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The Northeast Utilities System

APR 17 2000

Docket No. 50-245  
B18030

J. C. Linville, Director  
Millstone Inspection Directorate  
Office of the Regional Administrator  
Nuclear Regulatory Commission  
Region I  
475 Allendale Road  
King of Prussia, PA. 19406

Millstone Nuclear Power Station, Unit No. 1  
Response to Apparent Violation in Office of Investigations  
Report No. 1-1997-036

By letter dated February 28, 2000, Northeast Nuclear Energy Company (NNECO) provided its response to the NRC's letter dated January 10, 2000, regarding an apparent violation of 10 CFR 50.9. Submitted as Attachment 1 to NNECO's response was a report prepared by the Millstone Employee Concerns Program (ECP), for which the Company requested confidential treatment pursuant to the provisions of 10 CFR 2.790(a)(6). In the February 28th letter, NNECO indicated that it would forward a redacted version of the ECP report to the NRC.

Attachment 1 to this letter is an unredacted copy of the ECP report, with the information NNECO requests be withheld from public disclosure bracketed for the NRC's review and consideration. Consistent with 10 CFR 2.790(a)(6), the information we seek to withhold from public disclosure is being requested in order to protect personal privacy, and consists primarily of the deletion of names, job titles and other personal identifying information. In NNECO's view, the public disclosure of the bracketed information would clearly constitute an unwarranted invasion of personal privacy.

Attachment 2 to this letter is a redacted copy of the ECP report, which has redacted from it the information NNECO requests be withheld from public disclosure. Attachment 2 is enclosed for the NRC's use as appropriate, including placement in the NRC Public Document Room.

There are no regulatory commitments contained within this letter.

We appreciate the opportunity to submit a redacted version of the ECP report to the NRC.

Should you have any questions on this letter or the information NNECO requests be withheld from public disclosure, please contact Mr. David A. Smith at (860) 437-5840.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY



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Stephen E. Scace  
Director - Nuclear Oversight and  
Regulatory Affairs

Attachments (2)

cc: (w/o attachments)  
H. J. Miller, Region I Administrator  
L. L. Wheeler, NRC Project Manager, Millstone Unit No. 1  
P. C. Cataldo, NRC Inspector

Date: 2/25/00  
From: [ ]  
To: [ ]  
Via: Manager, Investigations

Subject: Report of Investigation of ECP Concern ECP862 Issue A

Reference: (a) Employee Concerns Processing Manual, Revision 4

Enclosures: (See Tabs)

1. Investigation Report
2. Concern Statement (ECF-3), Intake Form (ECF-1), Triage Form (ECF-5)
3. Investigation Plan (ECG-4)
4. Notification Letter (ECG-3)
5. Supporting Documentation
6. Interview Statements
7. Chronology (ECG-8)
8. Fact, Opinions, and Recommendations of the Investigator
9. Closure and Resolution Forms (ECF-7, CA-1, 2, & 3)

1. This letter reports the findings of subject ECP investigation into the following issue:  
*Issue A: A Health Physics (HP) Technician deliberately altered the ALARA Checklist Discussion Sheet by adding a statement: 'THE POTENTIAL EXITS [sic] AND IS LIKELY FOR PERSONNEL SKIN CONTAMINATIONS AND SHOE CONTAMINATIONS DURING THIS UNDRESS EVOLUTION' after individuals became contaminated while transferring radioactive, Asbestos Containing Material (ACM) from drums to a processing liner on 01/24/97.*
2. The ECP initiated this case file on 01/19/2000.
3. ECP Representative (ECPR) [ ] conducted the investigation of this case file during the period 1/20/2000 to 1/31/2000. Attorney [ ] participated in the interviews of the witnesses as a representative of the NUSCO legal department. There were no significant impediments to this investigation.
4. Investigative Findings and Conclusions:

A. Background

1) History of the ECP Concern

The ECP received two identical concerns alleging that the NRC had been misled during an inspection of a contamination event at Millstone Unit 1 in January 1997. ECP Case File WE197MP dated 02/06/97 and ECP Case File WC198MP dated 02/07/97 alleged there may be information that an employee rewrote or reorganized an RWP and/or an ALARA review in order to show asbestos workers were expected to become contaminated while performing radiological work. In addition, these concerns alleged information about clothing requirements may not have been factual, including accounts from the contaminated workers and people who

decontaminated them. The ECP investigated the following identical issues for these concerns:

*"The Concernee felt that inconsistent information was provided to the NRC investigation into a recent employee contamination event. Additionally, the Concernee felt that RWP and ALARA documents relating to this event were tampered with prior to the NRC investigation."*

On 02/20/97, the ECP requested the [ ] HP Unit 1 [ ] to investigate this issue. The ECP Processing Manual allows a third party to conduct an investigation for the ECP when the ECP Director considers the circumstances of an issue warrant this separation. [ ] investigation determined that there was no apparent tampering of the documents supplied to the NRC. [ ] reviewed documentation for completeness, consistency, and for the potential of tampering and found it to be detailed, complete, and showed no evidence of tampering. Interviews of the workers involved with the job confirmed that the paperwork was consistent with job activities.<sup>2</sup> The ECP accepted the investigation and conclusions of [ ] and conducted no additional investigation into the issue.

The subject of the above issue statement was also filed as a concern with the NRC. On 09/15/97, the NRC Office of Investigations (OI), acting on behalf of the U.S. Attorney for the District of Connecticut, began an investigation "to determine whether several NU employees were involved in the creation of false documents that were used to mislead the NRC during an NRC inspection of an incident involving the contamination of several workers."<sup>3</sup> In November 1997, the NUSCO legal department initiated its own investigation of the events surrounding the contamination of personnel on 1/24/97. The NUSCO legal department's investigation is privileged and the information was not available for this investigation.

On 01/10/2000, the NRC notified NNECo that the OI investigation determined [ ] deliberately altered the ALARA Checklist Discussion Sheet by adding the following statement:

**'THE POTENTIAL EXITS [sic] AND IS LIKELY FOR PERSONNEL SKIN CONTAMINATIONS AND SHOE CONTAMINATIONS DURING THIS UNDRRESS EVOLUTION'**<sup>4</sup>

The ALARA Checklist Discussion Sheet was attached to the ALARA Exposure Controls Summary and provided for the transfer of radioactive ACM from drums to

<sup>1</sup> See ECP Case Files WC197MP and WE198MP (not enclosed)

<sup>2</sup> See ECP Case Files WC197MP and WE198MP (not enclosed)

<sup>3</sup> See Tab 5, Supporting Documentation, Enclosure 4A, Letter IA 2000-001 to [ ] from James C. Linville, Director - Millstone Inspection Directorate, Region 1 dated 01/10/00; re: NRC Office of Investigations Report No. 1-1997-036

<sup>4</sup> See Tab 5, Supporting Documentation, Enclosure 4B, Letter IA 2000-004 to R. P. Necci NNECo from James C. Linville, Director - Millstone Inspection Directorate, Region 1 dated 01/10/00; re: NRC Office of Investigations Report No. 1-1997-036

a processing liner on January 24, 1997. Also, the NRC OI investigation found that in adding the statement, the HP Technician had deliberately caused NNECo to provide this information to an NRC inspector. The NRC maintained that the statement mislead the NRC inspector during his 1997 review into believing that the likelihood of workers becoming contaminated was in the documentation prepared prior to the job and was discussed at the pre-work briefing. The NRC OI investigation concluded that the statement was not in the ALARA documentation before the job was performed. The NRC OI investigation concluded this caused the NRC inspector to incorrectly conclude that proper ALARA controls had been in place as required by procedure.<sup>5</sup> The NRC OI investigation concluded the HP Technician caused NNECo to be in violation of 10 CFR 50.9, which requires, in part, that information provided to the NRC shall be complete and accurate in all material respects.<sup>6</sup>

2) Origin of the Radioactive ACM Concentrates and Task Definition

In the Summer of 1996, radioactive ACM concentrates (e.g., sludge) was collected from the floor of the "A" cubicle located in the Lower Level Radioactive Waste (LLRW) area of Unit 1. Trained asbestos workers, employed by PCI, collected the sludge in plastic bags. These plastic bags were then double and triple bagged and placed in 55-gallon drums. In all, the [ ] contractors collected ten 55-gallon drums of radioactive ACM sludge. The plastic bags had contact dose rates ranging from 280 millirem per hour (mr/hr) to 2000 mr/hr. Individual bags of sludge had contact dose rates ranging from 500 mr/hr to 6000 mr/hr.<sup>7</sup>

The Waste Services department scheduled the sludge to be shipped off-site for disposal on 01/24/97. In planning for this event, [ ], determined that the disposal site required the mixed waste sludge material to be shipped in a special shielded cask and be free of plastic materials. The Waste Services department, having no trained Level 1 asbestos workers, decided to employ [ ] contractors to pour the radioactive ACM sludge from the plastic bags into the shielded cask.

