

The case was assigned to Judge Louis LaVecchia on March 11, 1994. After a period of discovery, Dayton filed a motion for partial summary judgment on December 19, 1994, with regard to the two general duty clause violations (items 1 and 2) alleged in the serious citation. Judge LaVecchia granted this motion on January 3, 1995, and the remaining items (items 3-13 of Serious Citation No. 1 and items 1 and 2 of other Citation No. 2) were settled by the parties on January 27, 1995. On February 15, 1995, Judge LaVecchia approved the partial settlement agreement and reaffirmed his order granting partial summary judgment for Dayton. The judge's order was docketed with the Review Commission on March 16, 1995.

On April 5, 1995, the Secretary petitioned the Review Commission for review of the partial summary judgment order. On April 17, 1995, the Review Commission issued an order directing the case for review and remanding it to Judge LaVecchia with instructions to provide the requisite findings of fact and conclusions of law supporting his disposition of Dayton's motion for partial summary judgment. On April 28, 1995, Judge LaVecchia issued an order on remand vacating his original order granting partial summary judgment for Dayton on the grounds that it was erroneous.

The case was reassigned to the undersigned Judge for trial on July 12, 1995 and heard over a period of six months. The Secretary withdrew Item 1 of Serious Citation 1, the alleged heat stress violation, at the beginning of the hearing leaving only Item 2, the alleged ergonomics violation, in dispute (Tr. 60-61). Of the 22 instances of violation alleged under this item, the Secretary has withdrawn the following nine instances: D, E, G, H, I, M, O, T, and U (Tr. 6293-94).¹

INSPECTION AND CITATION HISTORY

On May 6, 1993, Faye Kearney, the senior compliance officer assigned to this case, began an inspection of the Dayton plant in response to a complaint regarding ergonomic hazards and access to medical records (Tr. 5708-10, 5811). Kearney has been an industrial hygienist with OSHA but is not certified (Tr. 5807-08). Her ergonomic experience consists of attending a two-week ergonomics seminar at the OSHA institute and conducting five or six ergonomic inspections prior to the Dayton inspection (Tr. 5700, 5702).

During the initial phase of the inspection, Kearney reviewed Dayton's OSHA 200 logs, OSHA

¹ At the hearing, the Secretary sought to amend the citation to reflect the alleged period of investigation to May 6, 1993 to November 1, 1993 (Tr. 6294, 6556). That motion was granted on March 13, 1996.

101s, and clinic dispensary passes, for the previous five years (Tr. 5710-12).² Kearney testified that the purpose of this review was to check for a “trend or pattern of repetitive motion injuries or illnesses” (Tr. 5712). After her review, she calculated injury incident rates for each job classification at the Dayton plant and found rates of “10% or higher” ! considered significant by OSHA guidelines ! for those jobs ultimately cited (Tr. 5714-16, 5807).

During the first week of June, 1993, Kearney conducted a walk-around inspection of the plant with Dayton’s safety manager, Kelley Elaine Mattocks, union representative Tony Carr, and compliance officer trainee Carlos Reynolds. At this time, she observed more than 26 job functions and took photographs of the work processes (Tr. 5732-33, 5759-60, 5806). From June 22 through July 20, 1993, Kearney conducted a second walk-around of the plant with the same group of individuals, during which trainee Reynolds videotaped each of the jobs in accordance with Kearney’s instructions (Tr. 304, 5726, 5761, 5767-68, 5770, 5812; Ex. C-962). Kearney stated that she used job evaluation forms supplied by Dayton to assist with this phase of inspection (Tr. 5768-69, 6479). These forms contain detailed information about each job, including its characteristics, physical demands and work conditions (Exhibits C-645 to C-666).

On August 16, 1993, Kearney sent the videotape taken by Reynolds and her narrative documentation to Brett Besser at the OSHA Salt Lake City Laboratory for an “ergonomic evaluation” (Tr. 5773-74; Exs. C-962, R-5585). Besser is a physical scientist and a certified industrial hygienist whose job entails analyzing videotapes of various work processes and identifying “ergonomic stressors”, as well as feasible abatement measures (Tr. 6011-12, 6014-15). In a cover letter accompanying these materials, Kearney informed Besser that the injury incident rates associated with all of the Dayton jobs submitted for his review were 10% or higher (Tr. 5803; Ex. R-5585). The narrative sent to Besser also included job descriptions taken from the job evaluation forms, as well as handwritten notes added by Kearney and Reynolds (Tr. 5828-29, 5831, 5838-46). Kearney briefly discussed this data with Besser by telephone on two occasions (Tr. 5775, 6286-89, Ex. R-5586). Besser completed his analysis and sent a written report detailing his findings to Kearney on October 18, 1993 (Ex. R-5586). The report consisted in large part of language contained in prior reports

² In order to receive treatment at Dayton’s onsite medical clinic, employees had to have a dispensary pass from their supervisor (Tr. 4373, 4406, 4530, 4565-66).

authored by Besser and incorporated in the Dayton report with minor changes. Besser testified that he did not intend for his report to be used as a basis for the issuance of a citation (Tr. 6025-29). Kearney testified that upon receiving the Besser report, she did not conduct any additional investigation or analysis nor did she discuss the report with Besser (Tr. 5779, 5873, 5900).

On October 25, 1993, Kearney held the closing conference for the Dayton inspection (Tr. 5972-73, 5975; Ex. R-5691). Sometime between October 18 and November 2, 1993, the date of the citation, she recommended that Dayton be issued a willful citation (Tr. 5781). Kearney testified that she relied completely upon Besser's report for the identification of ergonomic stressors and recommendations for abatement associated with each job copying each section from his and into the citation virtually verbatim (Tr. 5892-93, 5900, 5932-33, 5936-38, 6316-17). On cross-examination, however, she admitted that she actually drafted only one-fourth of the citation and left the remaining portion for trainee Reynolds to complete while she was out of the office on leave. Upon her return to the office on October 18th, she did not review the citation before it was sent out (Tr. 5933-34).

According to Kearney, normal procedure after completion of the drafting process is to submit the proposed citation (1) to a supervisor for review, then (2) to send the citation for typing, (3) submit the citation for a second supervisor review, (4) proofreading, and (5) final review by the area director (Tr. 5959-60). Since she was on leave, Kearney did not know if this procedure was followed for the Dayton citation; however, she claims that Reynolds assured her the proper procedures were followed (Tr. 5947-48, 5962, 5977-78). According to her diary sheet for the Dayton inspection, the draft citation was submitted to Kearney's supervisor on November 1, 1993, almost two weeks *after* her return from leave (Tr. 5976; Ex. R-5691).

As issued, the citation generally alleges that Dayton employees were exposed to the "increased risk of developing"³ cumulative trauma disorders. Generally, these are disorders which occur over time as the result of a repeated or continuous trauma to the body and include conditions such as carpal tunnel syndrome, tendinitis, bursitis, and various back injuries (Tr. 1399-1400, 1423, 2259-61, 3175-76, 4377, 4543, 4673, 5099). As noted at the hearing, the Secretary's case is limited to proving that which is set forth in the citation (Tr. 2021-23, 2674). Therefore, the Secretary is

³"Increased risk of developing " is not an element to be proven in an alleged general duty clause violation.

restricted to proving that only those work activities specifically alleged under each instance of violation constitute ergonomic stressors. For example, under Instance A, the Secretary alleges that the ergonomic stressors associated with the belt loader position are frequent lifting, elevated and extended reaches, and long periods of standing. Although the Secretary attempts to treat this list as illustrative by prefacing it with the phrase “such as”, she cannot without notice to respondent, be allowed to allege an infinite number of unknown stressors. In the absence of that notice the Secretary is bound by the specific stressors listed. Similarly, the Secretary is restricted to establishing the injuries alleged under each instance of violation as “consistent with” the identified stressors. For all but three of the instances, specific disorders or injuries are listed as consistent with the stressors alleged.⁴ For example, under Instance F, the Secretary alleges that the ergonomic stressors associated with the beadwinder job are “consistent with the development of acute shoulder, upper arm, upper back muscle, and tendon fatigue such as strains, sprains, tears or UECTDs such as bursitis, tendinitis, and rotator cuff injuries.” For some instances, however, the listed conditions include broad categories of injury such as musculoskeletal injuries and back injuries.⁵

KEY WITNESSES

I. Fact Witnesses

Brett Besser

Mr. Besser is a certified industrial hygienist who works at the OSHA Salt Lake City Laboratory as a physical scientist (Tr.6011, 6015). Since 1992 his primary job duty has been to conduct ergonomic analyses, a process which involves reviewing videotapes of workplace activities, identifying ergonomic stressors, and determining feasible abatement measures (Tr. 6012-13).

⁴ Citation Instances A, B, and C, generally allege that the ergonomic stressors associated with the cited job exposes employees to the generic malady known as cumulative trauma disorders.

⁵ A musculoskeletal injury is defined as one which occurs to the musculoskeletal unit or to the ligaments of the body, typically around the joints, the cause of which may be a variety of traumas (Tr. 5122, 5278).

Besser's ergonomic experience is limited to three weeks of training and two courses that were part of his master's degree curriculum (Tr. 6012, 6022, 6153-54). At the time of the hearing, Besser had participated in six to ten ergonomic inspections and examined over 100 videotapes from various industries (Tr. 6015-17). At Kearney's request, Besser reviewed the data gathered from the inspection of the Dayton plant and issued a report of his findings on October 18, 1993 (Exhibit R-586). Having never visited the plant himself, he based his report exclusively upon the information provided by Kearney, as well as texts and other materials which he listed in a bibliography (Tr. 6144, 6177, 6180, 6203-04; Exhibit C-989).

In his report, Besser examined each of the cited job classifications, identified the ergonomic stressors which he believed are associated with these jobs, and provided "known controls" or abatement measures which he believes would reduce or eliminate the effect of the stressors (Exhibit R-5586). For those jobs for which he determined lifting was a stressor, he used the lifting equation set forth in the 1981 National Institute of Occupational Safety and Health (NIOSH) guidelines to calculate an "action limit", a figure which takes into account the characteristics of a given lift and provides an acceptable weight that can be lifted by most individuals (Tr. 6033-34, 6102, 6314).⁶ The NIOSH equation is based upon epidemiological, biomechanical, physiological, and medical studies (Tr. 1658).

On cross-examination, Besser admitted that much of his report is "boilerplate" or "canned" language which he simply duplicated from previous analyses (Tr. 6241-44, 6371-86). He cautioned against treating his report as a complete ergonomic evaluation, indicating that an ergonomist should be hired to fully investigate suggested abatement measures (Tr. 6025-29). Besser also indicated that he expected Kearney, upon receipt of his report, to examine injury incident rates at the Dayton plant in order to determine whether a hazard existed at the plant (Tr. 6066-67, 6316-17).

Mr. Besser was not offered by the Secretary to testify as an expert. Thus, his testimony need not be scrutinized for reliability pursuant to rule 207 FRE *see* testimonial analysis of Drs. Schulze and DeHart *infra*. However, since Besser is not an expert, his testimony is accepted only as

⁶ There is also a 1991 version of the NIOSH lifting guidelines which, unlike the 1981 version, includes a component to evaluate the symmetry of a lift (Tr. 1650-51, 6102-03). The 1991 version also replaces the term "action limit" with "recommended weight limit" (Tr. 1650).

Complainant's representative who performed certain work activities preparatory to the issuance of the citation in this matter. His description of those work activities or thought processes, as with compliance officer Kearney, are relevant only to describe the elements which the Secretary believed were present to support and form the basis for the issuance of the citation.

Plant Doctors

Four doctors who worked at the Dayton plant's onsite medical clinic during the period in question testified at the hearing. All of the four doctors worked at Respondent's plant pursuant to a medical services contract between Dayton and St. Anthony's Hospital or the McBride Clinic (Tr. 4371-72, 4525-26, 4677-80, 4831, 4840). Their duties included treating work-related injuries sustained by plant employees, performing new hire physicals, and participating in the plant's medical committee (Tr. 4272-75, 4386-87, 4527-28, 4531, 4680-81, 4694, 4841-42). As a group, the testimony of the plant doctors covered a range of topics, such as clinic procedures and specific employees whom they have treated. Though seemingly well-qualified in their respective fields, the plant doctors were not offered by the Secretary as expert witnesses (Tr. 4377-83, 4833).

