

Committee in Session at 8:42 A.M. on Tuesday, March 20, 1979.

Senator Keith Ashworth in the Chair.

PRESENT: Chairman Keith Ashworth  
Senator Wilbur Faiss  
Senator Jim Kosinski  
Senator Rick Blakemore

ABSENT: Vice-Chairman Joe Neal  
Senator Clifton Young

GUESTS: Mr. Bob Horn, Executive Secretary, Mining Association  
Mr. Steven McCutcheon, V.T.N. Corporation, Irvine,  
California, and with the Chevron  
Company Exploration Program  
Mr. Al Edmundson, Chief, Bureau of Consumer Health  
and Protective Services of the Health Division  
Mr. Twain Walker, Legislative Counsel Bureau, Audit Division  
Mr. Peter G. Morros, Assistant Director, Conservation  
and Natural Resources  
Ms. Joyce Hall, Administrator of the Division of  
Mineral Resources

Chairman Ashworth opened the hearing on S.B. 237.

Mr. Bob Horn, Executive Secretary, Mining Association, stated that the leading uranium major exploration companies that are active in Nevada had a meeting Friday, March 16th, with representatives from Miranda Company, a major U.S. company, Western Nuclear, with Central American, with Coastal Petroleum, Placer Amex, a major English Company with Mocatal Mining Company, and with attorneys representing the mining industry: Mr. Hill, Richard Harris, and by phone with Conoco and Anaconda.

Mr. Steven McCutcheon, V.T.N. Corporation, Architecture and Planners, Irvine, California, also with the Chevron Exploration Program stated the Chevron Company has an exploration program under way at the present time. He stated he supported the need for this legislation. Proposed Changes to S.B. 237 (Exhibit "A") were elaborated on.

Senator Kosinski questioned whether the erosional force from the tailings would pose an additional maintenance cost. Mr. McCutcheon stated that it might pose an additional cost for maintenance of the tailings sites. Senator Faiss posed the question of what percentage of the uranium is left in the tailings. Mr. McCutcheon stated that from the conventional mill operation it would vary from 95 to 97% recovery. The primary direction will be to dispose of the tailings back into some form of below-grade disposal.

Senator Kosinski expressed concern over the long-term cost to the taxpayers of the State of Nevada. The government accounting office estimated it would cost over 200 million dollars to reclaim 22 of the abandoned milling sites which contained only 25 million tons of this ore. Questioned whether the reclamation, the burying of the tailings of this ore, is to be part of the mining process. Mr. McCutcheon stated that it was not to be part of the mining process. He stated that it is the assumption that the state would adopt regulations equal to those regulations which will emerge federally.

Vice-Chairman Joe Neal arrived at the meeting at 9:04 A.M.

Chairman Ashworth expressed concern that the regulations will provide for a maximum amount to be paid in each operation not to exceed a million dollars. He questioned whether the regulations, if adopted, would be sufficiently covered by a million dollars. Mr. McCutcheon stated that it was his opinion that the million dollars would be more than an equitable fee which would reasonably protect the state. He further stated that this was a reasonable basis. He pointed out that the bonding requirements to reclaim the sites can be found in the 2nd paragraph, in addition to the million dollar fee.

Mr. McCutcheon stated on Section 1, subsection c, the basic changes in the language "surety bond" has been changed to "post adequate bond and surety," this allows them to accept bonds or other surety. This simply allows flexibility to achieve the objective. The interest of the state is served here by this rewording. The term securing sites means decommissioning and reclamation of the sites. Senator Kosinski asked if Mr. McCutcheon had any objection to putting that definition into the wording of S.B. 237. Mr. McCutcheon stated he had no objection to this addition. Senator Kosinski stated that we have two separate issues, one relates to surety and securing the site and the second one to cost and fees for care and maintenance.

Senator Faiss questioned how much cover is actually needed to keep this radar gas from escaping into the atmosphere. Mr. McCutcheon stated that prior to beginning of operations you are required to do intensive radiologic surveys. The Nuclear Regulatory and E.P.A. have agreed the guideline criteria of radiation levels would not exceed twice the background levels in the tailings. If the state did not adopt this legislation, they would work with the state to try comparable legislation as an independent departmental analysis. Tailing concentrations of radioactive material is such a low level that they do not feel the concrete used in housing foundations would be a public health hazard. The Chevron exploration, at the present time, looks like it will be done underground and be a standard extraction. Senator Kosinski distributed copies of the report of Uranium Mill Tailings (Exhibit "B").

Mr. Al Edmundson, Bureau of Consumer Health and Protective Services of the Health Division, stated he met with the Mining Industry Friday, March 16th, to work on the wording for basic enabling legislation so that they can collect the necessary funds and continue to do the legislation and monitoring that they need to do. They will be required to follow the federal regulations fairly closely.

Mr. Twain Walker, Legislative Counsel Bureau, Audit Division felt the language on Page 2 of Section 2 would supercede the letter of February 22, 1979 to Senator Ashworth, (Exhibits C and D). As a result of more investigation they have submitted Exhibit D which is SB 237 Proposed Amendment. Also the Executive Budget calls for a uranium mills licensing program so the language would provide for a uranium mills licensing fund and would put it into compliance and further clarify and prevent redundancy. Chairman Ashworth questioned how the interest money would be handled, such as utilization of the revenue produced from the fund. Mr. Walker stated that it was the feeling that there would not be this much revenue generated before the next session and that there would be enough time then to address this issue. Mr. Edmundson felt at that time the language could be changed to include the interest to remain and accrue in the Trust Fund. Chairman Ashworth stated the money should go to the Treasury; but the money that accrues should go to increase the fund, not to the general revenue of the State of Nevada. The Treasurer of the State of Nevada should handle the fund.

Senator Neal questioned whether the mining companies now have the equipment and materials for monitoring the sites. The issue being to protect the health and welfare of the people in this area. Mr. Walker stated that at the present time they did not have the equipment, but that the health and welfare of the people is their objective. Senator Kosinski asked about their expertise in hiring for this type of environment, whether they could hire that sort of person, with a college degree or if they could hire someone and teach them out in the field. Mr. Walker stated they have been searching since October for men to fill that position. They are difficult to find.

Senator Kosinski questioned if securing a site would include reclamation. Also that they provide some additional language which would mandate that they design regulations for reclamation standards for these milling operations.

There are two radiological monitors on the staff at the present time according to Mr. Walker. If they get 10 mining companies they would have to come back to request another person. There are now three site locations with letters of intent from others.

Chairman Ashworth felt that there should be a special fund for the long-term care and maintenance and that the operational account should be budgetary. The agency can handle the accounts.

Mr. Peter G. Morros, Assistant Director, Conservation and Natural Resources Department, introduced the next speaker.

Ms. Joyce Hall, Administrator of the Division of Mineral Resources, spoke in support of the legislation S.B. 237 feeling it would protect the state and the residents of Nevada and collecting fees so the state taxpayers do not have to pay for the program. If a health hazard should occur, it would be easier to deal with it on a state level. She stated she felt that the bill, as amended, is a good one.

There being no further testimony Chairman Ashworth closed the hearing on S.B. 237.

Chairman Ashworth presented BDR 40-1392 stating that Senators Gibson and Close were trying to find another bill to incorporate BDR 40-1392. The bill allows the District Board of Health in Clark County to set the salary for Dr. Otto Ravenhold rather than the various entities in the area.

The committee concurred to present BDR 40-1392 for a committee introduction.

Chairman Ashworth stated the immunization bill, S.B. 117, now has all the amendments that were requested. Senator Kosinski stated that questions have been raised regarding Section 16 relating to private child care facilities, stating that "they cannot refuse to accept someone who was not immunized." He suggested using similar language in section 16 as that in section 17, thereby changing the reference to religious belief versus the medical conditions. Senator Kosinski suggested the verbage, "If the religious beliefs of the child, or his parents, do not require him to be immunized under section..., then the child is exempt from all the provisions of section 15 for purposes of admission." He further felt this way the operator will not be mandated to taking the child.