3) Pre-Job Preparation of ALARA Controls

In support of this evolution, the Site Health Services group, a self-directed work group, assumed the responsibility to establish the ALARA exposure controls for this task.<sup>8</sup> [ ] Technician, had the primary responsibility to prepare the radiation protection controls for the transfer of the radioactive ACM sludge from plastic bags to the shipping cask. [ ] met with various individuals to assess the risk factors that could impact the radiological

<sup>5</sup> See Tab 5, Supporting Documentation, Enclosure 4B, Letter IA 2000-004 to R. P. Necci NNECo from James C. Linville, Director-Millstone Inspection Directorate, Region 1 dated 01/10/00; re: NRC Office of Investigations Report No. 1-1997-036

<sup>6</sup> See Tab 5, Supporting Documentation, Enclosure 4B, Letter IA 2000-004 to R. P. Necci NNECo from James C. Linville, Director-Millstone Inspection Directorate, Region 1 dated 01/10/00; re: NRC Office of Investigations Report No. 1-1997-036

<sup>7</sup> See Tab 5, Supporting Documentation, Enclosure 4H, ALARA Post Job Review

<sup>8</sup> See Tab 6, Interview Statements, Enclosure 5A, Interview of [ ] on 01/20/00, question 1

<sup>9</sup> See Tab 6, Interview Statements, Enclosure 5A, Interview of [ ] on 01/20/00, question 2 and 3

controls needed for the job. The risk factors considered during the planning phase for this job included the following:

- The sludge was a concentrate of radioactive materials and could cause a high dose exposure (e.g., concern for radiation exposure)
- The work would be performed on relatively narrow staging that was high above the floor of the load bay (e.g., concern for falls during high work).
- The workers would be fully dressed in anti-contamination protective clothing (e.g., anti-c's) and may experience increased body temperatures during the work (e.g., concerns for heat stress).
- The workers would be subject to asbestos controls, including full-face respirators, that required removal *after* removal of anti-c's (e.g., concern for skin contamination).

In preparation for the work, [ ] Technician, discussed the various aspects of the job with individuals from [ ] Waste Services, and Health Physics. Since this job involved the disturbance of thermal insulation asbestos materials that had previously been collected at Unit 1, the provisions of 29 CFR 1926 applied, as applicable, to the work controls established for this job. Specifically, 29 CFR 1926.1101(j)(2) regulated the asbestos exposure requirements, including the following mandatory controls for hygiene facilities:<sup>10</sup>

- (j)(2)(i) The employer shall establish an equipment room or area that is adjacent to the regulated area for the decontamination of employees and their equipment which is contaminated with asbestos which shall consist of an area covered by a impermeable drop cloth on the floor or horizontal working surface.
- (j)(2)(ii) The area must be of sufficient size as to accommodate cleaning of equipment and removing personal protective equipment without spreading contamination beyond the area (as determined by visible accumulations).
- (j)(2)(iii) Work clothing must be cleaned with a HEPA vacuum before it is removed.
- (j)(2)(iv) All equipment and surfaces of containers filled with ACM must be cleaned prior to removing them from the equipment room or area.
- (j)(2)(v) The employer shall ensure that employees enter and exit the regulated area through the equipment room or area.

As part of the planning process, controls were discussed to address the decontamination sequence following the transfer of the radioactive-ACM to the shipping cask. However, [ ] stated:

"I didn't see how [the asbestos workers] would come out clean [e.g., uncontaminated]. That's why I went to [ ] Unit 1 (Acting)<sup>11</sup> the week before [the job was

<sup>10</sup> See 29 CFR 1926.1101 [Not attached]

<sup>11</sup> See Tab 6, Interview Statements, Enclosure 5C, Interview of [ ] on 01/20/00, question 1

scheduled to be performed]. That's when [ ] explained to me there were ways to do the job."<sup>12</sup>

[ ] stated that, at that time, it was not unusual for HP Technicians from the Site Self-Directed Work Group, including [ ] to come to [ ] to review radiation protection work activities.<sup>13</sup> In this case, [ ] stated [ ] believes both [ ] discussed the ALARA controls with [ ] in [ ] office approximately one week prior to the scheduled start of the job on 01/24/97. [ ] recalls advising that they should expect skin contamination with the sludge transfer job.<sup>14</sup> [ ] recalls the discussion originated when [ ] expressed concerns about heat stress if the asbestos workers were dressed in plastics.<sup>15</sup> [ ] stated it is well known that using plastics is the only way to keep people from becoming contaminated in a wet environment.<sup>16</sup> [ ] recalls recommending they waive plastics for the sludge transfer job.<sup>17</sup>

[ ] also recalls informing [ ] that Unit 1 had received "nuisance" contamination alarms<sup>18</sup> from the Personnel Contamination Monitor (PCM) during the job that collected the same radioactive-ACM concentrates from the Lower Level Radiation Waste Tank (LLRW) floor. [ ] stated the "nuisance" contamination alarms occurred because of the required removal sequence of the respirator while the asbestos worker undressed.<sup>19</sup> [ ] maintained the higher radiation levels associated with the concentrated sludge would increase the risk of skin contamination for the transfer job by a factor of 100 over the original collection job at Unit 1.<sup>20</sup> [ ] advised [ ] to contact HP Technicians who had been involved in the collection of the radioactive ACM sludge at Unit 1.<sup>21</sup>

[ ] states [ ] contacted members of the Unit 1 HP staff and learned about the "nuisance" contamination alarms received during the collection of the radioactive ACM sludge at Unit 1.<sup>22</sup> [ ] states [ ] collected this information prior to [ ] preparation of the ALARA package and prior to the performance of the pre-job briefing. It is noted that [ ] did not learn of any recordable skin contamination during the Unit 1 work.<sup>23</sup>

<sup>12</sup> See Tab 6, Interview Statements, Enclosure 5F, Interview of [ ] on 01/24/00, question 14

<sup>13</sup> See Tab 6, Interview Statements, Enclosure 5C, Interview of [ ] on 01/20/00, question 2

<sup>14</sup> See Tab 5, Interview Statements, Enclosure 5C, Interview of [ ] on 01/20/00, item 8 and 10

<sup>15</sup> See Tab 5, Interview Statements, Enclosure 5C, Interview of [ ] on 01/20/00, item 6 and 11

<sup>16</sup> See Tab 5, Interview Statements, Enclosure 5C, Interview of [ ] on 01/20/00, item 7

<sup>17</sup> See Tab 5, Interview Statements, Enclosure 5C, Interview of [ ] on 01/20/00, item 11

<sup>18</sup> "Nuisance" contamination alarms occur when radioactive material contamination is detected by a PCM 1B at a level below the detectable level of a portable frisker (e.g., 100 counts per minute). "Nuisance" contamination was described as minor skin contamination by the HP staff members interviewed.

<sup>19</sup> See Tab 5, Interview Statements, Enclosure 5C, Interview of [ ] on 01/20/00, item 5 and 9

<sup>20</sup> See Tab 5, Interview Statements, Enclosure 5C, Interview of [ ] on 01/20/00, item 10

<sup>21</sup> See Tab 6, Interview Statements, Enclosure 5F, Interview of [ ] on 01/24/00, question 4

<sup>22</sup> See Tab 6, Interview Statements, Enclosure 5F, Interview of [ ] on 01/24/00, questions 6, 7, & 8

<sup>23</sup> See Tab 6, Interview Statements, Enclosure 5F, Interview of [ ] on 01/24/00, question 6

While preparing the ALARA package, [ ] would discuss the job with the other members of the Site HP Self-Directed Work Group. [ ] Technician stated [ ] recalled [ ] saying there was a very good chance that someone might get contaminated [during the sludge transfer job]."<sup>24</sup>

On 01/21/97, [ ] completed [ ] preparation of the ALARA package, and signed and dated the documents, as required. The ALARA package included an ALARA Exposure Estimate<sup>25</sup>, an ALARA Exposure Controls Checklist<sup>26</sup>, an ALARA Exposure Controls Summary<sup>27</sup>, and an ALARA Checklist Discussion Sheet<sup>28</sup>.