Dr. Melissa Carla Smith-Horn, an employee of St. Anthony's Hospital, worked at the Dayton plant for six weeks in 1992, then from the fall of 1992 to May of 1993 (Tr. 4371-72). Dr. Smith-Horn has practiced medicine since 1987 and her specialty is occupational medicine (Tr. 4367-69).

Dr. Paula Rose Root, an employee with St. Anthony's Hospital, worked as medical director at the Dayton plant from fall of 1992 until March of 1993 (Tr. 4525-26, 4588). Dr. Root has practiced medicine since 1988 and her specialties are family and preventive/occupational medicine (Tr. 4522, 4524-25).

Dr. McKinley Snipe Lundy, an employee with the McBride Clinic, worked at the Dayton plant from August 1991 to November 1992 (Tr. 4677). Dr. Lundy has practiced medicine since 1980 and his specialty is occupational medicine (Tr. 4663-65).

Dr. Jack W. Parrish, an employee with the McBride Clinic, worked at the Dayton plant from October 1981 to November 1992 (Tr. 4839, 4845). Dr. Parrish has practiced medicine since 1954 and his specialties are family and occupational medicine (Tr. 4828, 4830).

Dayton Employees

A total of thirty-nine employees from various job classifications testified at the hearing. Since

eight of these employees testified in connection with instances which were subsequently withdrawn by the Secretary, the testimony of thirty-one employees remains relevant.

During the period in question, the employees worked 8-hour shifts that were broken up by two 10-minute breaks and one 20-minute lunch break, known as the “10/20/10” breaks. Most of the employees testified that were also entitled to take unscheduled restroom or water breaks, while others indicated that they often took no breaks at all. Some employees also mentioned that they worked varying amounts of overtime during a normal work week.

II. Expert Witnesses

The Secretary offered two witnesses as experts at the hearing: Dr. Lawrence Schulze and Dr. Roy Lynch DeHart. Dayton’s only witness, Dr. Hadler, was also offered as an expert. With regard to the testimony of Dr. DeHart, there remains an outstanding motion made by Dayton arguing that a portion of Dr. DeHart’s testimony constitutes “new information” and should be stricken. Dayton has also moved for sanctions against the Secretary. For the reasons set forth *infra*, footnote 12, these motions are denied.

Although neither Dr. Schulze nor Dr. DeHart reviewed a copy of the citation in any detail prior to or as part of their respective analyses, as emphasized at the hearing, each expert’s analysis is relevant only to the extent that it relates to the charges contained in the citation (Tr. 1998-99, 2007, 2230-31, 2419, 2452-53, 2705-06, 2712, 5525, 5634).

Dr. Lawrence Schulze

Dr. Schulze is an assistant professor in and director of the engineering/safety graduate program at the University of Houston (Tr. 1360, 1366-67; Exhibit C-626). He has a Ph.D. in industrial engineering, with concentrations in the fields of ergonomics and safety (Tr. 1356-58, 1413). Dr. Schulze is also a certified professional ergonomist and operates his own consulting business (Tr. 1358-59, 1379). He was offered by the Secretary as an expert in ergonomics and accepted as an expert in industrial engineering with ergonomics as his specialty (Tr. 1401, 1431). He has no medical training or experience.

Dr. Schulze was hired to perform an ergonomic evaluation of all Dayton plant job classifications cited here (Tr. 1461, 1466). As explained *infra*, his evaluation was conducted using a combination of the “observational method” and “functional job assessment” (Tr. 1395-96, 1457-59,

2596-97). Dr. Schulze began his analysis in October of 1994 by reviewing Dayton's OSHA 200 logs and accident analysis files (Tr. 1459-60). He then visited the Dayton plant over the course of three days, videotaping over 28 hours of work activities and measuring the layouts of each work station (Tr. 1429, 1460, 1463-64, 2461-62; Exhibits C-964, C-965, & C-966). After evaluating this data, he identified "ergonomic problem areas" associated with each job and developed recommendations to reduce or eliminate their impact on employees (Tr. 1460). For those jobs for which he determined lifting was a stressor, Dr. Schulze used the lifting equation set forth in the 1991 version of the NIOSH lifting guidelines to calculate a recommended weight limit, the weight at which an individual could safely perform a lift with the given characteristics (Tr. 1532, 1541, 1649-50; Exhibit R-5675). His findings were submitted to OSHA in a lengthy final report (Exhibit C-628).⁷

At the hearing, there was considerable debate over the exact issues for which Dr. Schulze's testimony was offered. Specifically, concern focused on the role that Dr. Schulze's testimony plays in the Secretary's case regarding causation, i.e. her claims that the cited work activities performed by Dayton employees caused or were likely to cause injury or harm. Upon a review of the record, it is clear that the Secretary intended for Dr. Schulze to address only the *potential* for injury to occur as the result of a given work activity, not to link *actual* injuries with these tasks. According to the Secretary's counsel, Dr. Schulze's purpose at the hearing was to: (1) identify ergonomic stressors; (2) indicate, based upon on his "knowledge of the literature that's available in the field, his training and education", the injuries that are likely to result from, or are "consistent with" such stressors; and (3) recommend abatement measures which will reduce or eliminate the stressors (Tr. 2387, 2390-91, 2393-94, 2396, 2399-2400). As the Secretary's counsel noted, in order to explain how an identified work activity may validly be considered an ergonomic stressor or "problem area", Dr. Schulze must link the activity with the potential for injury or harm; in other words, he must generally identify how this activity places the employee at risk for harm (Tr. 2391, 2415-17). In this respect, Dr. Schulze's analysis does not establish the cause of any *actual* injuries suffered by Dayton employees.⁸ The

⁷ Any references to actual Dayton injuries in Dr. Schulze's report were stricken by stipulation of the parties (Tr. 2402-04; Exhibit C-628).

⁸These same concerns apply to Besser who, though not offered as an expert witness, also lacks the
(continued...)

Secretary's counsel made it clear that this was an area which would be covered by her other expert witness, Dr. DeHart (Tr. 2274-75, 2397, 2401, 2411-12). Therefore, Dr. Schulze's testimony is relevant to the issue of causation only to the extent that the potential for injury is in question.

As noted at the hearing, Dr. Schulze's contention that a given work activity poses a hazard because it is likely to result in injury would be rooted in his understanding of the medical profession's findings in this area (Tr. 2415). For example, he could have explained that, as an ergonomist, he accepts that wrist deviation results in carpal tunnel syndrome because a particular report or study performed by a qualified member of the medical community establishes as much. But he failed to do so here, relying instead on unsubstantiated assertions that a given movement is, in fact, a stressor simply because he "knows" that it can potentially lead to injury. Although Dr. Schulze repeatedly claimed at the hearing that he is aware of literature which supports his conclusions, he was unable to provide the titles, authors, and/or the final results for most of these relevant materials, none of which were submitted into evidence by the Secretary (Tr. 2133, 2150, 2164, 2171-73, 2320-21, 2333-34, 3205-06, 3522-27).⁹ Likewise, with no details as to the facts supporting his sources, the bibliography Dr. Schulze prepared also fails to provide the evidence needed to support his claims (Tr. 2432-50). Under these circumstances, the significance of Dr. Schulze's testimony to the Secretary's case regarding causation, even if reliable, is minimal at best (*see* Daubert analysis *infra*).

Dr. Roy Lynch DeHart

Dr. DeHart is a professor of occupational and family medicine at the University of Oklahoma Health Sciences Center (Tr. 5062; Exhibit C-625). He has a medical degree from the University of Tennessee and is certified in the fields of preventive/occupational and family medicine (Tr. 5063, 5069-71). Dr. DeHart also serves as chairman of the department in which he teaches, a role which

⁸(...continued)

requisite medical training to make credible claims linking the potential development of various cumulative trauma disorders and musculoskeletal injuries to the work being performed at the Dayton plant. As the record indicates, he is neither an ergonomist nor a medical doctor, and his experience in both areas is minimal (Tr. 6155-58).

⁹ Besser also failed to provide sufficient references to the studies which purportedly support his conclusions. *See supra*, n. 36. At the hearing, counsel for the Secretary was advised to provide "the specific authority that [Besser] referred to and the page, so that we can look at it, to support his conclusions" (Tr. 6092-93). That information was not provided.

requires him to train and supervise residents who examine patients in an onsite clinic on a daily basis (Tr. 5071-72). In addition to teaching, Dr. DeHart privately treats patients, largely in a consultant capacity (Tr. 5072-73). At the hearing, he was offered and accepted as an expert in occupational medicine (Tr. 5117).

Dr. DeHart was hired by the Secretary specifically to establish causation, i.e. to prove that the work performed by Dayton's employees was causing or likely to cause the injuries alleged by the Secretary (Tr. 5368-69). Employing what is known as ratio or relative risk analysis, Dr. DeHart calculated specifically defined injury incident rates for each Dayton job classification, then compared each rate to the national tire industry's general injury rate as calculated by the Bureau of Labor Statistics (BLS) (Tr. 5138-42, 5168, 5170, 5217). Before performing his relative risk analysis, Dr. DeHart first conducted an extensive process by which the information supplied to him by OSHA was reviewed. Specifically, he assembled a "team" of residents and faculty from the University of Oklahoma to review 300-plus employee medical records, the videotape of each job taken by trainee Reynolds, and Besser's ergonomic evaluation report (Tr. 5144-46; Exhibit C-627 at 1-2).

Using data entry forms developed for the review process, the residents gathered data from the 300-plus medical records, documenting those injuries considered musculoskeletal in nature (Tr. 5146-47, 5203, 5415; Exhibit C-493).¹⁰ Also included on the data sheets was a list of potential stressors identified by the team as associated with a given job, some of which were the same stressors alleged by OSHA (Tr. 5150, 5408-09, 5524; Exhibit C-493).¹¹ Each stressor was then assigned a rating on a scale of zero to four indicating the team's degree of confidence that a particular stressor and the identified injury were related (Tr. 5150, 5156-58). The team also coded each injury with an X, Y or Z in order to indicate, respectively, whether the employee was returned to work without restrictions, returned to work with restrictions, or was removed from the workplace for any amount of time (lost worktime) (Tr. 5155).

The data entry forms were reviewed on at least two separate occasions by a group of faculty,

¹⁰ Dr. DeHart did not participate in this phase of the review process (Tr. 5166).

¹¹ The team analyzed data relating to 20 job classifications, but two were dropped because the associated medical record data was insufficient (Tr. 5204). According to Dr. DeHart, he has never reviewed the citation (Tr. 5525, 5634).

including Dr. DeHart, in an attempt to validate the data on the forms as compared to that found in the medical records (Tr. 5146-47, 5166, 5168). Several summary sheets were generated to summarize and compile the information contained on the data entry forms (Tr. 5415, 5417-18). According to Dr. DeHart, it became apparent during the review process that a number of injuries which were not musculoskeletal in nature had nonetheless been documented by the team of residents on the data entry forms (Tr. 5213, 5483-84). As Dr. DeHart indicated at the hearing, “some other injuries were occasionally recorded”, such as foreign bodies in the eye, burns, and lacerations (Tr. 5147, 5177-78, 5457-74, 5499-5517; Exhibit C-427). In some instances, the non-musculoskeletal injuries were not only documented, but also inaccurately associated with identified stressors.

On December 22, 1994, prior to any of the team’s efforts to “clean up” the injury data by removing these mistakes, Dr. DeHart provided a written report of his findings to OSHA (Tr. 5175-78, 5241-42, 5250; Exhibit C-627). Subsequent documentation was provided to OSHA, but only in the form of summary sheets, as the team continued its efforts to correct the data (Tr. 5232-45). The “clean-up” process apparently lasted until just a few days prior to Dr. DeHart’s testimony at the hearing with the last set of data in evidence dated February 28, 1996 (Tr. 5232-45, 5398, 5686-87; Exhibit C-987).¹² According to Dr. DeHart, the goal was to revise the injury data to reflect (1) only those injuries which were musculoskeletal in nature, (2) had a high probability of being related to an identified stressor (as evidenced by a rating of 3 or higher on the rating code scale), and (3) resulted in either lost worktime for the injured employee or a return to work with restrictions (as evidenced by a Y or a Z designation) (Tr. 5169, 5212-14, 5583-84).

