence upon the surrounding populations, has the continued scrutiny of official public health agencies on federal, state, and local levels. In this case of nuclear fission operations, however, . . . the normal process of supervision and regulation generally available through federal, state and local health departments and health officials are missing, and their initiation is handicapped by security policies."

The conclusion to be drawn from the above is that in addition to compassionate responsibility, there is substantial justification for requesting the federal government to totally fund a remedial action program. The tailings are the direct result of a program designed to protect the national interest, the federal government exercised enormous control over the procurement program, and, in fact, the nation purchased processed uranium at less cost because of a failure to include in the purchase price the cost of developing and implementing an adequate reclamation procedure.

I would like to submit for the record an opinion I requested from the Utah Attorney General's office earlier this year on the extent of federal responsibility, wherein he concludes that while a legal action against the federal government is probably barred by the statute of limitations, there is a legal basis for exclusive federal responsibility.

COST SHARING

It follows, therefore, from what has been established about the scope and extent of federal responsibility for these abandoned sites, that the cost sharing provisions of S. 3078 are wholly unacceptable to the affected states. Under the Department of Energy's formula the states would pay 25% of the costs associated with removal or in situ stabilization of the radioactive tailings. In Salt Lake City, Utah; Durango, Colorado; Grand Junction, Colorado; and Riverton, Wyoming, urban encroachment has restricted remedial action to a removal of the tailings which would push the total cost to \$7.5 million for the State of Wyoming, \$42 million for the State of Utah and \$64 million for the State of Colorado. This formula would require a state expenditure in Colorado alone of \$16 million in 1976 dollars. To date Colorado has already spent \$2.5 million, and by the end of this calendar year expects that figure to reach \$3 million.

In Utah I have imposed an austerity program in response to a public outcry over the cost of government at all levels. The State of Utah does not have the nearly \$10 million that would be required under the cost sharing provisions of S. 3078. I do not have to remind this Subcommittee that the focal point of the attack of Proposition 13 and its imitators is the state and local tax bases, not the federal.

The Department of Energy has suggested that the states should participate in this program because they received the benefits from the operation of these mills. This is specious in the extreme. From available records it is possible to determine that the combined tax yield from all sources to the State of Utah and its political subdivisions from the operation of the Vitro mill was \$1,376,747. This so-called "windfall" to the State of Utah would not begin to offset the governmental services provided Vitro's 200 employees at the state and local levels. In truth,

the Green River and Salt Lake Vitro sites have accrued additional costs for monitoring and supervision as well as a colossal revenue loss resulting from a building moratorium in the prime industrial area that Vitro once occupied. The people of Utah, like those in the other eight states who are similarly affected by this legislation, have benefited no more and actually much less than any other citizen of the United States from the Atomic Energy Commission's uranium procurement program, and now they should bear no greater burden from the removal of these deadly wastes.

STATE PARTICIPATION

In conclusion, I would like to briefly treat the issue of state participation in the decision-making process for ultimate disposal of these tailings. A major flaw in the Department of Energy bill is that states are essentially ignored. Because of the questions relating to the liability and ultimate responsibility for the uranium tailings once they have either been stabilized in place or moved to another site, it is imperative that the states concur in the location of the disposal site. They must also be involved regarding the standards and criteria which are developed to insure that the stated purposes of the legislation before you to protect the public from radiation exposure are achieved in both the short and long term. This is a police power function that properly and legitimately requires state involvement. State participation at the back end will have to suffice for the lack of state participation at the front end when the nuclear procurement program was instituted by the AEC nearly two decades ago. The secrecy with which that effort was undertaken in the name of national defense was perhaps defensible; the exclusion of states from involvement now is certainly not.

If I may be permitted something of a parenthetical observation at this point, Mr. Chairman, I wish to commend the Nuclear Regulatory Commission as one of the successor agencies of the AEC for the regional hearings they are initiating on high-level waste disposal siting. It is a refreshing contrast to the covert process by which the uranium procurement program was conducted. But I must confess to an eerie sense of *deja vu* about some of the similarities between the two programs. The enthusiasm with which the Administration is now pursuing the need to locate new storage sites for nuclear reactor waste materials is reminiscent of the promotion given the raw materials procurement program twenty years ago. And as the present search for high-level radioactive waste disposal sites is a legitimate national need, so the requirements for processed uranium in an earlier time served the national interest and ought not now be forgotten.

CONCLUSION

Mr. Chairman, allow me to conclude my remarks this morning by restating my gratitude and that of my colleague Governors throughout the West for the leadership you have shown in conducting hearings on the three remedial bills before you. One bill which is cosponsored by both Senators from my state, S. 3253, The Residual Radioactive Materials Act of 1978, meets the needs of the States as approved in the resolution adopted at the Western Governors Conference last month, and I would like to submit a copy of that resolution for insertion in the record.

I urge your Subcommittee's active and expeditious consideration of the merits of that bill in order that we may rid our cities, towns, and countryside of these poisonous wastes.

WESTERN GOVERNORS' CONFERENCE¹ ANNUAL MEETING, JUNE 17, 1978

RESOLUTION RE URANIUM MILL TAILINGS LEGISLATION

Whereas, uranium mill tailings located on inactive uranium mill sites contain a radiation level exceeding maximum permissible safety standards and thereby present a real or potential hazard to the public; and

Whereas, the uranium tailings piles are the results of mining for uranium fuel under Federal contracts for purposes of energy production and national security; and

¹ Resolution submitted on behalf of the Governors of Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, Oregon, New Mexico, Utah, Washington, and Wyoming.

Whereas, the production of uranium ore enured to the benefit of all U.S. citizens, and the cost of elimination of the health hazard created by uranium mill tailings is prohibitive to those states where they exist; and

Whereas, legislation is presently before Congress calling for appropriate remedial action to limit the exposure of individuals to radiation emanating from the various inactive mill tailings sites; and

Whereas, the President, the Congress of the United States, and the Department of Energy all have the necessary powers and financial capabilities, as well as the duty and obligation, to rectify this problem, and their assistance is vital to the immediate and proper resolution of this environmental and health hazard: Now, therefore, be it

Resolved, That the Western Governors recommend: 1) that any remedial measures on inactive tailings piles created prior to the implementation of the National Environmental Policy Act of 1969 be accomplished at total Federal expense, 2) that the abandoned uranium mill tailings be classified as radioactive wastes and placed under the exclusive jurisdiction of the Federal government, 3) that the Nuclear Regulatory Commission be charged with the establishment of standards and criteria for disposal and handling of mill tailings, and 4) that when such remedial measures are taken, they should be developed with the participation and ultimate concurrence of states directly impacted by this health hazard.

Senator HASKELL. Thank you, Governor. I appreciate your being here. I would like to ask you basically two questions. I think this bill on these abandoned sites should go forward, so these questions do not in any way indicate a desire to slow up legislation. But we have two additional problems that came out yesterday in the hearing.

Whether you have them in Utah or not, I don't know. I guess that is what I was about to ask you. One of the problems is this. There are certain active mills now, the Nuclear Regulatory Commission adopted regulations to properly dispose of tailings maybe a year ago or maybe a little more, but there is a tremendous amount of tailings from those presently active mills not covered by those regulations because those regulations merely took effect upon the material that was produced upon the promulgation of regulations.

Now, there is a large pile of tailings of active mills that nobody has considered, at least they have not been considered by the Federal Government and by the State government. That is one situation. My question really to you is, do you have that problem in Utah? Do you have such mills?

The second problem is the mines, as you know, the high grade or middle grade ore, whatever is minimal to the process, is taken, and the other ores are left in piles outside the minesites. There is some question as to whether those do or do not contain a health hazard.

I asked the various representatives of the Federal Government to give me their analysis of those two situations yesterday. I would merely like to have your reaction as to whether this problem does or does not exist in your State.

Governor MATHESON. We do have that situation in our State, Mr. Chairman. We have had mines where uranium has been extracted at many locations, particularly in the southern part of our State and/or has been stockpiled in various areas of our State and remain. I do believe we have active operations also at the present time.

There has not been to my knowledge a careful analysis of the scope and nature of the problem with respect to those situations, but I am aware of the fact there is great concern and have been advised by some people that could be a serious health problem.

My judgment about it is those two issues should be carefully examined as carefully as possible because they may be very critical and

very serious. But I would hope that we could proceed with the piece of business we have before us.

Senator HASKELL. Governor, as I prefaced this, this legislation should go forward. I just wanted your comments.

Governor MATHESON. And I guess I wanted to reemphasize that again because of our joint concern. I believe we should go forward and evaluate the other problems as quickly as possible and we do have those potentially in our State.

I am familiar with the fact that particularly in the State of New Mexico the second problem could be a serious one for them because they have such extensive activity, uranium activity in their State, particularly in the fifties and sixties. So they could have a very serious problem in their area.

Senator HASKELL. Thank you, Governor. I intend to ask the appropriate Federal agencies and analyze it; of course, it would probably be a great help to the committee if the health officer of your State could give us the benefit either formally or informally, not for the hearing record, but at some time, the benefit of his observations on those two particular problems.

Governor MATHESON. If we may do so, I will ask him to prepare a written analysis of them and submit it for the committee as promptly as possible. If that is acceptable to you, Mr. Chairman.

Senator HASKELL. That would be very acceptable. Again, thank you, Governor and my colleagues.

Senator GARN. Mr. Chairman, in view of your surprise of the pilings in the middle of Salt Lake City, I would like to come around and show you some photographs. This is an east-west thoroughfare in Salt Lake Valley. These are residential homes here.

Senator HASKELL. Let me tell you what I might ask you to do, not the book but just the aerial photo, you could submit that probably in some form.

Senator GARN. I would be happy to.

[The photograph follows:]

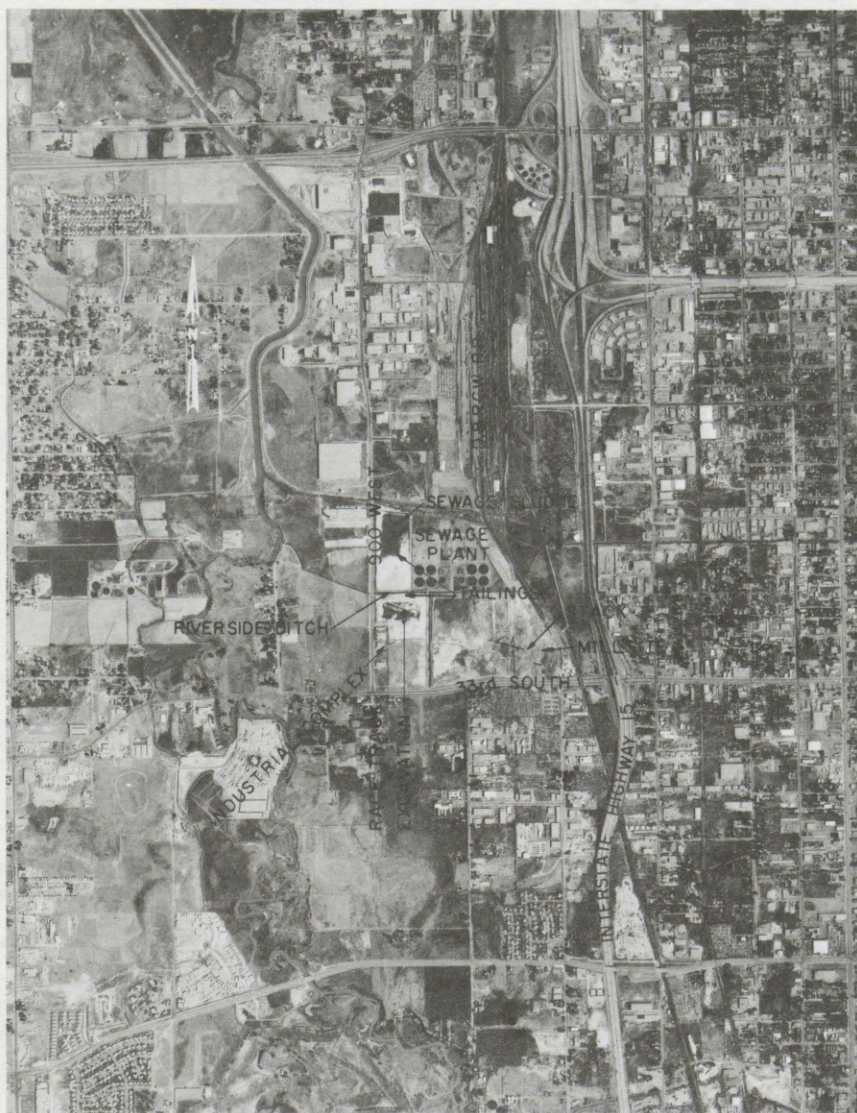


FIGURE 2-1
AERIAL PHOTOGRAPH OF PRESENT VITRO SITE

A-0023

2-5

Governor MATHESON. One other postscript, if I may, Mr. Chairman. We do have here today some of the uranium mill tailings from the Vitro site in a very tightly closed bag so there will be no radon emanating. I understand if we turn the lights off, it will glow in the dark. I am being a little facetious there. We would like to make that a part of the record, too, if you are willing to take that.

Senator HASKELL. I do not think we can put that in the record.

Governor MATHESON. Thank you very much.

Senator HASKELL. Dr. Robbins.

**STATEMENT OF DR. ANTHONY ROBBINS, EXECUTIVE DIRECTOR,
DEPARTMENT OF HEALTH, STATE OF COLORADO**

Dr. ROBBINS. Senator, I am Dr. Anthony Robbins, I am executive director of the Colorado Department of Health. I appreciate Governor Matheson's fine testimony on this issue and I will try not to repeat some of the points he had made.

I have submitted written testimony.

Senator HASKELL. It will be reproduced in full.

Dr. ROBBINS. I might start with a little history of what has happened in Grand Junction. During the fifties there was a uranium mill located in some sense the same way Salt Lake City's was, in the middle of town. But not only was that mill located there and a tailings pile accumulated, but the Federal Government, the old Atomic Energy Commission, encouraged people in Grand Junction to take fill from the tailings pile and use it under homes and other buildings.

The Colorado Department of Health became worried about this and then began a series of surveys which has now covered 25,000 structures in the city of Grand Junction where we found over 600 of the structures had elevated levels of radon gas. The problems you have with this is the tailings pile represents a hazard for people who get very close to it but in general the radon gas is dissipated quickly in the open air.

In contrast to that, when you build a building, a closed structure over the tailings, what happens, the radon gas diffuses right up to the concrete or wood floors and at that point you get the radon gas captured in the closed space.

So the highest levels we have observed are within the buildings. Of course, this is where people live and work. At this point, I guess there were a number of studies to be done but none of them really completed in terms of the effects of this exposure.

There are studies or uranium miners and others that suggest exposure to radon can cause cancer. But no one has studied the kind of situation which, where the people in Grand Junction live and work.

We began last year to look at lung cancer and leukemia deaths in Mesa County. Originally, the data suggested there were both increased lung cancer and leukemia deaths in comparison with the number of deaths in the west of the State of Colorado. An age adjustment was done. It turned out the difference between Mesa County and the rest of Colorado and lung cancer deaths was relatively small.

But for the 40-some leukemia deaths, 33 in adults, that produced a rate that was twice as high as the State average and with funds from the Nuclear Regulatory Commission we have begun a study of the background of the people who have died from leukemia who live in Grand Junction.

We now from death certificates have got 50 cases of adult acute leukemia and these are being matched in a case control method with two other groups; 50 deaths in people of the same age and sex occurring at the same time in Grand Junction, not from cancer, and 50 additional deaths from cancers that are not known to be associated with radiation exposure.

When the study is complete, we will have information on these people's occupations, where they live, and because we know the radon

levels for 21,000 structures in Grand Junction, we should have some evidence as to whether there might be a causal relationship between the tailings and the radiation and leukemia.

Senator HASKELL. Are you basically saying, Doctor, as of the present moment we don't have evidence that radon exposure causes injury?

Dr. ROBBINS. We don't have firm evidence. The kind of exposure we have had in Grand Junction causes cancer. We do have evidence the kind of radiation we see from radon in workers, for example, does cause cancer. So we are in a situation—

Senator HASKELL. What is the difference in the two cases?

Dr. ROBBINS. Only the levels of exposure and the time.