4) Pre-Job Preparation of Load Bay Job Site

While [ ] was responsible for the administrative preparations required for the sludge transfer job, [ ] was responsible for the field preparations in the Load Bay. Over the course of approximately two weeks, [ ] oversaw the preparations in the Load Bay where the sludge was to be transferred to the shipping cask. [ ] maintained a chronological log of the setup tasks for the radioactive ACM sludge job in the HP Shift Turnover Sheet. For example:

- On 01/13/97, [ ] walked down the cask with Maintenance Services and Fire Protection personnel.<sup>29</sup>
- On 01/14/97, [ ] discussed the high radiation ACM job with [ ] Foreman.<sup>30</sup>
- On 01/22/97, the Tele-dose monitoring equipment was installed and operational.<sup>31</sup>
- On 01/23/97, completed erection of the tent for the high radiation ACM job.<sup>32</sup> The tent was constructed to include 3-zones or rooms to allow for decontamination the personnel and equipment following the asbestos work. Each room is separated by plastic flaps. The equipment (dirty) room is where the asbestos concentrates were transferred into the liner (e.g., shipping cask). The second room called a shower room is where the respirators were removed, vacuumed, and the Plastic and Tyvex suits were removed. The third room is called the clean room.<sup>33</sup>
- On 01/23/97, attended pre-planning meeting with [ ]<sup>34</sup>

<sup>24</sup> See Tab 6, Interview Statements, Enclosure 5I, Interview of [ ] on 01/27/00, question 25

<sup>25</sup> See Tab 5, Supporting Documentation, Enclosure 4E, ALARA Exposure Estimate

<sup>26</sup> See Tab 5, Supporting Documentation, Enclosure 4F, ALARA Exposure Controls Checklist

<sup>27</sup> See Tab 5, Supporting Documentation, Enclosure 4G, ALARA Exposure Controls Summary, page 1 of 3

<sup>28</sup> See Tab 5, Supporting Documentation, Enclosure 4G, ALARA Exposure Controls Summary, pages 2 and 3 of 3

<sup>29</sup> See Tab 5, Supporting Documentation, Enclosure 4P, Shift Turnover Sheet dated 1-13-97

<sup>30</sup> See Tab 5, Supporting Documentation, Enclosure 4P, Shift Turnover Sheet dated 1-14-97

<sup>31</sup> See Tab 5, Supporting Documentation, Enclosure 4P, Shift Turnover Sheet dated 1-22-97

<sup>32</sup> See Tab 5, Supporting Documentation, Enclosure 4P, Shift Turnover Sheet dated 1-23-97

<sup>33</sup> See Tab 5, Supporting Documentation, Enclosure 4H, ALARA Post Job Review, page 3

<sup>34</sup> See Tab 5, Supporting Documentation, Enclosure 4P, Shift Turnover Sheet dated 1-23-97

5) Pre-Job Briefing

Both the HP Shift Turnover Sheet and the ALARA package indicate that by 01/24/97, [ ] believed the required preparation tasks had been completed for performing the sludge transfer task. Late in the morning on 01/24/97, a pre-job briefing was held to review the logistics for transferring the radioactive ACM sludge from plastic bags to the shipping cask, including the controls to be used during those tasks.<sup>35</sup> The ALARA Exposure Controls Summary sheet identifies the following attendees at the pre-job briefing: [ ]

[ ] However, the ECPR determined that [ ] did not attend the pre-job briefing because [ ] was assigned to another task on 01/24/97. In addition, [ ] had no recollection of whether [ ] had or had not attended the pre-job briefing.<sup>36</sup>

[ ] presented the health physics briefing for the job. [ ] stated he discussed the controls specified on the ALARA Exposure Controls sheet. [ ] states his briefing included the potential for personnel contamination to occur during the undress portion of the job.<sup>37</sup> [ ] recalls discussing how the small size of the tent increased the potential for workers to hit the walls of the tent while undressing and also to splatter mud (e.g., contaminated sludge) on tent surfaces.<sup>38</sup> This ECP investigation developed the following evidence while attempting to corroborate these statements:

- (a) [ ] states [ ] no longer recalls the specific content of the pre-job briefing for the sludge transfer job,<sup>39</sup> however [ ] recalls testifying under oath to NRC investigators that [ ] discussed each control listed on the ALARA Checklist Discussion Sheet during the pre-job briefing.<sup>40</sup> [ ] states [ ] was truthful during [ ] testimony.<sup>41</sup>
- (b) [ ] states [ ] does not recall workers being told *during the pre-job briefing* that they were *expected* to become contaminated during the undress period after they had transferred the sludge to the shipping cask.<sup>42</sup> [ ] does recall having discussions with [ ] *prior to the pre-job briefing* and agreeing that there was a real potential for skin contamination during this job.<sup>43</sup> [ ] stated personnel contamination was a "reality" of the job versus a "planned" contamination. In this regard, [ ] recalls, during this job, [ ] was much more concerned with controls

<sup>35</sup> See Tab 6, Interview Statements, Enclosure 5F, Interview of [ ]  
<sup>36</sup> See Tab 6, Interview Statements, Enclosure 5A, Interview of [ ]  
<sup>37</sup> See Tab 6, Interview Statements, Enclosure 5F, Interview of [ ]  
<sup>38</sup> See Tab 6, Interview Statements, Enclosure 5F, Interview of [ ]  
<sup>39</sup> See Tab 6, Interview Statements, Enclosure 5G, Interview of [ ]  
<sup>40</sup> See Tab 6, Interview Statements, Enclosure 5G, Interview of [ ]  
<sup>41</sup> See Tab 6, Interview Statements, Enclosure 5G, Interview of [ ]  
<sup>42</sup> See Tab 6, Interview Statements, Enclosure 5E, Interview of [ ]  
<sup>43</sup> See Tab 6, Interview Statements, Enclosure 5E, Interview of [ ]

[ ] on 01/24/00, question 12  
[ ] on 01/20/00, question 20  
[ ] on 01/24/00, questions 11 and 13  
[ ] on 01/24/00, questions 11 and 13  
[ ] on 01/25/00, question 19 and 27  
[ ] on 01/25/00, question 19, 27, 28, & 29  
[ ] on 01/25/00, question 30  
[ ] on 01/24/00, question 13  
[ ] on 01/24/00, back of page 1

minimizing the risk of radiation exposure than for precluding an incidental skin contamination.<sup>44</sup> [ ] stated [ ] "wasn't surprised" by the personnel contamination, although [ ] "wasn't necessarily expecting it."<sup>45</sup>

6) Sign-off of the ALARA Review Documents

Health Physics Operations Procedure RPM 5.2.3, ALARA Program and Policy, Rev.0, provides the description of actions to be taken by personnel involved in the planning, supervision, and performance of work in radiological control areas of Millstone Station. Section 1.4.4 of RPM 5.2.3 requires the ALARA Coordinator to complete the ALARA Review when the need for an ALARA Review has been determined. For the radioactive ACM sludge transfer job, [ ] prepared the ALARA Exposure Estimate<sup>46</sup>, the ALARA Exposure Controls Checklist<sup>47</sup>, the ALARA Exposure Controls Summary<sup>48</sup> and signed them on 01/21/97. In addition, [ ] prepared an ALARA Checklist Discussion Sheet<sup>49</sup> that did not require signatures. The ALARA Checklist Discussion sheet was attached to the ALARA Exposure Controls Summary sheet.

Prior to commencement of work, Section 1.4.5 of RPM 5.2.3 requires the "Job Leader" and "Department Manager" to sign the ALARA Review, including an ALARA Exposure Estimate, an ALARA Exposure Controls Checklist, and an ALARA Exposure Controls Summary. For the sludge transfer job, [ ] and [ ] signed the ALARA Review documents. Both [ ] dated their signatures on 01/24/97, the day of the pre-job briefing. Normally, this certification would be viewed as corroboration that the ALARA Review documents were completed and signed off before the start of the work.<sup>50</sup> However, during the ECP interviews, neither [ ] corroborated that they actually signed the ALARA package before the sludge transfer work was performed on 01/24/97. In addition, neither reviewer could recall reading a statement in the ALARA package stating that the job was expected to result in personnel contamination, as follows:

- (a) [ ] stated he does not recall reviewing the ALARA package or seeing a statement on the ALARA Checklist Discussion Sheet indicating that personnel contamination may occur during the job.<sup>51</sup> In this regard, the ECPR determined that [ ] has very limited recall about any aspect of the sludge transfer job. [ ] stated [ ] had "very little" involvement in

<sup>44</sup> See Tab 6, Interview Statements, Enclosure 5E, Interview of [ ]

<sup>45</sup> See Tab 6, Interview Statements, Enclosure 5E, Interview of [ ]

(cont.)

<sup>46</sup> See Tab 5, Supporting Documentation, Enclosure 4E, ALARA Exposure Estimate

<sup>47</sup> See Tab 5, Supporting Documentation, Enclosure 4F, ALARA Exposure Controls Checklist

<sup>48</sup> See Tab 5, Supporting Documentation, Enclosure 4G, ALARA Exposure Controls Summary, page 1 of 3

<sup>49</sup> See Tab 5, Supporting Documentation, Enclosure 4G, ALARA Exposure Controls Summary, pages 2 and 3 of 3

<sup>50</sup> See Tab 6, Interview Statements, Enclosure 5F, Interview of [ ]

<sup>51</sup> See Tab 6, Interview Statements, Enclosure 5A, Interview of [ ]

[ ] on 01/24/00, back of page 1

[ ] on 01/24/00, back of page 2-question 15

[ ] on 01/24/00, back of page 2

[ ] on 01/20/00, question 9 & 13

the planning for the job.<sup>52</sup> [ ] stated [ ] role was to locate a disposal site for the sludge material.<sup>53</sup> The ECPR notes that the only task performed by the Waste Services personnel was delivering ten 55-gallon drums of mixed waste to the work site.

