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A Plan for Diagnosis and Prevention of Illness Related to Nuclear Resource Development on Indian Land

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EXECUTIVE SUMMARY

Section 707(b) of the Indian Health Care Amendments of 1980, P.L. 96-537, required the development of a health care plan to address the health problems of American Indians as related to nuclear resource development on or near Indian reservations and in Indian communities. The plan was to be developed based on a study of this problem reported to Congress by the Secretary of the Department of Health and Human Services in April 1983. The plan was to include methods for diagnosing and treating Indians currently exhibiting such health problems as were described in the above study, preventive care for Indians who may be exposed to such health hazards, and a program of education for Indians who may experience such health problems.

The plan was developed with an awareness that no funds were specifically appropriated for the activities planned. A review of the literature pertaining to early diagnosis, specialized treatment, preventive efforts and educational strategies was then accomplished. Discussions with field staff in those locations most affected by nuclear resource development followed. Lastly, activities that currently are performed on a regular basis were surveyed. The plan summarizes the most effective techniques available to date.

The most frequent disease that statistically is correlated with nuclear resource development is lung cancer among uranium miners. This disease may account for as many as two premature deaths per year in Indian populations. Current research of early diagnostic approaches has had disappointing results in that the techniques do not allow early enough diagnosis for currently available treatment to reduce morbidity or mortality. Other disease entities are not significantly statistically correlated with nuclear resource development at this time. Periodic screening exams as practiced in the Indian Health Service (IHS) are as effective as any other strategy for diagnosis and treatment.

Preventive activities are focused on water safety, mine safety, and stabilization of uranium mill tailings sites. These activites have been ongoing for the last two decades although additional emphasis has been placed on such activities during the last five years. These activities are supported by many Federal agencies, including the IHS, and are governed by numerous laws and regulations. The IHS activity in surveillance and monitoring will continue.

Educational programs have occurred in a number of venues including: one-to-one, group, and tribal approaches. The most effective educational programs in reducing disease are those related to smoking cessation. These programs will continue. Other programs that educate Indians about the hazards of using tailings material in building, association of exposures and disease, and strategies for exposure avoidance will also be continued.

Although other health problems of the Indian population present substantially more risk of disease and/or death than radiation, the IHS is still concerned about the potential adverse health effects of radiation and will continue to provide education about radiation in order that radiation and its effects are better understood. In addition, the IHS will continue to work with all Government and private agencies with responsibility in radiation matters to

ensure that legislation and regulations regarding radiation are properly implemented and monitored on Indian land in order to reduce the level of radiation exposure to the worker and the general population.

Minimal evidence exists to support the efficacy of special screening measures currently available. The IHS will continue to utilize sound public health strategies in analyzing the health needs of those communities affected by nuclear resource development. This would include:

- Continued use of proven diagnostic and screening techniques by IHS health professionals to identify Indians exhibiting health problems related to nuclear resource development,

- Continued treatment of those diagnosed diseases consistent with sound medical practice,

- Continued collection of epidemiologic data in those Indian populations affected by nuclear resource development to identify health problems that may be related to radiation exposure,

- Continued surveillance (in conjunction with other Federal agencies) of environmental factors affecting radiation exposures of Indian people including water supplies, mines, and milling sites to prevent radiation exposures,

- Continued educational efforts to keep IHS health professionals aware of the risk factors and interventional strategies available to diagnose and prevent radiation related illness,

- Continued educational efforts in Indian communities to increase awareness of risks and diagnostic and preventive approaches to radiation related illness,

- Continued efforts with Tribes to identify hazards and safeguards in industry before mining or milling licenses are given for future nuclear resource development on Indian lands,

- Continued surveillance of medical research efforts to develop more effective diagnostic treatment and preventive approaches to radiation-related illness.