Senator HASKELL. I see. So you have firm evidence that exposure constantly by a worker causes physical injury but you are not quite sure how or whether injury is caused by more casual exposure, is that correct?

Dr. ROBBINS. I think that is quite correct. We operate from a public health point of view, that is a cautious point of view that says we ought to be sure it is safe before we have people living there and working under these conditions.

But at the present, and I think from that cautious point of view, we went through and got involved in the whole remedial action program to remove the tailings.

Senator HASKELL. Admittedly, it is not a very bright idea to live in a house sitting over tailings where radon is coming from. That is constant exposure just like the worker. I would be curious to know what the scientific evidence is where the exposure is more casual. But that is what you are developing.

Dr. ROBBINS. That is what we hope we will have answers to. The numbers are small and I think I should say it is entirely possible we will come out with results that do not tell us there is a causal relationship between the exposure and the disease, but they probably will not be able or they are likely to be able to tell us the other, that there is clearly no causal relationship.

I should comment on one other thing that is happening.

As you know, the price of uranium has risen and we are now in a situation again where there is a real commercial interest in some of the tailings piles. They were processed by older methods and there was a good deal of uranium left in them. Along with the new mining that has developed in the State of Colorado, we are also getting interest in reprocessing the tailings part.

We are concerned we do not make a second series of public health bad decisions and let these tailings be moved to anything or any place but in a safe fashion. There is a commercial interest. The whole process will be less expensive to the people in Government but we do believe the public health considerations have to come first.

This is certainly our position in terms of the Durango pile and the Grand Junction pile. Let me conclude by talking about the Colorado situation with regard to who should pay for a program of removing the tailings piles. I guess we are in a situation where Colorado, as Governor Matheson has already stated, has put some money into doing part of the removal of the Grand Junction project, and I, for one, have had the experience of going to our State legislature and asking for more money to do this, to contribute to what is now a 3 to 1 Federal-State matching program.

It is not very easy each time we go to the legislature. The view is expressed more strongly, particularly by legislators from the Grand Junction area, that this was an entirely Federal Government program, the decisions to allow the tailings to be deposited where they are spread around where Federal decisions, and there is no question the Federal Government ought to be paying the full cost of the program.

I agree with the position taken by Senator Hart and hope that is the way things will turn out. I guess I do need to comment there seems to be more currency now with some kind of 90-10 funding proposal. But if we end up with a 90-10 proposal and Colorado does not favor that at the present time, the one important contribution that could be made would be give Colorado credit for the money already spent.

I might try to give you some numbers as to how that might look. We have spent at the present time or will have spent by the end of the year, \$2.3 million. This would, on a 90-10 basis, produce \$20.7 million in Federal funds and even if one subtracted the \$5.4 million the Federal Government was spending in Grand Junction, it would mean at least the next \$15.3 million of money would be 100 percent Federal money. Although this is not as much as would be needed to do the cleanup, both the Durango and Grand Junction piles, it would certainly be a major contribution and at this time when the legislature has limited itself to a 7-percent increase in general fund spending each year, this would guarantee us at least a few years of continued effort.

I should conclude by saying obviously nothing would be more unhappy than a Federal appropriation to clean up the mill tailings dependent on a State appropriation with no State appropriation forthcoming. We would then have a glorious situation where having had the Federal Government offer to do a part of it and nothing getting done.

That would be very unhappy from my point of view. Thank you.

Senator HASKELL. Wait a minute. I missed that last part.

Dr. ROBBINS. I am worried if we come up with the 90-10 or some other matching program, our State legislature may say no, we have already put in \$2.3 million and we would have a hollow piece of legislation that would do nothing to remove the tailings piles.

Senator HASKELL. All right. I follow you.

Dr Robbins, you have heard the two questions I asked the Governor of Utah which are not necessarily involved in this bill, which involves abandoned uranium mines. But you think it is not only necessary to gather information for the record on those two factual situations but perhaps you could give us some information, write us a letter, we may have health exposure beyond the purview of this particular piece of legislation.

Dr. ROBBINS. It is very clear we do. My written testimony began with comments indicating we have problems in the mines, we have problems at mills, and we have problems in terms of final repositories. In addition, every time between mine and mill and mill and repository we had problems associated with transportation of the material.

There are places in Colorado where the road signs are radioactive from where the ore trucks rolled along back in the fifties and sixties. We are concerned and we are concerned about the problems of the growing uranium industry in the State, and we have been working

very closely with the Regulatory Commission to see if we can get to a situation where some kind of complete environmental review exists for each of the new projects proposed.

If I can take that a step further I think neither the NRC nor ourselves are ready to do it, but we do know it needs to be done. Ideally, we should be in a situation where we don't have to consider each new proposal as a single, one-by-one, first-come, first-served, basis. In addition to the generic environmental impact statement they are putting together on uranium milling, there should be a way the State of Colorado can consider general areas, can put some pressure on the industry to concentrate the milling activities and can try through a process to reduce the overall human exposure.

We have not worked out all of the systems but perhaps we will in the future.

Senator HASKELL. Perhaps your written statement covers the two areas I asked you about. I realize we have an ongoing problem. I realize you are working with the Nuclear Regulatory Commission to take care of that. I am concerned about problems that may be left behind.

Dr. ROBBINS. There are problems. We are concerned too.

Senator HASKELL. If you feel your testimony addresses those completely, then don't do anything else. If you feel supplementary information could be provided, I would appreciate it very much if you could provide it.

Dr. ROBBINS. It is not provided and I would be glad to write you on this.

Senator HASKELL. Thank you very much, Dr. Robbins.

[The prepared statement of Dr. Robbins and a subsequent submittal from the Colorado Department of Health follow:]

STATEMENT OF DR. ANTHONY ROBBINS, EXECUTIVE DIRECTOR, DEPARTMENT OF HEALTH, STATE OF COLORADO

The Colorado Department of Health offers this testimony in behalf of the people of Colorado, representing their vital interest in the safety of our nuclear fuel cycle. In fact, it is the entire nuclear fuel cycle which needs attention, not only disposal of low level radioactive wastes but also the mining and milling processes, the much needed permanent repositories and, hanging ubiquitously over the entire fuel cycle, the serious problem of transportation of radioactive materials. This testimony, however, focuses upon the current, unsatisfactory state of the inactive uranium mills and their tailings. Specifically, I will discuss (1) the need for a remedial action program with special reference to the Grand Junction situation; (2) how public health standards must be the most important criteria for such a program; (3) the nature of such a remedial action program; and (4) the funding necessary to accomplish such a program and who should provide the funding.

No other group of people has had more reason for concern about the health effects of the uranium industry than the people of Grand Junction in Mesa County on Colorado's western border. In Mesa County, the tailing from uranium mills of the 1950's were indiscriminately scattered in waste piles and then, much to our subsequent grief, utilized in the foundations of over 600 homes, businesses, schools, churches, and other structures. The Grand Junction Uranium Mill Tailings Remedial Action Program was initiated after the Colorado Department of Health detected elevated radiation levels in these structures.

In 1978, very preliminary studies indicate that Mesa County has an acute leukemia rate twice the state average. Case by case interviews are now underway to determine possible associations or etiologies. There is no scientific evidence yet to indicate an association with the uranium mill tailings, but the reason for concern is clear.

Thus, the State of Colorado has a long and intimate involvement with the real and potential health effects of uranium mining and milling. Much of the

early work on uranium miner lung cancer was accomplished in Colorado, well before some segments of the federal government acknowledged the radiation problem. We have studied the problem of inactive tailings piles since the late 1950's, investigating both radon and its daughters, which are generated by the piles and dispersed into the surrounding communities, and the particulate matter which is resuspended from the pile surfaces.

These and other studies of ours, supported by studies of the U.S. Environmental Protection Agency (EPA) and the Utah firm of Ford, Bacon and Davis under contract to the U.S. Department of Energy (DOE), give cause for serious concern about the health of individuals who live and work for long periods of time in the immediate vicinity of an inactive tailings pile.

There is increasing interest in the old uranium mill tailings and there are two reasons for this increased interest. First, the rising price of uranium and the old milling process makes it possible to recover additional uranium from the old piles. Secondly, there is the growing public health concern—that people living near or over these mill tailings are being exposed to serious and unnecessary radiation risks. We must not allow a second series of disastrous decisions to be made by moving these tailings piles for economic reasons alone. There will be many instances in which commercial interests in the uranium tailings piles will be compatible with the public health, but public health must be our first concern. For this reason, several different government entities should probably be involved in the conduct of a proper corrective program. This would include the Nuclear Regulatory Commission (NRC), the Environmental Protection Agency (EPA), the Department of Energy (DOE), and the state government.

Responsibilities of the NRC should be to license and regulate any corrective measures taken for inactive mills and tailings as well as inactive uranium mills and their tailings impoundments. The EPA, in its overview position and as developer of federal guidance under the Reorganization Plan No. 3 of 1970, should work closely with NRC in the development of NRC's regulations. Public health criteria which are compatible with the philosophies of both agencies must be developed as soon as possible to address standards for clean-up of original sites and requirements for proper stabilization of new disposal sites.

DOE responsibilities should be directed to the actual accomplishment of the corrective program. The corrective program should include: the selection and acquisition of disposal sites; reimbursement to those property owners who have at their own expense removed deposits and returned the tailings to the authorized disposal site; removal to authorized disposal sites those tailings deposits which have been dumped at unauthorized sites and which are not included under the Grand Junction Remedial Action Program; clean-up and restoration of original mill sites; stabilization of the tailings at the new disposal site; and, finally, long term maintenance of the new site and monitoring to determine the adequacy of such stabilization.

We strongly urge federal custody of the tailings. These tailings contain highly toxic long-lived radioactive materials which should appropriately be defined as low level radioactive wastes.

The responsibilities of the respective states might include the acquisition of the original mill site to allow restoration to occur. Resale of the reclaimed property at an increased value would allow the state to recover its administrative costs. Any further profits from resale could be provided to the federal government to mitigate the program's cost to the taxpayer. Our experience indicates the states must be responsible for informing future as well as present landowners and residents about potentially dangerous tailings deposits remaining on their property. The states must also be required to provide approval or concurrence on the federal effort, i.e., the NRC regulatory and the DOE operational programs, as was suggested in S. 2761 (95th Congress, 2nd Session).

Once public health considerations have been satisfied, the uranium industry may be a participant in the corrective program. The industry's contribution would be the economic recovery of residual uranium and other minerals from the tailings during the corrective process. Its participation would not only recover a valuable resource but could mitigate governmental costs if properly administered by DOE.

Many funding formulae have been discussed, but we still believe that with the exception of the state acquisition of the original mill site or tailings pile, the entire funding of this corrective program must be 100% federal for the following reasons:

- (1) A federal program required the generation of the wastes;
- (2) The federal government had sole title to the product of the mills in question;

(3) The federal government inappropriately and inadequately regulated itself and the industry;

(4) The state was preempted from any regulatory control over the conduct of the milling process during much of the federal uranium procurement program; and

(5) The state and local community will have benefited little from the operation of the mill and the corrective program, particularly if the health effects anticipated become evident.

The uranium procurement program was federal by initiation; it should be federal in its culmination. The federal government should make corrections in the program it created. This will include the costs of medical care, if any. A significant radiation dose to a considerable population can be reduced or eliminated. Action now is the best interest of all.

Let me, in closing, comment on the concept of 90/10, federal/state funding for these projects. This idea seems to have gained some acceptance among those states that have not yet entered into a remedial action program. In Colorado, we have had the experience of going back to the legislature on several occasions to request funding for the 75/25 funding of the Grand Junction Remedial Action Project and, each time we receive stronger and stronger comments indicating that the federal government, which, after all, caused the problem, should pay the full costs of correcting it. There may be a simple way to deal with this real problem in Colorado and, yet, protect the public health. At the present time, Colorado has already spent \$1.8 million dollars of state funds and appropriated another half-million dollars for the coming year. If Colorado were given credit for these expenditures within a 90/10 funding scheme, it is possible that only small amounts of state money would be needed in the future. The \$2.3 million already spent would produce \$20.7 million in federal funds and even if the federal money (\$5.4 million) already spent is subtracted, \$15.3 additional federal dollars would be available to continue efforts in Colorado. If this amount of money were not sufficient to complete the remedial action on all Colorado mill tailings piles, the amount of state money needed in the future might be relatively small and come farther off in the future, rather than next year.

As a public health official, my main concern is that the piles be removed to a safe repository and no one will have benefited if the federal government appropriates money and then for lack of state dollars no further action is taken.

COLORADO DEPARTMENT OF HEALTH,
Denver, Colo., August 14, 1978.

SENATE ENERGY COMMITTEE,
Dirkson Senate Office Building, Washington, D.C.
(Attn. Barbara Hough)

DEAR MR. CHAIRMAN: At the request of Ms. Hough, I am providing answers to the two questions which she posed:

1. Is the NRC control of tailings all inclusive?

At present NRC regulatory control is limited to only those locations where a valid source material license exists. While the license relates to the possession and use of the source material, other areas relevant to the process can be indirectly controlled by license conditions. NRC currently has no regulatory control over uranium mill tailings once the mill license is terminated. Because of this situation an agreement was reached in 1966 on a joint federal position regarding uranium mill tailings (copy enclosed).

The proposal before Congress, primarily sponsored by Senator Hart of Colorado, addresses the active uranium mill licenses and their attendant tailings piles. Essentially this will give NRC "control" over all uranium mills and their tailings. This would occur due to the redefinition of "by-product material" and the requirement for the Agreement States to be fully compatible with the federal program within 3 years, particularly regarding environmental reviews and public participation. We are concerned with the conduct of the NRC program regarding tailings disposal due to the fact that NRC is stating that the disposal goal is a "walk-away" situation not requiring further action by government and industry. As such a situation has yet to be defined and experienced we require that a long-term maintenance and surveillance financial surety arrangement be provided to government by the industry. There are times when we feel that the federal bureaucracy should be required to be compatible with reasonable state efforts.

It should also be pointed out that other tailings from the processing of bauxite, phosphate and fluorspar ores can contain considerable quantities and concentrations of naturally-occurring radioactive materials. The states are moving forward in this area. Hopefully the Federal Government may catch up at some point in the future in the control of all sources of ionizing radiation.

2. Is there a health problem associated with waste rock at uranium mines?

While there is a considerable quantity of such waste rock at mines which would not pose a serious health hazard, there are situations which give rise to concern. Improper disposal of shot-rock which has elevated uranium and radium concentrations in streams and drainages will provide a source of increased radioactivity in the receiving streams. At times, due to improper operation of measuring devices at the mine, higher grade materials may be inadvertently disposed of in the waste-rock storage. If this material is removed from the mine site and used around a building site, it could give rise to elevated radon (and its progeny) within the confined air space of these structures. We have encouraged the proper disposal of the waste-rock at the mine site and have discouraged use of such wastes off-site, even for road fill and surfacing due to our past experiences and the potential for the generation of a health hazard situation.

Should you require additional information in this matter, please advise.

Sincerely,

ALBERT J. HAZLE,
*Director, Radiation and Hazardous
Wastes Control Division.*

Enclosure.

AGREEMENT JOINT FEDERAL AGENCY POSITION REGARDING CONTROL OF URANIUM
MILL TAILINGS

The Federal Water Pollution Control Administration, the Public Health Service, and the Atomic Energy Commission agree that inactive tailings piles resulting from uranium milling operations should be structurally stabilized and contained to prevent water and wind erosion. Active tailings piles should be managed to minimize such erosion during use.

Planning, management, stabilization and containment of tailings piles are viewed as being the responsibility of the individual mill owners. Mill owners should develop, without undue delay, specific plans for accomplishing such management, stabilization and containment, and submit such plans through the appropriate state regulatory agencies for approval. The staffs of the Federal Water Pollution Control Administration, the Public Health Service, and the Atomic Energy Commission will be available to the state regulatory agencies, upon request, to provide advice and assistance regarding the development of pile stabilization and containment objectives and measures for achieving them.

Compliance by mill owners with approved plans for stabilization and containment should be recognized as constituting fulfillment of mill owner responsibility with regard to such tailings piles. Obtaining and enforcement of tailings piles stabilization and containment plans should rest initially with the states concerned.

(Signed): ROBERT E. HOLLINGSWORTH,
*General Manager,
U.S. Atomic Energy Commission.*
PHILIP R. LEE,
*Assistant Secretary of
Health, Education, and Welfare.*
FRANK C. DiLUZIO,
Assistant Secretary of the Interior.

