HHS Designation of Additional Members of the Special Exposure Cohort
under the
Energy Employees Occupational Illness Compensation Program Act of 2000

Designating a Class of Employees from

Blockson Chemical Company
Joliet, Illinois

I. Designation

I, Kathleen Sebelius, Secretary of Health and Human Services, designate the class of employees defined in Section II of this report for addition to the Special Exposure Cohort (SEC), as authorized under the Energy Employees Occupational Illness Compensation Program Act of 2000 (EEOICPA), 42 U.S.C. § 7384q.

September 3, 2010	[Signature on file]
Date	Kathleen Sebelius

II. Employee Class Definition

All Atomic Weapons Employer employees who worked at the Blockson Chemical Company in Joliet, Illinois from March 1, 1951 to June 30, 1960, for a number of work days aggregating at least 250 work days, occurring either solely under this employment or in combination with work days within the parameters established for one or more other classes of employees in the Special Exposure Cohort.

III. Designation Criteria and Recommendations

Pursuant to 42 U.S.C. § 7384q, for the class defined in Section II of this report, the Secretary has determined, and the Advisory Board on Radiation and Worker Health (Board) has recommended, that

(1) it is not feasible to estimate with sufficient accuracy the radiation dose that the class received; and

(2) there is a reasonable likelihood that such radiation dose may have endangered the health of members of the class.

The SEC final rule states in 42 C.F.R. § 83.13(c)(1) that it is feasible in two situations to estimate the radiation dose that the class received with sufficient accuracy. First, the rule states that radiation doses may be estimated with sufficient accuracy if NIOSH has established that it has access to sufficient information to estimate the maximum radiation dose for every type of cancer for which radiation doses are reconstructed that could have been incurred under plausible circumstances by any member of the class. Alternatively, radiation doses may be estimated with sufficient accuracy if NIOSH has established that it has access to sufficient information to estimate the radiation doses of members of the class more precisely than a maximum dose estimate.

The Board, pursuant to 42 U.S.C. § 7384q, advised the Secretary to designate the class as an addition to the SEC in a letter received by the Secretary on August 9, 2010.

IV. Designation Findings

Feasibility of Estimating Radiation Doses with Sufficient Accuracy

The Secretary established the feasibility determination for the class of employees covered by this report based upon the findings summarized below.

- The principal source of internal radiation exposures for members of the proposed class at Blockson Chemical Company was exposure to naturally occurring radioactive constituents contained in phosphate rock, radon, natural uranium and thorium, and their associated progeny.

- NIOSH evaluated the feasibility of completing dose reconstructions for all Atomic Weapons Employer personnel who worked on activities related to the production of uranium at Blockson Chemical Company, Joliet, Illinois, from January 1, 1951 through December 31, 1962. However, the beginning date of the class definition was changed to accurately reflect the time period of the Atomic Energy Commission contract with Blockson which began on March 1, 1951. The end date also was changed to June 20, 1960, to be consistent with a March 2010 determination by the Department of Labor (DOL) that the covered period ended on that date.

- NIOSH, in its Evaluation Report, found that no air sampling results are available for estimating intakes for Blockson workers. However, uranium urinalysis results (the preferred method of estimating internal doses received from exposure to uranium) are available for some Blockson workers. NIOSH has records and data from 122 urine samples from 25 different employees collected from April, 1954 to February, 1958 (nineteen employees have multiple samples). Ten records of the urinalyses are available, with results for 12 to 13 workers on each record.

- NIOSH believed that internal dose reconstruction for members of the proposed class was feasible, based on the following: (1) the availability of representative personnel uranium internal monitoring data for workers in Building 55; (2) the application of 95th percentile doses that are bounding for workers; (3) the use of claimant-favorable assumptions with regard to other non-uranium radionuclides and potential intakes in plant areas outside of Building 55; and 4) the development of a probabilistic source-term model to reconstruct radon exposures in Building 40.

- The NIOSH Evaluation Report states that no radon monitoring data are available for the period of uranium operations at Blockson. In order to estimate radon dose for claimants, NIOSH developed a probabilistic model to estimate radon concentrations in Building 40.

- The proposed NIOSH model calculates the average radon concentration in Building 40, and the uncertainty distribution generated by the model is the uncertainty distribution of the average concentration. If there is stratification of radon concentrations in the building, the distribution of actual concentrations in the building may not be the same as the distribution of average concentrations generated by the radon model. Consequently, the 95th percentile of the actual

building concentrations may not be the 95th percentile of the average building concentrations. While some worker accounts indicate that workers moved around the building during a shift, it does not necessarily follow that any given worker's exposure can be characterized by the distribution of the calculated average building concentration, as opposed to the distribution of the actual concentrations due to stratification.

- NIOSH has not been able to locate data or a situation it could use to validate the model. There are virtually no monitoring data from phosphate plants from the 50's or 60's. NIOSH has not reconstructed doses by modeling radon exposure at any other covered facilities. However the general form of the model proposed by NIOSH is included in existing methods for performing dose estimates in other applications. Specifically, RESRAD, a Nuclear Regulatory Commission-sponsored collection of models for estimating radiation exposures due to contaminated environs which is used in environmental remediation, contains a radon model of the general form proposed by NIOSH. Consequently, NIOSH's opinion was that the wide acceptance of methods like those in RESRAD obviated the need for site-specific validation.