Despite multiple efforts to correct the injury data, Dr. DeHart’s “cleaned-up”, final written

¹² This report, and the work which it represents, is the focus of Dayton’s renewed motion to strike new information as it relates to Dr. DeHart’s testimony (Dayton’s Post-Hearing Brief at 18). This motion was denied at the hearing on two separate occasions and is again denied here, together with its companion motion for sanctions (Tr. 5060-61, 7015-18). As Dayton acknowledges, Fed. R. Evid. 703 allows an expert to base his opinion on facts or data “perceived by or made known to the expert *at or before the hearing.*” As indicated at the hearing, the report, as well as Dr. DeHart’s conclusions, are essentially a reformatting of data already provided to Dayton (Tr. 5049-52). Moreover, given the effective cross-examination of Dr. DeHart, Dayton has not been prejudiced or harmed by the timing of this information’s receipt (Tr. 5030, 5044-46, 7016-17).

set of data still contains obvious errors (Exhibit C-987).¹³ For instance, one of the musculoskeletal injuries rated as having a high probability of being ergonomically related to the job is a foreign object in the right eye of a tire builder (Exhibit C-987 at 13). Another is a right ring finger trauma suffered by a belt loader that apparently occurred as the result of a pallet smashing it (Tr. 5457-61, 5480-82, 5485; Exhibits C-987 at 1 & R-5680). Yet another injury contained in the data is an incident of low back pain suffered by a tire builder that apparently occurred as the result of his being jarred while operating a vehicle (Tr. 5475-78; Exhibit C-987 at 13). This latter injury also highlights the fact that a large number of the entries listed in Dr. DeHart's data are merely descriptions of pain, not diagnosed conditions. As Dr. DeHart conceded at the hearing, pain is a symptom, not an injury (Tr. 5487-88).¹⁴ Still other entries are ambiguously described as "musc" or simply "back", providing no indication of a symptom, let alone a diagnosis (Tr. 5488; Exhibit C-987 at 12). Without the medical records underlying his analysis, there is simply no way, as Dr. DeHart himself admitted, to verify whether the data contained on these sheets is accurate (Tr. 5478-79, 5482).

To compound the problem, Dr. DeHart repeatedly indicated that the records on which his analysis is based were seriously deficient. According to his testimony, the medical records were not "precise enough" to allow him or his team to definitively establish that the injuries documented therein were work-related (Tr. 5156). He stated that the only assurance of work-relatedness came from 27 corresponding workers compensation records, leaving over 300 records for which the team was unable to absolutely conclude that the documented injuries were work-related (Tr. 5156, 5395-96). In addition, some of the medical records lacked a diagnosis, requiring the team to supply a diagnosis based upon the available data (Tr. 5202, 5400). Dr. DeHart agreed that in order to assess the relationship between an identified stressor and an alleged injury, one must be able to fully assess the medical condition of the employee, including diagnosis. He conceded, however, that he and the team "did not have [the] full data" to do so here (Tr. 5399-5400).

¹³ Dr. DeHart's testimony was not entirely consistent as to whether this data truly represents the team's final set of figures (Exhibit C-987). Although his initial testimony indicates that the February 28, 1996, data was final, he later testified that another run must have been performed sometime between February 28 and March 5, 1996, the first day of his testimony (Tr. 5398, 5475-76, 5484, 5686-87).

¹⁴ Dr. Parrish, one of the plant doctors, and Dr. Schulze, also testified that pain is a symptom. (Tr. 1552-53, 4873).

Dr. DeHart also acknowledged that the medical records were not complete because they lacked comprehensive medical histories for the employees as well as very little information regarding the individual employee's personal characteristics (Tr. 5390). These deficiencies made it impossible for Dr. DeHart to rule out preexisting conditions, prior injuries, or any one of the many "confounders", such as gender, weight, or age, related to the development of musculoskeletal injuries, as potential causes of a given injury. Thus, he was unable to state the degree to which an individual's work activities, as opposed to other factors, actually contributed in whole or in part, to the identified physical malady (Tr. 5410-13, 5396, 5412, 5429, 5451, 5609). In general, Dr. DeHart agreed that the records "did not provide...all the information necessary for a proper assessment of an individual's injury and whether it was ergonomically related" (Tr. 5390, 5395). Despite this admission, Dr. DeHart persists in his claim that "in his professional opinion", causation has been established for Dayton's injured employees as a whole, but not on an individual basis (Tr. 5272, 5366). Specifically, Dr. DeHart testified that he cannot say why a particular musculoskeletal injury has occurred because, as noted above, the medical records he and his team reviewed lacked the data critical to such a determination (Tr. 5270-74, 5351, 5375). However, based upon the "flow of data" and the "relative risk" associated with each job, Dr. DeHart claims that he "moved toward causation" and was able to ultimately conclude that causation had been established for Dayton's injured employees as a whole (Tr. 5366-67, 5375-77, 5431). On the other hand, Dr. DeHart fails to adequately explain how the limited data contained in the medical records can be insufficient for him to determine causation on an *individual* basis, yet still serve as a valid basis for his otherwise unsubstantiated conclusion that causation exists for Dayton employees as a population.

Dr. Nortin Hadler

Dr. Hadler, the only witness called by Respondent, is a medical doctor who is a member of the faculty at the University of North Carolina Medical School (Tr. 6625; Exhibit R-5657). His specialties include internal medicine and rheumatology, an area which includes musculoskeletal disorders (Tr. 6628, 6635-36). Dr. Hadler has impressive credentials: he serves on several medical journal editorial boards, has been invited to deliver lectures at academic institutions all over the world, and has received numerous honors and fellowships (Exhibit R-5657). He is widely published and his most recent publication, a 1993 text entitled "Occupational Musculoskeletal Disorders", is considered

a core text for ergonomics and musculoskeletal medicine by the American College of Occupational and Environmental Medicine (Tr. 6663-65; Exhibits R-5657 at 7-15, R-5692, & R-5677). Dr. Hadler was offered and accepted as an expert in “the etiology, diagnosis, treatment, and prevention of disorders to the musculoskeletal region, that may or may not result from occupational exposures, and the general body of medical and scientific literature that addresses these issues” (Tr. 6675-76, 6706-07).

Generally, Dr. Hadler believes that there is a range of activity or “ergonomic exposure” that only becomes unhealthy at its extremes. Just as too little or no activity can be harmful, too much activity, defined by Dr. Hadler as a level “just short of” or approaching violence, can also be harmful (Tr. 6716-19, 6861-62, 6866-68, 6883, 6913, 6953-54; Exhibit R-5709). For Dr. Hadler, an example of activities that fall within the latter category are those engaged in by professional athletes (Tr. 6861, 6868, 6913-14, 6946). While there is no identifiable point at which the activity becomes harmful, Dr. Hadler maintains that movement, in general, is good and repetitive motion is necessary for the health of one’s tendons, bones, and ligaments (Tr. 6719, 6723-24, 6873).

Dr. Hadler does not dispute that maladies of the type alleged here by the Secretary actually exist (Tr. 6957-58, 6994). Indeed, he identified three types of musculoskeletal disorders which can affect an individual’s upper extremity or body, the latter two of which are relevant here: degenerative joint diseases such as osteoarthritis; peripheral nerve disorders such as carpal tunnel syndrome; and soft tissue disorders such as tennis elbow or bursitis (Tr. 6728-33; Exhibit R-5693). Dr. Hadler disputes the cause of such disorders as alleged by the Secretary claiming that a significant number of scientific studies have been unable to prove that these types of conditions can be attributed to repetitive or forceful work activities.

To support his argument, Dr. Hadler reviewed eleven scientific studies, seven of which focus upon carpal tunnel syndrome and four of which focus upon other types of cumulative trauma disorders.¹⁵ According to his evaluation, none of the carpal tunnel syndrome studies support the

¹⁵ Dr. Hadler identified three types of analytical studies which may be employed to assess the cause of musculoskeletal disorders for a given population; the cross-sectional study; the longitudinal or cohort study; and the experimental study (Tr. 6750-55; Exhibit R-5695). While all three have specific advantages and disadvantages, he contends that the experimental study is the most reliable (Tr. 6754-55, 6779). Only one of
(continued...)

notion that repetitive motion is a risk factor for developing carpal tunnel syndrome (Tr. 6766-6810; Exhibits R-5698 to R-5703).¹⁶ Specifically, Dr. Hadler found that this group of studies prove individuals performing repetitive activities with their hands or wrists do not develop impaired median nerve conductivity in any greater proportion than individuals who do not engage in such activities.¹⁷ Of particular significance to Dr. Hadler were two studies conducted by Dr. Peter Nathan, in which a group of workers was studied in 1984 and two-thirds of the same group was studied again in 1989 after five years of continued ergonomic exposure (Tr. 6806-09; Exhibit R-5703).¹⁸ In 1984, Dr. Nathan found no relationship between impaired median nerve conductivity and repetitive and/or forceful work, nor did one develop after five years of additional exposure.

Of the four remaining studies he reviewed, one was conducted by Dr. Hadler himself, one by a group of NIOSH researchers, and two by Dr. Barbara Silverstein, an epidemiologist. Dr. Hadler's study compared the cumulative trauma disorders recorded in the OSHA 200 logs for three groups of directory assistance operators working in three different cities (Tr. 6811-18, 6903-09; Exhibit R-5704). He found that although the work the operators performed varied little from site to site, the medical conditions they experienced varied dramatically. Thus, he was unable to conclude that their work accounted for these conditions (Tr. 6815-18; Exhibit R-5704). The second study examined the same group of directory assistance operators and discovered the same discrepancies as Dr. Hadler (Tr. 6822-23; Exhibit R-5705). The two studies differed only in terms of the methodologies used to

¹⁵(...continued)
the eleven studies Dr. Hadler reviewed here is an experimental study (Exhibit R-5707).

¹⁶ According to Dr. Hadler, carpal tunnel syndrome is defined as "impaired conductivity" or a slowing of the median nerve, the nerve which travels through the wrist (Tr. 6764, 6975, 6978, 6983-84; Exhibit R-5696).

¹⁷ One of the carpal tunnel syndrome studies concluded that the repetitive work performed by employees at a meat packing plant did, in fact, contribute to their abnormal nerve conduction tests and subsequent carpal tunnel release surgeries (Tr. 6784-88; Exhibit R-5700). Dr. Hadler, however, contends that the evidence examined by this study actually proves otherwise, since the likelihood of an abnormal nerve conduction test among the active employee group was no greater than that for the job applicant group (Tr. 6791-92)

¹⁸ Although the loss of one-third of the original study population could be considered a possible bias of this study, Dr. Hadler indicated this was unlikely given that the missing employees tended to be younger workers with the least amount of exposure (Tr. 6935-36; Exhibit R-5703).

compile the evidence of health effect. Dr. Hadler relied upon OSHA 200 logs while the NIOSH research group administered questionnaires and conducted physical examinations (Tr. 6824, 6827-28). The NIOSH research group also considered which factors might explain the variations in health effect between the three sites and concluded that work practices and psychosocial variables, such as working overtime or wearing bifocals, were more responsible for the disorders experienced than computer keystroke rate, the ergonomic variable (Tr. 6824-27).

The first Dr. Silverstein study reviewed by Dr. Hadler is an epidemiological study which actually served as the former's doctoral dissertation in 1985 (Tr. 6839; Exhibit R-5706).¹⁹ This study, which Dr. Hadler described as "pioneering" and "important", examined 574 workers from six Detroit automotive plants who volunteered to participate in the study (Tr. 6837-39, 6848). The workers were divided into four groups based upon the levels of repetition and force which they engaged in on the job. These levels were measured as either high or low, and according to Dr. Hadler, were defined somewhat arbitrarily (Tr. 6839-41). Upon interviewing the employees, then physically examining them for symptoms and/or signs of either carpal tunnel syndrome or tendinitis, Dr. Silverstein generally found that the employees who performed high repetition, high force tasks were exposed to developing these conditions (Tr. 6846-50). Dr. Hadler disputes this conclusion as "untenable" based on the evidence gathered for the study, and faults Dr. Silverstein for failing to conduct electrodiagnostic testing to diagnose carpal tunnel syndrome (Tr. 6846-49, 6853-56, 6862, 6968).