Senator HASKELL. Mr. Berick.

STATEMENT OF DAVID BERICK, WASHINGTON REPRESENTATIVE,
ENVIRONMENTAL POLICY CENTER

Mr. BERICK. Thank you very much. I am David Berick. With your permission, I would like my testimony in full to be entered in the record in consideration of your time and my cold and I will try to reduce my remarks I will make this morning.

The administration bill, S. 3078, and Senator Hart's bill, S. 3253, call upon Congress to assume compassionate responsibility to provide remedial action for inactive mill tailings sites. The Department of Energy has argued, in turn, that while it will not accept the blame, it will nonetheless accept the responsibility for these inactive mill tailings. Or rather, for some of the tailings.

It will not accept the responsibility under this legislation for the tailings at Monticello, Utah, which it currently owns. It will not accept the responsibility for the tailings at Edgemont, S. Dak., which are currently owned by the Tennessee Valley Authority. It will not accept responsibility for tailings resulting from the Manhattan Project which are now stored at the Department of Energy, Lake Ontario Ordnance Works in Niagara County, N.Y.

In addition, the Department of Energy has testified that there are 30 sites, including Middlesex, N.J., where tailings were used in construction as they were at Grand Junction, which require remedial action, but for which it does not presently intend to assume responsibility.

Mr. Chairman, the difficulty with compassionate responsibility is that it allows the good Samaritan to be compassionate at his convenience. The legislation adopted by this committee should establish a program to deal with all inactive, and disposed of, uranium mill tailings, regardless of their status through direct remedial action, compliance with EPA and nuclear regulatory standards applied retroactively, and cleanup of Manhattan project wastes. In the latter case, the Department of Energy must accept the blame as well as the responsibility.

There is also some question as to the recipients of the compassion. As both the DOE and the General Accounting Office have testified before Congress, these inactive mill tailings are currently owned either by the original landowner, the mill operator, or have been purchased since mill operations have been terminated.

Union Carbide, for example, continues ownership at five mill tailings sites where it produced uranium and owns a sixth site. In four other cases, the tailings are owned as part of the uranium mining and milling interests by such corporations as Wyoming Mining & Milling Co., Exxon, and United Nuclear Corp.

Mr. Chairman, we have just noted that over half of the sites are owned by commercial interests with a financial stake in both the disposition of the tailings and the uranium industry in general.

The DOE has argued that it should assume the compassionate responsibility for the potential liability of the States in cleaning up these tailings, but in reality it is also assuming the potential liability of these corporations and others which originally operated the mills.

Quite aside from the financial burden which the Federal and State Governments will assume, this approach sets a very uncomfortable precedent of excusing responsibility for environmental damages and hazards.

In 1976, Allied Chemical was fined \$13.2 million for dumping the pesticide Kepone into the James River. In exchange for a contribution to an environmental trust of \$8 million, which netted Allied a \$4 million tax break, Allied was finally assessed a fine of \$5 million. Allied

also settled a damage claim with the State of Virginia for \$5.2 million for a total corporate compensation of \$18.25 million. Recent estimates of the cost to dredge the 1,000 acres of the James now believed to be contaminated by Kepone are \$35 million, not including the cost of ultimate disposal. Two hundred square miles of the James have been contaminated.

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This year the Johnson Outboard Division of the Outboard Marine Corp. was taken to court by the EPA for dumping PCB for the last 18 years with a potential penalty against the company of \$20 million.

Finally, the Reserve Mining Co. has been found responsible for the potential hazard of its dumping taconite tailings containing asbestos in Lake Superior. The company has dumped roughly 67,000 tons of tailings a day since 1955 into the lake. Reserve was found to be liable for the expenses incurred by city water departments to treat drinking water found to be potentially hazardous because of the tailings. Reserve was also fined \$1.6 million and directed to develop an environmentally safe land disposal tailings dump.

While this mixed bag of environmental disasters and determination of corporate responsibility reveal that corporations are rarely held responsible to the full extent of remedial action costs and damages, attempts have been made to determine corporate responsibility for past actions. The Reserve Mining case is particularly to the point in that the hazard of asbestos fibers was itself contestable, and in fact unknown at the time Reserve began creating the hazard.

Mr. Chairman, the hazards from uranium tailings are not contestable and were indeed known at the time operations at these presently inactive mills were terminated. The experience of pitchblende miners and radium liminising workers served as a principle data base for establishing radiation exposure standards throughout that period.

In the specific cases, the Colorado Department of Public Health conducted a survey of radium in surface water downstream from uranium milling operations in 1951. The survey included mills at Durango, Naturita, Uravan, and Rifle. The department confirmed its findings in a second test of these same sites in 1955. The State of Colorado convened a meeting of Federal, State, and local officials to discuss the findings and possible remedies in December 1956. This led to a succession of annual meetings on the subject of uranium mill tailings and effluents.

In April 1958, the U.S. Surgeon General convened a conference on the interstate pollution of the Animas River from uranium mill wastes. This was followed in October 1958, by an Atomic Energy Commission meeting in Grand Junction involving representatives from eight States and companies involved in uranium milling to inform them of the potential hazards of milling operations and effluents.

In addition, the AEC Raw Materials Laboratory embarked upon a two-track study on the radiological and nonradiological hazards of

uranium mill wastes in July of 1957. This study was begun because of the discovery in May 1957, that nitrate wastes in process uranium in the mills had contaminated ground water supplies adjacent to uranium mills.

The study was expanded to include radiological aspects when the State of South Dakota reported that tailings at mill sites in the State gave off levels of alpha and beta radiation in excess of safety standards.

The interim report of this study to the Joint Committee on Atomic Energy in February 1958, identified radium and its products as the principal hazard of mill wastes and noted that radium levels always exceeded permissible levels.

Finally on May 11, 1960, the AEC established the radiation control program for uranium milling operations to reduce the radiological hazards and contamination from uranium mills.

In 1959, the joint committee held extensive hearings on employee radiation hazards and heard substantial evidence about the dangers of radon gas and other uranium ore hazards. This evidence included a U.S. Public Health Service study of uranium miners which showed a significant increase in cancer from radon gas exposure.

Mr. Chairman, only one site addressed in this legislation was shut down prior to the developments I have just discussed. The next shut-down was in 1961. The hazard residing in the uranium tailings piles may have been ignored, but there was reason to suspect that a hazard existed. To argue, as the DOE and the States have, that the contracts did not require proper mill tailings disposal and therefore there is no responsibility on the part of the companies is a completely unacceptable approach. The companies responsible for generating those tailings should be held accountable to the fullest extent.

This legislation should require the Attorney General to take litigative action concurrently with the remedial actions performed by DOE to recover such costs and damages as the courts will award.

The resolution of corporate responsibility and Federal compassion is extremely important not only to assure recovery of damages, but is necessary to determine the issues of the ultimate ownership and responsibility of the disposal site and the tailings as well as the costs of perpetual care and monitoring.

All three bills provide for the States to acquire the ownership of the tailings site. S. 3253 differs from the other two bills in that it requires the Federal Government to take title to the tailings and the ultimate disposal site. In the case of all three bills, the tailings site acquisition requirement does not extend to land contaminated incidentally.

Given the problem of assigning responsibility for a radioactive waste which will remain hazardous for the foreseeable future, the Environmental Policy Center believes that the Federal Government should be ultimately responsible for such wastes both from inactive and future mills. However, we are not in favor of a free lunch. The precedent set for inactive mill tailings disposal should be consistent with that of future tailings and the costs and responsibilities should be assigned to the mill operators to the extent possible. We note that Senator Percy has just introduced a bill which would require the establishment of waste disposal trust funds which is one possible approach to this problem.

The limitation on acquisition of the tailings site to exclude incidentally contaminated land may not be justifiable. The tailings piles have

been subject to substantial wind and water erosion. A 1974 study by the EPA at 20 inactive sites found that the contaminated area around the tailings from wind erosion is often several times the area of the actual tailings pile and may extend offsite. It is estimated that above background radiation levels generally extend to several thousand meters from the piles. While acquisition may be an excessive requirement, responsibility for the radiological safety of these offsite areas should be clearly established.

The tailings and remedial action should be subject to a regulatory process which will assure safe disposal. Compassionate action should not be subject to compassionate regulation or review. In this light, we support the requirement in S. 3253 that the remedial action chosen be subject to State concurrence. This requirement is absent from the administration bill, S. 3078. However, both bills lack a formal procedure for the presentation of the remedial action, its costs, its environmental impacts, and alternative actions.

This cannot be left to an undefined assumption that someone will do an environmental impact statement and that that will take care of everything including public participation. It would be useful to borrow the approach taken in S. 3008 and establish a formal remedial action plan. Such a plan should require public hearings in its formulation and would be submitted to the States and the NRC for review and concurrence. S. 3078 and S. 3253 both provide that the DOE shall have the right of approval of any disposal plan and this requirement could be retained.

The remedial action plan should not preclude an environmental impact statement and, in fact, the plan itself should be developed from the impact statement which will point out the long- and short-term risks of various alternatives.

S. 3253 does not contain the exclusion from liability found in the administration bill, S. 3078. We support S. 3253 on this point, especially since both bills provide for the DOE to have the principal role in determining the remedial action. Inclusion of a remedial action plan and concurrence mechanism will safeguard the Government from liability.

Senator HASKELL. I don't understand what you are saying. Would you say that in different words?

Mr. BERICK. The situation is, the bill leaves the process by which they plan to perform legal action clearly delineated; it leaves completely ambiguous the process by which the Department of Energy will determine what the action is and determine what the environmental impacts are and the process by which the States and the NRC will review.

Senator HASKELL. I don't think this committee has the technical competence in detail how this will be done. That is a very technical question. If this committee says the legislation will be done and it is satisfactory environmentally, there is no way further we can go, nor do I think any of the staff have the ability to tell, in detail, the NRC how to do their business.

Mr. BERICK. I am not suggesting that. I am suggesting you borrow the approach outlined in Senator Garn's bill which requires a remedial action plan be brought up and then that plan would be a formal document, a formal requirement in the process. Specific requirements

could be established as Senator Garn's bill does for what should be included in that plan which should be submitted and which should allow fuller participation as well.

I am not suggesting this committee direct the regulatory agency to establish standards. What I am suggesting is the legislation require the formal process by which a remedial action plan is prepared. At the moment, that is left to the Department of Energy to determine as it wishes and really does not establish means by which it shall be done and clearly see what shall be done for them.

Senator HASKELL. Thank you.

Mr. BERICK. Now both of the bills allow for the Department of Energy to retain approval of any of those plans. That requirement could be retained so the Federal Government does retain full control of a project.

Here again we believe inclusion of a formal remedial action plan outlining exactly what is going to be done, who is going to be responsible for what actions—financial, contractual actions—will help safeguard from liability but we do not believe the Federal Government should be excluded from responsibility since they are the ultimate responsible agency.

Both S. 3008 and S. 3253 attempt to prevent the Environmental Protection Agency from asserting its existing authority over mill tailings under the Resource Conservation and Recovery Act, the Clean Air Act, the Safe Drinking Water Act, and the Federal Water Pollution Control Act. In addition, S. 3008 attempts to prevent the Environmental Protection Agency from asserting its jurisdiction under its general radiation and environmental protection authorities transferred by Reorganization Plan 3.

At best, this is an ironic turn of events because it has been the EPA which has been responsible for revealing the hazards of inactive uranium mill tailings as well as the potential impact from uranium mining and milling portion of the uranium fuel cycle. The EPA has been extensively involved in both the Grand Junction and Salt Lake City situations through its Las Vegas Laboratory. The EPA has also identified and surveyed the radon hazard from other types of radioactive mine and mill tailings such as phosphate tailings.

As Dr. Rowe testified yesterday, EPA will release the criteria for control of radon from the sites in the future.

The EPA assisted the Navajo Nation in identifying and implementing decontamination problems and controls for mill sites on Navajo lands beginning in 1973. Decontamination has been underway at the Shiprock, N. Mex., site since 1974 under EPA guidance and is now almost complete. The EPA conducted an extensive survey of gamma radiation at inactive mill sites in 1974 which served to identify the scope of the radiological hazard at such sites.

Presently, the EPA is devoting approximately 13 man-years annually under the Clean Air Act, Resource Conservation and Recovery Act, inactive mill tailings, and radon daughters assessment programs for uranium mill tailings research and standard setting. The EPA budget is not fully adequate for the task, but that is exceedingly poor excuse for preventing the EPA from asserting jurisdiction in a critical environmental area.

We concur with the General Accounting Office recommendation that the regulatory structure outlined in S. 3078, the administration bill,

be preserved. In that bill, the EPA would be responsible for establishing standards and criteria to protect the public health, safety, and the environment.

As the IRG subgroup draft—Interagency Review Group on Nuclear Waste Management, mine and mill tailings subgroup; current draft report—points out, there are substantial gaps in our knowledge of both uranium tailings characteristics and control mechanisms. The subgroup notes seven major areas of research and development deficiencies.

These are: (1) Analysis of long-term disposal and stabilization methods including the effectiveness of soil and clay covers to reduce radon emissions; (2) methods and feasibility of extracting radionuclides from tailings piles; (3) analysis of the health impacts of radon daughters which EPA is currently funding the National Academy of Science's NEIR Committee to investigate; (4) dosimetry of radon daughters and radon, which EPA is currently funding the National Council on Radiation Protection and Measurements to develop; (5) development of models to explain the airborne exposure pathway for radon and its daughter products; (6) development of models to explain the liquid exposure pathway for dissolved and eroded radionuclides from uranium mines and mills; and (7) methods for measuring the amounts of radon released from tailings piles.

The state of knowledge concerning mill tailings is far from complete and the development of both regulations and control technology will require a considerable and ongoing effort. The data base and technology, as the GAO notes, are not mature. A case in point is a 1977 EPA study which reported that radon levels actually increased at one inactive pile after it had been stabilized with an earth cover.

We believe that a standard setting role for EPA and an enforcement implementation role for the NRC is a proper and necessary regulatory approach. We see no reason to arbitrarily limit the EPA's authority in the hopes that the problems of uranium mill tailings will be resolved by turning regulatory jurisdiction over to another agency.

The problem is in fact bigger than both agencies. The IRG subgroup recommends a \$400,000-per-year increase in EPA's budget and notes that NRC should increase its budget by \$300,000 in fiscal year 1980 beyond already scheduled increases.

The IRG subgroup draft notes that to date no mill tailings piles have been stabilized according to NRC current criteria which has been in effect only since May of 1977. The draft points out that remedial actions at inactive sites will, in effect, be a pilot program for mill tailings stabilization. We urge the committee to keep this in mind in its consideration of these issues and the establishment of remedial measures to insure the protection of the public and the environment from a hazard which will exist for the foreseeable future.

The Environmental Policy Center recommends that the committee retain the regulatory approach provided in the administration bill and explicitly establish an EPA standard setting role. We recommend that a formal remedial action plan be required and that it be presented to the State for concurrence as well as specifically provide for public participation. We believe that the liability exclusion should be dropped as provided in S. 3253 and that the Attorney General should be required to establish the responsibility of the previous and current mill tailings owners.

Finally, we recommend that the scope of the legislation be expanded to include those sites where mill tailings have been neglected by the Federal Government, including such sites as Monticello and Niagara County, N. Y., as well as inactive sites.

The bill should direct the DOE to establish in cooperation with the NRC agreements to clean up all hazardous sites either through owner compliance or through direct remedial action. The notion of compassionate responsibility should be dropped and the Department of Energy should be instructed to cooperate in the assessment of hazards and remedial action wherever a hazard has been created by the improper or inadequate disposition of uranium tailings.

An initial authorization period of 5 years, with additional authorization required on an annual basis, would assure that the program and State participation will be fully initiated but will allow a check by Congress on both the determination of the number of sites and the costs of such remedial actions.

Senator HASKELL. Thank you, Mr. Berick. It is certainly not the intention of this legislation, or at least I would not assume it to be, to relieve any private party of responsibility or contractual responsibility they may have. We don't know what the statute of limitations situation is but I think it is important the Government go ahead and clean up at least the abandoned sites.

Then, if they can, establish liability against a private party. Then they have recovered their money. What are you suggesting? You are suggesting it be directed—I assume you want the Government to go ahead.

