



## MEMORANDUM

TO: Savannah River Site Work Group  
FROM: SC&A, Inc.  
DATE: April 26, 2018  
SUBJECT: SC&A Comments on NIOSH Draft Permit Sampling Plan

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SC&A reviewed the National Institute for Occupational Safety and Health's (NIOSH's) draft "SRS Work Permit Sampling Plan" that was distributed by Tim Taulbee's email of April 17, 2018, subject *SRS Work Permit Evaluation – Path Forward*. Our comments are provided below, in advance of the scheduled May 8, 2018, Savannah River Site (SRS) Work Group conference call on this subject. We welcome any clarification from NIOSH on these points prior to the conference call.

### General

A critical aspect of any valid coworker model development is establishing the crucial link between the exposure potential of the monitored and unmonitored subpopulations. In essence, it must be adequately demonstrated that the exposures experienced by the monitored workers are *representative* of the exposures experienced by the unmonitored workers. Alternatively, if it is determined that some portion of the unmonitored worker population was performing work in a different radiological environment then it would likely be inappropriate to apply coworker doses to that subpopulation.

To establish this necessary representative link, NIOSH proposes to compare bioassay data associated with work permits for monitored construction trade workers (CTWs) and unmonitored subcontractor construction trade workers (subCTWs) to ascertain whether these two groups "*worked side by side in the same radiological environment at the same time.*" NIOSH will "*randomly pull*" Safe Work Permits (SWPs), Job Plans, and Radiation Work Permits (RWPs) for this purpose and "*directly compare the monitoring of subcontractor workers listed as having worked on the individual Work Permit.*"

### SC&A Comment

The key objective of this sampling should be to demonstrate that (1) the radionuclides to which workers were potentially exposed are the same and (2) the actual work, and exposure potential of that work, were the same. For the second objective, some knowledge or characterization of the permitted work would be necessary. If the sampling shows the work of two groups not to be the same, then NIOSH would need to demonstrate for (1) that the target radionuclides that are not the same (for subCTWs) would have negligible significance to exposure or could be bounded by

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other means, and for (2) that the subCTW work or exposure potential in question could be bounded by other means. However, to demonstrate that the planned permit sampling achieves these objectives, the draft sampling plan needs a clear statement of outcome metrics, i.e., what the specific end results are envisioned to be and how success will be defined for these results. For example, by what measure (qualitative and quantitative) will the comparability of the two worker populations (CTW vs. subCTW) be determined?

### Specific

1. SC&A recommends that the Standing Radiation Work Permit (SRWP) not be included in the sampling for the reasons cited (typifies more routine work). SC&A is unclear on the status of “*Extended Special Work Permits (EWP)*” and would not want those included if, by their extended timeframe, they were more typical of routine work (as with the SRWPs).
2. SC&A agrees that the potential dose related to tritium exposure at SRS during the 1990s was not significant and can be bounded by a large quantity of routine bioassay data; we recommend that permits for tritium exposures not be sampled. (However, tritium exposures before reactor shutdown, while unlikely, may have been higher before 1989 and may be problematic if job-specific bioassays were missed—see ██████████ 2017, page 23).
3. SC&A agrees that in vivo monitoring should be included but treated with a degree of caution, in that permit target radionuclides need to be accounted for in the periodic (e.g., annual) in vivo monitoring performed.
4. SC&A has a concern about the status of pre-1989 sampling. In his email forwarding NIOSH’s proposed permit sampling plan for SRS, Tim Taulbee indicates that, based on a survey of Radiation Survey Logsheets during the 1970s and 1980s, the number of surveys for DuPont in-house maintenance greatly exceeded that of subcontractor work. The implication seems to be that this would make a sampling comparison for the DuPont operational era unnecessary. SC&A disagrees for reasons stated in the attachment to this memo.
5. NIOSH states the following in the introduction:

*The numerical summary contained herein also includes the fact that NIOSH and the ORAU Team continued to work with the site Records Management department during the March 2018 site visit to determine if additional target boxes may exist and be available for review.*

It is not clear if the effort to locate additional target records is still ongoing or the available records have been exhausted. Location of additional target records would be especially critical given the limitations in records identified for the pre-1989 period.