The second Dr. Silverstein study reviewed by Dr. Hadler is the only experimental study he considered and is also rooted in Dr. Silverstein's doctoral thesis (Tr. 6885, 6962; Exhibits R-5707 & C-990). For this study, also known as an "intervention" study, Dr. Silverstein examined the impact of the ergonomic changes which she recommended and implemented at an industrial plant with a high prevalence of upper extremity complaints (Tr. 6885-86). After evaluating the health effects both before and after the changes were instituted, Dr. Silverstein concluded that her study was a failure because training and education was not provided in conjunction with the intervention (Tr. 6887, 6960). Dr. Hadler, however, maintains that the evidence she gathered indicates not only that

¹⁹ An expanded version of this study, apparently published in 1987, was extensively analyzed by the Commission in *Pepperidge Farm, supra* at 2023-24.

cumulative trauma disorder symptoms did not abate, but that employees actually experienced worse health effects after the intervention (Tr. 6886-87, 6960-62).

While Dr. Hadler's views have been considered controversial, he maintains that other sources have voiced the same reservations as he regarding cumulative trauma disorders and whether they may be validly attributed to work (Tr. 5340-42, 6875-82, 6899-6901; Exhibit R-5708). Dr. Hadler also maintains that the primary causes or sources of musculoskeletal disorders are psychosocial factors. Specifically, he contends that complaints which can be associated with such conditions result when an individual experiences pain, but lacks the ability, for whatever reasons, to cope with the pain (Tr. 6857-60, 6892, 6928-29, 6943-44, 6994-97). Here, he argued that the health effect which occurred at the Dayton plant could be attributed to the difficulties which occurred during contract negotiations between the union and the company (Tr. 6860-61). Overall, Dr. Hadler concluded that none of the Dayton employees he observed on videotape were exposed to an ergonomic hazard (Tr. 6915-16, 6947, 6994, 7006).

THE RELIABILITY AND ADMISSIBILITY OF EXPERT TESTIMONY

The Secretary relies heavily upon the expert testimony of Drs. Schulze and DeHart to establish that hazards (stressors) existed at Respondent's worksite and those hazards caused or are likely to cause serious injury or death to employees exposed to those hazards. As a preliminary matter, the proffered expert testimony must be evaluated for reliability and its admissibility determined. The failure of this testimony to survive scrutiny as to admissibility will eliminate essential evidence in support of two critical elements in the Secretary's burden of proof; that is, the existence of hazards in the workplace and the likelihood of resulting injury or death (causation). Accordingly, the evaluation of the proffered testimony must be thorough and in accordance with current case law. Both witnesses possess impressive academic credentials and work experience and were accepted as experts within their respective professions. However, the fact that a witness is an expert is insufficient to establish that the testimony rendered by that witness is reliable and, therefore, admissible. The admissibility of expert testimony in federal courts is currently being analyzed by the courts in light of the recent decision issued by the Supreme Court, *Daubert v. Merill Dow Pharmaceuticals* ("Daubert I") 113 S.Ct. 2786 (1993). The expert evidence offered in this case must also be tested for admissibility as required by that decision.

In *Daubert I* the Supreme Court set the standard for admitting expert scientific testimony in a federal trial. Prior to the issuance of the *Daubert* decision, the test applied for determining the admissibility of expert scientific testimony was whether the opinion or the scientific technique used to support the opinion was “generally accepted” within the relevant scientific community. See *Frye v. United States* 293 F. 1013, 1014 (1923) The Supreme Court overturned the *Frye* decision on the ground that the Federal Rules of Evidence superseded the “general acceptance” test. The court noted that under the federal rules, the admissibility of expert testimony is governed by Rule 702 Fed. R. Ev.:

“If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training or education may testify thereto in the form of an opinion or otherwise”.

Under this rule, according to the Court, “the trial judge must ensure that any and all scientific testimony or evidence admitted is not only relevant, but reliable” *.Daubert* at 2795. The trial court is the “gatekeeper” who must evaluate proffered expert testimony to determine its admissibility. See *Dauberts’ Gatekeeper: The Role of the District Judge in admitting expert testimony* 68 *Tulane Law Review* 1457 (1994). The evaluation of the evidence “entails a preliminary assessment of whether the reasoning or methodology underlying the testimony is scientifically valid and of whether that reasoning or methodology properly can be applied to the facts in issue” *Daubert* at 2796.

The Court noted that expert witnesses are permitted wide latitude to offer opinions including opinions that are not based upon first hand knowledge. While stating that a definitive check list was not being offered, the court set forth four “general observations” that should be considered when evaluating the reliability of scientific expert testimony.²⁰ First, the trial judge must determine whether a theory or technique employed by the witness is “scientific knowledge” which will assist the fact finder and whether the theory or technique can be (and has been) tested. A second consideration is whether the theory or technique used by the expert has been subject to peer review and publication. Third, what is the known error rate for the theory or technique and finally, has the theory or technique

²⁰Although Rule 702 deals with ‘scientific technical or other specialized knowledge’, the court limited its analysis to scientific expert testimony. As noted by Chief Judge Rehnquist, the court provides no guidance as to determining “the difference between scientific knowledge and technical knowledge” *Daubert* at 2800.

been generally accepted within the relevant scientific community. The Court contemplates a “flexible” application of the suggested elements of inquiry to establish scientific validity (evidentiary relevance and reliability) of the proffered evidence. *Ibid* at 2796-97

The Court observed, by quoting Judge Weinstein that “[e]xpert evidence can be both powerful and quite misleading because of the difficulty in evaluating it. Because of this risk, the judge in weighing possible prejudice against probative force under Rule 403 of the present rules exercises more control over experts than over lay witnesses” *Weinstein* 138 F.R.D. at 632. *Id* at 2798. The role to be played by scientific expert testimony and the need to scrutinize that evidence by the fact finder was explained by the Court as follows:

It is true that open debate is an essential part of both legal and scientific analyses. Yet there are important differences between the quest for truth in the courtroom and the quest for truth in the laboratory. Scientific conclusions are subject to perpetual revision. Law, on the other hand, must resolve disputes finally and quickly. The scientific project is advanced by broad and wide ranging consideration of a multitude of hypotheses, for those that are incorrect will eventually be shown to be so, and that in itself is an advance. Conjectures that are probably wrong are of little use, however, in the project of reaching a quick, final, and binding legal judgment - often of great consequence - about a particular set of events in the past. *Id.*

On remand, the Ninth Circuit analyzed and applied the new test for admissibility of scientific testimony *Daubert v. Merrill Dow Pharmaceuticals, Inc.* 43 F.d. 1311 (9th Cir. 1995) (*Daubert II*) by first observing that it is necessary to engage in a two pronged analysis; first, it is necessary to determine whether the expert testimony reflects “scientific knowledge,” that is, does the testimony evolve from good science obtained by utilizing a “scientific method” and, secondly, is the evidence relevant to the case. *Daubert II* 32 F.3d at 1315. The court emphasized that it is the role of the fact finder to ensure that the testimony constitutes “good science” and stated:

Our task, then, is to analyze not what the experts say, but what basis they have for saying it....
This means that the expert’s bald assurance of validity is not enough. Rather, the party presenting the expert

must show that the expert's findings are based on objective, independent validation of the expert's methodology. *Id.* at 1316²¹
(See also *Peter v. Huber, Galileo's Revenge: Junk Science in the Courtroom* cited by the Court at 1317)

In *Daubert II*, the Ninth Circuit was particularly concerned about the reliability of proffered expert testimony based upon research which is not independent of the litigation. The court stated:

“... experts whose findings flow from existing research are less likely to have been biased toward a particular conclusion by the promise of enumeration; when an expert prepares reports and findings before being hired as a witness, that record will limit the degree to which he can tailor his testimony to serve a parties' interest”....
[t]estimony proffered by an expert [that] is based directly on legitimate, preexisting research unrelated to the litigation provides a most persuasive basis for concluding that the opinions he expresses were derived by the scientific method. *Daubert II* at 1317

The first prong of Rule 702 will also be satisfied, in the absence of research independent of the litigation, if the proffered expert testimony is based upon research subjected to peer review. In other words, “the experts must explain precisely how they went about reaching their conclusion and point to some objective source - a learned treatise, the policy statement of a professional association, a published article in a reputable scientific journal or the like - to show that they have followed the scientific method...” The court concluded that proffered testimony of plaintiff's expert in that case was nothing more than “unadorn assertions that the methodology...employed comports with standard scientific procedures.” *Id.* At 1319.

²¹As to the factors considered by the Supreme Court in determining reliability, the Ninth Circuit found them illustrative rather than exhaustive. It further stated that the factors are not equally applicable, or applicable at all, in every case. *Daubert II* at 1317. In footnote 3, the Ninth Circuit noted that:

These factors raise many questions such as how do we determine whether the rate of error is acceptable, and by what standard? Or, what should we infer from the fact that the methodology has been tested, but only by the party's own expert or experts? Do we ask whether the methodology they employ to test their methodology is itself methodologically sound? Such questions only underscored the basic problem, which is that we must devise standards for acceptability where respected scientists disagree on what's acceptable. *Id.* At 1316-17.

The *Daubert I* decision has created a virtual cottage industry among members of the legal community analyzing its meaning and the impact of that decision upon the admissibility of expert testimony, scientific and otherwise, in the federal judiciary. A large number of court decisions have also discussed *Daubert*.²² The Tenth Circuit, the circuit in which this matter arose, addressed the *Daubert* issue in *Compton v. Subaru of America Inc.* 82 F.2d 1513 (1996). In *Compton*, a products liability case, the court held that *Daubert* applies only to novel scientific testimony. The court stated:

The language in *Daubert* makes clear the factors outlined by the Court are applicable only when a proffered expert relies on some principle or methodology. In other words, application of the *Daubert* factors is unwarranted in cases where expert testimony is based solely upon experience or training. *Id*

In those cases where the expert testimony is not based upon a “methodology or technique”, the Tenth Circuit, in its interpretation of Federal Rule 702, “merely requires the trial court to make a preliminary finding that proffered expert testimony is both relevant and reliable while taking into account that the inquiry envisioned by Rule 702 is a flexible one” *Id* at 1519 citing *Daubert* at 589-95. Thus, in the Tenth Circuit, before applying *Daubert*’s nonexhaustive list of factors when reviewing proffered expert testimony, it is necessary to first determine whether the proffer is (1) scientific (2) novel and (3) based upon a particular methodology or technique.²³

It appears that the Tenth Circuit holds a minority view in its application of *Daubert*. In a more recent case, *Watkins v. Telsmith Inc.* 12 F.3d 984 (Sept. 1997), the Fifth Circuit faced the issue of whether the *Compton* analysis of *Daubert* should apply in that circuit. In *Watkins*, the proponent of the proffered expert testimony, which had been rejected by the lower court on the basis of *Daubert*, argued that the testimony was not novel and was based upon the witness’ experience. Thus,

²²A computer run for less than a three year period (1995-97) produced 107 law review articles discussing the *Daubert* decision. There have been over seventy reported federal court decisions during the same time frame analyzing or referencing the decision.

²³The court did not discuss the applicability of *Daubert* to expert testimony based upon “technical or other specialized knowledge” (Rule 702). Since the court applies *Daubert* only novel scientific testimony based upon a particular methodology or technique, it appears that *Daubert* is not relevant to technical or other specialized knowledge in the Tenth Circuit. See also *Unites States v. Jones* 107 F.3d 1147 (6th Cir. 1997) wherein the Sixth Circuit held that *Daubert* applies only to scientific expert testimony.

Daubert should not apply. The court, noting that the Seventh and Eight Circuits disagreed with *Compton*, *id* at 989,²⁴ stated:

We cannot agree with the *Compton* court’s conclusion that *Daubert* only applies when “unique, untested or controversial methodologies or techniques” are relied on by the expert. *Daubert* expressly denies that the the precepts of Rule 702 apply only to unconventional evidence. And while *Daubert* dealt with expert scientific evidence, the decision’s focus on a standard of evidentiary reliability and the requirement that proposed expert testimony must be appropriately validated are criteria equally applicable to “technical, or other specialized knowledge....”