You say the Department of Energy has not accepted responsibility for Edgemont or Niagara County. I understand they take the position—this legislation does not mention those sites because the DOE has the authority to go ahead and clean up, if the TVA would clean up—would you comment on this?

Mr. BERICK. The issue there is the mechanism by which the Department of Energy in this legislation has defined those sites; for example, it refers only to processing sites. The case with the Tennessee Valley and Niagara sites, that is not a processing site. Those tailings were transported to those sites for disposal.

The issue is under the standards for those sites which will be addressed, that site in Niagara County will not be included.

Senator HASKELL. Because it is not a processing site?

Mr. BERICK. That is correct.

Senator HASKELL. I think I see your point there. This bill addresses certain abandoned sites and we do have these two other situations. Were you in the room when the Governor of Utah was here?

Mr. BERICK. Yes.

Senator HASKELL. I don't know if you were here yesterday, but I asked the governmental agencies to give us a rundown on the extent it might be a health hazard of mines, abandoned mines, they testified they already had regulations on active mills but their regulations were only a year old. So then you have got a whole bunch of tailings that were generated prior to 1 year ago, which I think is a problem that needs to be addressed because those tailings, if the tailings are hazardous, have got to be just as hazardous as the abandoned sites.

Do you have any comments on that?

Mr. BERICK. This goes again to my question of who is responsible for those tailings and to the extent to which the mill operators are responsible. There has been no effort to make that determination. The situation at present is the Environmental Protection Agency, another Resource Conservation and Recovery Act has authority over solid waste, the bill was passed in 1976, its implementation of regulations has been delayed by congressionally mandated studies. Mining and milling wastes.

At present the way the regulations are being drafted, the EPA would have jurisdiction in many cases over hazardous mining and milling wastes. So the mine wastes and operating mills and perhaps those previously generated mill wastes, could be covered under that legislation. I mean, if it is in place, those standards will be implemented. This fall, I believe, is the current schedule.

And, my understanding is many of those wastes could be covered. There is some question about whether those standards would be applied retroactively or not. But the legislation does apply to existing waste disposal sites.

The committee might want to pursue that and particularly expand the level authority to deal with this area, if there was some question of statutory authority.

Senator HASKELL. Yesterday there was some question of who should set the standards, NRC or EPA. Apparently there is some conflict in the evidence as to how quickly the EPA can act. I don't want to delay this particular piece of legislation. This piece of legislation leaves a couple of great big gaps in the overall procedure which I think the committee has got to get additional information on and address those two areas.

Mr. BERICK. Yes, sir, my point is under that solid waste disposal act, the EPA is empowered to deal with mining wastes.

Senator HASKELL. Retroactively?

Mr. BERICK. In the case of existing disposal operations; yes, sir. It is treated as existing disposal. It does not specifically address tailings, mine tailings sites.

An additional point is the NRC does not presently regulate mining wastes at all. The only wastes that it does regulate, regulate the mines, are from solution mines which are treated, as uranium, as the operation produces refined radon solution but the NRC does not presently regulate mining wastes at all.

Senator HASKELL. This is an area for further exploration.

Mr. BERICK. I understand.

Senator HASKELL. Thank you very much, Mr. Berick. I appreciate your testimony.

[The prepared statement of Mr. Berick follows:]

STATEMENT OF DAVID BERICK, WASHINGTON REPRESENTATIVE, ENVIRONMENTAL POLICY CENTER

Mr. Chairman and Members of the Committee, thank you for the opportunity to appear before you today on behalf of the Environmental Policy Center and to comment on the legislation before the Subcommittee concerning uranium mill tailings.

Mr. Chairman, let me begin by making a few general observations about the inactive uranium mill tailings piles and sites which are the subject of the bills we are discussing today. The 23 inactive sites being considered contain roughly 23 million tons of tailings. This is 2 million tons less than are piled at the largest operating mill and substantially less than the 115 million tons total at all oper-

ating mill sites. The inactive sites, while they are not a drop in the bucket constitute only a bucket in the bath tub of the uranium mill tailings control problem. The uranium mill tailings hazard will not be resolved simply by addressing the inactive tailings. The action this committee takes should reflect the need for a more extensive Federal policy on all uranium tailings. The committee should be mindful of the precedents which it sets.

Full appreciation of the hazards of uranium tailings has been dreadfully long in coming. Despite acknowledgement of radon hazards to uranium miners and the recognition of a radium hazard from tailings dumped into the Animas River in Colorado in the late 1950's, uranium tailings never have received the research and regulatory attention necessary to protect the public. As late as 1974, an EPA study of inactive uranium mill tailings was left incomplete because of inadequate funding. Even after the experience at Grand Junction, Colorado where radon concentrations resulted from the use of uranium tailings in construction, the EPA reported that tailings continued to be used in construction at various locations through 1975.

The record, Mr. Chairman, is a sorry one. It is within this context that I shall address the bills before you today.

The Administration bill—S. 3078 and Senator Hart's bill—S. 3253 call upon the Congress to assume the compassionate responsibility to provide remedial action for inactive mill tailings sites. The Department of Energy has argued, in turn, that while it will not accept the blame, it will nonetheless accept the responsibility for these inactive mill tailings. Or rather for some of the tailings. It will not accept the responsibility under this legislation for the tailings at Monticello, Utah which it currently owns. It will not accept the responsibility for the tailings at Edgemont, South Dakota which are currently owned by the Tennessee Valley Authority. It will not accept the responsibility for tailings resulting from the Manhattan Project which are now stored at the DOE Lake Ontario Ordinance Works in Niagara County, New York. In addition, the Department of Energy has testified that there are 30 sites, including Middlesex, New Jersey, where tailings were used in construction as they were at Grand Junction, which require remedial action for which it does not presently intend to assume responsibility.

Mr. Chairman, the difficulty with compassionate responsibility is that it allows the good samaritan to be compassionate at his convenience. The legislation adopted by this committee should establish a program to deal with all inactive, and disposed of, uranium mill tailings, regardless of their status through direct remedial action, compliance with EPA and Nuclear Regulatory standards applied retroactively, and clean-up of Manhattan Project wastes. In the latter case, the Department of Energy must accept the blame as well as the responsibility.

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In the specific cases, the Colorado Department of Public Health conducted a survey of radium in surface water downstream from uranium milling operations in 1951. The survey included mills at Durango, Naturita, Uravan, and Rifle. The Department confirmed its findings in a second test of these same sites in 1955. The State of Colorado convened a meeting of Federal, State, and local officials to discuss the findings and possible remedies in December 1956. This led to a succession of annual meetings on the subject of uranium mill tailings and effluents. In April, 1958, the U.S. Surgeon General convened a conference on the interstate pollution of the Animas River from uranium mill wastes. This was followed in October 1958 by an Atomic Energy Commission meeting in Grand Junction involving representatives from eight states and companies involved in uranium milling to inform them of the potential hazards of milling operations and effluents.

In addition, the AEC Raw Materials Laboratory embarked on a two-track study on the radiological and non-radiological hazards of uranium mill wastes in July, 1957. This study was begun because of the discovery in May, 1957 that nitrate wastes in processing uranium in the mills had contaminated ground water supplies adjacent to uranium mills. The study was expanded to include radiological aspects when the State of South Dakota reported that tailings at mill sites in the State gave off levels of alpha and beta radiation in excess of safety standards. The interim report of this study to the Joint Committee on Atomic Energy in February, 1958 identified radium and its products as the principle hazard of mill wastes and noted that radium levels always exceeded permissible levels. Finally, on May 11, 1960, the AEC established the Radiation Control Program for Uranium Milling Operations to reduce the radiological hazards and contamination from uranium mills.

In 1959, the Joint Committee held extensive hearings on employee radiation hazards and heard substantial evidence about the dangers of radon gas and other uranium ore hazards. This evidence included a U.S. Public Health Service study of uranium miners which showed a significant increase in cancer from radon gas exposure.

Mr. Chairman, only one site addressed in this legislation was shutdown prior to the developments I have just discussed. The next shutdown was in 1961. The hazard residing in the uranium tailings piles may have been ignored, but there was reason to suspect that a hazard existed. To argue, as the DOE and the States have, that the contracts didn't require proper mill tailings disposal and therefore

there is no responsibility on the part of the companies is a completely unacceptable approach. The companies responsible for generating those tailings should be held accountable to the fullest extent.

This legislation should require the Attorney General to take litigative action concurrently with the remedial actions performed by DOE to recover such costs and damages as the courts will award.

The resolution of corporate responsibility and Federal compassion is extremely important not only to assure recovery of damages, but is necessary to determine the issues of the ultimate ownership and responsibility of the disposal site and the tailings as well as the costs of perpetual care and monitoring. All three bills provide for the States to acquire the ownership of the tailings site. S. 3253 differs from the other two bills in that it requires the Federal government to take title to the tailings and the ultimate disposal site. In the case of all three bills, the tailings site acquisition requirement does not extend to land contaminated incidentally.

Given the problem of assigning responsibility for a radioactive waste which will remain hazardous for the foreseeable future, the Environmental Policy Center believes that the Federal Government should be ultimately responsible for such wastes both from inactive and future mills. However, we are not in favor of a free lunch. The precedent set for inactive mill tailings disposal should be consistent with that of future tailings and the costs and responsibilities should be assigned to the mill operators to the extent possible. We note that Senator Percy has just introduced a bill which would require the establishment of waste disposal trust funds which is one possible approach to this problem.

The limitation on acquisition of the tailings site to exclude incidentally contaminated land may not be justifiable. The tailings piles have been subjected to substantial wind and water erosion. A 1974 study by the EPA at 20 inactive sites found that the contaminated area around the tailings from wind erosion is often several times the area of the actual tailings pile and may extend off-site. It is estimated that above background radiation levels generally extend to several thousand meters from the piles. While acquisition may be an excessive requirement, responsibility for the radiological safety of these off-site areas should be clearly established.

The tailings and the remedial action should be subject to a regulatory process which will assure safe disposal. Compassionate action should not be subject to compassionate regulation or review. In this light, we support the requirement in S. 3253 that the remedial action chosen be subject to State concurrence. This requirement is absent from the Administration bill—S. 3078. However, both bills lack a formal procedure for the presentation of the remedial action, its costs, its environmental impacts and alternative actions. This cannot be left to a undefined assumption that someone will do an environmental impact statement and that that will take care of everything including public participation. It would be useful to borrow the approach taken in S. 3008 and establish a formal remedial action plan. Such a plan should require public hearings in its formulation and would be submitted to the States and the NRC for review and concurrence. S. 3078 and S. 3253 both provide that the DOE shall have the right of approval of any disposal plan and this requirement could be retained.

The remedial action plan should not preclude an Environmental Impact Statement and in fact the plan itself should be developed from the Impact Statement which will point out the long and short term risks of various alternatives.

Senate bill 3253 does not contain the exclusion from liability found in the Administration bill S. 3078. We support S. 3253 on this point, especially since both bills provide for the DOE to have the principle role in determining the remedial action. Inclusion of a remedial action plan and concurrence mechanism will safeguard the government from liability.

Both S. 3008 and S. 3253 attempt to prevent the Environmental Protection Agency from asserting its existing authority over mill tailings under the Resource Conservation and Recovery Act, the Clean Air Act, the Safe Drinking Water Act, and the Federal Water Pollution Control Act. In addition, S. 3008 attempts to prevent the Environmental Protection Agency from asserting its jurisdiction under its general radiation and environmental protection authorities transferred by Reorganization Plan 3.

At best, this is an ironic turn of events because it has been the EPA which has been responsible for revealing the hazards of inactive uranium mill tailings as well as the potential impact from uranium mining and milling portion of the

uranium fuel cycle. The EPA has been extensively involved in both the Grand Junction and Salt Lake City situations through its Las Vegas Laboratory. The EPA has also identified and surveyed the radon hazard from other types of radioactive mine and mill tailings such as phosphate tailings.

The EPA assisted the Navajo Nation in identifying and implementing decontamination problems and controls for mill sites on Navajo lands beginning in 1973. Decontamination has been under way at the Shiprock, New Mexico, site since 1974 under EPA guidance and is now almost complete. The EPA conducted an extensive survey of gamma radiation at inactive mill sites in 1974 which served to identify the scope of the radiological hazard at such sites.

Presently, the EPA is devoting approximately 13 man-years annually under the Clean Air Act, Resource Conservation and Recovery Act, Inactive Mill Tailings, and Randon Daughters Assessment programs for uranium mill tailings research and standard setting. The EPA budget is not fully adequate for the task, but that is an exceedingly poor excuse for preventing the EPA from asserting jurisdiction in a critical environmental area.

We concur with the General Accounting Office recommendation that the regulatory structure outlined in S. 3078, the Administration bill, be preserved. In that bill the EPA would be responsible for establishing standards and criteria to protect the public health, safety and the environment.

As the IRG sub-group draft¹ points out, there are substantial gaps in our knowledge of both uranium tailings characteristics and control mechanisms. The sub-group notes seven major areas of research and development deficiencies. These are: 1) analysis of long-term disposal and stabilization methods including the effectiveness of soil and clay covers to reduce radon emissions; 2) methods and feasibility of extracting radionuclides from tailings piles; 3) analysis of the health impacts of radon daughters which EPA is currently funding the National Academy of Science's BEIR Committee to investigate; 4) dosimetry of radon daughters and radon, which EPA is currently funding the National Council on Radiation Protection and Measurements to develop; 5) development of models to explain the airborne exposure pathway for radon and its daughter products; 6) development of models to explain the liquid exposure pathway for dissolved and eroded radionuclides from uranium mines and mills, and 7) methods for measuring the amounts radon released from tailings piles.

The state of knowledge concerning mill tailings is far from complete and the development of both regulations and control technology will require a considerable and ongoing effort. The data base and technology, as the GAO notes, are not mature. A case in point is a 1977 EPA study which reported that radon levels actually increased at one inactive pile after it had been stabilized with an earth cover.

We believe that a standard setting role for EPA and an enforcement implementation role for the NRC is a proper and necessary regulatory approach. We see no reason to arbitrarily limit the EPA's authority in the hopes that the problems of uranium mill tailings will be resolved by turning regulatory jurisdiction over to another agency. The problem is in fact bigger than both agencies. The IRG sub-group recommends a \$400,000 per year increase in EPA's budget and notes that NRC should increase its budget by \$300,000 in FY 1980 beyond already scheduled increases.

The IRG sub-group draft notes that to date no mill tailings piles have been stabilized according to NRC current criteria which has been in effect only since May, 1977. The draft points out that remedial actions at inactive sites will, in effect, be a pilot program for mill tailings stabilization. We urge the Committee to keep this in mind in its consideration of these issues and the establishment of remedial measures to ensure the protection of the public and the environment from a hazard which will exist for the foreseeable future.

The Environmental Policy Center recommends that the Committee retain the regulatory approach provided in the Administration bill and explicitly establish an EPA standard setting role. We recommend that a formal remedial action plan be required and that it be presented to the state for concurrence as well as specifically provide for public participation. We believe that the liability exclusion should be dropped as provided in S. 3253 and that the Attorney General should be required to establish the responsibility of the previous and current mill tailings owners.

¹ Interagency Review Group on Nuclear Waste Management—mine and mill tailings sub-group; current draft report.

Finally, we recommend that the scope of the legislation be expanded to include those sites where mill tailings have been neglected by the Federal Government, including such sites as Monticello and Niagara County, New York as well as inactive sites. The bill should direct the DOE to establish in cooperation with the NRC agreements to clean-up all hazardous sites either through owner compliance or through direct remedial action. The notion of compassionate responsibility should be dropped and the Department of Energy should be instructed to cooperate in the assessment of hazards and remedial action wherever a hazard has been created by the improper or inadequate disposition of uranium tailings. An initial authorization period of five years, with additional authorization required on an annual basis, would assure that the program and state participation will be fully initiated but will allow a check by Congress on both the determination of the number of sites and the costs of such remedial actions.

This concludes my prepared remarks.

Senator HASKELL. Mr. Anderson.

STATEMENT OF MAXIE L. ANDERSON, PRESIDENT AND CHIEF EXECUTIVE OFFICER, RANCHERS EXPLORATION AND DEVELOPMENT CORP.; ACCOMPANIED BY JAMIE DEUEL

Mr. ANDERSON. Mr. Chairman, we represent a little different element. I have a prepared statement.