- (b) [ ] recalled that [ ] signed the ALARA documents without performing a review of the material.<sup>54</sup> Although [ ] recalls discussing the potential for personnel contamination during the pre-job briefing<sup>55</sup>, [ ] method of reviewing the ALARA package in January 1997 prevents [ ] from recalling any of the package's content at this time. In addition, [ ] recalls telling the NRC OI Investigator that [ ] did not sign the ALARA Exposure Controls Summary sheet until Monday, 01/27/97.<sup>56</sup> This was three days after the sludge transfer had been completed [ ] recalls telling the NRC that [ ] dated [ ] signature "1/24/97" instead of "1/27/97" because [ ] actually attended the briefing on 1/24/97.

#### 7) Personnel Contamination

After the pre-job briefing, the [ ] contractors reported to the SRW Load Bay with the designated Waste Handlers and HP Technicians. During the job, the HP technicians monitored the Tele-dose and directed personnel to rotate to different positions in order to equalize exposure among the work crew.

The job design planned for an asbestos worker to remove each plastic bag of radioactive-ACM from the 55-gallon barrel staged at the exit of the Clean Room. Each plastic bag was then transported through the Clean Room and Shower Room into the Equipment Room. In the Equipment Room the plastic bag was opened and the contents transferred to the liner of the shipping cask using a funnel.

Early in the work evolution, the asbestos workers observed that some of the plastic bags contained moisture, including standing water. During the transfer of one bag through the Clean Room, the bag leaked causing the Clean Room to become contaminated. [ ] states [ ] attempted to decontaminate the area. [ ] stated [ ] believes it is likely [ ] pants became contaminated while kneeling in the spilled liquid while [ ] attempted to perform the clean up from the spill.

By approximately 1300 hours, the sludge transfer was completed and the [ ] contractors commenced to exit the tented work area. The [ ] contractors undressed one at a time through the 3-stage process in accordance with the controls for the asbestos work. All five of the [ ] contractors, Workers 1 through 5, were radiologically contaminated.

Workers 1 through 4 went to the Unit 2 Decontamination Facility to be decontaminated. Initially, the Site HP Technicians wrapped the workers'

<sup>52</sup> See Tab 6, Interview Statements, Enclosure 5A, Interview of [ ]  
<sup>53</sup> See Tab 6, Interview Statements, Enclosure 5A, Interview of [ ]  
<sup>54</sup> See Tab 6, Interview Statements, Enclosure 5G, Interview of [ ]  
<sup>55</sup> See Tab 6, Interview Statements, Enclosure 5G, Interview of [ ]  
<sup>56</sup> See Tab 6, Interview Statements, Enclosure 5G, Interview of [ ]

[ ] on 01/20/00, question 3  
 [ ] on 01/20/00, question 2  
 [ ] on 01/25/00, question 26  
 [ ] on 01/25/00, question 27  
 [ ] on 01/25/00, question 22

contaminated areas and escorted them to the Unit 2 Decontamination Facility because it was the closest facility to the solid radioactive waste load bay. Both [ ] HP Technicians, joined [ ] at the job site to assist in the decontamination effort.<sup>57</sup> Worker 5, [ ] removed [ ] pants and exited the site without further decontamination efforts.

The ALARA Post-Job Review documents the following contamination results<sup>58</sup>:

WORKER #	CONTAMINATED BODY PART	CCPM
• Worker 1	Right knee Right elbow Shoes	
• Worker 2	Right shoulder Right/left hand Shoes	
• Worker 3	Right hand Left Hand Left Wrist Shoes	
• Worker 4	Right knee Left Knee Left Hand Shoes	
• Worker 5	Pants	

[ ] states [ ] escorted one of the [ ] contractors to the Unit 2 Decontamination Room and unsuccessfully attempted to decontaminate [ ] shoes.<sup>59</sup> [ ] remained at the Unit 2 Decontamination Room until all of the workers were either decontaminated or transferred to the Unit 1 Decontamination Room for additional decontamination procedures.<sup>60</sup> The ECPR estimated that all decontamination efforts in the Unit 2 Decontamination Facility were completed by 1645 hours. This equates to 5 minutes before [ ] exited the site on 01/24/97.<sup>61</sup>

[ ] initially escorted [ ] (Worker 4) to the Unit 2 Decontamination Facility.<sup>62</sup> The decontamination techniques permitted at the Unit 2 Decontamination Facility were ineffective on [ ] [ ] Unit 1 Technical Support, states [ ] recalls telling [ ] to [ ]

<sup>57</sup> See Tab 6, Interview Statements, Enclosure 5I, Interview of [ ] on 01/27/00, question 7

<sup>58</sup> See Tab 5, Supporting Documentation, Enclosure 4H, ALARA Post Job Review

<sup>59</sup> See Tab 6, Interview Statements, Enclosure 5I, Interview of [ ] on 01/27/00, question 10

<sup>60</sup> See Tab 6, Interview Statements, Enclosure 5I, Interview of [ ] on 01/27/00, question 13

<sup>61</sup> See Tab 5, Supporting Documentation, Enclosure 4O, Millstone Station Transaction History Report (22-29 Jan 97), pages 5 & 7

<sup>62</sup> See Tab 6, Interview Statements, Enclosure 5E, Interview of [ ] on 01/24/00, back of page 2

move to the Unit 1 Decontamination Facility where soap could be used.<sup>63</sup> [ ] then moved [ ] to the Unit 1 Decontamination Facility and worked to decontaminate [ ] These efforts were unsuccessful and [ ] was conditionally released from Millstone Station with contamination on [ ] left hand, [ ] corrected counts per minute (ccpm), and right knee, [ ] ccpm. [ ] left the Millstone Station at 1919 hours on 01/24/97.<sup>64</sup> [ ] returned to the Unit 1 Decontamination Facility on Saturday, Sunday, and Monday (e.g., 01/25/97 through 01/27/97) until [ ] was successfully decontaminated by HP personnel.<sup>65</sup>

On Monday, 01/27/97, [ ] conducted an ALARA Post-Job Review of the transfer evolution. [ ] stated [ ] did not attempt to assess the mechanisms that caused the personnel contaminations in the ALARA Post-Job Review.<sup>66</sup> Nevertheless, the ALARA Post-Job Review did address a potential cause of the work shoe contaminations. The ALARA Post-Job Review states that although an asbestos support worker attempted the decontamination of the Clean Room, some of the shoe contaminations may have occurred in the area.<sup>67</sup> [ ] stated that other mechanisms could have caused the work shoe contaminations, such as:

- Stepping back into the Shower Room from the Clean Room after the plastic shoe covers (e.g., booties) were removed, or
- Using an improper undressing sequence during which the shoe covers were removed prematurely.

[ ] stated that during [ ] planning for the job, [ ] did not consider it likely for an asbestos worker to as step back into the Shower Room from the Clean Room after removing [ ] plastic shoe covers. However, [ ] stated [ ] did consider it likely for the asbestos workers to be affected by the heat in the area (e.g., the potential for heat stress) to an extent that may likely cause them to undress in an improper sequence that would result in shoe contamination.<sup>68</sup> In this regard, [ ] emphasized [ ] understanding that when an asbestos worker enters the clean room, all of [ ] protective clothing has been removed with the exception of modesty garments and work shoes. [ ] stated [ ] believed this requirement would extend to a second pair of plastic booties, if they had been specified.<sup>69</sup>

#### 7) Management's Initial Assessment of the Personnel Contamination

<sup>63</sup> See Tab 6, Interview Statements, Enclosure 5B, Interview of [ ] on 01/20/00, question 11

<sup>64</sup> See Tab 5, Supporting Documentation, Enclosure 4O, Millstone Station Transaction History Report (22-29 Jan 97), page 2

<sup>65</sup> See Tab 5, Supporting Documentation, Enclosure 4L, page 2, Personnel Contamination Report for [ ]

<sup>66</sup> See Tab 6, Interview Statements, Enclosure 5N, Interview of [ ] on 02/07/00, question 15

<sup>67</sup> See Tab 5, Supporting Documentation, Enclosure 4H, ALARA Post Job Review

<sup>68</sup> See Tab 6, Interview Statements, Enclosure 5N, Interview of [ ] on 02/07/00, question 44

<sup>69</sup> See Tab 5, Supporting Documentation, Enclosure 4H, ALARA Post Job Review, page 3 and Tab 6, Interview Statements, Enclosure 5N, Interview of [ ] 02/07/00, question 46 and 47

At approximately 1530 – 1600 hours on 01/24/97, [ ] was informed the asbestos contractors had become contaminated during the job to transfer radioactive ACM sludge to the shipping cask.<sup>70</sup> [ ] recalls receiving a report of the number of contaminated workers, and the contamination levels and skin areas affected.<sup>71</sup> [ ] recalls [ ] turned the job of assessing the contamination event over to [ ]<sup>72</sup> because [ ] was hoping to leave Millstone Station early on Friday, 01/24/97.<sup>73</sup> [ ] states [ ] understood this direction to involve the following actions:<sup>74</sup>

- Assess for the need to perform a Shallow Dose Equivalent (SDE) calculation.
- Determine if any other notifications are required.
- Lend advice regarding the various decontamination techniques.