Further, it seems exactly backwards that experts who purport to rely on general engineering principles and practical experience might escape screening by the district court simply by stating that their conclusions were not reached by any particular method or technique. The moral of this approach would be, the less factual support for an expert’s opinion, the better. *Compton’s* view of the admissibility of expert evidence is untenable. *Id* at 991 (citations omitted)

The court concluded that:

Whether the expert would opine on economic valuation, advertising psychology, or engineering, application of the *Daubert* factors is germane to evaluating whether the expert is a hired gun or a person whose opinion in the courtroom will withstand the same scrutiny that it would among his professional peers. *Id* (citations omitted)

The Review Commission has not had the opportunity to discuss and/or adopt either the apparent majority rule expressed by the Fifth Circuit or the minority view of the Tenth Circuit regarding admissibility of expert testimony. Thus, this Commission ALJ is without Commission guidance

²⁴*Cummings v. Lyle Indus.*, 93 F.3d 362, 366-371 (7th Cir. 1996); *Peitzmeier v. Hennessy Indus., Inc.* 97 F.3d 293 (8th Cir. 1996 Cert. Denied 117 S.Ct. 1552 (1997) See also: *Daubert II supra*; *Joiner v. General Electric Company*, 78 F.3d 524 (11th Cir. 1996)

regarding an obviously critical element of this case. I turn now to an analysis of the expert testimony relating to the evolving field of ergonomics proffered by the Secretary in light of *Daubert I* and its progeny; (paraphrasing the Ninth Circuit) “mindful of my position in the hierarchy of the federal judiciary, I take a deep breath and proceed with this heady task.” *Daubert II* at 1316

The Secretary offered the expert testimony of Dr. Roy DeHart to establish causation; that is, that injuries allegedly sustained by employees were caused by conditions existing in Respondent’s workplace to which those employees were exposed. (Tr. 50, 97) Dr. DeHart is a medical doctor specializing in occupational medicine and is also experienced in matters involving “ergonomics”²⁵. He possesses impressive credentials and extensive experience in the field of occupational medicine.(See Ex. C-625) Dr. DeHart testified that “work is healthy” and “the fact that individuals are engaged in physical activity in and of itself is healthy”. (Tr. 5421) Indeed, he has prescribed exercise for patients experiencing low back pain (Tr. 540). Under certain circumstances, weight lifting is a “conditioning activity” (Tr. 5406) and torso bending as well as other “ergonomic stressors” could be beneficial. (Tr. 5407) In this case, however, he supports the Secretary’s position that Respondent’s employees were exposed to the “increased risk of developing cumulative trauma disorders”²⁶ as alleged in each instance cited by the Secretary. Dr. DeHart supports this conclusion on the basis of his findings resulting from the application of the “relative risk” statistical methodology.²⁷ The work performed and the conclusions reached by Dr. DeHart and his colleagues were not independent of this litigation nor were they based upon preexisting research. Dr. DeHart’s work product was created at the behest of the Secretary of Labor specifically for this litigation.

The Secretary provided Dr. DeHart with records obtained from Respondents’ clinic which were received initially by a team of six resident doctors and three faculty members at the University

²⁵DeHart defines ergonomics as the study of work. He considers ergonomics to be a science within the field of engineering (Tr. 5064, 5093-94)

²⁶Establishing that employees were exposed to “increased risk” of injury is not a necessary element of proof for a general duty clause violation (section 5(a)(1). The Secretary was unable to provide a convincing explanation for the insertion of the phrase in the citation. For purposes of this analysis the language is superfluous and irrelevant to the Secretary’s burden of proof. See Kearney testimony Tr. 5918-5920.

²⁷When initially asked, Dr. DeHart stated that the methodology could not be identified by a particular name. (Tr. 5139-40)

of Oklahoma medical school to determine (1) whether injuries listed on the records and identified by the team members as musculoskeletal injuries were consistent with ergonomic stressors identified by the Secretary and (2) whether a trend of injuries could be determined for each job activity (Tr. 5190-91). The team also viewed the video taken by OSHA of the jobs performed by employees and the ergonomic analysis prepared by Mr. Besser. A data collection form was created for each job task recording and assigning a letter designation for various degrees of severity of injury.²⁸ A total of 333 records were reviewed and for each stressor identified as job related, a rating code was developed to determine the likelihood that an injury was caused by said stressor. A zero rating indicated no relationship between the stressor and a reported injury; "1" indicated a 25% relationship; "2" meant as 25-50% relationship; "3" a 50-75% relationship and "4" a 75-100% relationship between exposure to a stressor and an injury. (Tr. 5150-51). The Secretary, in her brief, describes the methodology applied by Dr. DeHart as follows:

Once Dr. DeHart identified the number of injuries that met the criteria that had been established - that is, musculoskeletal injuries that resulted in some kind of limitation or lost work time, than a calculation was made to determine what the rate of injury was for that particular work activity or task. (Tr. 5212). Since the period of review of the medical records was 1989 to August 1993, a time period of 4.66 years was used in the calculation. (Tr. 5198). The next step in the incidence rates calculation was to multiply the time period reviewed by the number of employees assigned to a particular job task. That result was then divided by the number of injuries/illnesses that were found which determined the rate of injury per year that individuals in those job tasks were being exposed to. The amount found was then multiplied by one hundred in order to ascertain the rate per one hundred employees per year. (Tr. 5197). The time period of 4.66 years was used consistently for all incident rate calculations. The numbers of employees varied with each job. The number of injuries would also vary by job task. (Tr. 5198, C-972). This analysis was performed for each of the job tasks. (Tr. 5217) Secretary's brief p. 21, footnote excluded)

Having determined an "incident rate" of injury within Respondent's plant of each relevant job task, Dr. DeHart performed a comparison between that rate (musculoskeletal injury rate) with the incident

²⁸The letter "X" indicated that the employee, immediately returned to work, "Y" was used to indicate that the employee immediately returned to work with some restriction and "Z" signified lost work time.

rates experienced by the tire industry in general as reported by the Bureau of Labor Statistics (Tr. 5216). DeHart described this comparative analysis methodology as a “relative risk” approach (Tr. 5160-70). Complainant describes the “relative risk” approach as follows:

Relative risk, also know as ratio analysis, is a mathematical calculation and common approach for comparing data which is generally accepted within the field of occupational medicine. (Tr. 5141, 5225-26). There are recognized techniques which would be present in any basic biostatistics book, more commonly in epidemiological textbooks, and in many occupational medicine textbooks. (Tr. 5143). Calculating the relative risk determines whether or not the incident rate is higher for the population group being studied as compared to another standard.

The reliability of a relative risk ratio, such as was used here, is based on data that is used to determine the incident rate. The reliability of the association increases as the calculation exceeds 1 in terms of the risk ratio. As the relative risk ratio exceeds 1, an association between the causative agent and the injury, here the musculoskeletal injuries and the ergonomic stressors present in the job task, is established. (Tr.5274).

A confidence interval is a method of providing some statistical assessment of the data. It is a way to assign some degree of confidence in the comparison of the data between the two data sets. In this case, application of a confidence interval was not appropriate because the data set were not the same since the Department of Labor figures include all injuries and illnesses and the Dayton Tire data includes only those injuries that are classified as musculoskeletal. (Tr. 5277-78). In this instance, the degree of confidence for the overall population increases as the pattern of injuries build across the group being studied. (Tr. 5161). (Complainant’s Brief pages 22,23).

The Secretary asserts that the methodology utilized by Dr. DeHart is “accepted in his field” (Secretary’s brief pg. 23) and, therefor, his findings are reliable. Despite the urging of this Administrative Law Judge that the parties should discuss expert testimony in light of the *Daubert I* decision, *supra*, the Secretary declined to provide that analysis. It is apparent that the Secretary is relying upon the “general acceptance” test *Frye v. United States, supra.*, to support the proffered expert testimony of Dr. DeHart, (Secretary’s brief pgs. 17-23).

Respondent on the other hand, provided a detailed attack upon Dr. DeHart’s testimony in relation to *Daubert I*. First, Respondent asserts that Dr. DeHart’s findings were generated specifically for this litigation and were not validated by any objective, independent analysis or source

see Daubert I at 1317-19. Second, although the so called relative risk analysis does not appear to be a generally accepted methodology for establishing causation *see* Tr. 5438-40, 5433-35, 5439-40, the most that can be expected from Dr. DeHart's work is that it is hypothesis generating rather than hypothesis proving Tr. 6760 (Respondent's brief pg. 22). Thus, argues Respondent, DeHart's study proves nothing about the alleged relationship between stressors and injuries at Respondent's plant. Third, DeHart's work is subject to "ecological fallacy" because crucial individualized data was not collected (Tr. 5436-38). Respondent explains this fallacy as follows:

"[DeHart] studied a population in the aggregate and made no effort to eliminate or account for confounding factors that might have affected risk or the development of injury. Ex. 2 at 5428-29. Confounding factors contribute to "bias," or inaccuracy (Ex. 2 at 5446) in an epidemiological study. Ex. 2 at 5450-51.

For example, some of the non-ergonomic factors that can contribute to an injury that appears at first to be ergonomically-related are gender, age, obesity, psychosocial factors, height, strength, other physical conditioning, heredity, arthritis, bursitis, pregnancy, gout, diabetes and prior injuries. Ex. 2 at 5410-12. Dr. DeHart did not control for any of these factors in his study. Ex. 2 at 5412.

Another type of confounding factor is off-the-job activities that might contribute to an injury that appears at first to be job-related. Some of these are sports, hobbies, housework and yard work. Ex. 2 at 5412. Dr. DeHart was not able to account for these factors in his analysis of apparently job related injuries at Dayton. Ex. 2 at 5412-13." (Respondent's brief pg. 22-23)

Because Dr. DeHart failed to account for confounding factors, his study and conclusions do nothing more than raise a "red flag" that injuries may be work related (Tr. 5892-94). Moreover, DeHart assumed that all injuries reported by Respondent's employees were job related (Tr. 5494). Respondent also argues that Dr. DeHart's comparison of his findings with a study published by the Bureau of Labor Statistics is meaningless because "the time frames for the two data sets were different; the types of injuries represented in the two data sets were different and even the types of jobs encompassed within the two data sets were different (Tr. 5569-70) (Respondent's brief pg. 24). Dr. DeHart acknowledged that the comparison was the equivalent of comparing apples to a fruit basket without knowing whether any apples are in the basket (Tr. 5577).

Respondent also attacks the reliability of the information contained in the records reviewed

by Dr. DeHart which forms the basis for his conclusions. Respondent points to the following “admissions” by Dr. DeHart:

- (1) The medical records were incomplete. (Tr. 5390)
- (2) The records did not contain, among other things, complete medical histories. (Tr. 5390)
- (3) The records lacked information relating to the employee’s personal characteristics. (Tr. 5390)
- (4) The records lacked information relating to any physical examination of the employee. (Tr. 5390)
- (5) The records lacked information relating to the onset of symptoms reported in the records. (Tr. 5390)
- (6) The individual records did not provide sufficient information that, if Dr. DeHart had been the treating physician, he would have felt comfortable making a diagnosis. (Tr. 5390)
- (7) The records did not provide the information necessary to determine whether an employee’s reported injury was ergonomically related. (Tr. 5391)
- (8) Dr. DeHart accepted the information in the medical records at face value, and never attempted to independently confirm the information contained in any medical record. (Tr. 5391)
- (9) The information contained in the medical records was inadequate with reference to history of, or occurrence of, injuries. (Tr. 5391-93)
- (10) With respect to the vast majority of the medical records reviewed, Dr. DeHart was unable to determine even whether the reported injury was job related. (Tr. 5395-96)
- (11) With respect to the majority of records, Dr. DeHart was unable to determine the degree to which biomechanical, job-related factors contributed to a

govern injury, and the degree to which any other factors contributed to that injury. (Tr. 5396)

- (12) The information in the medical records was so incomplete that Dr. DeHart could not rule out preexisting conditions as the cause of the reported injury. (Tr. 5396)
- (13) The information in the medical records was so incomplete the Dr. DeHart could not rule out prior injury as the cause of the reported injury. (Tr. 5396)
- (14) The information in the medical records was so incomplete that Dr. DeHart could not rule out non-occupational factors as the cause of the reported injury. (Tr. 5396)
- (15) The medical records did not provide sufficient information to allow a full medical assessment and diagnosis, which is necessary to assess the “ergonomic-relatedness” of an employee medical complaint. (Tr. 5399-5400)
- (16) For the majority of the medical complaints reflected in the records, Dr. DeHart was simply unable to determine the etiology, or cause, of the complaint. (Tr. 5455-56) (Respondent’s brief pgs. 25-26)

Thus, argues Respondent, the records reviewed by Dr. DeHart lack sufficient detail to rule out preexisting conditions, prior injuries or other non-occupational factors that may have caused the malady described by each of Respondent’s employees.