INTRODUCTION

PURPOSE OF THE PLAN

Considerable concern has been expressed about the possible adverse effects on the health of Indian people as a result of the mining and processing of uranium deposits in the western United States (U.S.). Enactment of P.L. 96-537, the Indian Health Care Amendments of 1980, on December 17, 1980, added impetus to an already increasing concern. A new section, Section 707, "Nuclear Resource Development Health Hazards," was added. Subsection (a) of Section 707 required that a study be conducted of the health hazards to Indian miners and Indians living on or near Indian reservations, and in Indian communities, as a result of nuclear resource development. A report, entitled "Health Hazards Related to Nuclear Resource Development on Indian Land," was completed and submitted to Congress on April 27, 1983.[1] This report will be summarized below.

Section 707 further required in Subsection (b) that a plan based on the results of this study and including: (1) methods for diagnosing and treating Indians currently exhibiting such health problems; (2) preventive care for Indians who may be exposed to such health hazards, including the monitoring of the health of individuals who have or may have been exposed to excessive amounts of radiation, or affected by other nuclear development activities that have had or could have a serious impact upon the health of such individuals; and (3) a program of education for Indians who, by reason of their work or geographic proximity to such nuclear development activities, may experience health problems, be generated for Indian miners, Indians living on or near Indian reservations, and in Indian communities.

EXTENT OF THE PLAN

The development of a plan for diagnosis, follow-up and prevention was predicated upon the findings of the report submitted to Congress pursuant to Section 707, Subsection (a) of P.L. 96-537. This report was submitted following a study completed by the Indian Health Service which investigated the health hazards to Indians as a result of nuclear resource development on or near Indian land. The report noted that the major sources of radiation on Indian land are uranium mining and milling activities and abandoned uranium mill tailings piles.

Most of the Nation's uranium resources are located in the western United States and sizable deposits are found on Indian land. Early mining operations were not well regulated and miners were exposed to high levels of radiation.[2] A number of these miners, some of whom were Indian, later developed lung cancer.[3] Improvements in regulations and enforcement have resulted in better conditions in the mines and have lowered miners' exposure.[4,5] However, existing monitoring techniques measure levels of radon present in the mines and not radon exposure to the individual. Until research is complete on a personal dosimeter for radon, it will not be

possible to measure an individual's exposure with the degree of accuracy desired. Likewise, current milling operations, although well regulated, contribute radiation exposure to both workers and the regional population where the mill is located. Based on risk estimates developed for the milling industry, this exposure can be estimated to result in less than two premature deaths/year from cancer nationwide.[6]

Numerous studies have been conducted of the five abandoned uranium mill tailings piles located on Indian land.[7,8,9] Remedial action is now planned by the Department of Energy as a result of P.L. 95-604, the Uranium Mill Tailings Radiation Control Act of 1978, and is scheduled for completion by 1989.[10] While no health effects of water contamination have been observed, radiation levels at the piles exceed background levels and may be cause for concern to persons living close to or working at these sites.

Although other health problems of the Indian population present substantially more risk of disease and/or death than radiation, the IHS is still concerned about the potential adverse health effects of radiation. General approaches to diagnosis, treatment, follow-up, and education are described in this plan consistent with the low frequency of disease associated with the hazards of nuclear resource development in most Indian communities. This does not preclude the development of other strategies based on local conditions and needs.

THE MEDICAL APPROACH

The Epidemiologic Basis for Intervention -- The previously cited report to Congress reviewed extensively the literature describing the effects of radiation and its potentially lethal implications for humans. Some of the health effects that exposure to radiation may cause are cancers (including leukemia), birth defects in the children of exposed parents, and cataracts. These effects (with the exception of genetic effects) have been demonstrated in the studies of medical radiologists, uranium miners, radium workers, survivors of atomic bombs, and radiotherapy patients who received high doses. Genetic effects, while observed in laboratory animals, have not been observed in any of the studies of exposed humans.[11]

Mining -- The major health risk from radiation exposure to the Indian people is the development of lung cancer as the result of uranium mining. Studies conducted from 1950 to 1960 indicated that a higher number of deaths from lung cancer occurred among uranium miners than would normally be expected.[12] A follow-up study in 1974 verified these conclusions. Among the 779 Indians included in these studies, the observed rate of lung cancer was significantly higher than expected.[13] A 1980 study reported that 16 of 17 cases of lung cancer diagnosed at the Shiprock Indian Hospital in New Mexico had a history of uranium mining.[14]