[ ] walked to the Unit 2 Decontamination Facility and logged in to the RCA control point. The data file from the Millstone Personnel Radiation Exposure Management (PREM) system shows that [ ] logged into the Unit 2 RCA on RWP 2970001 at 1636 hours on 01/24/97.<sup>75</sup> [ ] states [ ] assessed the contamination event through discussions with individuals in the Decontamination Room.<sup>76</sup> [ ] states [ ] specifically recalls seeing and talking with [ ] states that based of [ ] review of the work,<sup>77</sup> [ ] concluded that:

- The levels of contamination were below regulatory reporting levels,<sup>78</sup>
- The skin contamination had been anticipated,
- The skin contamination likely occurred while removing protective clothing and respiratory equipment,<sup>79</sup>
- There was no evidence of inadequate radiological controls, and<sup>80</sup>
- No corrective actions were required.<sup>81</sup>

[ ] performed [ ] review during a sixteen minute period, after which [ ] logged out from the Unit 2 RCA control point at 1652 hours and returned to [ ]

<sup>70</sup> See Tab 6, Interview Statements, Enclosure 5C, Interview of [ ] on 01/20/00, question 20  
<sup>71</sup> See Tab 6, Interview Statements, Enclosure 5C, Interview of [ ] on 01/20/00, question 21  
<sup>72</sup> See Tab 6, Interview Statements, Enclosure 5C, Interview of [ ] on 01/20/00, question 22  
<sup>73</sup> See Tab 6, Interview Statements, Enclosure 5C, Interview of [ ] on 01/20/00, question 20  
<sup>74</sup> See Tab 6, Interview Statements, Enclosure 5B, Interview of [ ] on 01/20/00, question 9  
<sup>75</sup> See Tab 5, Supporting Documentation, Enclosure 4R, Personnel Radiation Exposure Management (PREM) system Data Base Information, EID Number 23270 dated 01/24/97  
<sup>76</sup> See Tab 6, Interview Statements, Enclosure 5B, Interview of [ ] on 01/20/00, question 14  
<sup>77</sup> See Tab 6, Interview Statements, Enclosure 5B, Interview of [ ] on 01/20/00, question 16  
NOTE: [ ] recalls talking with [ ] 01/24/97 but does not specifically recall seeing [ ] at the Unit 2 Decontamination Facility. Instead [ ] believes [ ] saw [ ] at the Unit 1 Decontamination Facility. However [ ] clearly recalls going *only* to the Unit 2 Decontamination Facility on 01/24/00 and states [ ] talked with [ ] *only* at the Unit 2 Decontamination Facility. The PREM data file, however, shows that [ ] did log into the Unit 1 RCA later on 01/24/97 [ ] does not recall making the Unit 1 RCA entry.  
<sup>78</sup> See Tab 6, Interview Statements, Enclosure 5B, Interview of [ ] on 01/20/00, question 25  
<sup>79</sup> See Tab 6, Interview Statements, Enclosure 5B, Interview of [ ] on 01/20/00, question 25  
<sup>80</sup> See Tab 6, Interview Statements, Enclosure 5B, Interview of [ ] on 01/20/00, question 15  
<sup>81</sup> See Tab 6, Interview Statements, Enclosure 5B, Interview of [ ] on 01/20/00, question 25

office at Unit 1.<sup>82</sup> Data from the Personnel Radiation Exposure Monitoring (PREM) system indicates that [ ] also logged into Unit 1 RCA control point at 1752 hours for fifteen minutes. It is more likely than not that [ ] continued [ ] review of the contamination event through discussions with individuals in the Unit 1 Decontamination Room. Up to this point in time, [ ] had not reviewed the ALARA Review paperwork because these documents were not transported with the contaminated individuals.

[ ] recalls that [ ] showed [ ] the ALARA Checklist Discussion Sheet immediately after performing [ ] review of the contamination event. The ECPR determined that this could have occurred no earlier than Saturday, 01/25/97. At that time, [ ] states [ ] recalls [ ] opening a 3-ring notebook to the ALARA Checklist Discussion Sheet and pointing to a paragraph stating personnel skin and shoe contaminations were expected while undressing. [ ] states [ ] does not recall the exact words contained in the paragraph, or whether the paragraph contained a sentence that was italicized, bolded, underlined, and/or capitalized.<sup>83</sup>

During ECPR questioning, [ ] states [ ] did not see the ALARA Checklist Discussion Sheet until *after* [ ] became involved in assessing the contamination event on 01/24/97.<sup>84</sup> The ECPR obtained a Transaction History (TH) report from the Security department for 01/24/97 and a copy of the Personnel Radiation Exposure Monitoring (PREM) system data for the same time period. The PREM data indicates that [ ] logged in to the RCA at Unit 2 to access the Unit 2 Decontamination Room at 1636 hours and logged out at 1652 hours on 01/24/97.<sup>85</sup> While [ ] was in the Unit 2 Decontamination Room, the TH report indicates that [ ] logged out of the South Access Point at 1650 hours on 01/24/97.<sup>86</sup> Since [ ] did not log back in to the Millstone Station until 0516 on 01/25/97,<sup>87</sup> the ECPR concluded that [ ] could not have seen the written documentation until after [ ] logged into Millstone Station at 0722 hours on 01/25/97.<sup>88</sup> Also, since [ ] does not recall when [ ] showed [ ] the ALARA Checklist Discussion Sheet on 01/25/97, it is possible that [ ] did not see it until just prior to [ ] leaving Millstone Station at 1150 hours. Therefore, there is no conclusive evidence to determine whether the document read by [ ] had been altered to

<sup>82</sup> See Tab 5, Supporting Documentation, Enclosure 4R, Personnel Radiation Exposure Management (PREM) system Data Base Information, EID Number 23270 dated 01/24/97

<sup>83</sup> See Tab 6, Interview Statements, Enclosure 5B, Interview of [ ] on 01/20/00, question 33

<sup>84</sup> See Tab 6, Interview Statements, Enclosure 5M, Interview of [ ] on 02/02/00, question 19

<sup>85</sup> See Tab 5, Supporting Documentation, Enclosure 4R, Personnel Radiation Exposure Management (PREM) System-Data Base Information, page 13

<sup>86</sup> See Tab 5, Supporting Documentation, Enclosure 4O, Millstone Station Transaction History Report, 11 pages dated 01/22/97 through 01/29/97, Entry for [ ] dated 01/24/97 "O"

<sup>87</sup> See Tab 5, Supporting Documentation, Enclosure 4O, Millstone Station Transaction History Report, 11 pages dated 01/22/97 through 01/29/97, Entry for [ ] dated 01/25/97 "I"

<sup>88</sup> See Tab 5, Supporting Documentation, Enclosure 4Q, Millstone Station Transaction History Report, 11 pages dated 01/22/97 through 01/29/97, Entry for [ ] dated 01/25/97 "I"

reflect an expectation for personnel skin and shoe contaminations.

B. Issue A

*Issue A: A Health Physics (HP) Technician deliberately altered the ALARA Checklist Discussion Sheet by adding the statement:*

**“THE POTENTIAL EXITS [sic] AND IS LIKELY FOR PERSONNEL SKIN CONTAMINATIONS AND SHOE CONTAMINATIONS DURING THIS UNDRRESS EVOLUTION”**

*after individuals became contaminated while transferring radioactive, asbestos-containing material from drums to a processing liner on 01/24/97.*

Issue A is Indeterminate

1) Summary

There is no direct evidence that [ ] altered the ALARA Checklist Discussion Sheet after 01/24/97 by adding the statement:

**“THE POTENTIAL EXITS [sic] AND IS LIKELY FOR PERSONNEL SKIN CONTAMINATIONS AND SHOE CONTAMINATIONS DURING THIS UNDRRESS EVOLUTION”.**

However, a review of the circumstantial evidence indicates that [ ] could have made this change after 01/24/97. The ECPR concluded that sufficient factual information could not be developed to reach a conclusion regarding the likelihood that [ ] made the change alleged in Issue A. While the evidence indicates [ ] changed the ALARA Checklist Discussion Sheet after the job was completed on 01/24/97, there is no evidence to indicate what was changed on the document. The evidence obtained during this investigation indicates that the technical content of the sentence in question, namely the potential for personnel skin and shoe contaminations, had been included in planning meeting discussions and the pre-job briefing. However, since personnel skin and shoe contaminations occurred during the job, and the ALARA Checklist Discussion Sheet was changed after the job, there is a likelihood that the change to the ALARA Checklist Discussion Sheet may have emphasized the preplanning considerations for these events. The evidence obtained during this investigation indicates there is a potential that editorial changes, not technical changes, were made to highlight the likelihood that personnel skin and shoe contaminations would occur during the job. The ECPR concluded there is not sufficient evidence to conclude that the statement identified in Issue A was added, in whole or in part, before or after 01/24/97.