Respondent cites *Casey v. Ohio Medical Products* 877 F. Supp. 1380 (1995); *Viterbo v. Dow Chemical Co.* 826 F.2d 420 (1987) and *Carroll v. Litton Systems, Inc.* 1990 U.S. Dist. LEXIS 16833 (W.D.N.C. 1990) for the proposition that incomplete medical records, as in this case, are an insufficient basis for establishing causation.

The second expert witness called by the Secretary, Lawrence Shulze, holds a Ph. D from Texas A&M University in Industrial Engineering. He also has an extensive background, both educational and work experience, in the field of ergonomics. As previously stated, the Secretary offered the testimony of Dr. Shulze to verify ergonomic stressors identified at Respondent’s

workplace and injuries that are likely to be sustained by employees exposed to those stressors. Shulze also suggested equipment and procedures for abating the violations alleged by the Secretary.

Dr. Shulze utilized the “observational method” to identify ergonomic stressors to which Respondent’s employees were exposed. As with Dr. DeHart, the work performed by Dr. Shulze was at the request of the Secretary for this litigation. Essentially, the observational method involves observing the work processes at Respondent’s plant and the manner in which employees perform their tasks. The Secretary describes the work performed by Dr. Shulze in this case as follows:

During his plant entry, he observed and videotaped each job; determined what tools were used; measured forces, noise, weights, heights and distances; and documented the tasks with photographs. (Tr. 1460, 1465). Dr. Schulze completed his analysis by analyzing the video footage and the data he had collected of each job task. With this information, he created an operation process chart to determine what percentage of time the employees spent in their activities, identified risk factors and ergonomic problem areas, made abatement recommendations, and then formulated a written report. (Tr. 1460). (Secretary’s brief pg. 11)

The Secretary asserts that the methodology utilized by Dr. Schulze is “widely used and generally accepted within the field of ergonomics” (Secretary’s brief pg. 12). It appears that the Secretary is relying upon the educational background and work experience of Dr. Schulze as well as the “general acceptance” of the observational method to establish the reliability of his testimony.

Respondent on the other hand, strenuously argues that the “observational method” is nothing more than the personal opinions of an individual based upon observance of an event. Respondent cites *O’Connor v. Commonwealth Edison Co.* 13 F.3d 1090, 1106-07 (7th Cir.) Cert. denied 114 S.Ct. 2711(1994) for the proposition that personal observation is not a proper basis for expert scientific testimony. Indeed, in this case three individuals observed the same work activities either in person (Schulze) or by video (Besser and DeHart) and, according to Respondent, the testimony of these individuals regarding their observations is remarkable because of their dissimilarities. In its brief, Respondent lists seventeen pages of “dissimilarities” in the testimony of Schulze, DeHart and Besser based upon their perception of the work activities. (Appendix B of Respondent’s brief). Respondent argues that Dr. Schulze engaged in a casual visual inspection of the work areas because it was “least intrusive” and seeks to legitimize the procedure by characterizing it as the observational

method. Moreover, according to Respondent, the personal observations of Dr. Schulze cannot be established as accurate or reliable as required under Rule 702 FRE or *Daubert I supra* (Respondent's Reply Brief pgs. 8-9).

The first step in the analysis is to determine whether the testimony offered by DeHart and Schulze constitutes scientific testimony within the meaning of Rule 702 FRE as alleged by Complainant. The substance of the proffered expert testimony is that ergonomic stressors³⁰ exist in Respondent's plant (Schulze) and those stressors are causing or likely to cause employee injuries (DeHart). Both witnesses assert that their testimony relates to a scientific endeavor known as ergonomics. Ergonomics was defined by Dr. Schulze as:

“the evaluation, design and/or redesign of facilities, work stations, work areas, job tasks, to accommodate the work to the worker, rather than having the worker have to accommodate to the work environment, the work station, tools in the work area” (Tr. 1398).³¹

According to Schulze the study of occupational related diseases has been a documented concept “from Ramazzini in the 1700's” (Tr. 1399).³² Both witnesses agree that ergonomics is a science. Since the weight of the evidence in the record supports the conclusion that ergonomics is a science and there is no evidence to the contrary, the proffered testimony of Schulze and DeHart satisfy the requirement of Rule 702 for expert opinions of a scientific nature.

³⁰ “Ergonomic stressor” was defined by Schulze as “a stress, force or load to body, that has an impact on the job task that's being performed.” (Tr. 1400).

³¹ Schulze testified that ergonomics is a subspeciality in the field of industrial engineering. He was unaware of any university which offers a degree in ergonomics (Tr. 1402-03).

³² Bernardino Ramazzini is known as the father of occupation medicine. In the preface to his book “*De Morbus Artificum*” (About the diseases of workers) (1721) Ramazzini wrote :

“...Manifold is the harvest of diseases reaped by certain workers from the crafts and trades that they pursue; all the profit they get is injury to causes. The firsthand most potent is the harmful character of the materials that they handle, noxious vapors and very fine particles, inimical to human beings, including specific diseases. *As the second cause I assign certain violent and irregular motions and unnatural postures of the body, by reason of which the natural structure of the living machine is so impaired that serious diseases gradually develop therefrom...*” (Emphasis added) *Industrial Environment - Its Evaluation and Control NIOSH*.

As noted previously, the Tenth Circuit Court of Appeals has taken the position that *Daubert I, supra*, applies only to *novel* scientific testimony. *Compton v. Subaru of America, supra*. Thus, the second step in the analysis is to determine whether the testimony offered by Schulze and DeHart is “novel.” The concept of “ergonomics” is not new; however, it is a new phenomenon in the enforcement scheme of the Occupational Safety and Health Act. There is no standard governing employee exposure to ergonomic stressors and only one Review Commission case relating to alleged general duty clause violations for employee exposure to ergonomic stressors, *Pepperidge Farm, supra*. Moreover, no cases have been found which discuss the likely injuries to be sustained by long periods of standing, elevated and extended reaches, awkward postures, torso flexions, frequent lifting, twisting, static posture and the myriad other ergonomic stressors contained in the citation issued to Respondent. There can be no doubt that these issues are clearly “novel” to the enforcement of occupational safety and health under the Act.

Since the proffered testimony of Schulze and DeHart directly relate to the novel issues raised by Complainant’s citation, the analysis of their expert testimony must be made in accordance with *Daubert I supra; see Compton supra*. As noted above, the *methodology* utilized by an expert witness must be analyzed to determine the “reliability” of the opinion expressed by the expert. Evidentiary reliability, according to the Supreme Court, means trustworthiness. In a case involving scientific evidence, “*evidentiary reliability* will be based upon *scientific validity*” *Daubert I* footnote 9 at 2795 (Emphasis in original). There is a distinction between *scientific validity*, which refers to the ability of a scientific test to measure what it purports to measure, and *scientific reliability*, which refers to the ability of a scientific test to obtain consistent results *see Black, A Unified Theory of Scientific Evidence* 56 Ford. L. Rev. 595, 599 (1988), referenced by *Daubert I id*. Thus, the issue is not what conclusion was reached by the expert but *how* the conclusion was reached. Accordingly, the “general observations” offered by the Supreme Court, *supra*, must be applied to test the scientific methodologies utilized by Schulze and DeHart.

First, are the “observational method” (Schulze) and the “relative risk” method (DeHart) testable and has either method been tested specifically as applied to this case? Notwithstanding the self-serving statements of both witnesses that the techniques which they used produce accurate results, there is nothing in this record to verify that the techniques are “testable” or that they have

been “tested” for purposes of this litigation; that is, it has not been established that the techniques are scientifically valid by measuring what they purport to measure in this case. Moreover, there is insufficient evidence to support the conclusion that the methodologies are scientifically reliable; that is, that the tests, if applied by other qualified scientists, will obtain consistent results. Second, there is no evidence in this record that either technique has been subjected to peer review and/or publication for purposes of establishing that the alleged “ergonomic stressors” alleged by the Secretary are, in fact, “stressors” or, whether and under what conditions said stressors are likely to cause injury. Third, both Schulze and DeHart testified that they did not calculate an “error rate” for their conclusions or, indeed, that it is possible to calculate an error rate. Thus, there is no way to calculate the probability that some or all of their conclusions may be inaccurate other than to accept, without question, that what they have to say is totally accurate.

Fourth, both witnesses maintain that the techniques which they utilized are “generally accepted” within their respective scientific community. Dr. Schulze insists that the “observational method” which he employed is generally accepted within the ergonomic community for identifying stressors. The Courts however, have been unwilling to accept the observational method, without anything more, as a reliable method for establishing scientific fact. *See: Deimer v. Cincinnati Subzero Products, Inc.*, 58 F.3d 341 (7th Cir. 1994); *O’Connor v. Commonwealth Edison Co.*, 13 F.3d 1090 Cert. Denied 114 S.Ct. At 27 (1994); *Wintz v. Northrop Corp. et al* 1995 WL 758 114 (ND Ill.). Thus, general acceptance of the observational method “*ipse dixit*” is not a sufficient basis for establishing scientific fact in this case.

With respect to the “relative risk” method, Dr. DeHart conceded that his evaluation has major flaws:

JUDGE YETMAN: Doctor, of what value is your study?

Without trying

to diminish your work here, but I have to put this in some sort of context. Of what value are your findings in terms of determining whether there are specific violations at the Dayton Tire plant?

THE WITNESS: What we have attempted to show is the number of work-related injuries per category, and we have used as a comparison base the overall tire

industry experience. There are two major flaws, one of which has been pointed out, that we do not have a comparison with the direct job.

The second major flaw is that we are comparing data that includes all illnesses and all injuries to just those related to musculoskeletal injuries. What it should provide, though, is some indication of the degree of injury that is occurring in the plant.

JUDGE YETMAN: Okay. Getting back to my understanding of what value your information [is] to me or, indeed, to the Respondent, it is to present a red flag to the Respondent that something may be wrong with these various work activities that must be looked at.

THE WITNESS: As you indicated yesterday.

JUDGE YETMAN: You agree with that?

THE WITNESS: Yes. (Tr. 5578-79)

Thus, with at least two “major flaws” in the methodology utilized by DeHart, it cannot be reasonably argued that an acknowledged flawed analysis is “generally accepted” within the field of occupational medicine. Moreover, Dr. DeHart’s agreement that his study provides nothing more than a “red flag” that “something may be wrong” with the work activities cited by the Secretary is an insufficient basis to conclude that injury causing hazards exist at Respondent’s worksite. As stated by the Supreme Court, “[c]onjectures that are probably wrong are of little use...in the project of reaching a quick, final and binding legal judgment...” *Daubert I supra* at 2800. For these reasons it is concluded that neither the observational method nor the relative risk method, as applied in this case, are generally accepted scientific methodologies. Moreover, based upon the demeanor of both witnesses at trial, the admonition of the Ninth Circuit in *Daubert II supra* at 1317 that “testimony proffered by an expert [that] is based directly on legitimate, preexisting research unrelated to the litigation provides the most persuasive basis for concluding that the opinions he expresses were derived by the scientific method” is particularly applicable here. Neither witness presented any independent corroborating evidence of any nature to support their conclusions.