Senator HASKELL. It will be reproduced in full in the record.

Mr. ANDERSON. This is testimony I gave to the House. I see we did not change the title.

Senator HASKELL. We will change the title for you.

Mr. ANDERSON. What I would like to do, with your permission, as we are presently reclaiming and recycling uranium in Naturita. We hope to do the same at Durango. I would like to present my testimony two ways. First, a summary of what we are doing, and we have about 13 slides so you can visualize what is happening and then perhaps complete the testimony thereafter.

First, mine is a small mining company. We mine copper and uranium for a living in the western United States, Colorado, New Mexico, Utah. We are quite familiar with uranium tailings, all sorts of tailings which are traditional in the West, and I was asked to testify because of our reclaiming the tailings in Naturita on the San Miguel River and moving them and recovering some uranium therefrom.

There is one thing I believe as you might understand, uranium reserves in the United States, we will become a net importer of uranium between 1980 and 1985, about 5, 6, 7 years from now.

Therefore, I believe any reclamation also includes recovery of resource, all of importance to the country. First, I have been in the business for 25 years, since I was 18, and I am quite familiar with it. As I understand the issue before your committee, sir, the question of funding, whether the Government should be 100 percent responsible for the State or 25 or 10 percent responsible. I would pose to you in some cases, perhaps 20 percent of the cases of the tailings, there may be some commercial liability in recycling the tailings.

My testimony will go to that with the suggestion within the legislation you are considering that perhaps on a 75-25 percent split with the Government taking 75 percent and industry picking up 25, the uranium tailings might be recycled and turned into a returnable and profitable operation, and private industry, if we don't return a profit, we cannot operate if we don't recover our money.

The question was raised by the gentleman who testified ahead of me as to the propriety of charging the companies. We acquired the Naturita-Durango site about a year ago. I have been in the business since I was 18, which was 1953. Under the terms that existed at that time, tailings, there was no part of the contracts the companies, that required the companies to do anything with tailings because nobody knew there were any potential hazards. Tailings have been produced in the West since the Gold Rush age and are part of our heritage, sir.

First, uranium recovered in Durango, the first uranium mines was not mined for uranium, it was mined for vanadium. Uranium was left in piles. In 1943, a conception of the Manhattan project, those tailings, we worked with uranium for the first time. That is one of the reasons uranium was taken at all. I don't know that the Government's money is well spent in finding which one. Nobody recognized there was any harm in the first place.

With such complaints, I believe it might be a little bit of a penalty. That is not fair. I will show you the tailings. This is the operation. My associate, Jamie Deuel, will go through them with you.

Mr. DEUEL. I would like permission to digress in these hearings. The word radioactivity is used as a ultimate evil. In my 10-year nuclear submarine career, I spent approximately 3 years of my life, 24-hour-a-day years, living within 200 feet of a very high-powered reactor. I also had the experience of going through the world's first nuclear plant overhaul on the U.S.S. *Nautilus*, which was a very radiologically hot operation—and then biologically and genetically handled many levels of radioactivity.

What concerns me a bit is the uninitiated use of radioactivity analogous to something that is an absolute evil. Also, sir, there is a uranium epidemiological study currently underway I am the administrative manager for, being conducted by the University of New Mexico's Cancer Research and Treatment Center to look at the very question you discussed with Dr. Robbins about the actual impacts and health hazards of radon gas and environments, specifically, in this case, your underground uranium mines.

It is a pioneering preliminary study by Dr. Gino Saccomano from Grand Junction, Colo., who would suggest the underground miner is virtually no more at risk to cancer from his exposure to radon gas than is the man in the street. If, and this is a very strong caveat for the mining industry, he does not smoke. Of course, there are all kinds of safety laws and regulations that deny him this opportunity. But if you have ever been underground, you would know it is very difficult to police. Many miners still smoke underground and that is quite a hazard.

This study is in its first year. We are about 8 months into the first year to see first of all if we have a sufficient population data base to expand Dr. Saccomano's work and then to answer the question is the underground miner at risk or not at risk from radon.

This, sir, is the San Miguel River. One of your State's major recreational rivers, with the Naturita tailings pile a little right of center. These buildings and these other units here represent a GE ore mine and stockpiling station and has nothing to do with the Ranchers' operation at this point.

Closer to the site, we remove these tailings with three pieces of equipment. A caterpillar, that moves the tailings around, so a front-end loader can pick it up and load it, dump the tailings into an ore-carrying truck.

The tailings are moved away from the site along the river on a very unstable—in a geological sense—gravel bed to a very tight formation about $3\frac{1}{2}$ miles away inland, away from all population. The only population of any consequence was a house that was not occupied at the time we moved here. We have worked out an arrangement with the owner who is renovating that.

Some of our people live here. There is no population within a mile or more of this site. It is at the headwaters of the Paradise Valley. It sits on an about 125 to 150 feet of very tight mancos shale. We have pledged in our environmental statement that there will be no impact on the ground water.

The tailings then for ultimate disposal are placed in these three leaching tanks. This is a closeup of tank one. As you can see, it is about—what would you suggest—65 to 70 percent full at this time. The tank is approximately 20 feet deep. As the tank is filled, we can begin leaching or the actual washing operation that will remove the uranium and the vanadium values.

The way these tailings are distributed is quite a simple but I think ingenious mechanical system called the spreader conveyor.

At this end, to the right of the screen, is a load out-bin where the tailings that have already been in contact with the sulfuric acid and are called the agglomerated at that time are introduced and begin a long journey in a conveyor to a point where there is a tripper. This tripper moves laterally back and forth across this conveyor, distributing the tailings quite evenly, building up a face, as you can see. The spreader conveyor is self-tracked. As a new face is built-up, the spreader conveyor continues its slow moving down the length of the tailings pile.

This is a more dramatic view from the tank, 20 feet below the surface, looking up at the spreader conveyor. At this point, sir, I am a little bit ahead of the process, the basic process. The trucks in that second scene carry these tailings material untreated from the riverside site. They come to a position here that is called the grizzly and bottom dump their load through this grizzly down through onto a conveyor system.

The tailings material drops down and begins a conveyor path. It is quite damped so we are able to eliminate or minimize the dusting and we have commitments environmentally that if it should become drier, we have spray systems around to moisten this. If we are concerned it is getting too damp, chemically we need to keep it in a certain range, if we should get into a rainy season we have a drier, and a scrubber here, and we send the tailings through to keep it down to about 10 percent moisture.

It ends up in one of two—we only show one at this point in the operation—kidney-shaped stockpiles. From this point it is taken to here. This is agglomerator where the chemical interaction takes place. Then, on to the tank.

This is a slide to show you a closeup of the conveyor system detailed in the previous slide. We bring it up, drop it through the grizzly into the conveyor system, over the tanks, then out of the tanks, the underflow solutions come down. The plant.

·We won't go into the details. These ponds are reconstituting ponds. Then when we get inside this unit, after going through these various processes, we come to the yellow cake, filter press. This is what commercially and energywise it is all about, getting this yellow cake. There are two filters in the series. When this one is filled up, it is taken off line. The other one, the materials are filtered through it.

We break the yellow cake material off. It comes out with a consistency we could probably compare to toothpaste. This is the \$400 a pound yellow cake but we don't transport this. In fact, we have a very expensive, richly designed slurry tanker. These are the two we had to build especially for these. They are quarter inch stainless steel. The slurry itself is 50 percent moist, 50 percent water, and is only filled to about 60 percent of the capacity of this tank. So there are a lot of safety factors built into this slurry carrier.

This, then, sir, is the Naturita tailings operation alongside the San Miguel River. At one time it was thought to be a waste. Today, Ranchers' Exploration and Development Corp., is trying to make it a resource to the country and derive a fair profit.

Senator HASKELL. Mr. Anderson, one question. I assume in an operation processing tailings would be subject to NRC regulations, is that right?

Mr. ANDERSON. Yes; we are under the auspices of the Colorado Department of Health; since it is an agreement State all of our permission to proceed, and methodology is reviewed and approved by the Colorado Department of Health, which in turn gets all of their support from NRC.

I might go on now and I will try to be brief since I know you have been here all morning.

Basically, what we would propose to do, in about 20 percent of the cases, or perhaps 5 of the 23 or so piles, there is a possibility if the assistance of the Government was given with the mining and the hauling and the placement of materials and the covering of them, the recycling of materials could be carried out in a manner which would return a profit to a private company, if it were possible then it would pay taxes, if there were a profit it would pay taxes, and part of the cost if not a fair amount of the cost would recovered.

In the case of Naturita, we need no assistance. It was one of the oldest piles that has been derived. Madam Curie and her husband, Pierre Curie, did their original uranium work on uranium from Colorado, from this area—the radium they used in their original experiments.

I think for your consideration we would suggest the 75-25 split that has been proposed in the case of commercial interests as differentiated against the States, that if such assistance were requested from private companies that would be a net savings to the Government and perhaps possible recycling of uranium and reduction of the very small quantities that presently exist to lesser quantities.

I have already made such a presentation to the House. I must emphasize that will not be the case in all cases. I might also make another observation based on 25 years in the business. As Commander Deuel says the nuclear reactor, he lived with them, and I worked in the mines a great number of years, that the dangers we speak of are pretty hard to see from the standpoint of actually being out there and living with them.

I would say whether uranium tailings were in cities, that one needs to, and even myself would say, one should err on the side of conservatism and I very much recommend the removal from cities like Salt Lake, Durango, and Rifle. There would be no question in my mind. But where we are in isolated open areas, the hazards proposed have two features. One has to do with the uranium entering the groundwater. I think if one can take remedial action to keep that from happening, I believe that would take care of one of your questions.

In the other case, I believe, where we speak of radon gas, that is a by-product of uranium and I believe in that case the radon itself, if one really realizes what it does, radon gives off an alpha particle and an alpha particle cannot penetrate a piece of cigarette paper. So there is a reasonable question as to any danger unless there is a populated area. In Salt Lake City, it is trapped in an area. It is like breathing carbon monoxide for a long time. It will build up in the blood and enough where it will kill you. When you are out away from it all, it is pretty difficult to think of any real hazard existing to anyone.

In summary, I am glad to see Senator Domenici is here, we feel in your consideration of this legislation you should consider the aspect of the possible commercial utilization and therefore the production costs to the government of the reprocessing or relocating of the tailings, perhaps on a split of 75-25. If the companies derive a profit, and if they didn't, they would not undertake it, but in that case they would pay taxes both to the cities and counties and State as well as the Federal Government.

Thank you, sir.

Senator HASKELL. Thank you very much, Mr. Anderson, for your testimony, and to you, Commander Deuel. Before I turn the hearing over to Senator Domenici, I want to announce statements for the record following Mr. Anderson's testimony from the State of New Mexico will be inserted in the record, and also from the Navaho Nation.

[The prepared statements of Mr. Anderson, Mr. Olguin of New Mexico, and Mr. Tso, Navaho Nation follow:]

STATEMENT OF MAXIE L. ANDERSON, PRESIDENT AND CHIEF EXECUTIVE OFFICER,
RANCHERS' EXPLORATION AND DEVELOPMENT CORP.

Ranchers Exploration and Development Corporation ("Ranchers") is pleased to have the opportunity to present its ideas regarding actions which can be taken to alleviate problems posed by a number of uranium mill tailings located in the western United States. Ranchers is completely in favor of federal financial assistance to accomplish a solution. We do believe, however, that federal assistance should not be limited to remedial projects undertaken by the state governments involved. We feel it is imperative that any legislation enacted provide a mechanism whereby capable and responsible firms can obtain financial assistance and incentives in undertaking projects to accomplish the remedial effects you seek.

I would like to address several matters pertaining to the remedial actions which are the objectives of the proposed legislation. It is recognized that there are numerous unknowns as to the harmful effects of the emanations from the uranium mill tailings in question. It would, however, seem only logical to eliminate any possible danger to population centers by moving nearby tailings to more remote locations as soon as possible. We do not believe there is demonstrable proof that tailings away from populated areas represent a significant environmental threat.

For those of you who must consider adoption of remedial legislation, several basic technical points should be recognized. Any immediate hazard from gamma

or radon gas is eliminated by moving the tailings to sites removed from the general population. Covering the tailings with a foot of compacted clay will eliminate any significant hazard from gamma radiation. It is not difficult to find locations where there is low risk of eroding that cover, even with abnormally large amounts of precipitation. We have also had no particular difficulty in locating underlying geologic formations impermeable enough to prevent contamination of ground water. The principal problem to be dealt with is radon gas emanations. However, our experience indicates that if tailings are placed in impermeable clay-lined tanks and covered with two feet of compacted shale, radon emanations can be reduced to levels less than those existing naturally in most areas of the country.

Though the above discussion is an over-simplification of a complicated subject, it clearly indicates that definite benefits can be achieved through relocation of tailings where mills are no longer active and population centers have developed in the immediate vicinity. The potential benefits must be determined on a case-by-case basis. Even more important, in our opinion, is that the standard or objective for the restored status of each site, following remedial action, must also be considered on a case-by-case basis. As an example, the normal background radiation level in one location may differ several-fold from that in another locality. What might be a reasonable standard to strive for in one location could be completely unachievable at another.

Many of the tailings which are the subject of proposed legislation resulted from milling processes much less efficient than those employed today. Consequently, some of them contain significant quantities of uranium and vanadium which can be partially recovered using today's technology. In most cases this recovery is not economically feasible as a pure business venture. The Naturita, Colorado tailings of approximately 600,000 tons covered 20 acres on the banks of the San Miguel River. Only about one pound of U_3O_8 (uranium oxide) was contained in each ton of tailings material. Extensive engineering research and metallurgical testing revealed that 60-65% of this could be recovered. Ranchers concluded that the tailings could probably be recycled profitably, acquired the property, and committed themselves to the venture.

Ranchers has also acquired a larger tailing on the banks of the Animas River near downtown Durango, Colorado. It occupies about 35 acres and contains some 1.4 million tons of material, with less than one pound of U_3O_8 per ton. Metallurgical tests indicate that a smaller percentage of this will be recoverable, compared to the recovery being achieved at Naturita. Due to the higher population density in the Durango area, it will be necessary to use a recycling and ultimate storage location nearly three times as far from the original tailings site as is the case in Naturita. The economics of any tailings removal and reprocessing operations are marginal at best. In Durango, the low-grade material, reduced extraction efficiency, and higher haulage costs are seriously threatening the viability of the project.

It would now appear that we have a situation where a joint effort between the federal government and private industry could be mutually advantageous. An objective analysis would probably lead to the same conclusion with respect to several of the other tailings covered by the proposed legislation. I would like to propose amendments to the legislation which you are now considering whereby the government would pay 75% and private industry 25% of costs incurred to relocate tailings involved.

The uranium production which resulted in the tailings was to satisfy urgent requirements for our national defense during and right after World War II. It would therefore seem reasonable for the government to bear the major responsibility for their existence and adequate safeguarding. I believe this is the basis for the western states maintaining the position that 100% federal funding should be provided. I want to emphasize that my 75% government/25% industry proposal pertains solely to a relationship between the federal government and private industry, limited to existing tailings at inactive sites. Relocating and reprocessing tailings will provide the nation a net saving energy resources and at the same time eliminate environmental problems. If private industry is able to make a fair profit through recovery of uranium and vanadium from the tailings, the federal government will without question also profit. Such projects will result in additional employment, reduced welfare payments, and increased income for all levels of government through income and other taxes.

I would like to discuss one other matter which I think should be of joint concern. That is the long-time delay that appears inherent to determining a course of action in solving the tailings problem. Following this is another delay

in obtaining a myriad permits, licenses, approvals, etc. before work can commence. Ranchers had to obtain nearly 30 such documents from various governmental agencies of the State of Colorado and the United States in starting the Naturita project. It is ironic that the time required for licensing must be so long for projects which result in an environmental improvement. There should be a way that such licensing can be expedited and considered differently than as a totally new uranium mining and milling operation. The latter is creation of a new situation, whereas the tailings removal operation is to alleviate an existing problem.