The ECPR reached this conclusion based upon consideration of the following findings:

- a) [ ] Prepared An ALARA Review Package Prior To 01/24/97
- b) The ALARA Review Package Prepared Prior To 01/24/97 Included An ALARA Checklist Discussion Sheet
- c) No Individual Can Attest To Whether Or Not The ALARA Checklist

Discussion Sheet Prepared Prior To 01/24/97 Contained The Statement Identified In Issue A

- d) [ ] Considered The Potential For Personnel Contamination During The Planning For The Job And Likely Included Radiological Controls On The Original ALARA Checklist Discussion Sheet For Addressing Potential Personnel Skin And Shoe Contaminations
- e) Special Contamination Controls Were Not Implemented To Prevent Personnel Skin and Shoe Contaminations Considered Likely While Undressing
- f) The Pre-Job Briefing Included A Discussion Of The Radiological Controls Stated In The ALARA Checklist Discussion Sheet
- g) A Likely Cause Of Shoe Contaminations During The Undressing Stage Of The Job Was Caused By An Unexpected Spill Prior To Undressing
- h) The Initial Assessment Of The Contamination Event By Health Physics Management Concluded The Personnel Contaminations Had Been Expected
- i) [ ] Modified The Record Copy Of The ALARA Checklist Discussion Sheet After 01/24/97
- j) The Modified record copy Of The ALARA Checklist Discussion Sheet Contains The Statement Alleged To Have Been Added In Issue A

The evidence supporting each of these findings is discussed in the following paragraphs in the Analysis section of this Investigation Report.

## 2) Analysis

The following discussion identifies the evidence used as the basis of each finding. The evidence used during in this analysis has been previously presented in the Background section of this Investigation Report, including and the identification of the information source as footnotes.<sup>89</sup>

- a) [ ] Prepared An ALARA Review Package Prior To 01/24/97

The ECPR based this finding on the interview statements of [ ] and the

ALARA Review documents, as follows:

- [ ] stated [ ] prepared the ALARA Review package for the job using a personal computer in the department over the course of several weeks. [ ] signed the ALARA Review documents on 1/21/97.
- [ ] stated [ ] believes [ ] read the ALARA Review package prior to the job.
- [ ] states [ ] witnessed [ ] prepare the ALARA

<sup>89</sup> See the Background section of this Investigation Report for source information.

Review package prior to the job. [ ] also states [ ] witnessed technical discussions between [ ] regarding the radiological controls to be used for the job.

- [ ] signed the ALARA Review documents on 1/24/97.
- [ ] signed the ALARA Review documents that had been prepared and signed by [ ] on 1/21/97 and signed by [ ] on 1/24/97. Note that [ ] states [ ] did not sign the ALARA Exposure Controls Summary sheet until Monday, 01/27/97 - three days after the transfer job was performed.<sup>90</sup> [ ] states [ ] recalls back-dating [ ] signature to 01/24/97 to agree with the date that the pre-job briefing was held.<sup>91</sup>

b) The ALARA Review Package Prepared Prior To 01/24/97 Included An ALARA Checklist Discussion Sheet

The ECPR based this finding on the interview statement of [ ] and the ALARA Exposure Controls Summary sheet, as follows:

- [ ] states [ ] prepared the ALARA Checklist Discussion Sheet prior to 01/24/97 as part of the ALARA Review package.
- The record copy (e.g., hard copy) of the ALARA Exposure Controls Summary sheet attaches and implements two pages of ALARA controls specified on the ALARA Checklist Discussion Sheet.<sup>92</sup> The record copy of the ALARA Exposure Controls Summary sheet contains a signature dated 01/21/97 by [ ] and dated 01/24/97 by [ ] and [ ]<sup>93</sup>

c) No Individual Can Attest To Whether Or Not The ALARA Checklist Discussion Sheet Prepared Prior To 01/24/97 Contained The Statement Identified In Issue A

The ECPR based this finding on the interview statements of [ ] the record copy of the ALARA Checklist Discussion Sheet, and the record copy of the ALARA Exposure Controls Summary sheet, as follows:

- The ALARA Checklist Discussion Sheet was not distributed during the pre-job briefing.
- [ ] states [ ] believes [ ] read the ALARA Review package prior to the job, but has no specific recollection of the content of the ALARA Review package.

<sup>90</sup> See Tab 6, Interview Notes, Enclosures 5G, Interview of [ ] on 01/25/00, question 22

<sup>91</sup> See Tab 6, Interview Notes, Enclosures 5G, Interview of [ ] on 01/25/00, question 26

<sup>91</sup> See Tab 6, Interview Notes, Enclosures 5G, Interview of [ ] on 01/25/00, question 22

<sup>92</sup> See Tab 5, Supporting Documentation, Enclosure 4F, ALARA Exposure Controls Summary

<sup>93</sup> See Tab 5, Supporting Documentation, Enclosure 4F, ALARA Exposure Controls Summary

- Although [ ] was consulted during the pre-planning of the ALARA Controls for the job, [ ] states [ ] did not review any of the ALARA Review documents prior to the job.
  - [ ] states that the ALARA Review package, including the ALARA Exposure Controls Summary was fully signed off on 01/24/97 before the job was performed. [ ] signed the ALARA Review package as reviewers.
  - [ ] one of two reviewers for the ALARA Review package, states [ ] recalls recognizing [ ] signature dated 01/24/97 on the ALARA Exposure Controls Summary sheet when it was shown to [ ] by an Attorney for NU in November 1997. [ ] states [ ] has no memory of [ ] review of or the content of the ALARA Review package.
  - [ ] the other reviewer for the ALARA Review package, states [ ] did not read the ALARA Checklist Discussion Sheet before signing the ALARA Exposure Controls Summary sheet.<sup>94</sup> In addition, [ ] states [ ] did not sign the ALARA Exposure Controls Summary sheet until Monday, 01/27/97 - three days after the transfer job was performed.<sup>95</sup> [ ] states [ ] recalls back-dating [ ] signature to 01/24/97 to agree with the date that the pre-job briefing was held.<sup>96</sup>
- d) [ ] Considered The Potential For Personnel Contamination During The Planning For The Job And Likely Included Radiological Controls On The Original ALARA Checklist Discussion Sheet For Addressing Potential Personnel Skin And Shoe Contaminations

The ECPR based this finding on the interview statements of [ ]

[ ] the record copy of the ALARA Checklist Discussion Sheet, and the record copy of the ALARA Exposure Controls Summary sheet, as follows:

- [ ] states [ ] developed the ALARA Controls for the job based upon [ ] discussions with several individuals, including [ ] and Unit 1 HP Technicians who had previously worked on radioactive-ACM waste collection jobs. [ ] states [ ] knew that asbestos workers on the Unit 1 job had experienced minor contaminations (e.g., "nuisance" contamination alarms) after undressing following the job.
- [ ] briefed [ ] on the concept of planned and/or expected contaminations. [ ] advised [ ] that [ ] believed there existed a much higher risk for personnel contaminations during the sludge transfer

<sup>94</sup> See Tab 6, Interview Notes, Enclosures 5A, 5F, & 5G, Interview of [ ] on 01/24/00, back of page 2; and Interview of [ ] on 01/20/00, question 9; Interview of [ ] on 01/25/00, question 26

<sup>95</sup> See Tab 6, Interview Notes, Enclosures 5G, Interview of [ ] on 01/25/00, question 22

<sup>96</sup> See Tab 6, Interview Notes, Enclosures 5G, Interview of [ ] on 01/25/00, question 26

<sup>96</sup> See Tab 6, Interview Notes, Enclosures 5G, Interview of [ ] on 01/25/00, question 22

job than was present when the same radioactive-ACM material was collected at Unit 1 [ ] advised that this risk for personnel contamination occurred during the undress portion of the job.

