UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

JUN 20 1979

Rec'd 6/25/79 11:45 AM

Mr. Todd M. Frazier, Chief
Surveillance Branch
NIOSH
Robert A. Taft Laboratories
4676 Columbia Parkway
Cincinnati, Ohio 45226

Dear Mr. Frazier:

This letter is a follow-up to our telephone conversation of May 23, 1979 concerning NIOSH's need for Three Mile Island (TMI) occupational exposure data; access to decontamination plans; and the types of and rationale for collecting occupational exposure data following the TMI accident.

As you know, Secretary Califano requested the above information in his April 14, 1979 letter to Chairman Hendrie. Chairman Hendrie's response of May 23, 1979, outlines the type of information available.

In order to develop further details of the existence and availability of the requested information, NRC and Metropolitan Edison representatives met at TMI on May 4, 1979. I have enclosed a copy of a May 15, 1979 memo (Enclosure 1) from G. Knighton to B. Grimes and R. Purple which describes the substance of these discussions.

There are some additions and corrections to the enclosed May 15, 1979 memo as follows:

1. Regarding Page 1, item 1): The bulk of the TLD's are read-out monthly, however, some are read-out daily or following a particular job depending on such things as how close an employee is to the quarterly exposure limit or the potential for exposure on the job.

2. Regarding Page 2, item 5): Respiratory protective equipment is worn only when exposure to the administrative limit of 40 MPC hours is anticipated. Records of whole body counts are available to facilitate possible epidemiologic follow-up studies.

3. Regarding Page 2, item 6) The licensee has informed us that the summing of internal and external doses could be done with the records currently being accumulated.

4. Regarding Page 3, item 9): We now understand "monitoring of general environmental radiation levels on site" to include areas within the TMI facility structures. The devices used in these areas consist of fixed area and mobile monitors for direct and airborne radiation measurement.

   Some of the fixed area monitors have strip chart records, others are of the integrated exposure type (air samplers with filters) and others have alarm set points with no permanent records kept. The mobile monitoring devices are used on jobs in areas where contamination is known or suspected. These are backed up by individual dosimeters for permanent exposure records.

5. Regarding Page 3, item 10): The NRC will require the licensee to prepare plans for clean-up procedures. These plans will be reviewed by NRC, and will be available for NIOSH review and comment.

For your information, in a mark-up of the FY 1980 NRC authorization bill, the Congress has indicated that we should include the TMI worker population in the EPA/NRC Epidemiology Feasibility Planning Study which will begin this month. I have enclosed a copy of the work scope for your information. (Enclosure 2) The TMI workers will be included in Tasks 3 and 4 of Phase I of the study and, if this population is considered to be feasible for further analysis, it will be carried over into Phase II. We will keep you advised of the progress of this feasibility study. Phase I should be completed in August or September of this year. It may be that you will not want to commit significant resources and effort to your program until the results of this feasibility study are complete.

We will be forwarding to you copies of extracts of the types of exposure records currently being kept at TMI as soon as we obtain them. I hope that this information will assist you in developing plans for your program and in identifying more specifically what particular pieces of data you will need, and at what frequency. We are available to meet with you to discuss these matters further, and would offer our offices in Rockville for such a meeting.

Please feel free to contact me (301-443-5855) or Michael Parsont (301-443-5854) of my staff.

Sincerely,

Robert A. Purple, Assistant Director
Radiological Health & Safeguards Standards
Office of Standards Development

cc: T. Robbins

Enclosures:
As stated

OFFICE OF THE CHAIRMAN

May 23, 1979

JDavis
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HShapar
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RMinogue
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RAlexander
ED 5743

The Honorable Joseph A. Califano, Jr.
Secretary of Health, Education
and Welfare
Washington, D. C. 20201

Dear Mr. Secretary:

This is in response to your letter of April 14, 1979 which lists the additional information or actions that you will need from the NRC to ensure the accuracy of the NIOSH study of worker exposures to radiation and radioactive material in connection with the accident at the Three Mile Island Nuclear Power Plant.