6. In the section “Execution of the Sampling Plan,” NIOSH states:

*Before the site visit, the statistician will pick a stratum (area will be chosen so that the areas sampled are proportional to the areas in the sampling frame) and randomly choose an available year from that area.*

It is not clear whether this means that each site area (with the possible exception of the reactor areas) will be given equal weight for the purposes of sampling or if areas with a larger number of identified folders will be given greater weight (e.g., F and H Areas).

7. In the section, “Execution of the Sampling Plan,” NIOSH states:

*ORAUT will capture all available bioassay for each of the identified CTW’s, regardless of sample dates. Finally, ORAUT will evaluate the bioassay data and provide a report of CTW monitoring. The statistician will compute a point estimate and confidence interval for the percentage of CTWs of interest who were monitored, with “of interest” and “monitored” as defined above.*

SC&A assumes the purpose of the activity is to gather additional data from which comparisons of the relative magnitude of the available monitoring data can be done.

8. In the section, “Execution of the Sampling Plan,” NIOSH states: “*The statistician will compute a point estimate and confidence interval for the percentage of CTWs of interest who were monitored, with ‘of interest’ and ‘monitored’ as defined above.*” SC&A is concerned that such an estimate would not necessarily answer the question of whether unmonitored workers performed tasks side-by-side with monitored workers. While an estimate of the number (or percentage) of subcontractors and regular CTWs who were monitored internally is not without merit, the important question is whether NIOSH identified work plans in which unmonitored workers were performing separate tasks that did not include at least some monitored workers. Such an analysis is inherently more qualitative in nature than quantitative.
9. Attachment A of NIOSH’s sampling plan includes a description of how indexed work permits identify construction work, but it does not include specific instructions on identifying subcontractors involved in the construction work. However, SC&A assumes that all work permits included in the final sample will involve subcontractors in some capacity. This assumption is based on the definition provided for “*folders of interest*”:

*A folder of interest has at least one RWP (or job plan) with both RWP detail (header) data (indicating work performed and/or monitoring requirements) and sign-in sheets of workers. Sign-in sheets may also be used if the RWP header is denoted as available in another folder. At least one of those workers must be a subcontractor CTW who should have been monitored by bioassay.*

## References

██████████ 2017. ██████████ Interview (written response to questions), October 6, 2017, forwarded to SC&A by NIOSH via email on October 24, 2017.

ORAUT-RPRT-0083. 2017. *Evaluation of Monitoring of Construction Workers Identified in High-Level Cave Job Plans at the Savannah River Site*, Revision 00, National Institute for Occupational Safety and Health, Cincinnati, OH. June 27, 2017.

SC&A 2018. Email from SC&A, Inc. to Savannah River Site Work Group, Subject: *SRS Records Review: 1972–1989*. February 15, 2018.

Taulbee 2018. “SRS Work Permit Sampling Plan,” attachment to email from Tim Taulbee, NIOSH, to Bradley Clawson, Chair, Savannah River Site Work Group, Subject: *SRS Work Permit Evaluation – Path Forward*. April 17, 2018.

## ATTACHMENT: SC&A'S POSITION REGARDING PRE-1989 PERMIT SAMPLING

In his email of April 17, 2018, transmitting NIOSH's proposed permit sampling plan, Tim Taulbee indicates that, based on a survey of Radiation Survey Logsheets during the 1970s and 1980s, the number of surveys for DuPont in-house maintenance greatly exceeded that of subcontractor work. As Tim noted, Joe Fitzgerald (SC&A) agrees that use of subcontractors during the DuPont era (before 1989) was much more limited than during the Westinghouse Savannah River Company (WSRC) era, and that DuPont tended to use in-house CTWs side-by-side with its own employees. Regardless of the relative magnitude of subcontractor CTW use by the site during the 1970s and 1980s, it is still necessary to establish that those subcontractors were doing the same work as the in-house CTWs. It is not totally clear what specific concern is being conveyed here, but assuming NIOSH is questioning the value of sampling any permits before 1989, SC&A wants to reconfirm and add additional basis to its prior recommendation to the Work Group, as contained in its email of February 15, 2018 (SC&A 2018):