For the foregoing reasons it is concluded that the methodologies utilized by Drs. Schulze and DeHart fail to meet the minimal requirements for evidentiary reliability when tested in accordance with *Daubert I*. Thus, any evidence offered with respect to the conclusions reached by the witnesses

based upon those methodologies is inadmissible pursuant to Rule 702 FRE. Accordingly, that testimony is stricken from the record.³³ This is not to say, however, that the testimony of those individuals that is not specific to this case but is based upon their general professional knowledge in their respective fields is not admissible. To the contrary the general description of matters relating to the fields of ergonomics and occupational medicine is admissible and reliable.³⁴

STIPULATIONS

On September 28, 1995, the parties submitted the following joint stipulations:

1. As a result of an OSHA inspection, Respondent Dayton Tire was issued a citation under Section 5(a)(1) of the Occupational Safety and Health Act alleging ergonomic hazards at its worksite located at 2500 South Council Road, Oklahoma City, Oklahoma.
2. The total penalty proposed by the Secretary of Labor as a result of the alleged violations contained in the ergonomic citation is \$5,000.00.
3. Jurisdiction of this proceeding is conferred upon the Occupational Safety and Health Review Commission.
4. Dayton Tire is an employer engaged in a business affecting commerce within the meaning of Section 3(5) of the Occupational Safety and Health Act of 1970, 29 U.S.C. § 652(5).
5. None of the ergonomic hazards identified in the citation is likely to cause death.
6. Compliance officers Carlos Reynolds and Faye Kearney did not measure the muscular force exerted by Dayton Tire employees at any time during their visit to the Dayton Tire facility.
7. Compliance officers Carlos Reynolds and Faye Kearney did

³³Since the Secretary failed to establish by a preponderance of the evidence that Respondent violated section 5(a)(1) of the Act, it is not necessary to provide a *Daubert* analysis of Dr. Hadler's testimony.

³⁴It is recognized that this ruling is a serious, and as seen *infra*, a fatal blow to the Secretary's case and will, most likely, form the basis for an appeal if the Secretary is so inclined. For that reason and in fulfillment of my role as a fact finder and in order to provide a complete record, an analysis of the testimony of Drs. DeHart and Schulze derived from the application of their respective scientific methodologies will be contained in footnotes accompanying the analysis of each alleged violation, *infra*.

not measure the torso flexion of Dayton Tire employees at any time during their visit to the Dayton Tire facility.

8. Compliance officers Carlos Reynolds and Faye Kearney did not calculate the ulnar deviation of Dayton Tire employees at any time during their visit to the Dayton Tire facility.
9. Compliance officers Carlos Reynolds and Faye Kearney did not calculate the wrist flexion or extension of Dayton Tire employees at any time during their visit to the Dayton Tire facility.
10. Compliance officers Carlos Reynolds and Faye Kearney did not calculate the shoulder flexion or abduction of Dayton Tire employees at any time during their visit to the Dayton Tire facility.
11. Compliance officers Carlos Reynolds and Faye Kearney did not calculate the forearm pronation or supination of Dayton Tire employees at any time during their visit to the Dayton Tire facility.
12. Compliance officers Carlos Reynolds and Faye Kearney did not measure the force used in “forceful finger exertions” by Dayton Tire employees at any time during their visit to the Dayton Tire facility.
13. Compliance officers Carlos Reynolds and Faye Kearney did not measure the “increased compressive force” exerted by Dayton Tire employees at any time during their visit to the Dayton Tire facility.
14. Compliance officers Carlos Reynolds and Faye Kearney did not calculate the “static posture times” of Dayton Tire employees at any time during their visit to the Dayton Tire facility.
15. At the time the Secretary issued the Citation in this case, there were no incidents of heat stroke documented in Dayton’s OSHA 200 logs for the year 1993.
16. Mr. Besser has never visited the Dayton Tire facility.
17. Compliance officers Faye Kearney and Carlos Reynolds did not videotape employees in the cited jobs for a full eight hour shift.
18. The wet bulb globe thermometer used by the compliance officers to measure heat stress conditions was overdue for

calibration at the time of the measurements.

19. The compliance officers did not place their wet bulb globe thermometer on a tripod while taking measurements.

DISCUSSION

In the *Pepperidge Farm* case, *supra*, the Review Commission considered the application of § 5(a)(1) to alleged ergonomic violations for the first time. In addition to multiple recordkeeping violations, Pepperidge was cited under the general duty clause for exposing its employees to both lifting and repetitive motion hazards.³⁵ The Commission analyzed each of these allegations under well-established principles of § 5(a)(1) doctrine. A general duty clause violation exists where the Secretary has established that: (1) a condition or activity in the employer's workplace presents a hazard to employees, (2) the cited employer or the employer's industry recognizes that hazard, (3) the hazard is causing or likely to cause death or serious physical harm, and (4) feasible means exist to eliminate or materially reduce the hazard. *General Dynamics Land Systems Div., Inc.*, 15 BNA OSHC 1275, 1280, 1991-93 CCH OSHD ¶ 29,467 (No. 83-1293, 1991), *aff'd without published opinion*, 985 F.2d 560 (6th Cir. 1993).

I. Existence of a Hazard

According to the Commission, the first prong of a § 5(a)(1) analysis ! the existence of a hazard ! turns on two factors: actual or potential physical harm, and a sufficient causal connection between that harm and the workplace. *Pepperidge Farm* at 2014. Here, the Secretary contends that Dayton employees suffered from a significant number of injuries, all of which she claims can be considered cumulative trauma disorders and can be attributed to work activities at the Dayton plant. Having submitted only three employee medical records into evidence, the Secretary bases her allegations of injury largely upon the testimony of the thirty-one Dayton employees called as witnesses at the hearing to testify as to the thirteen instances of violation remaining in issue, as well as Dr. DeHart's analysis of over 300 employee medical records covering the period from 1989 and

³⁵ In *Pepperidge Farm*, the lifting tasks and repetitive motion tasks performed by plant employees were cited under separate citation items. Here, however, the Secretary includes lifting among the numerous work activities listed under each instance of the one violation at issue here, linking all such tasks to the development of cumulative trauma disorders.

1993.³⁶ The Secretary also relies upon nine accident analysis files and fourteen workers compensation records to document employee injury.³⁷ In addition to these sources, the testimony of the four Dayton plant doctors who treated employees at the onsite clinic during the period in question, as well as Dayton's OSHA 200 logs, are equally relevant. As discussed *supra*, in terms of causation, the Secretary has indicated that her case rests largely on the shoulders of Dr. DeHart, but to the extent that his testimony is relevant to proving potential harm, also relies upon Dr. Schulze.

Although Dayton indicates in its post-hearing brief that medical records would be the “best evidence” of the employees’ medical conditions, the company does not dispute that the employee injuries alleged by the Secretary actually occurred (Dayton’s Post-Hearing Brief at 17). However, Dayton strongly contests the Secretary’s claim that any of the injuries sustained by plant employees were caused by the work activities alleged in the citation to be stressors. Like Pepperidge Farm, Dayton also argues that the Secretary has failed to define the alleged hazard in a way that “apprises the employer of its obligations, and identifies conditions or practices over which the employer can reasonably be expected to exercise control.” *Pelron Corp.*, 12 BNA OSHC 1833, 1835, 1986-87 CCH OSHD ¶ 27,605 (No. 82-388, 1986). Citing to *Kastalon, Inc.*, 12 BNA OSHC 1928, 1986-87 CCH OSHD ¶ 27,643 (No. 79-3561, 1986) (“*Kastalon*”), Dayton claims that the Secretary has been unable to establish the point at which each work activity presents a hazard to employees.

These arguments, as well as those raised by the Secretary, are considered in detail below with regard to each instance of violation.

Instance A ! Belt Loaders

The following prefatory language applicable to all of the alleged instances of violation appears above the first instance of violation:

Section 5(a)(1) of the Occupational Safety and Health Act of 1970:

³⁶ Of the three medical records in evidence, only two are admitted for the substantive information contained therein (Exhibits C-173 & C-241). The medical record for employee Randy Burch was admitted only to serve as an example of the forms used by the plant doctors (Tr. 4567-71; Exhibit C-29).

³⁷ An accident analysis form was completed by an employee’s immediate supervisor whenever there was a report of injury (Tr. 6438-40, 6448). The form, copies of which were circulated throughout the respective department’s management, was developed by Dayton’s safety department as a way to gather information regarding injuries at the plant (Tr. 6439-41).

The employer did not furnish employment and a place of employment which were free from recognized hazards that were causing or likely to cause death or serious physical harm to employees in that employees were exposed to an increased risk of developing Cumulative Trauma Disorders from tasks that they were performing and engineering and administrative controls were not implemented.

Under Instance A, the citation states in relevant part:

A) Department #112 - Compounding and Mixing; belt loader(s) loading a feed belt and monitoring Banbury control panel were exposed to cumulative trauma disorders involving ergonomic stressors such as frequent lifting, elevated and extended reaches, and long periods of standing.

Two employees testified in connection with this instance: Sang Van Nguyen (Tr. 4266-4318); and Michael Keith Willard (Tr. 4319-43). Belt loaders are primarily responsible for loading specified amounts of natural and synthetic rubber, pigment, and scrap rubber, known as “TMA”, onto a conveyor belt which leads into a mixer (Tr. 4271, 4277-78, 4309, 4327, 4339-40; Exhibit C-962, Segment starts 00:00:12).³⁸ Tools used by a belt loader include a knife used to cut various materials and a large hook used to carry materials to the conveyor belt (Tr. 4271-73, 4278-79, 4307, 4322, 4327). In some cases, a cutting machine with a large descending blade is used to cut bales of rubber (Tr. 4272, 4305-06). Once the conveyor belt is loaded, the belt loader uses a computer to verify the weight of the materials, collectively known as a “batch”, and the materials are then processed into slab stock rubber (Tr. 4306-07, 4325, 4340). Anywhere from 100 to 150 batches are run per 8-hour shift (Tr. 4272-73, 4286-87, 4334-35). Other duties performed by belt loaders include cleaning up around their work area and performing “remills”, which involves running certain stocks of slab rubber through the machine a second time (Tr. 4340-43).

According to Mr. Willard, 90% of the belt loader job is lifting and loading stock (Tr. 4343). The belt loader lifts bales of rubber weighing approximately 75 pounds from a pallet onto the

³⁸ In referencing the relevant portions of the Secretary’s videotape depicting the various jobs at issue here, it is clear that the videotape provides only a sample of the job duties performed by an employee over the course of an 8-hour shift. Indeed, these brief videotaped segments do not depict all of the activities which an employee might engage in during an average workday. For example, Mr. Nguyen testified that the video does not depict the belt loader loading TMA onto the conveyor belt (Tr. 4308).

conveyor belt and each batch requires between eight to twelve bales (Tr. 4270-72, 4282, 4323-24, 4334-35). Although a lifting device known as a “strong arm” is available to assist with this task, both employee witnesses indicated that the device frequently malfunctions (Tr. 4273, 4276, 4328-29, 4332, 4338-39). As a result, Mr. Willard rarely uses the strong arm to lift rubber bales (Tr. 4332). In addition, the strong arm is only capable of lifting 120 pounds; thus, when the bales of rubber stick together, as they often do on hot days, their combined weight exceeds the capacity of the strong arm (Tr. 4274-75, 4280). On such occasions, Mr. Nguyen indicated that he would locate someone to help him lift the rubber onto the belt (Tr. 4275-76). Mr. Willard testified, however, that he worked by himself approximately 75% of the time (Tr. 4325-26). Additional materials lifted by belt loaders include the TMA, which ranges in weight from five to as much as fifty pounds if it sticks together, and bags of pigment, which weigh anywhere between five ounces to fifty pounds (Tr. 4278-79, 4309, 4340). For each batch of rubber produced, the belt loader must reach up over his head to operate the computer control panel (Tr. 4286, 4303). Belt loaders must also reach to remove the bales of rubber from stacks piled as high as four to five feet (Tr. 4282-84, 4331). All of the belt loader’s duties are performed while standing on a concrete floor, but in between batches there might be an opportunity to sit down for a few seconds (Tr. 4280-81, 4333).

Mr. Nguyen, who worked as a belt loader for an unspecified period of time in 1993, testified that in June of that year, he reported to his supervisor that he was experiencing a tingling in his left arm (Tr. 4289-91).³⁹ Over the course of several days, he was seen by a doctor at Dayton’s onsite clinic and referred to an offsite physician, both of whom prescribed medication to relieve his symptoms. He was also assigned to light duty work (Tr. 4290-93). Still experiencing pain, Mr. Nguyen visited his personal physician and was ultimately diagnosed with carpal tunnel syndrome (Tr.