All NRC nuclear power facility licensees are required to maintain records of individual worker exposure to external radiation indefinitely or until the Commission authorizes disposition. Also, any bioassay results that provide interpretation of internal radiation exposures, as required by NRC license conditions, must similarly be maintained indefinitely or until disposition is authorized. Survey results consisting of measurements of radioactivity in general work areas or on surfaces, or ambient dose rates in work areas, must be preserved for two years after completion of the survey. However, records are required to be maintained until disposition is authorized in the case of: (1) records of air monitoring for determining compliance with limits on air concentrations to which workers are exposed; (2) in the absence of personal monitoring data, records of surveys to determine external radiation doses; and (3) records of the results of surveys used to evaluate the release of radioactive effluents to the environment. For normal operations, licensees are required to report only the annual frequency distributions of worker exposures, and not the individual doses identified for each worker, unless the worker terminates employment or assignment. Upon termination, each worker's external dose is reported to NRC.

The NRC staff will be reviewing the licensee's plans for radiation protection and internal and external dosimetry for workers during recovery operations. We will be pleased to provide HEW personnel with access to this information and welcome any suggestions they may have. It appears likely that the usual reporting requirements will need to be augmented for Three Mile Island for the duration of the cleanup and recovery operations. Although our plans for these special reporting requirements are not yet final, we will continue to make available to the HEW onsite representatives under Mr. Charles Cox any and all data acquired by this Agency.

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PDR (D.W.P.)

During the incident at Three Mile Island, the licensee established a program for monitoring the internal exposures of workers using an onsite whole-body counter. Records of these measurements will be maintained by the licensee and will be available for inspection.

It appears evident that considerable coordination between NRC and HEW staff will be essential if we are to satisfy fully the needs you have listed. The NRC staff will be in contact with HEW representatives to set up an early meeting with appropriate personnel to develop detailed arrangements. Mr. Robert A. Purple has been assigned the responsibility for ensuring the needs that you have listed are fully met. Since this information is covered by the Privacy Act, transfer of the information will require appropriate safeguards to protect the privacy of individuals.

We very much appreciate the interest of the Department of Health, Education and Welfare in these aspects of our occupational health protection program.

Sincerely,

Original Signed by
Victor Gilinsky

for Joseph M. Hendrie
Chairman

C/R NOTE: This letter has been coordinated with all Commissioners. It has been retyped to incorporate all comments and is approved for signature.

OFFICE ▶	SD	SECY C/R	OCM	OCM		
SURNAME ▶	ABrodsky	gs	JMDarie	JMHendrie		
DATE ▶		5/21/79	5/22/79	5/ /79		

M. Parsont
OSD

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

MAY 1 5 1979

MEMORANDUM FOR: B. Grimes, Assistant Director for Engineering and Projects, DOR

R. Purple, Assistant Director for Radiological Health and Safeguards Standards, OSD

FROM: G. Knighton, Chief, Environmental Evaluation Branch, DOR

SUBJECT: SITE VISIT TO THREE MILE ISLAND TO DISCUSS PLANS FOR MONITORING WORKER EXPOSURE

On May 4, 1979, the staff met with TMI personnel and their contractors at the Observation Center at Three Mile Island to discuss TMI's program for monitoring and recording worker exposure to radiation at the TMI plant. The objective of the meeting was to establish a staff information base so that they could respond to the request of Mr. Califano (HEW) to Chairman Hendrie (see letter Califano to Hendrie dated April 14, 1979) with respect to providing information to NIOSH on worker exposures during the TMI clean-up.

Those present at the meeting were as follows:

NRC

George Knighton - DOR
S. Block - DOR
M. Parsont - OSD
J. Nehemias - DSE
R. Bores - IE
J. Stohr - IE

TMI

Don Ruppert - Met. Ed.
Tom Peterson - Electric Boat
Ernie Murri - NUS
Dave Limroth - Met. Ed.