*As a followup to last Friday's teleconference regarding SRS path forward, we have discussed this within SC&A, and propose that NIOSH pursue pre-1989 RWP/SWP in terms of obtaining a representative sample from which a bioassay completeness assessment can be performed for that earlier period. This assessment would need to reflect the availability of RWPs/SWPs for 1972–1988, and encompass a sufficient scope of facilities and timeframe. Based on Tim's presentation, it appears that 11 boxes have been identified to date that contain records of this kind for that period; presumably, additional boxes will be identified as the ongoing NIOSH review is completed. It would be important that NIOSH include a sampling approach for the pre-1989 period based on what is found in the boxes. The work group, supported by SC&A, would review these sampling plans (including one for the latter period) and provide any comments to NIOSH, as noted Friday's call. **Given the relatively fewer number of transient subcontractors (and subcontractors, in general) and RWPs during the 1970s and 1980s, it is understood that NIOSH's sampling approach may differ from what is done for the 1990s.***

*We believe this approach to be the most efficient one that can provide the best assessment on the subcontractor completeness at this point. [Emphasis added.]*

In this email, SC&A again acknowledges the “*relatively fewer number of transient subcontractors (and subcontractors, in general) and RWPs during the 1970s and 1980s*” and understands that “*NIOSH's sampling approach may differ from what is done for the 1990s.*” However, it should be pointed out that the number of subcontractor CTWs identified by Tim in his email for one SRS area, 773-A, for March 1973 (“0” subcontractors, compared with 35 DuPont CTWs and 185 operations employees), does not comport with a later survey conducted by NIOSH for the same facility for 1981–1986 (as show in Table 2-2 of ORAUT-RPRT-0083, reproduced below). That table shows a total of 650 subcontractor CTWs at 773-A during that time period, with as many as 172 subCTWs in the year 1985, alone. It is clear that the particular

year and SRS facility chosen to be sampled (as least for Radiation Survey Logsheet surveys) will influence the number of subcontractor CTWs identified.

For certain facilities—773-A is one example, but there are probably a few others—the number of subcontractor CTWs may rival DuPont CTWs (as shown in NIOSH’s Table 2-2) for some years and may compare with WSRC in the 1990s as well. This is not to suggest that the finding of fewer overall subcontractor CTWs at SRS prior to 1989 is wrong, but that supposition may not be universal for all facilities for all years, particularly in the 1980s leading up to an operational transition to decontamination and decommissioning, restart, and waste management activities.

It is important to sample what pre-1989 RWPs are available to validate that the two worker cohorts (DuPont CTW and subCTW) are similar in terms of work and exposure potential. This would add further basis for confirming that conclusion, given the initially ambiguous findings of the recent NIOSH/OCAS Claims Tracking System (NOCTS) comparison. This would argue for a sampling regime focused on the SWPs identified for A Area facilities, for which permits were identified in the 1972–1989 timeframe (although SWPs appear to have been phased out by 1976). It would also argue for continued scrutiny for any additional boxes of permit records that may apply for pre-1989 facilities beyond just A Area.

**Table 1. Total Identified Workers by Year**  
(reproduced from Table 2-2 of ORAUT-RPRT-0083)

<b>Year</b>	<b>DuPont CTW</b>	<b>DuPont CTW with potential for intake</b>	<b>Subcontractor CTW</b>	<b>Subcontractor CTW with potential for intake</b>
1980	60	48	[redacted]	[redacted]
1981	47	41	82	47
1982	68	55	80	20
1983	70	43	99	57
1984	60	49	122	65
1985	49	44	172	115
1986	43	25	87	38
<b>Totals</b>	<b>397</b>	<b>305</b>	<b>650</b>	<b>350</b>