S.B. 117, Exhibit "E" Senator Faiss moved to "Amend" and "Do Pass" S.B. 117.

Seconded by Senator Neal.

Discussion: Chairman Ashworth stated this would put the same kind of restrictions in Section 16 as is in Section 17, making it, "if the religious prohibition exists," instead of making it mandatory. He also included changes discussed in Exhibit F.

Motion carried.

Yeas - - 4

Nays - - None

Absent: Senators Young and Blakemore.

S.B. 298 - Exhibit "G"

Senator Neal moved to "Delete Section 1 in its entirety and retain Sections 2 and 3. Do Pass with amendment."

Seconded by Senator Faiss.

Discussion: Chairman Ashworth directed the bill drafter take out the reference in Section 3, line 5 that refers to Section 1.

Motion carried.

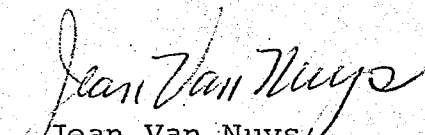
Yeas - - 4

Nays - - None

Absent: Senators Young and Blakemore.

There being no further business, Chairman Ashworth adjourned the meeting at 10:21 A.M.

Respectfully submitted,

  
Jean Van Nuys  
Committee Secretary

Approved:

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Chairman  
Keith Ashworth

## PROPOSED CHANGES TO S.B. 237

Proposed rewording: Section 1(a), lines 4 through 9, page 1.

(a) Fees for licensing, monitoring, inspecting or regulating mills or other operations for the concentration, recovery or refining of uranium. Fees will be in an amount estimated to reasonably cover the actual cost of such activity. Payment of the fees is the responsibility of the person applying for a license or licenses to engage in uranium concentration, recovery or refining.

Proposed rewording: Section 1(b), lines 10 through 14, page 1.

(b) Fees for the care and maintenance of radioactive tailings and residues at the inactive uranium concentration, recovery or refining sites. The fees must be based on a unit fee for each contained pound of uranium oxide produced. Payment of the fees is the responsibility of the person licensed to engage in uranium concentration, recovery or refining. The regulations will provide for a maximum amount to be paid for each operation, not to exceed one million dollars, and that amount shall not be increased after the licensee and the state have reached agreement on the final sum.

Proposed rewording: Section 1(c), lines 15 through 23, page 1, and lines 1 through 3, page 2.

(c) A requirement for persons licensed by the state to engage in uranium concentration, recovery or refining to post adequate bond,

surety or other financial arrangement to cover the costs of securing sites used for uranium concentration, recovery or refining to a safe and stable condition because of abandonment or because of unwillingness or inability of the licensee to satisfy the requirements of the state. The state board of health shall determine the amount of the bond, surety or other financial arrangement based upon an estimate of actual expense that may be incurred in securing the site. The amount of the bond, surety or other financial arrangement may be reviewed by the board from time to time and may be increased or decreased as the board deems appropriate. The bond, surety or other financial arrangement shall be administered by the state health officer who shall use the bond, surety or other financial arrangement as required to protect the public health, safety and property.

Rewording of definition of "Byproduct material", lines 20 through 23, page 2.

1. "Byproduct material" means (1) any radioactive material (except special nuclear material) yielded in or made radioactive by exposure to the radiation incident to the process of producing or utilizing special nuclear material, and (2) the tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content.

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March 9, 1979

TO: Senator Jim Kosinski  
FROM: J. Kenneth Creighton, Research Analyst JKC  
SUBJECT: Uranium Mill Tailings

This is a followup to your request regarding uranium mill tailings.

Presently Arizona has two abandoned mills located in northern Arizona on Indian reservations. Because of their locations, the Nuclear Regulatory Commission handles them. There is, however, pending legislation (H.B. 2324) in the Arizona Legislature which requires a mill operator to pay five cents per ton of tailings which is then placed in a special state fund. If the mill is abandoned and the operators satisfactorily clean up the tailings, they are refunded their share of the state fund.

I have also enclosed some materials regarding environmental and health effects of uranium tailings.

JKC/llp  
Enc.



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EXHIBIT B --

March 8, 1979

TO: Senator Jim Kosinski  
FROM: J. Kenneth Creighton, Research Analyst  
SUBJECT: Licensing and security fees and related information  
regarding uranium mining

This is in response to your request about licensing and security fees and related information regarding uranium mining in Nevada.

Apparently the mill tailings are a very serious threat to the health of human beings and to the environment. The Environmental Protection Agency says that only 10-15 percent of the radioactive material in the ore is removed during processing. The remaining 85-90 percent is still in the mine tailings. This material produces radon gas which significantly increases the level of radiation and increases genetic and somatic effects in the surrounding environment. The standard method for reducing these risks is to dump approximately 20 feet of dirt on the tailings in an effort to hold the gas in. EPA, however, says this method is not very effective because the gas can still escape. In Grand Junction, Colorado, uranium mine tailings were used for construction and it has resulted in a very expensive cleanup effort. In short, the tailings appear to be dangerous and there is little, if anything, that can be done with them.

Enclosed is a copy of the "Uranium Mill Tailings Radiation Control Act of 1978" for your reference. On page 3036, section 203, (1) it states: "that an adequate bond, surety, or other financial arrangement (as determined by the Commission)" must be provided by a licensee for the decontamination, decommissioning, and reclamation of sites, structures and equipment. It does not specify the amount of the bond or other arrangement, however, in the final paragraph of the section, it does say that if a state provides for a financial arrangement it must be acceptable to the Nuclear Regulatory Commission (NRC). On page 3041, section 207, NRC is authorized to be appropriated \$500,000 to help states design regulatory programs during fiscal year 1980 only.

Mr. Al Edmundson of the state consumer health division informs me that Nevada would be making a mistake if it does not license, regulate and monitor uranium milling operations. If the NRC were to do it, licensing would become more expensive and inspections more sporadic. Nevada is an "agreement" state which means that we do our own radiological monitoring and testing consistent with federal standards. Under S.B. 237, he says, the state would charge a \$12,000 examination fee and \$80,000 for a license. In addition, the mill operator would be required to post a bond to pay for decommissioning and disposal of hazardous material if the operation folded before the termination date of its license. I have, however, been informed that bonding companies will not provide this type of bond and Mr. Edmundson is examining several alternatives. He will also be meeting with mining representatives on March 16 to discuss this problem. In comparison, the NRC would charge an \$11,000 examination fee, \$96,700 for a license and an additional \$175-180,000 for an environmental impact statement which states are not required to perform. However, Mr. Wayne Kerr of NRC has told me that the state's cost may increase. If a state does regulate uranium milling operations (Nevada does not have any active mills at this time) it must adopt standards equal to or better than the federal standards. This may require an environmental assessment statement which is less expensive than an EIS but it would increase the applicant's cost.

Also enclosed are copies of Mr. Edmundson's cost projections for a state monitoring program of uranium mills and a flow chart of receipts under S.B. 237 prepared by the fiscal analyst's office.

JKC/llp  
Enc.

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EXHIBIT B

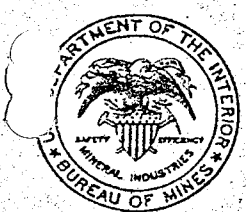
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Bureau of Mines Report of Investigations/1975

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# Radium Removal From Uranium Ores and Mill Tailings



UNITED STATES DEPARTMENT OF THE INTERIOR

## RADIUM REMOVAL FROM URANIUM ORES AND MILL TAILINGS

by

S. R. Borrowman<sup>1</sup> and P. T. Brooks<sup>2</sup>

## ABSTRACT

Mill tailings from conventional uranium extraction processes contain nearly all of the radium originally in the ore. Such tailings require controlled storage in perpetuity to safeguard the surrounding environment from radioactive contamination. Alternatives to controlled storage of the tailings are (1) removal of the radium from the tailings for separate storage or use or (2) removal of the radium when processing the uranium ore.