G. Knighton opened the meeting and introduced the objectives of the staff visit. It was suggested that the meeting format follow along the lines of questions from the staff to be answered by TMI personnel. The following is a summary of the exchange that followed.

1) With respect to the workers who are monitored for radiation exposure, all personnel working at TMI wear TLD-100 (natural LiF) dosimeters supplied by Harshaw. TMI processes these personnel dosimeters. The Harshaw TLD read-out system they use provides dose equivalent exposures from low energy gammas (for skin dose) as well as penetrating gamma radiation. They stated that NRC personnel had checked out their system and found it to be satisfactory. At present the personnel monitors are read out monthly with the dose being recorded on a computer tape based on NRC Form 5 information. Read-out data includes name, social security number and job type.

Contact: S. Block, EEB/DOR
28066

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2) In addition to the above, pocket chambers (of various commercial mix) are worn by personnel entering radiation areas. The indicated dose from the pocket chamber is integrated so that the dose for each worker can be followed on a daily (or individual job) basis to assure that he does not exceed plant specified exposure limits. After each use, the dose from the pocket chamber is recorded on the individual's dose record card. These cards are discarded whenever the TLD's exposures are recorded. If a pocket chamber (0 - 200 mR) goes off scale, or if the daily pocket chamber integrated dose exceeds 1000 mR, the individual's TLD is immediately read out. If the pocket chamber and TLD's do not reasonably agree, the exposure is investigated.

3) Radiation Work Permits (RWP's) are also computerized with all names, jobs, places and exposures recorded. There have been 4000 workers involved, 500 of which are TMI workers. Each contractor has a code number assigned him to identify the exposure received by his people as a separate group.

4) All of the above information could be available to NRC and be supplied, even on a daily basis, if requested.

5) In our discussions on internal dosimetry, the licensee whole-body counts all RWP trained personnel (including contractors and visitors) prior to their initial entry into an RWP area to establish a base line count. Additional whole body counts are taken whenever a nose swab shows any activity, or when exposure ≥ 40 MPC hours are received, or when people terminate their job. All personnel wear respiratory protection if any airborne radioactivity is detected. The licensee uses Scott air packs or hoods for many operations involving airborne radioactivity.

6) At present, and in accordance with the regulations, the licensee does not add internal and external doses.

7) The whole body count data, taken by Helgeson Nuclear Service and Radiation Management Corporation (RMC), have not been put on computer tape at present although the first report is in from these contractors. The licensee plans to have this data on tape as soon as possible. They can supply relevant information on whole body counting techniques and procedures from both contractors, if necessary, for staff review. They can also provide criteria for selection of personnel for counting and those who are counted.

8) Twenty TMI people were selected for a urinanalysis bioassay for tritium and Iodine soon after the accident. The analysis was performed by RMC. Final assay results have not been officially released by RMC although preliminary indications are that no significant burdens of these radionuclides have been found.

9) Although a discussion was held on the issue raised by the Califano letter, "monitoring of general environmental radiation levels on site," at this time there is an element of doubt as to whether or not the "environmental" concern is monitoring worker exposure inside or outside the plant. If the HEW concern is exposure outside the plant, then Teledyne and RMC provide TLD monitoring service to this end.

10) A discussion was held on the preparation of an ALARA program for occupational exposure during the TMI clean-up. TMI personnel explained that a detailed report on their clean-up procedures would be very costly and they presently have no plans for providing an ALARA program report to NRC for NRC's review. All clean-up procedures are being reviewed by a TMI ALARA engineering group for approval. These are presently available to NRC for review on site.

11) Some discussion was held on the Privacy Act with respect to supplying the names of occupationally exposed individuals to NIOSH. The licensee stated that he foresaw no difficulty in supplying this information to NRC but that NRC cannot release this information to any other person or government agency without permission of TMI and/or the individual involved. Getting individual data, by name, to NIOSH is a problem that legal staffs must resolve.

12) The licensee stated that Johns Hopkins is doing a study for DOE similar to that which NIOSH is planning on performing.

