

**DUPONT DEEPWATER WORKS,  
DEEPWATER, NEW JERSEY**

**STATUS OF SITE PROFILE  
ISSUES RESOLUTION**

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# BACKGROUND

- DuPont Deepwater Works was under contract to the Manhattan Engineering District from 1942 to 1947
- Contracted to develop industrial-scale facilities for purification of uranium from various ores, recovery of scrap uranium, manufacture of uranium metal and various uranium compounds. Worked with various forms of uranium and converted it to more useful forms, including production of uranium metal using the magnesium process and various related research activities
- Sources of exposure included:
  - External exposure to naturally occurring uranium and its short-lived progeny (Th-234 and Pa-234)
  - Internal exposure from inhalation of airborne uranium and inadvertent ingestion of residual uranium deposited on surfaces

# Time Sequence of Document Production and Review

1. January 3, 2008 – NIOSH issued Appendix B to Battelle-TBD-6001, which provides data and guidance for dose reconstruction of workers at the DuPont facility in Deepwater, New Jersey (i.e., the original site profile)
2. March 8, 2011 – NIOSH issued *Technical Basis Document for the DuPont Deepwater Works, Deepwater, New Jersey*. DCAS-TKBS-0006, Rev. 00. This revision was motivated by the withdrawal of TBD-6001, which was the parent document for the January 3, 2008 version of the site profile.
3. August 12, 2011 – SC&A issued *Review of the NIOSH Site profile for DuPont Chambers Works, Deepwater, NJ*.
4. September 7, 2012 – AWE Work Group meeting (note that there were many AWE Work Group meetings prior to this date, but this is the first meeting where DuPont was discussed).
5. March 13, 2013 – NIOSH issued *DuPont Deepwater Works NIOSH Response to Findings in SC&A's Review dated August 12, 2011*.
6. June 6, 2013 – SC&A issued *SC&A Response to NIOSH's Commentary on Findings Regarding the Site Profile for DuPont Deepwater Works*.
7. September 27, 2013 – AWE Work Group meeting.

# DATA SOURCES AND STRATEGIES FOR DOSE RECONSTRUCTION

## External Dose

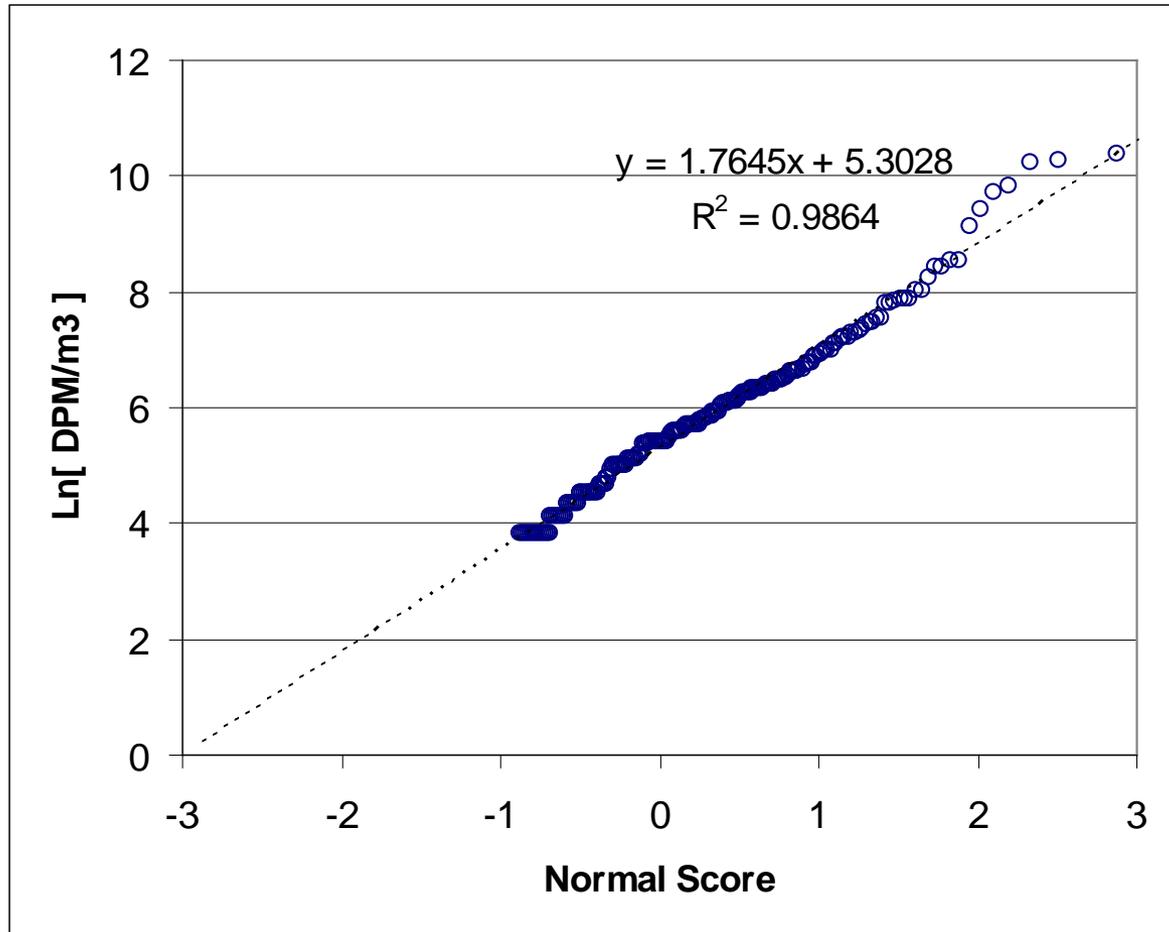
No external dosimetry data. Exposures are based on process knowledge and the results of MCNP calculations. Exposure scenarios include:

- Submersion in a cloud
- Standing on contaminated surfaces
- Standing close to various sizes and types of uranium sources

NIOSH employed standard TBD-6000 methodologies, which have been previously reviewed and accepted by the TBD-6000 Work Group.

## Internal Dose

No bioassay data. Intakes and internal exposures are based 252 airborne dust loadings collected from 1944 to 1945, fit the data to a lognormal distribution, and assigned either the full distribution or the 95<sup>th</sup> percentile of the distribution to the workers based on potential for exposure.



Uranium air Sampling Data for DuPont Deep Water Works for 1944 and 1945

# SEVEN FINDINGS AND THE STATUS OF THEIR RESOLUTION

1. Issue 1: SC&A's original concern was that air sampling data from 1944 and 1945 may not be applicable to 1942 and 1943 activities. However, NIOSH correctly points out that there was virtually no uranium handling and processing activity prior to 1944. SC&A agrees.

**Recommendation: Issue closed**

2. Issue 2: SC&A's original concern was that the ingestion pathway was not modeled in accordance with approved NIOSH procedures. NIOSH agrees and will revise the calculations.

**Recommendation: Issue in abeyance until revisions are made**

3. Issue 3: SC&A's original concern was that the Putzier effect was not taken into consideration when modeling external doses. NIOSH pointed out that the Putzier effect does not apply to the uranium processing activities that took place at the facility. SC&A concurs.

**Recommendation: Issue closed**

# SEVEN FINDINGS AND THE STATUS OF THEIR RESOLUTION (continued)

4. Issues 4 and 5: SC&A was concerned that the radiation dose rate at specific distances was assigned as a distribution rather than as a fixed deterministic value, but SC&A nevertheless agreed with the results. NIOSH agreed to repackage the material in a manner where the uncertainty in the distance of the worker from the source material is assigned an uncertainty distribution rather than assigning an uncertainty distribution to the dose rate at a given distance from the source. SC&A agrees with this strategy.

**Recommendation: Issue in abeyance until revisions are made**

5. Issues 6 and 7. Each of these issues are related to the assumption that the radiation dose rate measured using an open window survey meter at 1 meter from surfaces contaminated with uranium dust is assigned 50% photon dose and 50% beta dose. NIOSH agrees that this 1:1 photon-to-beta ratio is incorrect and will use a 1:10 ratio. SC&A agrees.

**Recommendation: Issue in abeyance until revisions are made**