In summary, I want to reiterate Ranchers' support of legislation to provide financial assistance to affected states for remedial action concerning uranium mill tailings. Our only reservation is that it should provide some means for direct assistance to private enterprise and thus make feasible a joint government/industry remedial and recovery operation at some of the tailings sites. We believe that several of the tailings should be considered an asset in view of the energy source material and other industrial products they contain. Private industry should be encouraged, through tax credits or other incentives, to undertake such projects in the most efficient and economical manner possible. Ranchers is not seeking financial assistance on our Naturita project, which is a commercially viable venture. However, if in the future tax incentives are tendered to others on tailings projects, we would appreciate a retroactive clause applying to Naturita. Industry and government must work together to solve this problem. It is our sincere belief that such a joint effort can accomplish the desired remedial effects, with maximum recovery of valuable residual elements at the minimum cost to the federal government and the states involved.

ENERGY RESOURCES BOARD,
Washington, D.C., July 21, 1978.

HON. FLOYD HASKELL,
Chairman of Subcommittee on Energy and Natural Resources Committee. Washington, D.C.

DEAR MR. CHAIRMAN: The State of New Mexico, through this correspondence, would like to formally request that you submit for the record state testimony on S. 3078, the "Residual Radioactive Materials Act of 1978," presently under consideration by your subcommittee.

At present, there exists in New Mexico 6,367,000 tons of inactive mill tailings piles. The state certainly appreciates the timeliness and importance of this legislation and the opportunity to provide our views on this subject for this committee.

Thank you for accomodating our request and if there are any questions regarding the State's position on the subject of uranium mill tailings piles, please do not hesitate to contact our Washington office.

With best wishes.

Sincerely,

MICHAEL OLGUIN,
Director, State of New Mexico, Washington Office.

The State of New Mexico is pleased to submit for the record the following statement on S. 3078, the "Residual Radioactive Materials Act of 1978."

With the 6,367,000 tons of inactive mill tailings piles (5 actual piles) in existence in New Mexico today, we certainly appreciate the timeliness and importance of this legislation and the opportunity to provide our views on this subject for this Committee.

The presence of these tailings piles and the costs associated with their cleanup is of grave concern to the people of the State of New Mexico. Thus, at the outset, there are three major issues of critical importance to our State which arise in any discussion of legislation proposing remedial action for inactive tailings piles. These are:

1. Who is to bear the costs of such remedial action and how much funding should be provided?
2. What is the definition/coverage of the piles to be provided for by the legislation?
3. Who is responsible for the standards, stabilization plans and Environmental Impact Statement applied to any remedial action?

The State of New Mexico maintains the position that:

1. All costs associated with remedial action should be borne by the Federal Government. (We are attaching, for the record, a copy of the resolution recently adopted by the New Mexico State legislature which states that, "... in the interest of equity the total cost of uranium tailings stabilization should be borne by the Federal Government..." (See attachment A.)) In addition, the costs of accomplishing any cleanup cannot be fully determined, with any degree of accuracy, until the detailed remedial plans are available. Thus, we recommend that adequate funding be phased in initially for the preparation of restoration plans and then for plan implementation;

2. All separate, inactive piles generated during the Federal Procurement Program shall be provided for regardless of whether or not the pile is on a licensee's property;

3. All stabilization plans for piles within a state should be reviewed and have concurrence from that state; all standards developed should be reviewed and commented upon by the states and the state should be allowed to monitor the sites; and, the state should not be responsible for preparation of any Environmental Impact Statements.

The basic reason for the above positions on the part of our State is due to the fact that the benefits accrued from the operations that generated these tailings piles were national in scope—that is, the mining and milling were done for the "National Defense." The tailings resulted from operations during the period when the Federal Government had jurisdiction and control over the production and price of yellowcake. In addition, restoration costs were not covered at the time of this mining and milling and the State had no control over disposal of waste. Thus, the State does not feel in any responsible for the presence of these piles and their decommissioning. It is, therefore, incumbent upon the Federal Government to accept the total costs of the necessary remedial action and any ancillary costs. Again, we've no valid reason for the State having to pay any costs.

As aforementioned, we have five inactive tailings piles in New Mexico. One, at Shiprock, is on Indian land and will no doubt be provided for in the final version of this legislation. The other four, however, are located at sites which are presently licensed by the State of New Mexico. Although these piles are inactive and have been so since the late fifties and early sixties, they are adjacent to operating licensed facilities. In S. 3078 and several other bills introduced, the definition used for sites affected by the legislation is such that these four piles would be excluded because of being at a licensed facility. These piles were generated during the same time period, having the same Federal customer and are just as inactive as the other piles provided for by this legislation. In the interest of fairness, these piles should also be provided for in the final bill.

In addition, it is important that States be given the authority of concurrence relative to the final remedial action plan for each site in their State. A recently completed DOE sponsored study of the Phillips Pile, an inactive pile at Ambrosia Lake, New Mexico, was very unsatisfactory. (See Attachment B for detailed comments.) We are concerned about the possibility of inadequate disposal procedures being implemented if the State and the NRC are not given the opportunity for timely input into the plans and concurrence on the final plan. We feel that plan concurrence is essential in order to carry out the responsibility of protecting health and safety in our State. We would also wish to review and comment on any standards generated relative to the remedial action. Furthermore, the responsible organization should be identified if Environmental Impact Statements (EIS) are required. Since most of the affected States, including New Mexico, do not have "Little NEPA" legislation, the States would have neither the enabling legislation nor the resources to perform an EIS. It should be made clear in the bill that the States would not be responsible for generating any EIS.

To reiterate our position, we support 100 percent Federal funding, a definition of affected sites that would incorporate all of the inactive piles in New Mexico, State concurrence on final plans for site remedial action and review of standards, and exclusive Federal EIS responsibility. We have prepared an example of the type of legislation New Mexico feels would provide the best solutions to these crucial problems and have included it in this testimony for the record. (See Attachment C.)

ATTACHMENT A

34TH LEGISLATURE—STATE OF NEW MEXICO—FIRST SESSION, 1979

A RESOLUTION

Whereas, there are presently before the congress of the United States certain legislative measures (H.R. 12938, H.R. 12335, H.R. 13049) which would provide for the stabilization of uranium tailings piles; and

Whereas, certain of those measures require the state in which the tailings piles are situated to provide twenty-five or more percent of the money to stabilize the piles; and

Whereas, the uranium tailings piles in New Mexico were produced during a period when the price of uranium was controlled in the interest of national security; and

Whereas, the depressed price of uranium prevented the State of New Mexico from gaining a fair return on the resource through diminution in severance taxes; and

Whereas, in view of such diminution of revenue, it is now grossly inequitable for the federal government to impose any financial burden on the uranium-producing states; Now, therefore be it

Resolved by the Joint Interim Natural Resources Committee of the New Mexico State Legislature That in the interest of equity the total cost of uranium tailings stabilization should be borne by the federal government; and be it further

Resolved That this resolution be communicated to the Southwest Regional Energy Council and to the governor of New Mexico so that he may further communicate the intent of the committee to the Western Governors Policy Council; and be it further

Resolved That both organizations immediately express such intent to the congressional delegations of all member States.

ADDITIONAL INFORMATION

TAILINGS PILES IN NEW MEXICO

Facility	Location	Estimated tons	Total area (acres)	Status
Inactive piles:				
Footo Mineral.....	Shiprock.....	1,700,000	{26 42}	Operated 1954-58. ¹
Homestake.....	Milan (UNHP).....	1,218,000	72	
Phillips.....	Ambrosia Lake.....	2,584,000	91	Operated 1958-62. ²
Anaconda.....	Blue Water.....	{ C-584,000 A-181,000	24 51	Operated 1958-59.
Total inactive piles.....		765,000	75	
		6,367,000	286	
Active piles (as of December 1977):				
Anaconda.....	Blue Water.....	13,600,000	226	Active.
Kerr McGee.....	Ambrosia Lake.....	23,000,000	265	Do.
UNHP.....	Milan.....	16,200,000	105	Do.
United Nuclear.....	Church Rock.....	10,000	24	Do.
SOHIO.....	Cebolleta (L Bar Ranch).....	522,000	65	Do.
Total active piles.....		53,33,000	725	
New Mexico total.....		59,699,000	1011	

¹ Partially stabilized.

² Not stabilized.

ENERGY RESOURCES BOARD,
Santa Fe, N. Mex., March 27, 1978.

Rep. MORRIS K. UDALL,
Chairman, House Interior Committee,
House Office Building,
Washington, D.C.

DEAR REPRESENTATIVE UDALL: In December 1977, Ford, Bacon, & Davis Utah, Inc. (FB&DU) released a report (GJT-13) which describes studies which this company has performed at the Phillips inactive uranium mill tailings pile located at Ambrosia Lake, New Mexico. In addition to these studies the report also discusses stabilization procedures for this pile.

The studies of the pile preformed by FB&DU are very incomplete and should be considered as only preliminary studies. The two stabilization procedures which FB&DU describe are both unsatisfactory. Neither of the procedures reduces the radon emission by a significant amount, neither would stabilize the pile for the very long time period required, and each fails to give adequate attention to decontamination of the surrounding area, including the area of the mill site.

A more detailed analysis of the data base available for the Phillips pile, reasons why the FB&DU stabilization procedures are unsatisfactory, and suggestions for studies to adequately evaluate long term stabilization of the pile are enclosed.

If adequate stabilization of the Phillips pile is not done now, very costly remedial measures will be required later.

Sincerely,

NICK FRANKLIN,
Administrator.

ATTACHMENT B

COMMENTS ON STUDIES OF THE PHILLIPS PILE, AMBROSIA LAKE, N. MEX. AND STABILIZATION PROCEDURES

STUDIES

If an adequate study of transport of radionuclides and trace elements from a uranium mill tailings pile is desired many months of careful in-field data is required. The Ford, Bacon & Davis Utah (FB&DU) studies (GJT-13) of the Phillips inactive pile should at most be regarded as only very preliminary. While studies have been made at the Phillips pile by groups other than FB&DU the data base for this pile is inadequate. The areas of lack of data on radionuclide transport to the environment include:

1. Surface contamination due to transport by wind and water.

While gamma surveys of the area around the Phillips pile were done by both FB&DU and EPA, only the EPA survey covered the area in a comprehensive grid. This survey was done in August 1975, or almost three years ago. Several serious breaches in the dike (see LA-6839-MS) have occurred which allow water runoff from the pile to carry radionuclides into the surrounding area. Resuspension and wind movement of tailings directly from the pile transport radionuclides to regions even further from the pile each year. The EPA gamma survey does not represent the extent of contamination of gamma emitting radionuclides as it now exists.

To determine contamination in surface soils of alpha emitting radionuclides FB&DU only did limited Ra-226 in soils sampling. However FB&DU indicated that, "all surface soil samples obtained within .5 miles of the tailings pile contained Ra-226 above 4 times background ranging as high as 425 pCi/gm". It is our understanding that at this pile the Los Alamos Scientific Laboratory under a DOE contract has done extensive gross alpha measurements in surrounding surface soils and also some Ra-226 in soils measurements. It would be helpful in determining the spread of the alpha emitting radionuclides if this data was released.

The FB&DU study did not determine in surface soils the increase of such elements as Se, Mo, V, and As due to transport from the Phillips pile. Since the area is a cattle grazing area any increase in these trace elements will be important.

Contamination of and transport from the mill site area was also not measured in detail by FB&DU. Preliminary gamma surveys made by the state indicate piles of waste containing radionuclides much in excess of background to be located at the mill site. It is our understanding that LASL has made some measurements of gross alpha for some of the piles.

2. Levels of radionuclides in ambient air.

There is almost no data available as to the concentrations of Th-230, Ra-226 and other of the particulate radionuclides (which have low MPC's in air) in the ambient air downwind from the pile. FB&DU cite one study done in 1964. At this time the pile was not as dry as now, as operations had just ceased. One study done for a short time many years ago is inadequate to determine concentrations. Spring and summer winds may at times be gusty, and hence monitoring for several months is necessary to determine the true conditions. The mill site, which presently has people working there, is very close and in the usual downwind direction from the pile.

For the radon studies, FB&DU did not set up radon monitors upwind and downwind and meteorology stations. This is the only way in which ambient radon due to the pile can be accessed experimentally. More over FB&DU made very few radon measurements and even fewer downwind. They were made during a limited time period (seven days). However in the area where people work a concentration of 28 pCi/1 was obtained. Besides the FB&DU data there is some radon data available from EPA measurements. However this data too is limited.

FB&DU also measured radon flux from the pile. The measurements are limited in number (4) and were done over a limited time period (2 days). The Los Alamos Scientific Laboratory has measured flux samples over a period of many months. From the limited data given in a talk presented at an AAAS meeting, LASL data appears to show flux levels higher than levels obtained by FB&DU. It would be helpful if LASL would provide their data in detail, stating sampling location, meteorology conditions, time, sampling errors, etc.

3. Subsurface water transport—for details on the FB&DU study, a review of the study made by the NMEIA Water quality division is attached.

4. Meteorological data.

In order to calculate atmospheric dispersion and probable maximum storm run off good meteorological data is needed. The wind rose data published by FB&DU was limited to one year of data from Kerr-McGee. LASL may have some data, and if so this should be published. The extent of available data needs to be determined and if more data is needed steps should be taken to obtain it.

5. Earthquake damage.

The Phillips pile lies above an inactive mine. No studies are available to indicate what type of subsidence of the surface might occur during an earthquake. A major fault runs near the pile.

HEALTH EFFECT CALCULATIONS

In addition to securing only limited in-field data FB&DU calculations of health effects are inadequate. FB&DU state "population within 5 miles of the pile is low." An attachment to these comments lists the number of people employed around Ambrosia Lake as determined by a recent ERB survey. As of December 1977 48 people were employed at the UNC mill—the area in which radon was measured at 28 pCi/1 outdoors and 19 pCi/1 indoors and the area in which external gamma radiation was measured to be as high as 420 μ R/hr. Due to the fact that this area is often downward radionuclide particulate levels may also be high at the UNC mill.

In addition, uptake by grazing cows and transport to the human food chain of radionuclides and trace elements is ignored in the FB&DU study. This region is an important cattle raising area and cattle can usually be seen grazing near the fence surrounding the pile.

In the proposed EPA criteria for radioactive waste it is recommended that assessments should be based (among others) on at least:

"The potential adverse health effects on human individuals and populations for a reasonable range of future population sizes and distributions and uses of land, air, water, and mineral resources for one thousand years, and general estimates of adverse effects for longer periods for materials having potential impact beyond one thousand years when such estimations could determine the selection of a more effective disposal option." Clearly the FB&DU assessment fails to follow the EPA criteria.

STABILIZATION

In looking at recovery of the residual values, the FB&DU study fails to look at recovery in an existing facility. The alkaline circuit UN-HP mill is licensed to operate at 3500 T/day and is currently running about 2500 T/day. Whether this circuit is efficient enough to be used to recover any of the U308 in the Phillips pile could be evaluated.

In analysing the various measures which could be taken to stabilize the pile FB&DU fails in all cases to take the EPA suggested criteria into account. This criteria states for control:

"Controls should be applied with a goal of isolating radioactive wastes from the biosphere over their hazardous lifetime to protect humans and minimize unnecessary contamination of the environment. When institutional control is the method chosen to provide environmental protection of radioactive wastes, no restrictions on customary uses of associated land areas and surface and ground

waters due to any residual risks should be required after 100 years; radioactive wastes that would require protection beyond 100 years should not be isolated by institutional means, but rather by as many physical and natural barriers as is practicable to minimize environmental impact if one or more fails or is accidentally or intentionally breached."

Because of the long half-life of the parent Th-230 in the decay chain stabilization of the Phillips pile must be for time periods beyond 100 years. Studies on how to achieve this type of stabilization should include answering the questions of:

1. Could any of the material be safely returned to old mined-out areas?

Included in the answer should be considerations of: (a) Have mined out areas collapsed to such an extent that backfilling is impossible. (b) In wet mines how will backfilling effect the transmissivity of the aquifer. (c) Will contamination of the aquifer occur if backfilling is used in wet mines.

2. How many feet of surface soil, rock, clay, etc. would be necessary to prevent (a) wind & water erosion from exposing the tailings pile in 1000 years, (b) plant root uptake of radionuclides, (c) diffusion of radon to the surface, (d) animal disruption of surface soils to a depth to expose the tailings and (e) human digging into the tailings?

3. What type of diversion channel could be used to divert run off from the upper land area and what types of stabilization could be done at the base of the pile to reduce water erosion?