G. Knighton indicated that we appreciated the informal information exchange and that there would be a subsequent meeting with NIOSH to discuss their specific plans. He also stated that we did not consider this information exchange as containing any licensee commitments to provide information to NRC. Such commitments will only be considered when HEW (NIOSH) needs are better defined.

Knighton

G. Knighton, Chief
Environmental Evaluation Branch
Division of Operating Reactors

cc: See page 4

MAY 15 1979

B. Grimes
R. Purple

cc: Don Ruppert - Met. Ed.
Tom Peterson - Electric Boat
Ernie Murri - NUS
Dave Limroth - Met. Ed.
G. Knighton - DOR
S. Block - DOR
M. Parsont - OSD
J. Nehemias - DSE
R. Bores - IE
D. Stohr - IE
J. Sniezek - IE
NRC PDR
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R. Arnold - Met. Ed.,
Vice President - Generation

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DATE ▶	5/14/79	5/14/79	5/14/79			

SECTION E

PART III

CONTRACT SCHEDULE

SCOPE OF WORK, TERMS AND CONDITIONS

ARTICLE I - STATEMENT OF WORK

A. HISTORY

The Energy Reorganization Act of 1974, as amended, abolished the Atomic Energy Commission (AEC) and created a new agency, the Nuclear Regulatory Commission (NRC), to which was transferred the licensing and related regulatory authority of the AEC under the Atomic Energy Act of 1954, as amended. The Energy Reorganization Act also added authority for the NRC to license and regulate certain facilities of the Energy Research and Development Administration (ERDA), which was also created by that Act.

PROJECT TITLE: A Study to Determine the Feasibility of Conducting an Epidemiologic Investigation of the Health Effects of Low-Level Ionizing Radiation

B. BACKGROUND AND OBJECTIVES

To improve the scientific basis for their regulatory activities, the Nuclear Regulatory Commission and the Environmental Protection Agency in consultation with the Department of Health, Education and Welfare, will support a study to assess the feasibility of performing epidemiologic investigations of the health effects induced by exposure to low-levels of ionizing radiation. The purpose of this feasibility study is to ascertain the overall value and likelihood of scientific merit of such epidemiologic investigations.

The dose levels of primary interest are those applicable to exposures experienced by populations both in the work place and the general environment. Single, repeated and continued exposures should be considered.

It can be assumed that the human health effects induced at low-levels of radiation exposure are similar to those observed normally in human populations. Based on the present body of knowledge, the predominant detectable health effect is the induction of neoplastic diseases. However, there are other human health effects for which quantitative risk estimates are available. Such effects are also of interest in this study. Publications of the Committee on the Biological Effects of Ionizing Radiation (BEIR) of the National Academy of Sciences, of the United Nation's Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) and other relevant publications should be used as references for these effects. These references should also be considered in making assumptions on dose-effect relationships and corresponding risk estimates.

The overall objectives of this feasibility study are:

(i) to define the statistical, technical, and administrative strengths and constraints which are inherent in the conduct of epidemiologic studies on subjects exposed to low-level ionizing radiation.

(ii) to examine the merit of conducting such epidemiologic studies on the health effects of low-level ionizing radiation exposure in light of the strengths and constraints identified in (i) above, current knowledge of biological effects and the characteristics of candidate populations.

C. STATEMENT OF WORK

The Contractor shall provide the necessary personnel, facilities, materials, and services to accomplish the specific tasks listed below. The effort hereunder will be accomplished in two phases, the details of which are presented in the scope of work which follows.

Phase I. PRELIMINARY ANALYSIS OF STATISTICAL STRENGTHS AND LIMITATIONS

Task 1) Conduct a literature search and identify various methods of conducting epidemiologic investigations relevant to the effects of low-level ionizing radiation.

Task 2) Provide a specific evaluation of the strengths and limitations of epidemiologic methods to estimate the risk of health effects from exposure to low-level ionizing radiation in various populations receiving radiation doses in excess of "normal" background levels. The contractor may propose and evaluate any suitable epidemiologic methods not identified by the literature search.