- [ ] provided [ ] with documents stating that occasional personnel contaminations were *likely* when radiological work was performed in a hot environment because of an earlier programmatic decision to increase the contamination limit for reusable "clean" protective clothing.<sup>97</sup> For this job, the HP Technicians expected a hot environment.
- [ ] recalls [ ] told [ ] about planned and expected personnel contaminations during the pre-planning for this job. [ ] recalls having the understanding that although no personnel contaminations were planned for the job, their occurrence was an expected reality as a result of the nature of this specific job.
- [ ] states [ ] recalls attending planning meetings for the job during which the likelihood for personnel contamination was addressed during the undress portion of the job. [ ] recalls discussing how people were to undress in the change-out rooms. [ ] recalls diagramming the undressing sequence on a board and discussing the removal of the outer layer of clothing, which was expected to be the most contaminated. [ ] recalls discussing the progression through the undress sequence.<sup>98</sup>
- [ ] recalls attending a planning meeting with [ ] to discuss the details of the job.<sup>99</sup>
- [ ] recalls hearing [ ] discussing their planning for the job. [ ] recalls them discussing their expectation that personnel would cross contaminate themselves while attempting to remove their outer gloves while undressing after the job.<sup>100</sup>
- Any cross-contamination of an asbestos workers hands while undressing significantly increases the potential for the additional cross-contamination, including modesty garments, shoes, and skin.
- The ALARA Checklist Discussion Sheet included radiological controls that implied personnel skin and shoe contaminations were expected while undressing after the job, as follows:

"Asbestos protocols require workers to remove all outside protective clothing with the exception of modesty garments prior to exiting the asbestos containment... Outer protective clothing will be highly contaminate. Survey hands and shoes immediately after exit from

<sup>97</sup> See Tab 6, Interview Statements, Enclosure 5F, Interview of [ ] on 01/24/00, attached document titled "POTENTIAL FOR SKIN CONTAMINATION DUE TO LEACHING OF RESIDUAL CONTAMINATION IN PROTECTIVE CLOTHING"

<sup>98</sup> See Tab 6, Interview Statements, Enclosure 5L, Interview of [ ] on 01/31/00, question 12

<sup>99</sup> See Tab 6, Interview Statements, Enclosure 5G, Interview of [ ] on 01/23/00, question 2

<sup>100</sup> See Tab 6, Interview Statements, Enclosure 5I, Interview of [ ] on 01/27/00, question 5

asbestos tent and have personnel perform a PCM-1B count. Document all personnel and clothing contaminations. Follow station procedures for the decontamination of personnel.”

In addition, the statement alleged to have been added in Issue A, (e.g. ‘THE POTENTIAL EXITS [sic] AND IS LIKELY FOR PERSONNEL SKIN CONTAMINATIONS AND SHOE CONTAMINATIONS DURING THIS UNDRRESS EVOLUTION’), neither identifies nor implies the need for radiological controls not already implemented by the ALARA Exposure Controls Summary sheet.

- [ ] recalls testifying to NRC investigators in November 1997 that the HP Technicians discussed all of the radiological controls stated in the ALARA Checklist Discussion Sheet during the pre-job briefing, including the hands and shoe contamination survey requirements after undressing.

e) Special Contamination Controls Were Not Implemented To Prevent Personnel Skin and Shoe Contaminations Considered Likely While Undressing

The ECPR based this finding on the interview statements of [ ] the record copy of the ALARA Checklist Discussion Sheet, and the record copy of the ALARA Exposure Controls Summary sheet, as follows:

- The ALARA Checklist Discussion Sheet required workers to perform a PCM-1B count and document all personnel and clothing contaminations. This is a normal radiological control requirement for radiological workers prior to exiting an RCA.
- The ALARA Checklist Discussion Sheet required contamination surveys of hands and shoes immediately after each worker exited from the asbestos tent. This survey of hands and shoes is in addition to the normal PCM-1B count performed prior to exiting an RCA. The contamination survey would not prevent the cross-contamination considered likely during undressing - it could only detect whether a contamination had occurred.
- [ ] stated [ ] incorporated no *special* provisions, equipment, or instructions in the ALARA Review based on [ ] expectation that workers were likely to become contaminated during the undress portion of the job.<sup>101</sup>
- [ ] stated that [ ] was primarily involved with the planning of the field work as the lead HP Technician in the Load Bay and did not recall planning any special provisions, equipment, or instructions for the undress sequence.<sup>102</sup>
- [ ] stated [ ] recalls [ ] stating in the early stages of planning the ALARA controls that they (the HP Technicians) were not

<sup>101</sup> See Tab 6, Interview Statements, Enclosure 5F, Interview of [ ]

on 01/24/00, question 14

<sup>102</sup> See Tab 6, Interview Statements, Enclosure 5E, Interview of [ ]

on 01/24/00, questions 14 & 15

going to specify the personnel protective clothing requirements until after they had met with the asbestos abatement contractor and the Unit 1 HP Technicians who had originally collected the radioactive-ACM. [ ] stated [ ] wanted to ensure [ ] protective clothing requirements reflected the experience gained during the previous asbestos job. Later in the planning stage of the job, [ ] stated [ ] heard the Site HP Technicians remark on a number of occasions that the contamination issues were real but the primary hazard was asbestos. [ ] stated the Site HP Technicians planned to protect the workers against exposure to asbestos fibers and stated this would be sufficient to protect against contamination.<sup>103</sup>

f) The Pre-Job Briefing Included A Discussion Of The Radiological Controls Stated In The ALARA Checklist Discussion Sheet

The ECPR based this finding on the interview statements of [ ] and the record copy of the ALARA Checklist Discussion Sheet, as follows:

- [ ] states the HP Technicians discussed all of the radiological controls in the ALARA Review package during the pre-job briefing. [ ] recalls discussing the undressing sequence and identifying to the workers where he considered they had the greatest risks for cross-contaminating themselves.
- [ ] had unclear recollections of the pre-job briefing. Although [ ] states [ ] does not recall discussing the expectation that workers would become contaminated during the pre-job briefing, [ ] does recall [ ] preparing a briefing sheet on the ALARA Package that included the radiological controls for the job.
- [ ] states [ ] recalls testifying to NRC investigators that each of the radiological controls on the record copy of the ALARA Checklist Discussion Sheet were discussed by the HP Technicians during the pre-job briefing.<sup>104</sup> [ ] states [ ] believes the HP Technicians did discuss the expectation that workers could become contaminated while undressing after the job.
- One of the ALARA Controls on the ALARA Checklist Discussion Sheet stated:

“Asbestos protocols require workers to remove all outside protective clothing with the exception of modesty garments prior to exiting the asbestos containment... Outer protective clothing will be highly contaminate. Survey hands and shoes immediately after exit from asbestos tent and have personnel perform a PCM-1B count. Document

<sup>103</sup> See Tab 6, Interview Statements, Enclosure 5L, Interview of [ ]

on 01/31/00, question 5

<sup>104</sup> See Tab 6, Interview Statements, Enclosure 5G, Interview of [ ]

on 01/23/00, question 27

all personnel and clothing contaminations. Follow station procedures for the decontamination of personnel.”

g) A Likely Cause Of Shoe Contaminations During The Undressing Stage Of The Job Was Caused By An Unexpected Spill Prior To Undressing

The ECPR based this finding on the interview statements of [ ] and the ALARA Post Job Review, as follows:

- The ALARA Post Job Review states some of the shoe contaminations may have occurred in the Clean Room because of an ineffective decontamination of the area after a plastic bag of asbestos concentrates leaked liquid while being carried through the Clean Room.<sup>105</sup> [ ] states [ ] did not expect or plan for plastic bags of radioactive-ACM to contain moisture and free-standing water. [ ] states [ ] did not expect or plan for a plastic bag of radioactive-ACM to leak.<sup>106</sup>
- The ALARA Post Job Review contains no other assessment for how the workers' shoes became contaminated during the job. NOTE: [ ] states the ALARA Post Job Review *did not* include a complete assessment of the causes for the personnel contaminations that occurred during the job.
- [ ] states that [ ] did not anticipate the asbestos workers' shoes to become contaminated while undressing.<sup>107</sup> [ ] states the contamination of the work shoes was a *planning error* because the [ ] had not accounted for the extra change area in the tent used for undressing.<sup>108</sup> [The ECPR interpreted [ ] to be referring to the Clean Room in this comment.] [ ] states [ ] would have prevented the work shoe contamination by requiring the asbestos workers to wear an extra set of plastic booties.<sup>109</sup> This would have kept the work shoes protected through the extra stage of undress. The ECPR agrees that by failing to consider the potential for a plastic bag to leak liquid when being transported to the Equipment Room, the Site HP Technicians missed the opportunity to consider using another barrier of protection for the undress sequence.

h) The Initial Assessment Of The Contamination Event By Health Physics Management Concluded The Personnel Contaminations Had Been Expected

The ECPR based this finding on the interview statements of [ ] as follows:

- The ECPR interviewed [ ] with respect to his initial assessment of the contamination event. [ ] assigned [ ]

<sup>105</sup> See Tab 5, Supporting Documentation, Enclosure 4H, ALARA Post Job Review, page 3

<sup>106</sup> See Tab 6, Interview Statements, Enclosure 5N, Interview of [ ] on 02/07/00, question 39

<sup>107</sup> See Tab 6, Interview Statements, Enclosure 5E, Interview of [ ] on 01/24/00, bottom of page 2