4. Should an underground pit be dug for the tailings and the tailings placed underground?

In addition to the totally inadequate stabilization measures proposed by FB&DU, FB&DU fails to address the problem of the mill area. For example as mentioned previously this area has piles of waste containing significant quantities of radionuclides. The piles will act as sources for radionuclide and trace element dispersion unless they are removed.

Besides preventing spread of the tailings pile, waste piles, etc. the contamination of the surrounding area must be clearly defined and standards for clean-up established.

The Phillips pile should be adequately stabilized and its surrounding area decontaminated. A good program initiated now will not require costly remedial measures later.

Employment—Ambrosia Lake Area—August 1977

Ambrosia Lake Operations—UNC (management & clerical)-----	47
Mine workers-----	336
Ambrosia Lake Mill—Kerr-McGee-----	195
Ambrosia Lake Mines—Kerr-McGee (clerical)-----	277
Mine workers-----	975
Mr. Taylor Operations—Gulf (clerical) -----	59
Construction-----	230
Johnny M. Mine—Ranchers (clerical)-----	15
Mine workers-----	115
Ambrosia Lake Mines—UNHP (clerical)-----	15
Mine workers-----	239
Ambrosia Lake Construction—UNHP and others (clerical)-----	31
Mine workers-----	118

ATTACHMENT C

STATE OF NEW MEXICO HEALTH AND SOCIAL SERVICES DEPARTMENT

Comments by the New Mexico Environmental Improvement Agency, Water Quality Division on the Hydrologic and Hydrogeologic Information contained in the Ford, Bacon, and Davis Utah Inc., document titled; Phase II—Title I Engineering Assessment of Inactive Uranium Mill Tailings Phillips/United Nuclear Site, Ambrosia Lake, New Mexico.

The N.M.E.I.A. appreciates this opportunity to address comments regarding the hydrological aspects of the Ford, Bacon and Davis Utah (FB&DU) report. The Agency believes there are several inaccuracies which deserve attention and that in general the subject areas concerning surface water hydrology and ground water hydrology are poorly addressed. This combination results in what the Agency feels may be a false sense of security regarding surface and ground water contamination.

On page 1-6 of the Chapter 1 Summary, paragraph 5 states: "There are no perennial surface streams near the Phillips/United Nuclear millsite. . . . Contamination of surface waters in the area is unlikely because there are no regularly flowing surface waters in the vicinity."

This statement is somewhat misleading in that the nearby Arroyo del Puerto flows perennially due to upstream contributions of water pumped from uranium mines and seepage from active mill tailings ponds. The flow has been maintained for many years and extends to San Mateo Creek, which may also regularly contain flow from uranium mine pumpage.

The drainage systems that head near Roman Hill and flow toward the Phillips/United Nuclear tailings pile on the north and east sides would probably be tributary to the Arroyo del Puerto if not obstructed by the tailings pile. Runoff events in this drainage which carry flow onto the top of the tailings pile as cited by W. D. Purtymun, et al., (1977), could potentially remove tailings from the pile and transport them toward and to the Arroyo del Puerto. Therefore, it does not seem prudent to ignore the 'regular' flow in the Arroyo del Puerto.

The first paragraph of page 1-7 erroneously states: "The Grants area is under continuing surveillance by the U.S. Environmental Protection Agency to monitor the impact of uranium mining and milling activities on the quality of local surface and ground waters."

This statement is patently untrue and may create for the reader a false sense of security. In reality, the U.S.E.P.A. conducted a limited monitoring survey of surface and ground water in the Grants Mineral Belt during February and March of 1975, the results of which were later issued as report number EPA 906/9-75-002. This two week survey represents the only significant EPA effort to monitor the impact of uranium mining and milling activities on surface and ground waters in the Grants Mineral Belt. Moreover, the National Pollutant Discharge Elimination System (NPDES) permit program administered by EPA pursuant to Section 402 of the Federal Water Pollution Control Act Amendments of 1972 (P.L. 92-500) has failed to result in significant regulatory control and imposition of self-monitor requirements for uranium discharges. Of the seven permits issued in New Mexico, six have been stayed due to requests for adjudicatory hearings by the uranium companies, and many permit applications remain undrafted due to the suspension of the effluent limitations and guidelines for uranium point sources.

On page 2-3 under the section labeled 2.7.2 Surface Water Hydrology reference is made to the surface drainage from the northeast via intermittent streams from the vicinity of Roman Hill. One of the intermittent streams referenced drains to the northern edge of the tailings pond and a large area of watershed exists immediately north of the tailings pile. Although the text states that. . . "A dike protects the northern boundary of the pile from off-site drainage". . . it goes on to state. . . "on at least one recent occasion this dike has been breached by storm runoff". . . . The section on surface water hydrology is completed on the same page with repeated statements which claim . . . "contamination of the surface waters in the area is unlikely because there are no regularly flowing surface waters in the vicinity to contaminate" . . . which has already been refuted in previous comments. However, this surface water hydrology section has failed to seriously evaluate the surface water runoff characteristics of the upstream watershed and quantify the runoff potential as it affects the tailings pile. If this document is as claimed, . . . "an engineering assessment to determine the relative magnitude of the hazards associated with each site" . . . then surely, greater quantitative attention should have been given to the runoff characteristics of the watersheds associated with a site so as to adequately judge the magnitude of the hazard of surface water contamination, storm runoff and erosion and remedial options available.

Section 2.7.3 Ground Water Hydrology on page 2-4 contains questionable information which raises concern. The statement which reads: "The tailings lie on unconsolidated materials which contain little or no unconfined ground waters" . . . is in contradiction to the hydrogeologic findings of W. D. Purtymun, et al., (1977), which established that a water table condition exists beneath the pile with a major flow direction to the southwest toward the Arroyo del Puerto. Additionally, the following language appears in the same paragraph and proves quite disturbing: . . . "Due to low annual precipitation and the high evaporation rate, it is unlikely that precipitation seeps through the pile or is a major contributing factor to unconfined ground waters." The statements on page 3-7 also state that:

"While there is potential for seepage from the piles there is no active recharge for water on the pile except for precipitation. The annual precipitation is 10 in. while the annual evaporation rate is 70 in., resulting in little likelihood of precipitation being a factor in seepage."

First, one should recognize the fallacy in the statement that precipitation is not a major contributing factor to unconfined ground waters. Precipitation is the major factor in the recharge of unconfined ground water. Second, the comparison of annual precipitation to annual evaporation is ludicrous. If this were a valid comparison, most of the Southwest would never receive recharge at all. Contrary to the FB & DU information, precipitation plays a significant role in the recharge of unconfined aquifers in the Southwest and in the Grants Mineral Belt. Most hydrologists realize that one cannot judge input and output components of the hydrologic cycle on the basis of annual averages. According to Gordon (1961), the shallow alluvium in the Grants-Bluewater Area receives something less than one inch of recharge annually from precipitation and serves as a water supply for domestic and stock wells.

Page 3-7 also states that, . . . "The United Nuclear Corporation's ion-exchange plant located in the old Phillips mill building is a closed system with no surface water discharge." This statement is incorrect, as there has been for several years a intermittent discharge into the ditch which lies on the east side of the mill buildings and flows southeastward toward the earth impoundment as seen in the FB & DU aerial photograph in figure 2-1. Furthermore, on March 17, 1978, United Nuclear Corporation was notified that a ground water discharge plan was to be submitted for the discharge from the ion-exchange plant pursuant to New Mexico Water Quality Control Commission Regulations.

Chapter 6, Mill Tailings Stabilization fails to include consideration of earthen dikes which should be constructed on the northern side of the tailings pile to divert the surface runoff from the Roman Hill Area.

As a final comment, it appears from review of the studies by R. F. Kaufmann, et al. (1976) and Purtymun, et al. (1977) that the Phillips/United Nuclear pile is capable of impacting the unconfined ground water in the shallow alluvial/colluvial aquifer. The work done by Purtymun, et al. simultaneously with the FB & DU investigation, in particular, seems to have not been given enough serious consideration by FB & DU. Not only should additional hydrologic and hydrogeologic work be incorporated in the FB & DU report, but the report as presently written should not be used as the sole basis for significant congressional policy making regarding tailings pile treatment and disposal.

The New Mexico Environmental Improvement Agency maintains that uranium tailings piles, both active and inactive, represent potential contamination hazards to ground water and that any disposal or reclamation policies contemplated should be based among other criteria, on sound hydrologic investigations so as to protect both surface and ground water from contamination.

REFERENCES

- Ellis D. Gordon, 1961. Geology and Ground Water Resources of the Grants-Bluewater Area, Valencia County, New Mexico. N.M. State Engineer, Santa Fe, N.M. Technical Report 20.
- R. F. Kaufmann, G. G. Eadie, and C. R. Russell. 1976. Effects of Uranium Mining and Milling on Ground water in the Grants Mineral Belt, N.M. Ground Water, Vol. 14; p. 296; Sept.-Oct., 1976.
- W. D. Purtymun, C. L. Wienke, and D. R. Dressen, 1977. Geology and Hydrology in the Vicinity of the Inactive Uranium Mill Tailings Pile, Ambrosia Lake, New Mexico. LA-6839-MS; Los Alamos Scientific Laboratory. June 1977.

TABLE OF CONTENTS—Continued

- Sec. 6. Indian lands.
- Sec. 7. Department of Energy rules and regulations.
- Sec. 8. Nuclear Regulatory Commission standards and criteria.
- Sec. 9. Environmental impact statements.
- Sec. 10. Authorization.

1 RESPONSIBILITY TO ASSIST STATES

2 SEC. 2. The Congress recognizes and assumes the re-
 3 sponsibility of the United States to assist the States in limit-
 4 ing the exposure of the public to radiation emanating from
 5 residual radioactive materials from abandoned uranium millsites and in-
 active uranium mill tailings piles.
 6 Such assistance shall be provided to the States
 7 of Arizona, Colorado, Idaho, New Mexico, Oregon, Texas,
 8 Utah, Wyoming, Pennsylvania, and any other State deter-
 9 mined by the Secretary of Energy to be affected by such
 10 exposure.

"Sec. 3 (a) The abandoned uranium millsites and inactive uranium mill tailings piles referred to in section 2 of this Act include, but shall not be limited to, the following areas: Monument Valley, Arizona; Tuba City, Arizona; Durango, Colorado; Grand Junction, Colorado; Gunnison, Colorado; Maybelle, Colorado; Naturita, Colorado; Rifle, Colorado; Slick Rock, Colorado; Lowman, Idaho; Ambrosia Lake, New Mexico; Blue Water, New Mexico; Milan, New Mexico; Shiprock, New Mexico; Lakeview, Oregon; Cannonsburg, Pennsylvania; Falls City, Texas; Ray Pointe, Texas; Green River, Utah; Riverton, Wyoming; and Spook, Wyoming; Mexican Hat, Utah; Salt Lake City, Utah.

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COOPERATIVE ARRANGEMENTS

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SEC. 4. The Secretary is authorized and directed to enter into cooperative arrangements with any State referred to in section 2 to provide 100 per centum of the costs of joint

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7 Federal-State programs to assess radiation levels at abandoned mill sites and inactive uranium mill tailings piles

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and to perform appropriate remedial action to limit exposure of individuals to radiation emanating from residual radioactive materials associated with such sites.

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TERMS

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SEC. 5. (a) Each arrangement under section 4 shall include terms as may be necessary to carry out the requirements of this section.

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1 less otherwise permitted by the Secretary, the land upon
 2 which the sites and inactive mill tailings is located and for those
 portions of the sites or piles over which the Federal Government had jurisdiction shall be acquired by the United States / before a remedial
 action is undertaken involving the removal of tailings from
 such site. The requirement for United States / acquisition shall not
 apply to—

- 7 (A) lands in the general vicinity of a processing
 8 site which may require decontamination activities as a
 9 result of incidental spread of radioactive substances, or
 10 (B) lands or structures where radioactive materials
 11 removed from the processing site have been used for
 12 construction-related purposes.

13 Subject to the Secretary's approval, the requirement for
 14 State acquisition of land under this paragraph may be met
 15 by means of a purchase option exercisable at any time
 16 within two years after remedial work is completed.

17 (3) The United States shall acquire any radioactive
 18 materials removed under this subsection.

19 (c) Unless otherwise determined by the Secretary, any
 20 remedial action under section 4 shall be performed by the
 21 Secretary or his authorized contractor and shall be paid
 22 for from amounts available under section 4.

23 (d) The United States shall be released from any
 24 radioactive materials-related liability or claim thereof related

1 to any remedial action taken after the date of enactment of
2 this Act under section 4.

3 (e) Prior to the commencement of any remedial action
4 with respect to any residual radioactive material under
5 section 4, the United States shall acquire any land to be
6 designated as a disposal site for such material. The Secretary,
7 with the concurrence of the Nuclear Regulatory Commission
8 and the State, shall designate the disposal site. The Nuclear
9 Regulatory Commission shall have responsibility for the
10 licensing and long-term care of the disposal site.

11 (f) The law of the State in which the processing site
12 or disposal site, as the case may be, is located shall be applied
13 to determine all questions of title, rights of heirs, and trespass
14 with respect to such site.

15 (g) The State and any agency or instrumentality of the
16 United States shall provide to the Secretary such reports,
17 accounting, and rights of inspection as the Secretary deems
18 appropriate under this section.

19 INDIAN LANDS

20 SEC. 6. (a) The provisions of sections 2, 3, 4, and 5 of
21 this Act shall not apply to the assessment and performance
22 of remedial action in connection with residual radioactive
23 materials resulting from uranium ore processing operations
24 formerly conducted on lands—

1 (1) held in trust by the United States for any
2 Indian, or for any Indian tribe, band, group, pueblo, or
3 community (hereinafter referred to as "Indian tribe"),
4 or

5 (2) owned by any Indian tribe subject to a restric-
6 tion against alienation imposed by the United States.

7 With respect to such materials, the Secretary is authorized
8 and directed to enter into cooperative arrangements with
9 the Secretary of the Interior and with the Indian tribes re-
10 siding on such lands, to provide 100 per centum of the costs
11 of a program to assess radiation levels at processing sites and
12 to perform appropriate remedial action to limit the exposure
13 of individuals to radiation emanating from residual radio-
14 active materials associated with such sites.

15 (b) The cooperative arrangements referred to in sub-
16 section (a) shall include such terms as are necessary to
17 carry out the requirements of this section.

18 (c) The Secretary, with the concurrence of the Secre-
19 tary of the Interior and the Nuclear Regulatory Commission,
20 and upon consultation with the Indian tribe, the Environ-
21 mental Protection Agency, and any other agency or person
22 he deems appropriate, shall determine the need for, and
23 selection of, appropriate remedial action for purposes of this
24 section.

1 (d) Any remedial action under this section shall be
2 performed by the Secretary or his authorized contractor and
3 shall be paid for by the Department of Energy.

4 (e) The Nuclear Regulatory Commission shall have the
5 responsibility for the continued custody of any residual radio-
6 active materials involved in any remedial action effort under
7 this section.

8 (f) The United States shall be released from any radio-
9 active materials-related liability or claim thereof related to
10 any remedial action taken after the date of enactment of this
11 Act under this section. The preceding sentence shall not
12 affect the trust responsibilities of the Secretary of the Interior
13 as described in subsection (a).

14 (g) The Secretary of the Interior and affected Indian
15 tribes shall provide such reports, accounting, and rights of
16 inspection to the Secretary as the Secretary deems appropri-
17 ate under this section.

18 DEPARTMENT OF ENERGY RULES AND REGULATIONS

19 SEC. 7. The Secretary may prescribe such rules and reg-
20 ulations as he deems necessary and appropriate to carry out
21 the provisions of this Act. Notwithstanding the provisions of
22 subsection (a) (2) of section 553 of title 5, United States
23 Code, such rules and regulations shall be subject to the
24 notice and public participation requirements of that section.

1 NUCLEAR REGULATORY COMMISSION STANDARDS AND
2 CRITERIA

3 SEC. 8. (a) The Nuclear Regulatory Commission shall,
4 within one hundred and eighty days after enactment of this
5 Act, establish standards and criteria with respect to all
6 phases of handling and disposal of residual radioactive ma-
7 terials to assure that the public safety and health and the
8 environment are adequately protected by the remedial action
9 undertaken pursuant to the terms of this Act.

10 (b) The Nuclear Regulatory Commission shall consult
11 with the Environmental Protection Agency in the establish-
12 ment of such standards and criteria.