In laboratory tests conducted by the Federal Bureau of Mines, radium was leached from tailings using either hydrochloric acid or ethylenediamine tetraacetic acid. A hydrochloric acid leaching method was used to extract both radium and uranium from the ore to yield tailings containing less radium than those produced by either conventional sulfuric acid or alkaline leaching processes. From 77 to 94 percent of the radium in mill tailings was concentrated by sedimentation in slime fractions representing nearly 25 weight-percent of the original sample.

## INTRODUCTION

Uranium milling waste contains most of the radium originally present in the uranium ore and is a potential source of human internal and external radiation exposure. Failure to properly contain mill tailings can cause radiological pollution of water, soil, and air with long-lived radium and its decay products. Research by the Bureau of Mines to minimize windblown contamination by stabilizing the tailings has been reported (4).<sup>3</sup> As part of the continuing program of the Federal Bureau of Mines to devise technology for controlling pollution in minerals processing, bench-scale testing was done to assess the practicality of removing radium from mill tailings and uranium ores.

Uranium-238, the major isotope in naturally occurring uranium, is only feebly radioactive and therefore is not a hazardous source of radiation.

<sup>1</sup>Research chemist.

<sup>2</sup>Research supervisor.

<sup>3</sup>Underlined numbers in parentheses refer to items in the list of references preceding the appendix.

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Uranium ore always contains radium-226, which is produced by the radioactive decay of uranium-238. When uranium and radium are in equilibrium, only 0.6 milligram of radium-226 is contained in 1 ton of uranium ore averaging 0.25 percent  $U_3O_8$ . Although weakly penetrating alpha particles emitted by radium and its decay products are not generally a hazardous source of external radiation, damaging internal radiation may result when radium is ingested by drinking contaminated water, breathing radium-bearing dust, or breathing the daughters of gaseous radon-222.

More than 90 percent of the uranium ore reports as insoluble tailings that contain little uranium but most of the original radioactivity. The relative hazard of the radioactive uranium family when contained in water is listed in table 1, in order of decreasing degree of health hazard (13).

TABLE 1. - Maximum permissible concentration in water (MPC<sub>w</sub>)  
for isotopes of the uranium family

Isotope	MPC <sub>w</sub> , pCi/l	Half-life	Emission
Ra <sup>226</sup> .....	3.3	1,620 years	Alpha, gamma.
Pb <sup>210</sup> .....	33	22 years	Beta, gamma.
Po <sup>210</sup> .....	233	140 days	Alpha, gamma.
Th <sup>230</sup> .....	667	8 × 10 <sup>4</sup> years	Do.
Th <sup>234</sup> .....	6,667	24 days	Beta, gamma.
U <sup>234</sup> .....	10,000	2.5 × 10 <sup>5</sup> years	Alpha, gamma.
U <sup>238</sup> .....	13,300	4.5 × 10 <sup>9</sup> years	Do.
Bi <sup>210</sup> .....	13,300	5 days	Alpha, beta.
Pa <sup>234</sup> .....	(1)	1.1 min	Beta, gamma.
Po <sup>218</sup> .....	(1)	3 min	Alpha, beta.
Po <sup>214</sup> .....	(1)	1.6 × 10 <sup>-4</sup> sec	Alpha.
Bi <sup>214</sup> .....	(1)	20 min	Alpha, beta, gamma.
Pb <sup>214</sup> .....	(1)	27 min	Beta, gamma.
Rn <sup>222</sup> .....	(gas)	3.8 days	Alpha, gamma.

<sup>1</sup>No value given for these short-lived isotopes.

Although the values in table 1 show the relative hazards of ingesting water containing members of the uranium family, no similar data are readily available on the maximum permissible concentration (MPC) of the uranium family in either tailings or soil. The problem is complicated by many factors, including soil characteristics, topography, and climate. Both radium and radon gas are primarily alpha emitters; however, radium is indirectly responsible for gamma radiation because of its gamma-emitting progeny. The hazard arising from habitation on or near mill tailings could be eliminated by removing radium, the causative agent; however, complete removal appears impossible and is probably unnecessary since the natural concentration of radium in the earth's crust is about 1 picocurie of radium per gram of earth. Currently, an MPC of about 20 picocuries of radium per gram is being considered for soil and building materials. This value is controversial, and an MPC approved by most authorities may require years for adoption in this country. In the United Kingdom, an MPC of 25 picocuries of radium per gram has been recommended for gypsum wall board and building blocks, and a total of 20 picocuries of radium and related nuclides per gram of building

materials is permitted in the U.S.S.R. (1, 7). Uranium mill tailings containing only 20 picocuries of radium per gram would have a net gamma-radiation level of about 0.05 milliroentgen per hour measured 3 feet above the surface, based on Schiager's relationship (8). Continuous exposure to gamma radiation at 0.05 milliroentgen per hour was not considered particularly hazardous in an opinion by the Surgeon General written specifically for dwellings constructed on or with uranium mill tailings (15).

The problem of setting an acceptable level of radiation exposure is very difficult because a dose-effect relationship has never been established for low-level radiation. Knowledge of these effects and of risk philosophy are still evolving. However, based on published information, an upper level of 20 picocuries per gram of material appears acceptable to some authorities. Although continued research may result in establishing a more conservative limit, a level of 20 picocuries of radium per gram of mill tailings provides a not unacceptable measure or target with which to gauge research efforts.

#### CURRENT MILLING AND WASTE DISPOSAL PRACTICES

Operations in uranium extraction processes include crushing, grinding, leaching, separating the leach liquor from the tailings, and recovering the uranium from the leach liquor. Leaching is done using solutions of either sulfuric acid or sodium carbonate and bicarbonate, depending on the nature of the ore. During uranium ore milling, many of the short-lived decay products of uranium disappear, whereas the long-lived nuclides survive. The most hazardous of these long-lived nuclides is radium-226. If uranium and its decay products were chemically similar, these elements would be extracted with uranium during leaching, and milling waste would be radiologically innocuous. However, radium is nearly insoluble in conventional leaching circuits and, consequently, more than 90 percent of the radium content of the ore reports in the mill tailings (13).

Since the early days of uranium processing, waste disposal methods have greatly improved, as required by limitations on radionuclide discharge imposed by the Atomic Energy Commission (now part of the Energy Research and Development Administration) (14). Impoundment of both solid and liquid wastes in ponds is the disposal method most widely practiced by industry. After ponding, most waste solutions eventually either evaporate or seep into the ground. Liming acidic waste solutions and adding soluble barium is an effective method for precipitating soluble radium and thereby minimizing the danger of discharging soluble radium to either surface or underground waterways. Alkaline waste solutions have been acidified to pH 8, then barium was added to precipitate radium. As an alternative to chemical treatment, the Anaconda Co. in Grants, N. Mex., discharges clarified liquid waste in a deep well that penetrates an isolated aquifer (5). Studies by the Bureau of Mines conclude that most liquid mill wastes can be recycled to the extractive process, thereby reducing pond area and milling requirements of fresh water, and minimizing the discharge of soluble radium (9-12).

Increased awareness of the dangerous quantities of radium in solid mill waste has resulted in developing several methods for stabilizing dry tailings ponds. Leveling tailings piles, riprapping the sides, and covering with

fertilized earth supports vegetation at mill sites in Monticello, Utah, and in Rifle, Colo. (2). This is an esthetically desirable method for suppressing both wind and water erosion and has proven suitable for enabling return of land to limited public use by reducing surface gamma radiation to acceptable levels (6). A chemical method for tailings stabilization demonstrated by the Bureau is effective against wind erosion in desert areas too dry to support vegetation. This method, employed at Tuba City, Ariz., consists of spraying dry tailings with crust-forming chemicals (4). However, chemical stabilization has limited life, and the treated areas require maintenance.

