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**Draft Report  
For the Weldon Spring Site Work Group**

**SC&A'S EVALUATION OF NIOSH'S RESPONSE OF  
SEPTEMBER 7, 2011, TO DAILY WEIGHTED EXPOSURE  
BLUNDERS IN WELDON SPRING DATA**

Prepared by

John Stiver  
Ron Buchanan

S. Cohen & Associates  
1608 Spring Hill Road, Suite 400  
Vienna, Virginia 22182

Saliant, Inc.  
5579 Catholic Church Road  
Jefferson, Maryland 21755

September 2011

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<b>S. COHEN &amp; ASSOCIATES:</b> <i>Technical Support for the Advisory Board on Radiation &amp; Worker Health Review of NIOSH Dose Reconstruction Program</i>	Document No.: Evaluation of NIOSH Response to DWE Blunders
	Effective Date: Draft – September 27, 2011
	Revision No. 0 (Draft)
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Task Manager: _____ Ron Buchanan	Supersedes:  N/A
Project Manager: _____ John Mauro, PhD, CHP	Peer Reviewer(s):  Joseph Fitzgerald John Mauro

**Record of Revisions**

<b>Revision Number</b>	<b>Effective Date</b>	<b>Description of Revision</b>
0 (Draft)	09/27/2011	Initial issue

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## 1 INTRODUCTION

### NIOSH’s Response of September 7, 2011

The National Institute for Occupational Safety and Health (NIOSH) provided a response (NIOSH 2011) to the Weldon Spring Site (WSS) Special Exposure Cohort (SEC) issue (SC&A 2010) concerning “blunders”<sup>1</sup> in the original daily weighted exposure (DWE) air concentration data as discussed at the WSS Work Group meeting of May 9, 2011.

The following presents SC&A’s evaluation of NIOSH’s September 7, 2011, response.

## 2 SC&A’S EVALUATION OF NIOSH’S SEPTEMBER 7, 2011, RESPONSE TO WSS ISSUE #1b, BLUNDERS IN DWE DATA

SC&A evaluated NIOSH’s response to the issue of blunders in the DWE original data and found the following.

1. **Limited data** – NIOSH’s white paper acknowledges that the available raw data are a “small” proportion of the total DWE data set that will be used in dose reconstruction (DR), but does not quantify that proportion (i.e., what percentile). The DWE data sets to be used in DR are identified in Tables 6-4 (uranium) and 6-5 (thorium) of the SEC-00143 petition evaluation report (NIOSH 2010).
2. **Representativeness of the limited data** – NIOSH’s report does not indicate the extent to which the available raw data are representative of the DWE data identified in NIOSH (2010). It is not clear from the report if the evaluated data pertains to the highest DWEs for each building, year and job category. For example, MCW 1961 (SRDB 14945) contains 27 pages of raw data calculations that are applicable to the metals plant (301) in the years 1958–1959. However, Table 6-4 (uranium) of NIOSH 2010 contains no DWEs for Building 301 in 1958, and only one value for one operation in 1959; that value is the second lowest DWE for Building 301 for all 7 years reported.
3. **Type and Magnitude of Error** – The types and relative magnitudes of the errors identified in NIOSH’s white paper are similar to those found in Davis and Strom (2008). That is, the average blunder resulted in about a factor of 2 underestimate, while the largest blunders resulted in an order of magnitude underestimate.
4. **Application of Findings** – NIOSH’s white paper presents preliminary findings only. It does not propose a method for incorporating this information into the overall uncertainty in DWEs for which raw data are not available. At the WSS Work Group meeting held on September 13, 2011, DCAS indicated that they believe the GSD of 5 based on the Davis and Strom report adequately bounds any additional uncertainties due to blunders.

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<sup>1</sup> The ISO definition emphasizes that a blunder is often considered a serious mistake caused by ignorance or confusion; stupidity, which is included in some U.S. English definitions of blunder, is not implied in this case (ISO 1995).

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However, SC&A believes that it is incumbent on DCAS to provide quantitative evidence supporting their position.

### 3 SUMMARY

SC&A believes that NIOSH should address the representativeness of the limited available raw data to the data sets to be used in DR and propose a method for incorporating uncertainties due to blunders into the overall uncertainty in DWEs for which raw data are not available. Because NIOSH’s use of DWEs to estimate inhalation intakes extends beyond WSS, the method should be generalized and applicable to all affected sites.

### 4 REFERENCES

Davis, A.J., and D.J. Strom, 2008. *Uncertainty and Variability in Historical Time-Weighted Average Exposure Data*, Health Physics, Vol. 94. February 2008. SRDB 41616.

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