

Surrogate Data Usage Blockson Chemical Company

Special Exposure Cohort Petition SEC00225

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Radon Exposure During the Residual Contamination Period (1960-1991)

- Radium bearing waste deposited on large phosphogypsum stacks
- Radon exposure in residual period from waste generated during the covered period (March 1951- June 1960) is reconstructed under Energy Employees Occupational Illness Compensation Program Act (EEOICPA)
- Exposure from phosphate plant production after Atomic Energy Commission (AEC) operations is not covered under EEOICPA

Available Radon Exposure Data

- Several radon measurements in Building 55 in 1978 were all low—maximum 0.61 pCi/liter
- Measurements made in 1983 at several locations on site were all low with maximum result of 0.0042 WL reported for the STPP (sodium tripolyphosphate) area
- Single measurement in 1983 taken at phosphogypsum pile was 0.0012 WL (0.29 pCi/L)

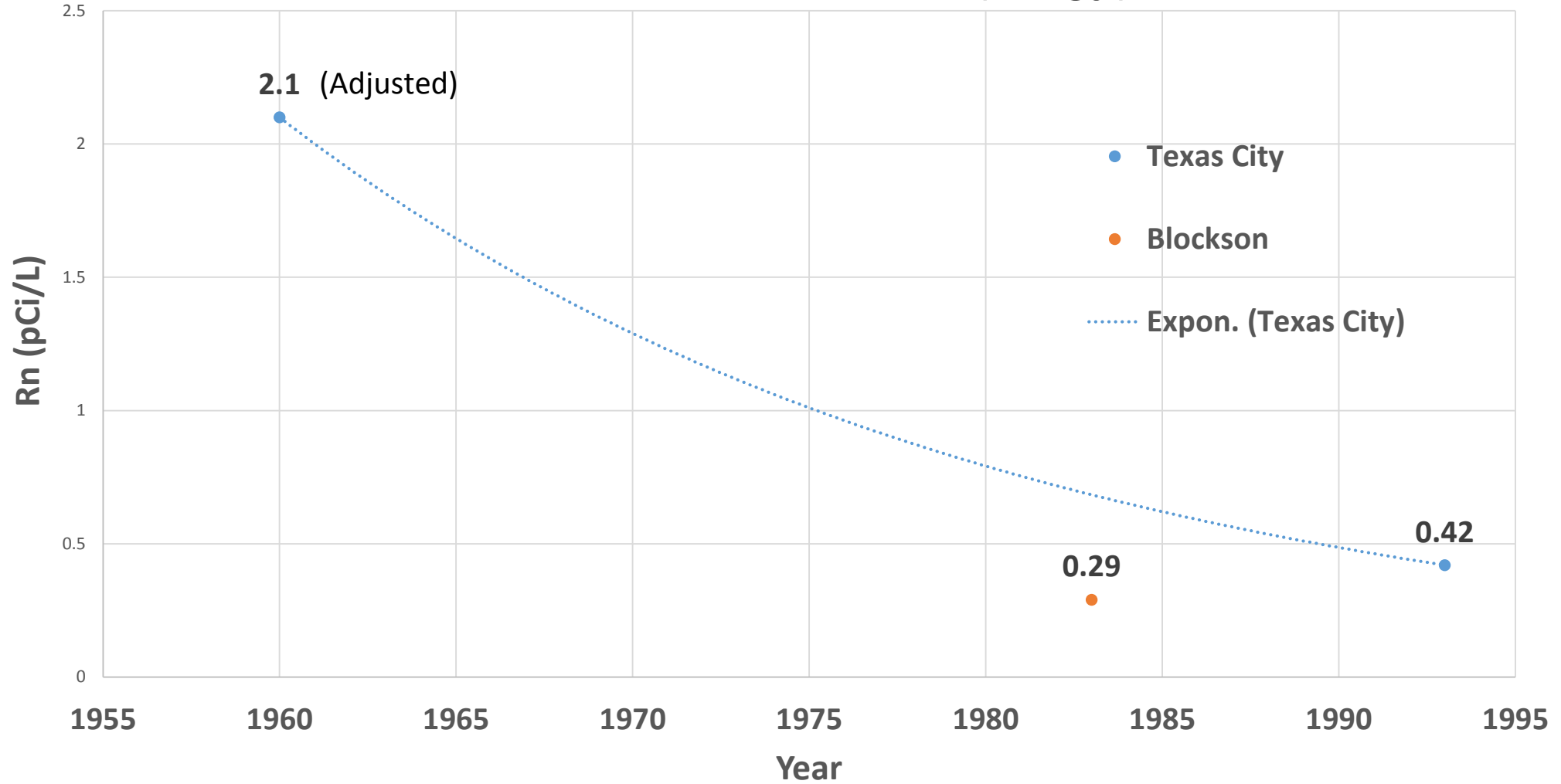
Radon Flux Data at Blockson

- In 1993, 300 radon flux measurements taken at the inactive stacks
- The weighted mean flux measurements was 4.1 pCi/m²-s
- The highest mean was 10.1 pCi/m²-s around the sides
- Radon concentration not reported with flux

Estimates of Radon Exposures

- Radon flux values at Blockson similar to results reported for Texas City Chemicals (TCC) phosphogypsum stack
 - Average value at TCC was 10.5 pCi/m²-s
- Both sites had the flux measurements taken around the inactive stacks after plants permanently closed
- Flux data for Texas City Chemicals includes radon concentration at top of the stack
- Factor applied to inactive stack radon concentration to allow for presumed higher concentration during active stack period during plant operations

Radon Concentrations at the Phosphogypsum Piles



Review Against the Board's Surrogate Data Criteria

- Hierarchy of Data
- Exclusivity Constraints
- Site or Process Similarities
- Temporal Considerations
- Plausibility

Surrogate Data Evaluation

- Hierarchy of Data
 - No personnel monitoring data and only one radon concentration value available from 1983
 - Process and source term data known but not useful in characterizing radon levels at the stacks
 - Surrogate data from Texas City has distinct advantage over the above, but does require some adjustment

Surrogate Data Evaluation – contd.