Ponds of radium-bearing mill waste, typically containing 700 picocuries radium per gram of solids, or 0.6 millicurie per ton, become repositories for large quantities of radium during the active life of a mill. In the Colorado River basin alone, more than 12 million tons of tailings containing about 8,000 curies of radium exist at abandoned mill sites (16). When carefully located, designed, and maintained, tailings ponds are a relatively inexpensive and yet effective means for minimizing radiation exposure to both animal and plant life. However, the radium in such piles is a major factor in causing increased radioactivity in the environment and food chain. This is a long-term problem, and its eventual seriousness is difficult to assess with our present knowledge of the environmental impact of low-level radiation. Abandoned mill sites are particularly hazardous because, unless maintained, tailings dams may either erode or rupture and release tailings to streams where the radium dissolves and contaminates the water for downstream users. As the tailings pond dries, wind scattering contaminates the air and surrounding area with radium-bearing dust. In addition to hazards from natural air and water erosion, there have been cases in which radioactive tailings have been used for soil conditions, mixed with cement for constructional use, and used as fill material. Unless technology is developed for eliminating radium in the tailings, controlled storage of tailings must be continued after the life of the mill.

Controlled containment of radium-bearing tailings would be a very expensive and probably an ultimately unsuccessful undertaking. Considering the 1,600-year half-life of radium, 10,000 years of controlled storage are necessary to reduce the radium in uranium tailings from 700 picocuries per gram to 20 picocuries per gram through natural decay. Although controlled containment seems the only feasible method, it involves high costs of continuous monitoring, maintenance, and loss of property usage for thousands of years.

#### RESULTS OF LABORATORY TESTING

Alternatives to stabilization and controlled storage of mill tailings are to either remove the radium from existing tailings ponds or to extract radium during uranium ore processing. The latter alternative would best apply to new milling processes. More than 95 percent of the radium must be extracted by either method to render the tailings innocuous by the previously mentioned criteria.

### Sand-Slimes Separation

Most of the radium in domestic uranium mill tailings occurs as very fine particles, or slimes, that do not settle readily. These slimes comprise about one-third of the solid tailings. Therefore, separating them from the coarser sands should enable the radium to be concentrated for either separate storage or further treatment.

A sample of acid-process tailings supplied by Vitro Chemical Co.,<sup>4</sup> Salt Lake City, Utah, containing 500 picocuries of radium per gram was used in sand-slimes separation by differential sedimentation. This resulted in recovery of 94 percent of the radium as a slime fraction representing 25 weight-percent of the original sample. The sands contained 50 picocuries of radium per gram, whereas the slimes contained 1,900 picocuries of radium per gram. Only a small improvement in radium removal would permit unrestricted storage of the sands. Although flotation techniques were tried and they produced radium-rich gypsum concentrates, flotation was less effective than sand-slimes separation by sedimentation.

A sample of alkaline-process tailings were obtained from United Nuclear-Homestake Partners Co., Grants, N. Mex. These tailings contained 450 picocuries per gram. Sand-slimes separation recovered 77 percent of the radium as a slime fraction representing 27 weight-percent of the original sample. The sands contained 140 picocuries of radium per gram, whereas the slimes contained 1,300 picocuries per gram.

### Leaching Radium From Uranium Mill Tailings

The predominant radium compound in tailings from sulfuric acid processing is radium sulfate, a compound that is highly insoluble in most aqueous solutions. However, certain chelating chemicals such as the tetrasodium salt of ethylenediamine tetraacetic (EDTA) acid form a water-soluble salt with radium. Acid-process tailings were leached at 60° C for 5 hours at 15-percent solids using 0.15 M EDTA, and for 1 hour at 15-percent solids using 0.3 M EDTA. In both tests, 80 percent of the radium was leached. Leaching at 35-percent solids using EDTA was ineffective. After three consecutive treatments with 0.15 M EDTA employed at 15-percent solids, 92 percent of the radium was dissolved. The leached tailings contained 40 picocuries of radium per gram. Calcium sulfate was also dissolved and amounted to 6 weight-percent of the tailings.

Alkaline-process tailings from the El Paso Natural Gas mill at Tuba City, Ariz., were leached for 2 hours at 60° C using 0.15 M EDTA at 15-percent solids. Removing radium by EDTA leaching was less effective for the alkaline-process tailings than for the acid-process tailings. Only 56 percent of the radium was leached from the alkaline-process tailings, and additional leaching time failed to improve radium extraction.

<sup>4</sup>Reference to specific companies or products does not imply endorsement by the Bureau of Mines.



Following EDTA extraction of radium from the acid-process tailings, 94 percent of the dissolved radium was precipitated from solution by acidifying with sulfuric acid to pH 2.5 and then adding barium chloride to form insoluble barium-radium sulfate. After filtration, the nearly radium-free solution was acidified further to precipitate EDTA for reuse. Further testing showed that no savings in chemicals was gained by confining leaching to only the radium-rich slime fraction of the acid-process tailings.

Alternatively, the acid-process tailings were leached three consecutive times for 30 minutes at 60° C using 1.5 M hydrochloric acid at 25-percent solids. This gave a residue containing 40 picocuries of radium per gram of tailings.

Neither EDTA leaching nor hydrochloric acid leaching extracted sufficient radium to enable uncontrolled storage of the acid-process tailings. Both methods appear expensive; chemical costs range alone from \$30 to \$50 per ton of tailings treated.

#### Leaching Radium From Uranium Ore

An insignificant amount of radium was leached from a variety of uranium ores using sulfuric acid, although various leaching conditions and chemical additives were employed in efforts to solubilize the radium. Use of complexing agents, including citric acid and EDTA, proved ineffective for dissolving radium at sulfuric acid concentrations required for good uranium extraction. Because of the extreme insolubility of radium in sulfate solutions, leaching methods using either hydrochloric or nitric acids were investigated because both uranium and radium salts of these acids are soluble. Initial laboratory testing showed little difference in the effectiveness of either hydrochloric or nitric acids for extracting both uranium and radium from ores; therefore, hydrochloric acid was used in further testing because of its lower cost.

Hydrochloric acid leach tests were done using the three ores listed in table 2.

TABLE 2. - Partial analysis of uranium ores used in hydrochloric acid leach testing, percent

Ore	Source	Ra <sup>1</sup>	U <sub>3</sub> O <sub>8</sub>	Ca	CO <sub>3</sub>	SO <sub>4</sub>	Total S
1	Lucky Mc mine, Wyoming.....	1,700	0.44	0.05	0.05	0.85	3.4
2	Happy Jack mine, Utah.....	760	.21	4.5	6.9	.06	.05
3	Shirley Basin mine, Wyoming.....	3,800	.66	.57	1.7	.16	.95

<sup>1</sup>Picocuries per gram.

Ore 1 was relatively high in lime and low in sulfur, whereas ore 2 contained less lime but more sulfur than the other two ores. Ore 3 was intermediate in sulfur and lime content. The effects of both hydrochloric acid and sulfate concentrations in leach liquor on radium solubility (fig. 1) were determined by leaching ore 3 at 25-percent solids for 20 minutes at 60° C using hydrochloric acid containing small additions of sodium sulfate. Soluble radium was determined immediately after leaching and again after aging the