The evaluation shall address the influence of data quality, potential confounding or effect-modifying environmental, demographic and other pertinent factors; the possible acquisition of adequate population size for study; and the capacity to discriminate between incremental radiation induced risk and existing "normal" risk of health effects.

Task 3) Based on currently available risk estimates and dose-effect relationships, assess the likelihood of epidemiologic studies distinguishing incremental radiation induced health effects from conditions and disorders normally occurring. The most recent reports of the BEIR Committee, UNSCEAR and other relevant publications shall be used as guides for both of these factors. The range of risk estimates shall be included in the analyses, based on whichever publications are selected.

The populations identified for this purpose shall include, but do not have to be limited to: occupationally exposed individuals; residents in areas with high natural and/or technologically enhanced background; residents in areas of nuclear facilities;

and groups exposed during medical procedures other than for the treatment of neoplastic diseases. Populations which have been the subject of previous epidemiologic investigations of the effects of low-level ionizing radiation shall also be included.

Task 4) Determine which of the populations identified in Task 3 above are most suitable for epidemiologic studies of the health effects of low-level ionizing radiation. Determination shall be based on such factors as study and control population composition and size; potential confounding factors; variability in local background radiation; variability in local rates of health effects; and population mobility. Explain why other populations identified in Task 3 above are not considered suitable for further study, and examine at what level of risk and/or exposure epidemiologic studies on such populations become feasible.

Note: Phase I must be completed and a report submitted to the NRC within sixty (60) days after the effective date of the contract.

Phase II. DETAILED SCIENTIFIC CONSIDERATIONS OF FEASIBILITY AND COST BASED ON FIELD EXAMINATION OF RELEVANT POPULATION CHARACTERISTICS.

Task 1) For each of the populations identified in Phase I, Task 4, as suitable for epidemiologic studies on health effects of low-level ionizing radiation, determine the nature, form, extent, quality and accessibility of existing health and radiation exposure data. Radiation exposure data should take into account the various characteristics of the different types of ionizing radiations. The Contractor shall identify and estimate the magnitude of the uncertainties in the radiation exposure data.

Investigate and discuss potential control populations and evaluate their potential contributions to an epidemiologic study or studies and provide cost estimates for such studies. Identify and assess potential confounding and effect-modifying factors relative to the study and control populations under consideration. Recommend those specific sources of data most appropriate to such a study.

Task 2)a Assess, based on Task 1, if it is possible to accomplish with existing data (for specific cancer sites, types and total cancer) either or both of the following objectives:

(i) Describe and quantify, using models and statistical analyses, including confidence intervals, the excess of cancer arising from exposure to low-level ionizing radiation. Include a discussion of considerations of study and control population size with different anticipated levels of risk and exposures and how confidence limits are affected by variations in these parameters.

(ii) Describe an upper bound of risk for radiation-induced cancer.

It is not intended that the contractor will develop specific models. However, the contractor can select appropriate models for illustrative purposes.

2)b For each population and epidemiologic approach considered, analyze the interrelationships among scope, duration and and cost.

Task 3) Explore which, if any, other deleterious health effects resulting from exposure to low-level ionizing radiation can be successfully studied in epidemiologic investigations of the selected populations.

Task 4) Identify how current data bases and record keeping practices could be improved for continuing epidemiologic studies in this area. This shall include identification of possible new data bases and record keeping practices that should be initiated to support epidemiologic studies in the future.

Task 5) For potential control populations that were eliminated from further consideration because of the lack of readily available health or exposure data, identify those, if any, for which some useful estimate could be obtained by field reconstructuion of the necessary data. For such populations, estimate the effort that would be involved in collecting (or reconstructing) the necessary data and the quality of the expected epidemiologic results.

D. REPORT REQUIREMENTS

The technical reports listed below are to be documented, produced and disseminated in accordance with NRC Manual Chapter 3202, which is part of this contract.