- Exclusivity Constraints (stringent justification required)
 - The available data on flux measurements at both sites were taken using Environmental Protection Agency (EPA)-approved methodology
 - They both represent complete data sets that are representative of the flux rates at each site
 - Simultaneous radon and flux measurements at Texas City allow for interpretation of flux data at Blockson

Surrogate Data Evaluation – contd.

- Site or Process Similarities

- Both sites created phosphogypsum waste by producing phosphoric acid from phosphate rock using the *wet process*
- Both sites used phosphate rock from Florida. The phosphate rock ores contained about 0.01% natural uranium
- The phosphogypsum stack at Blockson comprised 227 acres and was 90 feet tall, while the stack at Texas City Chemicals was 35 acres and 30 feet tall
 - Measurements were taken close to the stacks which would mitigate any issues related to stack size differences

Surrogate Data Evaluation – contd.

- Temporal Considerations
 - Both Blockson and Texas City started AEC production activities in the 1950s
 - Flux measurements at Texas City and Blockson taken on inactive stacks
 - Adjustments have been made to account for the relative emissions from active versus inactive piles
 - EPA value used to increase emission rate by a factor of 5 for active piles

Surrogate Data Evaluation – contd.

■ Plausibility

- The radon concentrations of 2.1 pCi/L at the start of the residual period and 0.4 pCi/L in 1993 are consistent with known low concentrations associated with phosphogypsum stacks
- The value of 0.29 pCi/L measured at the phosphogypsum stacks in 1983 is bounded by the predicted concentration of 0.69 pCi/L that is based on the Texas City Chemical data
- While the values are likely overestimates for the portion of the exposure due to AEC operations, it provides an upper bound estimate of a worker's exposure

Conclusion

- Based on a review of the available information at Blockson Chemical and Texas City Chemicals, the application of outdoor radon concentration data at Texas City Chemicals to the phosphogypsum stacks at Blockson Chemical meets the Board's criteria for surrogate data usage
- Using these data, along with an appropriate adjustment, the radon concentration data at Texas City Chemicals plausibly bounds the exposures to workers at the Blockson Chemical Company during the residual contamination period