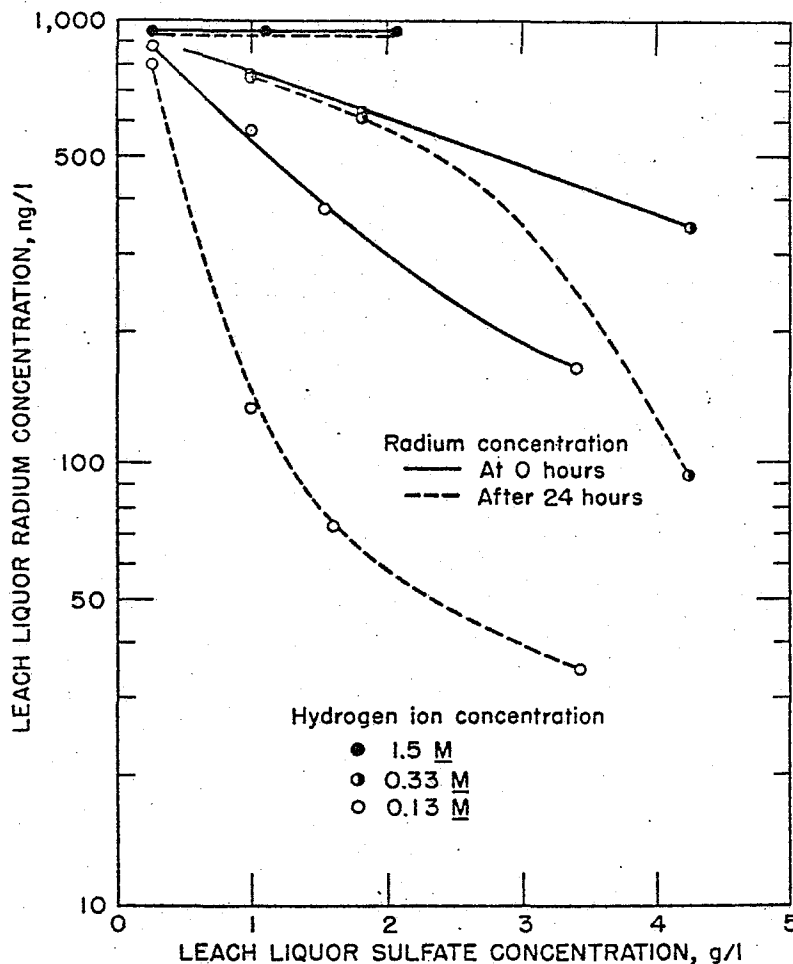


FIGURE 1. - Effects of acidity, sulfate concentration, and leach liquor age on radium solubility in hydrochloric acid.

sulfate. Leaching at 25-percent solids for 2 hours at 90° C using 25-percent sodium carbonate solution was followed by two additional 60-minute leaches at 60° C and 25-percent solids using 1.5 M hydrochloric acid. However, no additional radium was leached from the residues.

Because crosscurrent hydrochloric acid leaching of uranium was inefficient, the relatively low-sulfur ores (2 and 3) were leached using 1.5 M acid in a two-stage countercurrent system at 60° C and 25-percent solids using 30 minutes of retention per leaching stage. More than 99 percent of the uranium was leached. Leached residues using ores 2 and 3 contained 60 and 170 picocuries of radium per gram, respectively. Nearly 50 percent of the acidity was neutralized during leaching.

Uranium, but not radium, was removed from acidic chloride leach liquor by solvent extraction and was recovered as uranyl tricarbonate by stripping the loaded organic with carbonated ammonia solution. The organic solvent employed was a kerosine solution of 0.04 M di-2-ethylhexyl phosphoric acid and 0.01 M

leach liquor for 24 hours. The marked inhibitory effect of sulfate ion on radium solubility decreased when stronger hydrochloric acid solutions were employed. Radium was best leached using sulfate-free solutions, although the adverse effect of sulfate was overcome by increasing the amount of hydrochloric acid.

The three ore samples were separately leached by three successive 30-minute contacts at 60° C using 1.5 M hydrochloric acid at 25-percent solids. This gave leached residues containing 240, 50, and 80 picocuries per gram for ores 1, 2, and 3, respectively. Sulfur contained in the ores as sulfate appeared responsible for incomplete radium extraction. To remove radium-binding sulfate, the acid-leached residues were leached with sodium carbonate solution to convert calcium sulfate to calcium carbonate and soluble sodium

8

trioctyl phosphine oxide (3). Ninety-three percent of the uranium was extracted from leach liquor containing, in grams per liter, 0.69  $U_3O_8$ , 0.64  $V_2O_5$ , 0.29 Mo, 2.8 Fe, 14 Ca, 52 Cl, and 0.7 H. Two extraction stages were employed countercurrently at an aqueous-to-organic phase ratio of 3.5. The uranium-bearing solvent was stripped in a single stage at an organic-to-aqueous ratio of 20 using a 10-percent-ammonia, 18-percent-carbonate strip solution. The uranyl tricarbonate that precipitated during stripping was filtered, water-washed, and calcined at 600° C. This gave a marketable grade of uranium oxide assaying, in percent, 96  $U_3O_8$ , 1.7 Fe, 0.08 Mo, and 0.03  $V_2O_5$ .

After extracting uranium, the leach liquor was neutralized with lime, and the radium was coprecipitated with barium sulfate using 0.2 gram barium chloride and 0.3 gram sodium sulfate per liter of solution. Filtration isolated most of the radium in a precipitate equivalent to nearly 80 pounds of solids per ton of ore treated. Radium, originally at a concentration of 200,000 picocuries per liter of leach liquor, was reduced to a concentration of 400 picocuries per liter by this treatment.

#### CONCLUSIONS

Methods found effective for removing radium from uranium mill tailings included sand-slimes separation and leaching with solutions of either hydrochloric acid or EDTA. Although a maximum permissible concentration of radium in mill tailings allowing unrestricted usage has not been promulgated in the United States, a value of about 20 picocuries of radium per gram appears not particularly hazardous. None of the radium removal methods tested were able to produce tailings meeting this value. A method was devised for leaching both uranium and radium from several uranium ores using hydrochloric acid; however, sulfur contained in the ores apparently prevented complete radium extraction.

## ATTACHMENT NO. 1

## TENTATIVE ENVIRONMENTAL MONITORING PROGRAM FOR URANIUM MILL

## EQUIPMENT AND OPERATING COST PER SITE

Equipment

1. Maps, publications, aerial photos, field supplies	\$ 250
2. Radon sampling apparatus (pumps, valves, tubing, etc.)	480
3. Particulate air sampler, filters, tubing, etc. Approximately \$1,000 per location, 3 locations.	3,000
4. Eberline Model PRM-7 Micro R Meter for gamma radiation surveys.	950
5. Meteorology station (temperature, wind direction and speed)	900
6. Sampler housings, 6 per site, approximately \$200 per housing.	1,200
7. Electrical generators, gasoline cans, approx. \$400 each, 6 per site.	2,400
8. Tedlar bags for Radon samples, 40 @ \$50 each.	2,000
9. Soil sampling equipment	50
10. Sample containers, miscellaneous.	<u>100</u>
	Sub Total
	\$ 11,330

Operating Costs

3. Sample analyses	
(a) Radon 48 samples @ \$25	1,200
(b) Air samples, particulate, 24 samples @ \$245	5,880
(c) Water samples, 16 samples @ \$166	2,650
(d) Soil samples, 16 samples @ \$370	<u>5,920</u>
	Sub Total
	\$ 15,650
	Grand Total
	\$ 26, 980

## ATTACHMENT NO. 2

## TENTATIVE ENVIRONMENTAL MONITORING PROGRAM FOR URANIUM HEAP-LEACH OPERATION

## EQUIPMENT AND OPERATING COSTS PER SITE

Equipment

1. Maps, publications, aerial photos, field supplies	\$ 250
2. Radon sampling apparatus (pumps, valves, tubing, etc.)	480
3. Particulate air sampler, filters, tubing, etc. One location @ \$1,000	1,000
4. Eberline Model PRM-7 Micro R Meter for gamma radiation surveys	950
5. Meteorology station (temperature, wind direction and speed).	900
6. Sampler housings, 6 per site, approx. \$200 per housing.	1,200
7. Electrical generators, gasoline cans, approx. \$400 each, 6 per site.	2,400
8. Tedlar bags for Radon samples, 20 @ \$50 each.	1,000
9. Soil sampling equipment	50
10. Sample containers, miscellaneous	<u>100</u>
	Sub Total
	\$ 8,330

Operating Costs

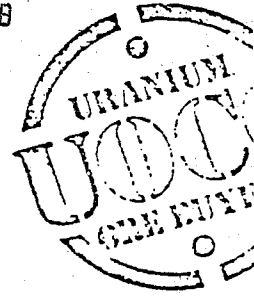
3. Sample analyses	
(a) Radon, 24 samples @ \$25	600
(b) Air samples, particulate, 4 samples @ \$245	980
(c) Soil samples, 4 samples @ \$370	1,480
(d) Water samples, 12 samples @ \$166	<u>1,990</u>
	Sub Total
	\$ 5,050
	Grand Total
	\$ 13,380

EXHIBIT B

RECEIVED

JUL 12 1978

Consumer Health  
Protection Services



July 10, 1978

Bill Horton, Director  
Bureau of Environmental Health  
Nevada Board of Health  
201 South Fall Street  
Carson City, Nevada 89701

Dear Mr. Horton:

This is in regards to UOCO, Inc. position and interest to possible licensing and operation of a heap leach for uranium extraction and production of yellowcake.