13 (c) The Nuclear Regulatory Commission shall minimize
14 the duplication of effort in the establishment of the standards
15 and criteria developed pursuant to subsections (a) and (b)
16 of this section by insuring that such standards and criteria
17 are consistent, to the maximum extent possible, with the
18 applicable provisions of the Resource Conservation and
19 Recovery Act of 1976, the Clean Air Act of 1970, the
20 National Environmental Policy Act of 1969, and any other
21 Federal law relating to the protection of the environment.
22 Where any provision of the above specified laws or any
23 other Federal law relating to the protection of the environ-
24 ment is inconsistent with the standards and criteria estab-
25 lished by the Nuclear Regulatory Commission under sub-

1 section (a), such standards and criteria shall control in
2 regulating remedial action undertaken pursuant to this Act.

3 (d) The Nuclear Regulatory Commission shall, pur-
4 suant to sections 5(a) and 7(a), be responsible for deter-
5 mining compliance with the standards promulgated under
6 subsection (a) of this section and for insuring that the re-
7 medial actions are performed in conformance with the plan
8 selected pursuant to sections 5(a) and 7(a) of this Act.

9 (e) Judicial review of the Nuclear Regulatory Com-
10 mission's rulemaking pursuant to subsection (a) of this
11 section may be had by any interested person in the United
12 States Court of Appeals of the United States for the Federal
13 judicial circuit in which such person resides or transacts
14 business only upon petition for review by such person filed
15 within ninety days from the date of such rulemaking, or
16 after such date only if such petition is based solely on grounds
17 which arose after such ninetieth day.

18 (f) The Department of Energy shall not commence any
19 remedial action pursuant to sections 5(a) and 7(a) of this
20 Act until ninety days following the promulgation of the
21 standards and criteria established pursuant to subsection (a)
22 of this section.

23 ENVIRONMENTAL IMPACT STATEMENTS

24 SEC. 9. The Secretary, in consultation with the Nuclear
25 Regulatory Commission, the Environmental Protection

1 Agency shall be responsible for the prepara-
2 tion of all environmental impact statements that may be
3 required by the National Environmental Policy Act of 1969,
4 for remedial actions undertaken pursuant to this Act.

4 SEC. 10 (a) The Secretary shall conduct a pilot study
5 in the city of Salt Lake City, Utah, to—

6 (1) determine to what extent, if any, radiation
7 from uranium mill tailings at the abandoned uranium
8 mill site contaminates structures located within a ten
9 mile radius of such sites; and

10 (2) determine whether the radiation referred to in
11 paragraph (1) of this subsection poses a health hazard
12 to individuals living or working in the area described
13 in such paragraph, and examine the types of remedial
14 actions which might be undertaken to limit the exposure
15 of individuals to such radiation.

16 (b) Within one year after the date of the enactment
17 of this Act, the Secretary shall issue a report containing
18 the findings respecting each of the items studied under sub-
19 section (a) of this section, together with such recommen-
20 dations as the Secretary considers appropriate. The
21 Secretary shall submit the report to the President and to
22 appropriate committees of the Congress.

"Sec. 11. For purposes of this Act--

- (a) the term "Secretary" means the Secretary of Energy.
- (b) the term "United States" includes the executive departments, the military departments, the independent establishments of the United States, and corporations primarily acting as instrumentalities or agencies of the United States, but does not include any contractor acting under contract with the United States.
- (c) the term "abandoned uranium millsite" means:
 - (1) those sites specified in Section 3 (a); and
 - (2) any other site on which uranium was processed, except---
 - (A) where the site was owned on January 1, 1978, by the United States Government or any agency or department thereof; or
 - (B) where a license issued by the United States Nuclear Regulatory Commission, the Atomic Energy Commission, or a State under section 274 of the Atomic Energy Act of 1974, as amended, was in effect on or was issued after January 1, 1978, and the production of a uranium product derived from ores other than onsite uranium tailings occurred since February 1, 1973, as hereinafter defined;
- (d) the term "uranium milltailings" shall mean the accumulated tailings resulting from processing of ores for extraction of uranium and also other radioactive materials such as residual stock of unprocessed ores or low-grade materials, and ground in the vicinity of the mill tailings piles and sites which has become contaminated with radionuclides, including radium 226, derived from the pile and site.

AUTHORIZATION

5
6 SEC. 12. There are hereby authorized to be appropriated
7 to the Secretary of Energy \$15,000,000 for the fiscal year
8 1979, and for subsequent years such sums as may be neces-
9 sary, to carry out the purposes of this Act, such sums to
10 remain available until expended.

A STATEMENT IN RESPONSE TO THE RESIDUAL RADIOACTIVE MATERIALS ACT
OF 1978

Mr. Chairman and committee members, my name is Harold W. Tso, Executive Director of the Navajo Environmental Protection Commission at Window Rock, Ariz. The Commission is charged by the Navajo Tribal Council with the protection and attainment of acceptable environmental quality on Navajo lands.

I appreciate the opportunity to express the concerns of the Navajo people about the Federal Government's efforts to address a problem of long standing on the Navajo Reservation; to authorize a cleanup of "abandoned" piles of uranium mill tailings under a cooperative Federal/State or Federal/Indian Tribe arrangement as reflected in Senate proposals S. 3008, S. 3078, and S. 3253.

Since 1960, the Navajo Nation has been concerned with low level radioactive wastes associated with uranium milling by-products and low-grade ores. From 1950 to 1968; the Navajo Nation approved the extraction of uranium from its ores at four uranium mills; the mill operators subsequently terminated operations and abandoned the millsites. The mills are located on the Navajo Reservation at Shiprock, New Mexico, Tuba City, Ariz., Monument Valley, Utah and Mexico Hat, Utah.

Our research indicates that approximately 5.6 million tons of uranium ore were mined on the Reservation, yielding about 12,000 tons of U_3O_8 for military and commercial purposes. This production resulted in the deposition of an equivalent 5.6 million tons of milling wastes, also known as mill tailings, on 991 acres of usable Navajo land. These tailings contain an estimated 3,200 curies of Radium-226 as well as other uranium and radium decay progeny.

The mill tailings present major problems to the Navajo people, by virtue of their impact upon economic development plans of local communities as well as health risks inherent in materials containing hazardous or toxic substances.

First, there is evidence that surface and subsurface dispersion of radionuclides is occurring via air and water transport mechanisms. Air particulate samples, water samples from varying depths within and adjacent to the mill tailings and portable radiological instrumentation verify the dispersion. There is even evidence of voluntary and quantitative transport of mill tailings for home construction, as has been the case with the Monument Valley site.

Second, direct radiation exposures to gamma radiation and radon gas diffusing from the mill tailings are not being mitigated. In this regard, the Navajo Tribe has initiated a temporary stabilization project at Shiprock whereby dispersed radionuclides contaminating soils adjacent to the mill tailings are being removed and relocated to the original location of the tailings.

	Mill level (acres)	Tailings
Shiprock.....	230	72
Mexican Hat.....	555	68
Monument Valley.....	90	30
Tuba City.....	114	22

Analytical data of collected environmental samples indicate decreased levels of radiation exposure. This project has also enabled the Navajo Tribe to develop radiological monitoring and surveillance capability as well as to develop expertise in procedures and methods for decontamination of millsites with heavy equipment.

Third, Navajo population located adjacent and peripheral to the millsites are both increasing and encroaching upon the areas containing the millsites and milling wastes. In the case of Shiprock, the entire tableland including the millsite and its wastes has been designated an Industrial Park by the community and the Navajo Tribe. The Mexican Hat community desires the construction of a new High School approximately 0.5 miles from the millsite as well as the expansion of a vocational industrial training center. While the Tuba City millsite is located about 5 miles from that community, the anticipated growth will be toward the millsite.

At this time the Navajo Nation supports the general intent of S. 3008, S. 3078 and S. 3253, which address specific provisions for the separate treatment of Indian land owned by Indian tribes. It is evident from the above that Navajo concerns with abandoned millsites and milling wastes are well-founded.

However, there are certain considerations which we feel need further comment. We desire and encourage the Committee reviewing these bills to define

a strong federal commitment to resolve the abandoned uranium millsites located on the Navajo Nation.

Whether cleanup costs are funded 75 percent or 100 percent by the Federal Government to assist the State governments through cooperative arrangements, we believe that the best interests of the Navajo Nation should reside in the following considerations:

1. There should be no question over the Federal government's relationship to Indian tribes to exercise its commitment, as specified in the bills to pay 100 percent of the costs of cleaning up the mill tailings to protect the public health and safety. Historically the uranium which was used for national interests was initially obtained from federal lands, which includes Indian land. Not until recent years was there an expressed concern by the Federal Government for the amounts of low level radiation located in close proximity to residential areas, either statutorily or environmentally. Away money obtained from the uranium millsite reprocessing operations should go to the Navajo Tribe rather than the United States.

2. We take issue with the language used¹ to determine the need for and selection of appropriate remedial action. The Indian tribes should be able to concur rather than consult with the Secretary of Energy and the Secretary of the Interior. The consultation process is weak and there is no guarantee that the Federal Government will include the Indian tribes in such deliberations.

3. The land acquisition process on Indian land is not specific enough. Although Indian land, classified as federally-owned land, the provision for such land acquisition by the State governments could pose major jurisdictional problems in terms of remedial action in the checkerboard areas of the Navajo Nation. The Navajo Nation wants to be assured that no Navajo lands be withdrawn and submitted for Custodial or Perpetual care to the respective state government; and that funds and such care as may be required be the direct responsibility of the Secretary of Energy and the Secretary of the Interior.

4. The Department of Energy and the U.S. Environmental Protection Agency should insure the use of available Navajo expertise in millsite decontamination and radiological monitoring.

5. The Environmental Protection Agency and the Department of Energy should jointly establish decontamination guidelines and standards as well as provide long term responsibility for the millsites.

6. The information obtained from radiological decontamination and cleanup of these millsites be incorporated in exploration and mining development plans of appropriate government agencies, corporations or individuals.

Mr. Chairman, the Navajo Nation strongly supports the intent of the bills for the protection of all people and hopes for favorable action upon Committee review. If there are any questions in reference to our comments please contact the Navajo Environmental Protection Commission, Navajo Nation, Window Rock, Arizona.

Senator HASKELL. I have been asking questions all along. I will defer to my friend from New Mexico.

Senator DOMENICI. Thank you, Mr. Chairman. First I would like to apologize to my good friend, Maxie Anderson, for not being here in a more timely manner. I have only been required to be at three committee meetings at the same time today, the budget hearings, the Alaska (d) (2) lands, which I know you have an interest in, in terms of our mineral resources, and this one.

But let me ask you just a couple of questions. As I gather, if you support 100 percent Federal responsibility in terms of resources to take care of the abandoned tailings we speak of, is that correct?

Mr. ANDERSON. Yes, sir. Except for the one provision, if there is commercial viability.

Senator DOMENICI. I understand. Now, you have been a proponent of reutilization of that which is usable from these tailings and you were involved in one such venture yourself, as I understand it; is that correct?

Mr. ANDERSON. That is correct, sir.

¹ (Sec. 7(1), S. 3253; Sec. 7(a), S. 3078; Sec. 8(b) (1) S. 3008).

Senator DOMENICI. On page three of your written statement, you support 100 percent and then you indicate the 75 percent Government/25 percent industry proposal concerns only the relationship of the Government to private industry.

Mr. ANDERSON. Yes, sir.

Senator DOMENICI. You are not suggesting if we proceed with 100 percent Federal payment, and I believe we will, that we ought to lock in a relationship of 75-25 on Federal private sector, are you?

Mr. ANDERSON. Well, sir, I would say this to you. In some cases where the early technology did not remove as much uranium from the ore as later technology allows and the company wants to receive and try and recover the uranium, I think 75-25 is all right. I think that is fair. I don't believe a company ought to be fooling around unless it has a pretty good handle on the economics of the situation.

I think—so in that case, I believe I would say 75-25 would be a good inducement for them to try and recover the uranium or any other mineral resource permanently, the piles. I also believe in their trying there may be some technology in allowing them to remove the radium. There is no market for radium so a company could not remove it and return a profit, so we would not try.

But I think by placing them in the tanks we are using, for instance, at Naturita, that some time in the future one could go back in and remove the radium in case a market developed and you did not have a chance to be here earlier but, first, uranium was reworked that now exists in the tailings. In Durango, it was worked for vanadium and uranium was left in the pilings.

Then after the Manhattan project in 1943 came into effect, those tailings were reworked to remove the uranium. So today those things we look at as wastes may well be an important resource for the country.

Senator DOMENICI. What I am concerned about is why you would not want us to build in the flexibility on the part of the Federal agency that will be in charge to go ahead and assess the Federal cost if they were going to do it all themselves but also to give them the latitude in the law to enter into business transactions with the private sector. The law would provide some basis for protecting the Federal Government so they get the best proposal possible. But why would we lock it into 75-25?

Mr. ANDERSON. Senator, the reasoning you follow is good. I think the problem we in industry suffer are people think we are trying to take advantage of the country. Most of us do not feel that way. I think lest that be a problem, I think good faith is demonstrated often by what a man does or is willing to do economically as against what he will say. Consequently, I think some demonstrable proof is one might to alleviate the position, to alleviate the soundness of the reasoning is quite correct, but I think it is more from the standpoint of good faith that I speak of.

Senator DOMENICI. How would one go about determining from a given specimen of tailings whether or not it is feasible to reprocess? Is that technology presently known?

Mr. ANDERSON. Yes, sir. There are economics we have developed in Naturita which gives us some guidelines. At Naturita where there was one pound of uranium left in each 2,000 pounds, in one ton, our experimental tests indicated we could recover around 60-plus percent of that, meaning we could recover six-tenths of a pound from an eco-

conomic standpoint worth about \$24 a ton. All costs we incurred had to come less than \$24 a ton or we could not recapture or make that return on our investment.

In that case, the economics worked out. We only had to move the material 3 miles. The Colorado Department of Health did not make it an impossible task sitting and so forth, and we, I think, satisfied the requirements. That would not necessarily be the case in Salt Lake City. The tailings there run about two-hundredths. If one might presume you might recover half, you are dealing with something of about \$4 a ton. I doubt if there are any economics that will support that operation.

So I do think, what I would suggest is that on a case-by-case basis, some other companies step forward, they are willing to undertake the operation and that the risk beyond the participation of Government is an undertaking with the Government. If it fails, it fails; if it makes a profit, it makes a profit, which are the normal rules we live by anyway.

It would be a case-by-case basis. If 100 percent of the cost were undertaken by the Government, there is some possibility it might increase some beneficial recovery return in some marginal cases such as Salt Lake. In most cases of the 23 piles that exist, there is no way to recover the material. As technology progressed past the year 1960, we knew how to get almost all of the uranium out. In those cases, it would just have to be buried, if that is what is deemed required.

Senator DOMENICI. So the piles, some might have commercially retrievable wastes but would be pre-1960, is that what you are saying?

Mr. ANDERSON. I believe in almost all cases, yes.

Senator DOMENICI. In your present operation, you are extracting uranium. Are you removing all of the waste and moving in somewhere, extracting the usable and then disposing of the new wastes?

Mr. ANDERSON. Yes; at some point we are developing something equivalent like beach sand. It has been so thoroughly processed you have removed all of the material and the remaining uranium is probably locked with silica and therefore is probably inert. I think that is what we are doing. We recover all of the uranium we can and vanadium in this case, we recover about 1,000 pounds a day of uranium, about 4,000 pounds of vanadium. So it is a reasonable quantity.

Then at the end we have these large tanks that look like swimming pools. The walls are about 15 feet thick. At the end we will take those and cover them with clay, about two feet, that will cut out all possible radiation hazard except for the question of radon gas, and it pretty well eliminates that.

Then at that point is it revegetated. I believe it would be quite good for just grazing. Everybody might be a little horrified but over all these years when nobody recognized any danger involved, people have grazed it, they have lived on it. Certainly wild animals have gone and fed in the area and so forth.

I don't believe it represents any danger at that point, in my own estimation, based on what we are aware of.

Senator DOMENICI [presiding]. Thank you very much. The chairman has asked me to adjourn the meeting and leave the record open for 2 weeks.

[Whereupon, at 11:55 a.m., the hearing was adjourned.]