There is a risk associated with the uranium milling process but it is not as clearly defined as the risk for miners. Risk estimates have been calculated utilizing radiation level measurements from existing mill tailings piles and assumed radiation levels from a model mill. Using this model approach, it is estimated that there may be as many as 1.3 deaths per year in the population living within 50 miles of a radon-emitting inactive tailings pile.[15]

Water -- Radionuclides in water appear to contribute little to an increase in radiation exposure of the Indian population. The IHS, in cooperation with Indian Tribes and the Environmental Protection Agency (EPA), undertook the task of sampling 710 Indian owned and operated community water systems which serve about 72% of all Indian homes on Indian land. A few water sources were found to have levels of gross alpha particle activity in excess of the 15 pCi/liter standard.[16] The source of radiation found is apparently of natural origin and is not the result of any mining or milling activity. These systems are no longer in use or have been integrated into other systems resulting in water which does not exceed the standard.

Mill Tailings Sites -- Concern over the potential health hazards of inactive uranium mill tailings was expressed as early as 1965 when the IHS attempted to gather information about the piles from both State and Federal agencies. As a result, the Public Health Service (PHS) conducted several environmental surveys in various areas including sites on Indian lands. These surveys were followed by others conducted by the EPA and the

then Atomic Energy Commission (AEC). As a result, it was concluded that some form of remedial action was required to alleviate potential public health hazards at 25 sites. Public Law 95-604 was the resultant legislation.

The objectives of the Uranium Mill Tailings Remedial Action Project are to conduct radiological screening, aerial and ground radiological surveys, and engineering assessments of radiological conditions at the tailings sites and properties in the vicinity of these sites. With this information, remedial action requirements will be determined, plans and specifications developed for implementing the required action, and the necessary remedial actions performed.

In summary, the most acute, known health problem associated with nuclear resource development affecting Indian populations is the increased incidence of lung cancers and other respiratory diseases in those individuals with mining exposures. Other less documented health problems may be related to contaminated water supplies and the proximity of uranium tailings sites to Indian communities. The strategic allocation of scarce health resouces needs to be directed towards these health problems where appropriate.

INTERVENTION STRATEGIES

The major emphasis in diagnosis (other than those routine physical examinations periodically given the majority of the Indian population by IHS throughout their lives) should focus on those diseases with a known increased frequency in the target population and should include those screening measures with a high likelihood of diagnosing specific disease entities early enough in the course of disease to make intervention effective in ameliorating the morbidity and mortality associated with that disease. The principles of public health practice are the basis for IHS strategies.

Miners -- Early diagnosis of radiation related diseases in miners (past or present) in the uranium mining industry is a primary goal of the IHS plan. Various estimates for the impact of these diseases argue for the need to focus in this area. It is well documented that miners in the uranium industry have a two-fold likelihood of dying prematurely from lung cancer.[17,18] This may also be expressed as a number of days of life lost due to premature deaths per year. Using figures calculated by the U.S. Nuclear Regulatory Commission in 1981, uranium miners may lose 45 days of life expectancy (compared to 2,370 days of life lost to smoking one pack/day of cigarettes).[19]

A survey of the medical literature was performed to assess the efficacy of early screening measures that might be applied to miners. In general, there was little evidence that any of the currently available screening techniques are capable of diagnosing disease early enough to allow for efficacious intervention to prevent morbidity or mortality. Some promise of future techniques is seen in the work of Saccomano, et al,[20] using fiberoptic bronchoscopy techniques. By performing serial

bronchial brushings via the bronchoscope, his group was able to identify cell changes consistent with the development of cancer of the lung. The impact on morbidity and mortality using this technique has not been clearly demonstrated. Currently, three national studies are being conducted to test further the usefulness of this technique.[21] Until such time as the effectiveness of this method is demonstrated, it is not warranted to implement as a standard practice.