This status of UOCO, Inc. interest at this time follows:

UOCO, Inc. is a relatively new ore-buying company (activated July 1, 1976) with contracts to sell concentrate to 6 committed domestic Public Utilities.

UOCO buys uranium ore from mine operators who do not presently have a market, thereby giving the producers a cash flow with which they can develop and expand their mining operations.

UOCO, in working with numerous property owners of Mineral County, is identifying considerable ore reserve potential but the quality of the ore is such that the hauling costs to transport the ore to the closest mill that can handle these ores is prohibitive.

The obvious solution to this is to upgrade the ore locally by heap leaching the Ion Exchange recovery to make a marketable yellowcake product thereby reducing the hauling costs by 99% which would return much of the hauling cost to the producer as increased payment for his ore which in turn allows him a profitable mining operation.

UOCO will obtain the financing to build and operate the heap leach operation as soon as UOCO has obtained contracts to purchase sufficient ore production to support a heap leach operation.

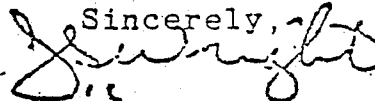
We have identified a property suitable for location of a heap leach near the center of over 30 known Uranium occurrences in Mineral County.

July 10, 1978

As soon as sufficient ore can be identified to support a leaching operation, UOCO will be in touch with your department to work with you on requirements for licensing.

It is our intent to engineer the most environmentally safe leaching operation that is possible to construct.

Sincerely,



J. S. Wright  
Manager

JSW:jc

cc: R.W. Gilmore  
J. Bennett  
A.P. Kibbe  
J.S. Wright

Chevron

EXHIBIT B

Chevron Resources Company  
320 Market Street, San Francisco, CA 94111  
Mail Address: P.O. Box 3722, San Francisco, CA 94119

July 12, 1978

RECEIVED

JUL 17 1978

Consumer Health  
Protection Services

Mr. William Horton  
Nevada State Health Division  
Bureau of Consumer Health  
Protection Services  
State of Nevada  
500 East King Street, Room 103  
Carson City, Nevada 89710

Gentlemen:

POTENTIAL URANIUM MILL  
LICENSING ACTION

Chevron Resources Company is currently conducting a uranium exploration program in Northern Nevada. Preliminary results from this program justify additional detailed evaluation. It is currently anticipated that at least another year of evaluation will be necessary to determine whether the deposits might warrant mining and milling.

Data available at this time are insufficient to permit a determination of whether mine and mill will be economically feasible. Should the results of continuing exploration and other investigations prove favorable, it is possible that an application for a Radioactive (or Source) Material license for the subject mill could be submitted to the State of Nevada by 1980 for review, processing and approval.

Potential mine production and/or mill throughput rates have not been addressed and potential development costs and employee requirements are uncertain. However, using data from comparable uranium mine and mill developments in other States, it is possible that costs for creating a mine and constructing a uranium processing mill, with all required supporting facilities, could be in the range of \$30-\$60 million. Such a project, if developed, could provide 180-250 direct jobs.

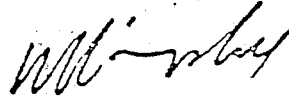
It is our understanding that Nevada is an Agreement State and that the State Health Division, Bureau of Consumer Health Protection Services will be the licensing agency for any uranium mill that might be constructed in the State. It is also our understanding that staff resources available at this time to your organization could be a constraint to the expeditious processing of such an application.



It is for these reasons that we advise you of the possibility of such an application being presented to you within the next two or three years, thus allowing you to integrate any resultant requirements into your departmental staff planning and budgeting activities.

We will continue to advise you of the progress of our programs in Nevada, and would like to cooperate with you in every possible way in determining future requirements that might be made of your Department. We will be happy to discuss our programs and future plans with you at any time.

Sincerely yours,



tw/C. Dahlstrom  
Vice-President

CD:bn

415-894-7800

URANIUM MILLS LICENSING  
101-6001

- 298 -

Program Statement

Under authority of NRS 459, State Board of Health Rules and Regulations for Radiation Control and the Nuclear Regulatory Commission (N.R.C.) Agreement for State regulation of radioactive materials, the Uranium Mills Licensing program will have statewide responsibility for review of license applications and issuance of licenses and license amendments for uranium mills. Uranium mills and heap leach operations will be inspected to assure compliance with State radiation control regulations and license requirements.

It is anticipated that as many as two mill operations may be established in Nevada by 1980. Initial licensure for a new mill operation entails approximately 1,500 man-hours.

Revenues - It is intended that the collection of uranium mill license fees, if approved, will provide for complete funding of this program.

Sub-Account Explanations

Salaries - Two positions are recommended. The first one, a Radiation Control Specialist II, will be responsible for licensing, regulation, and control of uranium mills. The second position, an Administrative Aid II, will provide clerical functions for the office.

Out-of-State Travel - No practical on-the-job experience in uranium mills licensing is available in the State. Travel to other states with Radiation Control Programs will help provide experience in licensing uranium mills.

In-State Travel - Funds recommended provide for necessary travel for investigations and inspections.

Operating - Includes laboratory services for analyzation of samples.

Equipment - Equipment funds recommended provide for office equipment necessary for two new positions. Specialized equipment is necessary for licensing and regulation and includes uranium mill equipment and heap leach equipment.

Date of Hearing \_\_\_\_\_  
Who Testified \_\_\_\_\_

Date Budget Closed \_\_\_\_\_

	1977-78 ACTUAL	1978-79 WORK PROGRAM	1979-80			1980-81			
			AGENCY REQUEST	GOVERNOR RECOMMENDS	LEG. AP.	AGENCY REQUEST	GOVERNOR RECOMMENDS	LEG. AP.	
REGULAR APPROPRIATION FEES & COLLECTIONS	\$ 76,389		\$ 76,536			\$ 61,491	\$ 61,785		
TOTAL FUNDS AVAILABLE	\$ 76,389		\$ 76,536			\$ 61,491	\$ 61,785		
NEW POSITIONS									
RADIATION CONT SPEC II	1.00	15,282	1.00	15,282		1.00	15,887	1.00	15,887
ADMIN AID II RANGE A	1.00	7,910	1.00	7,910		1.00	8,255	1.00	8,255
TOTAL NEW	2.00	23,192	2.00	23,192		2.00	24,142	2.00	24,142
INDUSTRIAL INSUR	\$	311	\$	311		\$	373	\$	372
RETIREMENT	\$	1,855	\$	1,855		\$	1,931	\$	1,931
PERSONNEL ASSESSMENT	\$	209	\$	209		\$	217	\$	217
GROUP INSURANCE	\$	1,168	\$	1,296		\$	1,343	\$	1,600
PAYROLL ASSESSMENT	\$	46	\$	46		\$	48	\$	48
UNEMPLOYMENT COMP	\$	93	\$	93		\$	97	\$	97
TOTAL SALARY-PAYROLL	\$	26,874	\$	27,002		\$	28,151	\$	28,415