- The lack of any radon monitoring data from the years of the proposed SEC class, or from a time period even particularly close to those years, carries weight as an argument to support adding the class. It would certainly have strengthened NIOSH's proposed approach if NIOSH had been able to identify supporting contemporaneous radon measurements from Blockson, or even from other similarly-constructed facilities that performed the same or similar functions. Therefore, it is not feasible to reconstruct radiation doses associated with exposure to radon gas and its short-lived progeny with sufficient accuracy for the period from March 1, 1951 to June 30, 1960.

- The principal source of external radiation exposure for members of the proposed class was exposure to naturally occurring radioactive constituents contained in phosphate rock, yellowcake, natural uranium and thorium, and all their associated progeny.

- No external dosimetry data are known to exist for Blockson workers, and NIOSH data capture efforts did not find any direct radiation survey results from the Blockson facility. Therefore, source term information was used to estimate external doses. Blockson's uranium recovery process was a byproduct process designed to fit into the existing phosphate process (Stoltz, 1958). The primary radionuclides of interest for potential external exposure in a uranium extraction process are U-238 and daughter radionuclides Th-234 and Pa-234m. Radiation dose rates from uranium and its daughter products are well-documented, and bounding estimates for external radiation doses can be reconstructed by calculating dose rates to individuals in proximity to the uranium products for a bounding amount of time. The dose rates from the extracted uranium would be higher than those dose rates encountered by employees who were exposed to radioactive materials that were present, but not concentrated, at other locations in the process. Therefore, the external doses from the extracted uranium would bound doses for all employees.

- NIOSH assumes employees received an annual chest X-ray and uses claimant-favorable methods and data to estimate related radiation doses.

- Pursuant to 42 C.F.R. § 83.13(c)(1), the NIOSH Director determined that there is insufficient information to either: (1) estimate the maximum radiation dose, for every type of cancer for which radiation doses are reconstructed, that could have been incurred under plausible circumstances by any member of the class; or (2) estimate the radiation doses of members of the class more precisely than a maximum dose estimate.

- Although the NIOSH Director found that it is not possible to reconstruct radiation doses for the proposed class, NIOSH intends to use any internal and external monitoring data that may become available (and that can be interpreted using existing NIOSH dose reconstruction processes or procedures) for an individual claim. Dose reconstructions for individuals employed at Blockson Chemical, but who do not qualify for inclusion in the SEC, may be performed using these data as appropriate.

- NIOSH finds that it is feasible to estimate, with sufficient accuracy, occupational medical dose for this class of employees using the assumptions and applicable protocols in the complex-wide Technical Information Bulletin, *Dose Reconstruction from Occupationally Related Diagnostic X-Ray Procedures* (ORAUT-OTIB-0006).

- The Board recommended the proposed class for addition to the SEC and the NIOSH Director concurred with its recommendation.

Health Endangerment

The Secretary established the health endangerment determination for the class of employees covered by this report based upon the findings summarized below.

(1) Pursuant to 42 C.F.R. § 83.13(c)(3), the NIOSH Director established that there is a reasonable likelihood that such radiation doses may have endangered the health of members of the class. Pursuant to 42 C.F.R. § 83.13(c)(3)(ii), the NIOSH Director specified a minimum duration of employment to satisfy this health endangerment criterion as "having been employed for a number of work days aggregating at least 250 work days within the parameters established for this class or in combination with work days within the parameters (excluding aggregate work day requirements) established for one or more other classes of employees in the Cohort."

(2) The Board and the NIOSH Director did not identify any evidence from the petitioners or from other resources that would establish that the class was exposed to radiation during a discrete incident likely to have involved exceptionally high-level exposures, such as a nuclear criticality incident, as defined under 42 C.F.R. § 83.13(c)(3)(i).

(3) The NIOSH Director concurred with the Board's finding that the health of the class may have been endangered and defined the class according to the 250-work day requirement specified under 42 C.F.R. § 83.13(c)(3)(ii).

IV. Effect and Effective Date of Designation

The Secretary submits this report on the designation of one additional class to the SEC for review by Congress, pursuant to 42 U.S.C. §§ 7384*l*(14)(C)(ii) and 7384q(c)(2)(A), as amended by the Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005, Pub. L. No. 108-375 (codified as amended in scattered sections of 42 U.S.C.). Pursuant to 42 U.S.C. § 7384*l*(14)(C)(ii), as amended by the Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005, Pub. L. No. 108-375 (codified as amended in scattered sections of 42 U.S.C.), the designation in this report will become effective 30 days after the date of this report's submission to Congress "unless Congress otherwise provides."

V. Administrative Review of Designation

The health endangerment determination of the designation provided in this report may be subject to an administrative review within HHS, pursuant to 42 C.F.R. § 83.18(a). On the basis of such a review, if the Secretary decides to expand the class of employees covered by this designation, the Secretary would transmit a supplementary report to Congress providing the expanded employee class definition and the criteria and findings on which the decision was based.