Other techniques for screening have even less impact on morbidity and mortality.[22] These would include such activities as regular history and physical examinations, annual chest x-rays, and even serial sputums for cytology. Establishing these routines at selected sites may be desirable. However, the aim would be to collect public health data, rather than expecting to aid individual miners. Public health education efforts to alter smoking behaviors in miners appear to have the most promise in reducing the development of lung cancer.[23]

Water -- With the passage of the Safe Drinking Water Act (P.L. 93-523), and the establishment of the National Interim Primary Drinking Water Regulations (NIPDWR) in 1977, the IHS was given improved standards for evaluating public drinking water supplies. The provisions of the NIPDWR established criteria for sampling radionuclides and established a maximum contaminant level. As noted above, the IHS, in cooperation with Indian Tribes and the EPA, has an ongoing program for water sampling including radionuclides. In addition, the IHS is working with the EPA to test ion exchange units for uranium removal and the preliminary results are encouraging. Lastly, IHS continues to work with the Tribes and the EPA to replace or modify water systems which cannot comply with the requirements of the NIPDWR.

Mill Tailings Sites -- As previously indicated, the Uranium Mill Tailings Remedial Action Project was developed to deal with the hazards of tailings sites. Much of the work outlined in this project has already been completed including radiologic screening and engineering assessments at all sites. This includes the 5 sites on Indian land in Riverton, Wyoming; Shiprock, New Mexico; Mexican Hat, Utah; and Monument Valley and Tuba City, Arizona. Based on these surveys and assessments, Shiprock and Riverton were given a high priority for remedial action, Tuba City and Mexican Hat a medium priority, and Monument Valley a low priority. According to the current schedule, remedial action is to begin at Shiprock in late 1984 and continue for 2 years. Riverton is slated for remedial action in 1985. Finally, Mexican Hat and Tuba City are scheduled in 1986 and Monument Valley in 1987. Each site will require approximately 2 years to complete the work.[24] The Department of Energy (DOE), the agency charged with responsibility for this program, has had discussions in the interim with Indian communities to resolve the issues involved in remediating these sites.

Education -- Educational efforts in Indian communities describing the hazards of radiation are ongoing and multifaceted. The presentation of

factual information has occurred in one-to-one counseling, consultation with various tribal groups, training of tribal health workers and others, and through activities conducted by the Office of Environmental Health, IHS.

As noted previously, the education of miners concerning the synergistic effects of smoking and underground uranium mining is of paramount importance. Many studies have been done in the recent past documenting the devastating impact of these two factors together in causing lung cancers. Smoking cessation is part of the overall disease prevention/health promotion effort of the IHS. It should receive added emphasis in those locations where underground mining has employed Indian people.

Educational efforts focusing on the effects of contamination on animal and plant life have been conducted in those Indian lands where contamination has occurred. Programs describing the hazards of using contaminated building materials have also been accomplished in those areas where use of these materials has occurred. Continued educational efforts in communities at risk for these hazards will be pursued.

Dissemination of survey and research data will be a continuing goal. In those communities most affected by nuclear resource development, sharing of developing data bases with community residents is of primary importance to their understanding of the problems and potential solutions. These efforts will continue.

CONCLUSIONS

The public, including Indians, has heard about radiation but does not understand it. This lack of understanding occurs in part because radiation cannot be seen, felt or smelled. In addition, people tend to equate all radiation with the reported effects of radiation from the atom bombs dropped on Japan, and are confused by the contradictory statements of the pro and anti-nuclear forces. Because the subject of radiation has become such an emotional issue, the need exists to adequately inform the Indian population of the real and imagined health hazards related to nuclear resource development on Indian land.

The nuclear resource developments of the last 40 years have presented some hazards to those individuals who worked in the industry and those people living near sites where nuclear resource development occurred. American Indians have been part of the population at risk. As described in a previous report, the potential adverse effects of radiation are a concern of the Indian people and the IHS. Although the risk of cancer developing from the radiation levels which exist as background, or in occupations related to the mining or milling of uranium, is small, the IHS will continue to work with all Government and private agencies to reduce the level of radiation and exposure to the worker and the general population.

Minimal evidence exists to support the efficacy of special screening measures currently available. The IHS will continue to utilize sound public health strategies in analyzing the health needs of those communities affected by nuclear resource development. This would include:

- Continued use of proven diagnostic and screening techniques by IHS health professionals to identify Indians exhibiting health problems related to nuclear resource development,

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