URANIUM HILLS LICENSING - Continued  
101-6001

- 299 -

	1977-78 ACTUAL	1978-79 WORK PROGRAM	1979-80			1980-81		
			AGENCY REQUEST	GOVERNOR RECOMMENDS	LEG. AP.	AGENCY REQUEST	GOVERNOR RECOMMENDS	LEG. AP.
TOTAL CUT-OF-STATE TRAVEL			\$ 800	\$ 800		\$ 840	\$ 840	
TOTAL IN-STATE TRAVEL			\$ 1,890	\$ 1,890		\$ 1,905	\$ 1,905	
OFF SUPPLIES & EXPENSE			\$ 130	\$ 130		\$ 137	\$ 137	
COMMUNICATIONS EXPENSE			\$ 1,025	\$ 1,025		\$ 1,077	\$ 1,077	
PRINT DUPLICATING COPY			\$ 610	\$ 610		\$ 641	\$ 641	
INSURANCE EXPENSE			\$ 20	\$ 39		\$ 20	\$ 50	
CONTRACTUAL SERVICES			\$ 20,930	\$ 20,930		\$ 21,977	\$ 21,977	
STATE OWNED BLDG RENT			\$ 1,310	\$ 1,310		\$ 1,375	\$ 1,375	
ADV PUBLIC REL EXPENSE			\$ 150	\$ 150		\$ 150	\$ 150	
TOTAL OPERATING EXP			\$ 24,103	\$ 24,202		\$ 25,305	\$ 25,415	
OFF FURNITURE & EQUIP			\$ 2,902	\$ 2,902				
SPECIALIZED EQUIPMENT			\$ 19,660	\$ 19,660		\$ 5,130	\$ 5,130	
TOT. CAPITAL OUTLAY EQ.			\$ 22,642	\$ 22,642		\$ 5,130	\$ 5,130	
TOTAL AGENCY EXPENDITURES			\$ 76,389	\$ 76,536		\$ 61,491	\$ 61,705	

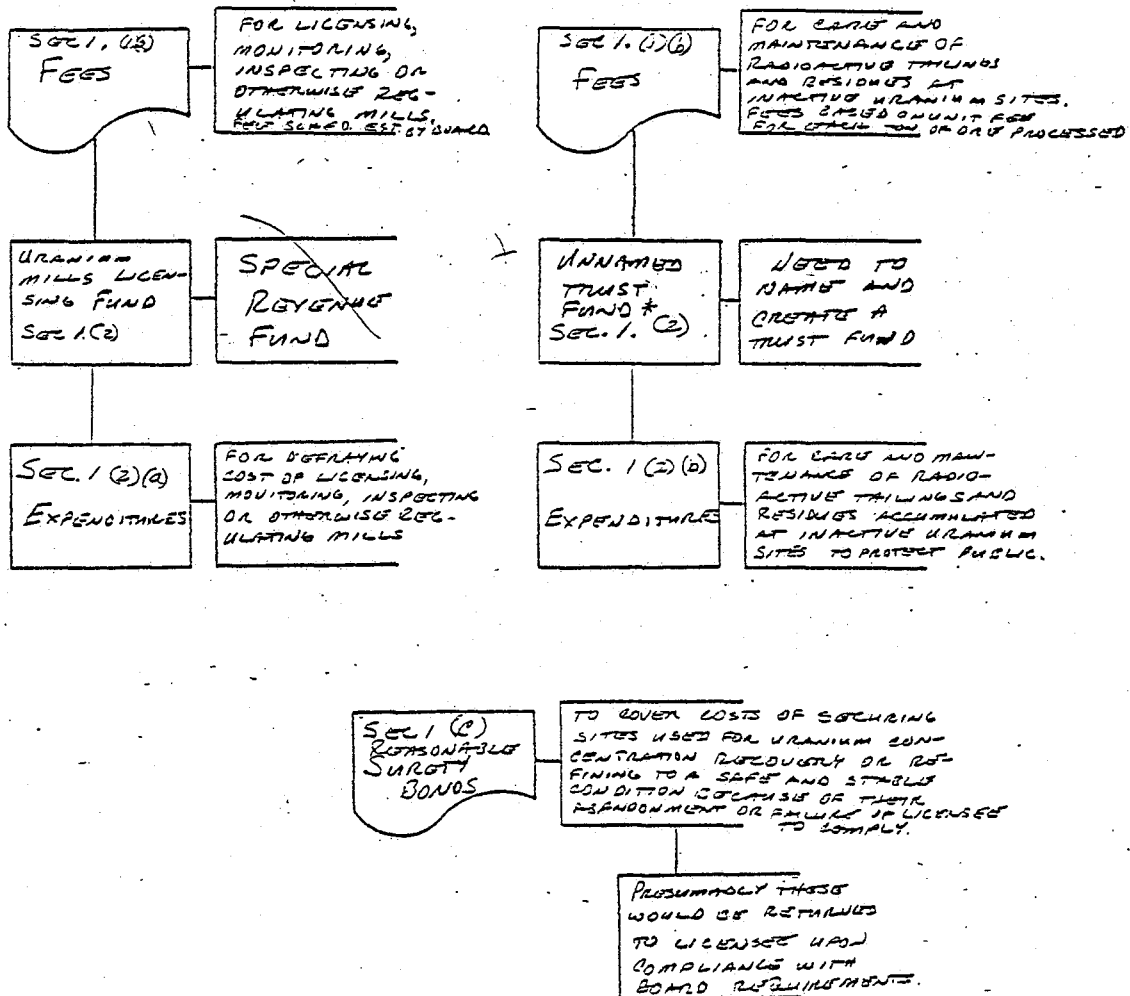
AGENCY BALANCE

BUREAU CONSUMER HEALTH PROTECTION SERVICES PROGRAM CONSUMER HEALTH- URANIUM MILLS LICENSING BUDGET NO. \_\_\_\_\_  
 FUNDING SOURCE (Federal-State) \_\_\_\_\_ STATE \_\_\_\_\_ POSITION PRIORITY 1

POSITION #	POSITION TITLE	ACTIVITIES/RESPONSIBILITIES/JUSTIFICATION	ACTUAL FY '78 (77-78)	FY '80 (79-80)	FY '81 (80-81)
	Radiation Control Specialist II	<p>NRS 459.80 provides for a Federal-State Agreement for transfer of regulatory control of certain radioactive materials from the Federal Government to the State. Such an Agreement was entered into effective July 1, 1972, and therefore the State is obligated to license and regulate radioactive materials covered by the Agreement and by State regulations promulgated pursuant to NRS 459, which includes radioactive materials at uranium mills and other uranium concentration and recovery sites. The possibility of the State having to license and regulate uranium mills and similar operations is imminent. Present staff is inadequate to handle both the present workload and uranium mill licensing and regulatory activities, which, according to other Agreement States involved in identical regulatory activities, is time consuming and costly. As an example, New Mexico estimates that the processing of their first uranium mill license consumed two man-years.</p> <p>Effective licensing, regulation, and control of uranium mills is essential to protecting the public health, safety, property and the environment. Proposed legislation has been drafted to enable the State Board of Health to assess fees for the complete recovery of costs to the State of regulating uranium mills, including the funds for this position.</p> <div style="text-align: right; margin-top: 20px;"> <p>35-15      2,110.52</p> <p>                    3798</p> <hr style="width: 50px; margin-left: auto; margin-right: 0;"/> <p>Service      2,8899</p> <p>Food            500</p> <p>  "    install    1890</p> </div>		<p>2111</p> <p>2058</p> <p>2058</p>	

S.B. 237

FLOWCHART OF RECEIPTS



\* AS CURRENTLY WRITTEN, FEES WOULD BE DEPOSITED TO ACCOUNT WITHIN THE SPECIAL REVENUE FUND.

STATE OF NEVADA  
LEGISLATIVE COUNSEL BUREAU

LEGISLATIVE BUILDING  
CAPITOL COMPLEX  
CARSON CITY, NEVADA 89710



LEGISLATIVE COMMISSION (702) 885-5627

DONALD R. MELLO, *Assemblyman, Chairman*  
Arthur J. Palmer, *Director, Secretary*

INTERIM FINANCE COMMITTEE (702) 885-5640

FLOYD R. LAMB, *Senator, Chairman*  
Ronald W. Sparks, *Senate Fiscal Analyst*  
William A. Bible, *Assembly Fiscal Analyst*

ARTHUR J. PALMER, *Director*  
(702) 885-5627

FRANK W. DAYKIN, *Legislative Counsel* (702) 885-5627  
JOHN R. CROSSLEY, *Legislative Auditor* (702) 885-5620  
ANDREW P. GROSE, *Research Director* (702) 885-5637

February 22, 1979

Senator Keith Ashworth, Chairman  
Human Resources and Facilities  
Legislative Building - Room 323  
Carson City, Nevada 89710

*superseded  
by Proposed  
Amendment*

Dear Senator Ashworth:

SB 237 is currently before your committee. Section 1(2) provides for the creation of a special revenue fund and for the deposit of money thereto. It is our feeling that the fund should be entitled, in law, and that the language providing for deposit of money should be clarified. In accordance with the above, we would like to suggest that lines 4 and 5 of page 2 of this bill be amended as follows:

"2. The money collected pursuant to this section must be deposited in the state treasury for credit to the uranium regulatory fund which is hereby created as a special revenue fund [which is hereby created]. The money received"

In addition to the above change we would recommend that the references to the fund at lines 6 and 7, and at line 10 of page 2 be changed by deleting "deposited into the fund" and inserting "used". This is necessary as money received will be deposited in the State Treasury rather than into the fund.