<sup>108</sup> See Tab 6, Interview Statements, Enclosure 5E, Interview of [ ] on 01/24/00, bottom of page 2

<sup>109</sup> See Tab 6, Interview Statements, Enclosure 5E, Interview of [ ] on 01/24/00, bottom of page 2

[ ] to assess the contamination event on the afternoon of 01/24/97.<sup>110</sup> [ ] assessment consisted of a review of the contamination levels for each worker, the areas of contamination, and the need for immediate radiological corrective actions. [ ] recalls proceeding to the Unit 2 Decontamination Room, and discussing the event with the HP Technician(s) present. [ ] specifically recalls learning from [ ] that the differences between radiological controls and asbestos controls had caused [ ] to anticipate personnel contaminations [during the undress period].<sup>111</sup> [ ] did not review the RWP or ALARA Review package at that time. [ ] states [ ] left the Unit 2 Decontamination Room with an understanding that the HP Technicians had expected the personnel contaminations [ ] had seen during the undress period. [ ] based [ ] conclusions primarily on [ ] discussion with [ ]

NOTE: During [ ] interview with the ECPR, [ ] stated [ ] had not expected work shoe contaminations caused by undressing.

i) [ ] Modified The Record Copy Of The ALARA Checklist Discussion Sheet After 01/24/97

The ECPR based this finding on the interview statements of [ ] [ ] the record copy of the ALARA Checklist Discussion Sheet, and the Properties Data from the J-Drive of [ ] Computer Network, as follows:

- [ ] created the electronic file for the ALARA Checklist Discussion Sheet using a disc in the A-drive of a personnel computer.<sup>112</sup> On 01/24/97, the hard copy of the ALARA Checklist Discussion Sheet attached to the ALARA Exposure Controls Summary was a copy of this electronic file. [ ] used this ALARA Review package to brief personnel during the pre-job briefing for the radioactive ACM job. [ ] states the ALARA Review was reviewed and signed by [ ] after the pre-job briefing but prior to commencement of the work.
- The ECPR considered whether [ ] had modified the ALARA Checklist Discussion Sheet after this sign-off. In a general discussion regarding the usage of ALARA Checklist Discussion Sheets, [ ] states [ ] may add and/or change ALARA Controls, as needed, during the performance of a job. [ ] states [ ] is not required to re-sign an ALARA Exposure Controls Summary sheet when [ ] makes changes to the ALARA Checklist Discussion Sheet.<sup>113</sup> For this radioactive ACM transfer job, [ ] states [ ] does not recall making a change to the

<sup>110</sup> See Tab 6, Interview Statements, Enclosure 5B, Interview of [ ]

<sup>111</sup> See Tab 6, Interview Statements, Enclosure 5B, Interview of [ ]

<sup>112</sup> See Tab 6, Interview Statements, Enclosure 5F, Interview of [ ]

<sup>113</sup> See Tab 6, Interview Statements, Enclosure 5F, Interview of [ ]

[ ] on 01/20/00, question 7

[ ] on 01/20/00, question 13

[ ] on 01/24/00, back of page 4

[ ] on 01/24/00, back of page 1

ALARA Checklist Discussion Sheet.<sup>114</sup> However, [ ] stated that [ ] may have made an *editorial* change that [ ] cannot recall.<sup>115</sup>

- The evidence shows that on Saturday, 01/25/97, [ ] accessed the electronic file for the ALARA Checklist Discussion Sheet, and “created”<sup>116</sup> a new electronic file for this document in the NU computer network’s J-drive.<sup>117</sup> On both Saturday, 01/25/97, and on Sunday, 01/26/97, [ ] modified the electronic file for the ALARA Checklist Discussion Sheet.<sup>118</sup> The specific content of [ ] changes cannot be determined, however, the changes were made after the job was performed on 01/24/97. Therefore, at the time the changes were made, [ ] knew that the job had resulted in personnel skin, clothing, and shoe contaminations. [ ] printed at least one copy of the electronic file for the ALARA Checklist Discussion Sheet [ ] created on 01/25/97.<sup>119</sup>
- The record copy of the ALARA Checklist Discussion Sheet contains a footer that reads, “J:\ALARA\U197CON.DOC”.<sup>120</sup> The ECPR determined that the footer was manually entered (e.g., it is not automatically inserted as the file name by the Microsoft Word program). [ ] states [ ] does not specifically recall when [ ] entered the footer for the ALARA Checklist Discussion Sheet, but states [ ] enters the file names in the footer of electronically created documents in order to find them again in the computer files.<sup>121</sup> Based on the above evidence, the ECPR concluded that the record copy of the ALARA Checklist Discussion Sheet (that contains the footer “J:\ALARA\U197CON.DOC”) was printed from the electronic file [ ] “created” in the NU computer network’s J-drive on 01/25/97. The ECPR concluded that the record copy is a substitute for the original copy of the ALARA Checklist Discussion Sheet that was attached to the ALARA Exposure Controls Summary on 01/24/97.

j) The Modified record copy Of The ALARA Checklist Discussion Sheet Contains The Statement Alleged To Have Been Added In Issue A

The ECPR based this finding on a review of the record copy of the ALARA Checklist Discussion Sheet, as follows:

- Section D, Other Considerations, paragraph 3 of the ALARA Checklist Discussion Sheet contains a statement that addresses the radiological

<sup>114</sup> See Tab 6, Interview Statements, Enclosure 5F, Interview of [ ] on 01/24/00, back of page 1

<sup>115</sup> See Tab 6, Interview Statements, Enclosure 5F, Interview of [ ] on 01/24/00, back of page 1

<sup>116</sup> The term “created” is used in computer terminology to identify when a file name is initiated on a given network drive. For example, copying an existing document from a disc on A-drive will “create” a new file name on J-drive. After a file name is “created” on a network drive, subsequent changes to the electronic file are recorded as “modifications” by the software.

<sup>117</sup> See Tab 5, Supporting Documentation, Enclosure 4N, “Properties” data from [ ] J-drive file “U197con.doc”

<sup>118</sup> See Tab 5, Supporting Documentation, Enclosure 4N, “Properties” data from [ ] J-drive file “U197con.doc”

<sup>119</sup> See Tab 5, Supporting Documentation, Enclosure 4N, “Properties” data from [ ] J-drive file “U197con.doc”

<sup>120</sup> See Tab 5, Supporting Documentation, Enclosure 4G, ALARA Checklist Discussion Sheet

<sup>121</sup> See Tab 6, Interview Statements, Enclosure 5F, Interview of [ ] on 01/24/00, question 35 and 36

concerns and associated controls caused by personnel contaminations during the radioactive ACM transfer job. The paragraph states:

“Asbestos protocols require workers to remove all outside protective clothing with the exception of modesty garments prior to exiting the asbestos containment. **THE POTENTIAL EXITS [sic] AND IS LIKELY FOR PERSONNEL SKIN CONTAMINATIONS AND SHOE CONTAMINATIONS DURING THE UNDRESS EVOLUTION.** Outer protective clothing will be highly contaminated. Survey hands and shoes immediately after exit from asbestos tent and have personnel perform a PCM-1B count. Document all personnel and clothing contaminations. Follow station procedures for the decontamination of personnel.”<sup>122</sup>

In this paragraph, the capitalized, underlined, italicized, and bolded sentence states that there is a likelihood for shoe contaminations to occur during the undress evolution. This sentence is in the record copy of the ALARA Checklist Discussion Sheet that contains the footer “J:\ALARA\U197C0N.DOC”.

5. Assessment of Chilling Effect

A. Protected Activity

The ECP initiated this case file into an allegation that an employee deliberately altered documents in order to mislead reviewers, including the NRC. An assessment for protected activity is not applicable.

B. Chilling Effect Assessment

The ECPR did not conduct a chilling effect assessment for this case file. This case file investigates an issue raised in 1997 for the purpose of documenting evidence that had not been previously recorded. Following the events in January 1997, the Waste Services and Health Physics organizations were reorganized. The HP personnel involved in this issue are no longer associated with the Self-Directed Work Group affected by this allegation. Also, because this issue involves a potential Notice of Violation against NNECo, management's handling of this issue, is likely to have a station-wide impact. This will be a future result based upon decisions not yet made regarding this case. Therefore, no chilling effect assessment is required for this concern.

C. Reason Line Management Not Used

The ECP employs trained and qualified investigators who are independent of the line organization involved in the events giving rise to this concern. The ECP was requested to perform this investigation and analysis based upon this expertise and independence.

<sup>122</sup> See Tab 5, Supporting Documentation, Enclosure 4G, ALARA Exposure Controls Summary, page 3 of 3

Approvals:

[	_____	]	<u>2/25/00</u>
	ECP Representative		Date
[	_____	]	<u>2/25/00</u>
	ECP Manager		Date
[	_____	]	<u>2/25/2000</u>
	ECP Director		Date