We are available to discuss this with you.

Sincerely yours,

JOHN R. CROSSLEY, C.P.A.  
LEGISLATIVE AUDITOR

By *Twain A. Walker, Jr.*  
Twain A. Walker, Jr., C.P.A.  
Audit Manager

JRC:TAW:hjr

SB 237  
PROPOSED AMENDMENT

Page 2, Line 5

1. Insert after the word "in", the following language:  
"the state treasury for credit to the uranium mills  
licensing fund which is hereby created as a special  
revenue fund."
2. Delete the words "a special revenue fund which is  
hereby created."

Page 2, Line 6

Delete the words "deposited into the" and,  
insert the word "used".

Page 2, Line 7

Delete the word "fund".

Page 2, Line 10

Delete the words "deposited into the fund" and,  
insert the word "used".

(REPRINTED WITH ADOPTED AMENDMENTS)

FIRST REPRINT

S. B. 117

SENATE BILL NO. 117—COMMITTEE ON HUMAN  
RESOURCES AND FACILITIES

JANUARY 25, 1979

Referred to Committee on Human Resources and Facilities

SUMMARY—Revises provisions relating to immunization  
of children. (BDR 34-227)

FISCAL NOTE: Effect on Local Government: No.  
Effect on the State or on Industrial Insurance: No.



EXPLANATION—Matter in *italics* is new; matter in brackets [ ] is material to be omitted.

AN ACT relating to immunization of children; providing for the exclusion from public and private schools of children who have not met statutory requirements for immunization; extending immunization requirements to children in child care facilities; increasing powers of health division to enforce requirements relating to immunization of children; providing penalties; and providing other matters properly relating thereto.

*The People of the State of Nevada, represented in Senate and Assembly,  
do enact as follows:*

1 SECTION 1. Chapter 392 of NRS is hereby amended by adding  
2 thereto the provisions set forth as sections 2 and 3 of this act.

3 SEC. 2. *Whenever the state board of health or a local board of health*  
4 *determines that there is a dangerous contagious disease in a public school*  
5 *attended by a child for whom exemption from immunization is claimed*  
6 *pursuant to the provisions of NRS 392.437 or 392.439, the board of trus-*  
7 *tees of the school district shall require either that the child be immunized*  
8 *or that he be quarantined outside the school environment under the super-*  
9 *vision of the local health officer.*

10 SEC. 3. *Any parent or guardian who enrolls his child in a public*  
11 *school or refuses to remove the child from school when such enrollment*  
12 *or retention in school is prohibited under the provisions of NRS 392.-*  
13 *435, 392.443 or section 2 of this act is guilty of a misdemeanor.*

14 SEC. 4. NRS 392.435 is hereby amended to read as follows:

15 392.435 1. [Within 3 months after any child is] *Unless excused*  
16 *because of religious belief or medical condition, a child may not be*  
17 *enrolled in a public school within this state [.] unless his parents or*  
18 *guardian [shall] submit to the board of trustees of the school district*  
19 *in which the child resides a certificate or certificates stating that the child*

Original bill is 6 pages long.  
Contact the Research Library for  
a copy of the complete bill.



## AMENDMENTS GENERATED BY HEARING

SB-117 March 15, 1979 9 a.m.

Page 1

Line 8 - Delete "be quarantined" insert "remain".

Lines 8 and 9 - Delete "under the supervision of the local Health Officer".  
Insert "and the local Health Officer be notified".

Lines 10 and 11 - Delete "enrolls his child in a public school or".

Lines 11 and 12 - Delete "such enrollment or".

Page 2

Line 2 - Insert after "immunization" - "or is complying with time limits and schedules adopted pursuant to NRS 439.550".

Line 46 - Delete "be quarantined" add "remain".

Line 47 - Delete "under the supervision of the local Health Officer". Insert "and the local Health Officer be notified".

Lines 48 and 49 - Delete "enrolls his child in a private school or".

Line 49 - Delete "such enrollment".

Page 3

Line 1 - Delete "or"

Line 10 - Insert after "immunization" - "or is complying with time limits and schedules adopted pursuant to NRS 439.550".

Page 4

Line 10 - Insert after regulations - "including the adoption of time limits and schedules for the immunization of students at various grade levels".

Page 5

Line 12 - Insert after "immunization"- "or is complying with time limits and schedules adopted pursuant to NRS 439.550".

Page 6

Line 17 - Delete "be quarantined" insert "remain".

Lines 17 and 18 - Delete "under the supervision of the local Health Officer" insert "and the local Health Officer be notified".

Lines 19 and 20 - Delete "places his child in a child care facility or".

Lines 20 and 21 - Delete "admission to or".

... S. B. 298

SENATE BILL NO. 298 - COMMITTEE ON HUMAN RESOURCES AND FACILITIES  
MARCH 2, 1979  
Referred to Committee on Human Resources and Facilities

SUMMARY—Transfers responsibility for recommending designation of certain places as state monuments, historic landmarks and archeological areas. (BDR 33-468)

FISCAL NOTE: Effect on Local Government: No.  
Effect on the State or on Industrial Insurance: No.

EXPLANATION—Matter in *italics* is new; matter in brackets [ ] is material to be omitted.

AN ACT relating to historical preservation; transferring responsibility for recommending the designation of certain places as state monuments, historic landmarks and archeological areas to the division of historic preservation and archeology of the state department of conservation and natural resources; and providing other matters properly relating thereto.

*The People of the State of Nevada, represented in Senate and Assembly, do enact as follows:*

1 SECTION 1. Chapter 383 of NRS is hereby amended by adding  
2 thereto a new section which shall read as follows:  
3 *Upon the recommendation of the administrator and the director, the*  
4 *governor may, by proclamation, designate any site, place or building*  
5 *located on any publicly owned land, or any land in the state held by the*  
6 *division of state parks of the state department of conservation and natural*  
7 *resources under lease or permit, as a historic landmark, historic building,*  
8 *historic site or archeological area. Before recommending any such desig-*  
9 *nation, the administrator shall consult with the agency or agencies*  
10 *responsible for administering the land.*

11 SEC. 2. NRS 407.120 is hereby amended to read as follows:  
12 407.120. Upon the recommendation of the administrator [of the  
13 division of state parks, with the approval of] and the director, [or the  
14 administrator of the division of historic preservation and archeology,  
15 through the director of the state department of conservation and natural  
16 resources,] the governor may, by proclamation, designate any site, place  
17 or building located on any publicly owned land, or any land in the state  
18 held by the division under lease or permit, as a state park, state monu-  
19 ment [ , historical landmark, historical building, an archeological area]  
20 or recreational area.

1     SEC. 3. NRS 407.130 is hereby amended to read as follows:  
2     407.130 The division shall administer, protect, mark and develop  
3     any [such] state monument, [historical landmark, historical] historic  
4     landmark, historic building, historic site, archeological area or recrea-  
5     tional area [so] designated [and proclaimed] as provided in section 1  
6     of this act and NRS 407.120 [.] which is situated on land administered  
7     by the division, and any money appropriated to the division, or derived  
8     by it from any source whatever, may be expended by it for the marking,  
9     care, protection, supervision, improvement or development of any such  
10    state monument, [historical landmark, historical] historic landmark,  
11    historic building, historic site, archeological area or recreational area