³⁹ Though relevant to the issue of exposure in view of the “cumulative” nature of the hazard alleged, the Secretary failed to elicit testimony from many of the employees who testified at the hearing establishing the length of time which they were employed in a cited job. For instance, it is not clear from the record how long Mr. Nguyen was employed as a belt loader. In addition, it is not evident whether he was employed in this position during the period alleged by the Secretary in her amended complaint (Tr. 6556). However, for this particular instance as well as those discussed *infra*, there is no evidence to suggest that the duties performed by the employee witnesses were any different from those performed by employees working in the same jobs during the period in question (Tr. 4903). Thus, the fact that some of the employee witnesses may not have been employed in a cited job during the alleged period does not preclude consideration of their testimony here.

4293-94, 4311-12). He subsequently underwent surgery which apparently relieved the tingling in his fingers, but his wrist and arm remained painful (Tr. 4295-96).

Mr. Willard testified that while working as a tire builder in 1989 at the Dayton plant, he developed bursitis in his right shoulder (Tr. 4336-37, 4341). In his four years as a belt loader, he indicated that he had “no problems” with his shoulder, but sometimes felt pain or discomfort which he never reported to his supervisor (Tr. 4328, 4336).⁴⁰

Because the citation mirrors his report, Besser identified frequent lifts, elevated and extended reaches, and long periods of standing, as the ergonomic stressors associated with the belt loader job (Tr. 6044-45; Exhibit R-5586 at 8). However, he found that the primary stressors of this job are those associated with the lifting of rubber bales (Tr. 6044). Using the formula found in the 1981 version of the NIOSH lifting guidelines, Besser determined that the load of this lift exceeds the calculated action limit and is consistent with the development of low back injury (Tr. 6044-45; Exhibit R-5586 at 10). He indicated, however, that the frequency component of his lifting analysis was omitted because he could not determine from the information Kearney provided to him how often the belt loaders performed this lift manually versus mechanically with the strong arm (Tr. 5838-40, 6043, 6249-50; Exhibit R-5586 at 9).⁴¹

⁴⁰According to Dr. Schulze, the primary ergonomic stressor associated with the belt loader job is the lifting of rubber bales, an activity which he claims is hazardous because it is frequent and asymmetrical (Tr. 1531-32, 1535-36, 1541-43, 1550-51, 1566, 3260, 3274; Exhibit C-628). Using the formula found in the 1991 version of the NIOSH lifting guidelines, he specifically concluded that manually lifting 75-pound bales of rubber at a rate of approximately five times per minute exceeded the calculated weight limit recommended by NIOSH for a lift of this nature (Tr. 1531-32, 1535, 1541-49, 2582, 3250; Exhibit C-628 at 94-97). Dr. Schulze calculated a frequency rate of five lifts per minute by observing four to six belt loaders during his visits to the Dayton plant (Tr. 1544-49). Dr. Schulze testified that any belt loader performing a manual lift in this manner increases his risk of developing back pain and/or injury (Tr. 1534-37, 1541, 1557-58, 1566-67, 2528, 3208-09). Dr. Schulze concluded that belt loaders who use the strong arm to lift rubber bales are also exposed to the risk of injury, but to a lesser extent than those performing a manual lift (Tr. 1538, 1555-56, 3252). Although his testimony suggests that he believes elevated and extended reaches are also stressors associated with this job, Dr. Schulze’s report does not explicitly identify such reaches or long periods of standing, as such (Tr. 1537, 1559-60, 3253-54, 3258-59, 3261-64, 3275; Exhibit C-628). He admitted, however, that neither activity is likely to result in injury (Tr. 1561-62, 3277).

⁴¹Dr. DeHart and his team concluded that as a group, belt loaders suffered a total of 25 musculoskeletal injuries from 1989 to 1993 (Tr. 5309-10). According to a data entry form for one
(continued...)

None of the plant doctors testified as to any specific injuries suffered by belt loaders. Dr. Parrish mentioned the job only to note that Dayton has twice reduced the size of the rubber bales, from 250 pounds down to the current weight of 70 to 75 pounds, in order to address the difficulty some employees were having in lifting them (Tr. 4856-58).

As evidence of actual injury, the Secretary relies upon Mr. Nguyen's testimony that he was diagnosed with carpal tunnel syndrome (Tr. 4293-94, 4311-12; Secretary's Brief at 43-44). Although I found Mr. Nguyen to be a credible witness, without underlying documentation to support his claims, it is impossible to determine whether an accurate diagnosis was made such that his injury may be properly considered as proof of harm in the context alleged here. As indicated *supra*, carpal tunnel syndrome is defined as "impaired conductivity" or a slowing of the wrist's median nerve (Tr. 6764; Exhibit R-5696). This impairment can be reliably measured through the use of electrodiagnostic testing, which monitors the time it takes for electrical activity, administered as shocks, to travel along the median nerve (Tr. 6764-65). Indeed, in the *Pepperidge Farm* case, the Commission based its finding of actual injury largely upon the results of such testing and the associated treatments, all of which was well-documented in the employee medical records in evidence there.⁴²

Here, Mr. Nguyen's condition does not appear in Dayton's OSHA 200 log for 1993 or any of the few medical records, accident analysis files, or workers compensation records submitted into evidence. He did testify, however, that he was sent to a doctor "to test the nerve and...neurology"; as he described it, the doctor "tap[ped] the nerves on my arm so he find out if got [sic] carpal tunnel" (Tr. 4290). While this suggests that Mr. Nguyen was, in fact, subjected to electrodiagnostic testing, particularly where such testing is also known as "nerve conduction" and is typically performed by a

⁴¹(...continued)

of the belt loaders evaluated, the stressors which Dr. DeHart's team considered under this job were frequent lifts, elevated/extended reaches, long periods of standing, awkward positions, and forceful exertions (Tr. 5633; Exhibit R-5680). Based on his calculations, Dr. DeHart found an injury incident rate of 35.7 for the belt loaders which, when compared to the BLS rate of 8.4, resulted in a relative risk of 4.25 (Tr. 5310-11; Exhibit C-979). Relying upon this data, as well as his review of the job, he concluded that the ergonomic stressors present in the belt loader position were sufficient to cause musculoskeletal injury (Tr. 5311).

⁴² More than half of the 68 *Pepperidge Farm* employees alleged by the Secretary to have suffered actual injury were diagnosed with carpal tunnel syndrome. *Pepperidge Farm* at 2015.

neurologist, there is nothing in the record to confirm that a medical professional judged Mr. Nguyen's test results to be abnormal (Tr. 4717, 4720). Accordingly, I am not persuaded, on the basis of his testimony alone, that this injury can reliably be considered proof of the harm alleged here by the Secretary.

In examining actual injury, the Commission in *Pepperidge Farm* not only considered employee testimony and medical records, but also relied upon the testimony of the plant's medical director, as well as a clinician hired by the Secretary to review employee medical records and physically examine some of the employees. Here, however, the plant doctors provided no testimony whatsoever regarding specific belt loader injuries.⁴³

Without proof of actual harm, the Secretary must establish a potential for harm. Such an inquiry, as the Commission observed in *Pepperidge Farm* in its discussion of the *Kastalon* case, raises questions as to the level of proof required to establish that the potential for harm exists. In *Kastalon*, the Commission, relying upon the Supreme Court's decision in *Industrial Union Dept. v. American Petroleum Inst.*, 448 U.S. 607 (1980) ("*Benzene*"), noted that the Secretary must present "a body of reputable scientific thought", such as epidemiological evidence, in order to establish that a significant risk of harm exists under the general duty clause.⁴⁴ *Pepperidge Farm* at 2012-13. Although the Commission stated in *Pepperidge Farm* that certainty as to the threshold level for injury

⁴³Dr. DeHart's identification of 25 belt loader injuries is highly suspect given his team's acknowledged inability to distinguish between injuries that can be considered musculoskeletal and those attributable to some type of acute trauma. As such, it would be unreasonable to base any conclusions regarding actual injury or harm solely on Dr. DeHart's analysis. Without the medical records underlying his analysis, it is simply not possible to verify whether his team's identification of 25 belt loader injuries is valid. In fact, Mr. Nguyen's injury does not even appear in Dr. DeHart's final set of injury data (Exhibit C-987).

⁴⁴ The Commission revisited this issue in *Waldon Healthcare Center*, 16 BNA OSHC 1052, 1060, 1993-95 CCH OSHD ¶ 30,021 (No. 89-2804, 1993) ("*Waldon*"), and observed that the holding in the *Benzene* case does not require "that there be a 'significant risk' of the hazard coming to fruition, only that if the hazardous event occur, it would create a 'significant risk' to employees." But as Judge John Frye indicated in *Beverly Enterp., Inc.*, No. 91-3344, slip op. at 9-10 (November 13, 1995) ("*Beverly*"), this language actually refers to the Secretary's proof of *exposure* to a hazard, not to her proof that the hazard actually exists. Indeed, in *Waldon*, the Commission concluded that the Secretary had established the hazard of Hepatitis B virus ("HBV") transmission in the cited facilities and rejected the employer's contention that the risk of *exposure* had to be significant. *Waldon* at 1059-60.

has never been held to be a prerequisite to regulation under § 5(a)(1), it specifically distinguished the *Pepperidge Farm* case from the *Kastalon* case on the grounds that the former dealt with allegations of *actual* injury, while the latter was concerned with *potential* injury. *Pepperidge Farm* at 2012-13. Where, as here, it has not been shown that *actual* injury occurred, determining the existence of a hazard hinges upon whether the Secretary is able to quantify such a threshold.

The ergonomic stressors alleged by the Secretary to be associated with this job are frequent lifting, elevated and extended reaches, and long periods of standing. There is no question that all of these activities are part of a belt loader's daily work duties. Indeed, Dayton itself acknowledges in its job evaluation form for the belt loader position that bending, carrying, lifting, standing, stooping, and frequent inspection of control panels, are all physical elements of this job (Exhibit C-666).⁴⁵

In and of themselves, however, these activities are not hazardous. As Dr. DeHart conceded, "work is healthy" and exposure to such activities can actually be beneficial under certain circumstances (Tr. 5406-07, 5421, 5537). Thus, the Secretary maintains that it is the frequency or repetition, and in some cases, the force, with which these tasks are executed that transforms them from seemingly benign movements into ergonomic "stressors" which can have an adverse affect on the body, creating the potential for injury (Tr. 1438-39, 6399). In other words, it is the length of time the employee stands, or the height and frequency of the elevated reach, that poses the alleged hazard. As such, proving the existence of the hazard alleged here requires the Secretary to identify with some certainty the levels of force, frequency, and/or repetition, at which injury becomes a possibility.

With regard to elevated and extended reaches, as well as long periods of standing, none of the Secretary's witnesses were able to identify the exact point at which these activities pose the potential for harm to belt loader employees or indeed, that the activities, without considering other factors such as age, gender, history of injury, or lifestyle, will cause injury at all. There is nothing on this record which adequately explains what makes these activities hazardous. It is not enough to claim that the belt loader who has to raise his hands in order to operate a strong arm will accumulate lactic acid in his arms, thereby increasing his rate of fatigue, or that standing compresses the disks between an employee's vertebrae in the lower back (Tr. 1533-34, 2356-57, 3280). Such statements

⁴⁵ As described in the form, this is a "typical job consisting of few operations repeated frequently in similar sequence."

not only fail to associate these activities with specific injuries, but also fail to identify just how long an employee must stand or hold up his hands before the potential for harm develops.⁴⁶ In his report, Besser admitted that the potential for harm resulting from the belt loader's activities cannot actually be quantified: "It is difficult to determine the absolute number of repetitions, or period of time that a posture can be maintained or an activity performed, which will cause an injury." (Tr. 6164, 6271, 6399; Exhibit R-5586 at 8). Three of the four Dayton plant doctors confirmed that there is simply no "magic number" of repetitions or level of force identifying the point at which injury will occur to an employee (Tr. 4410, 4546, 4612, 4628-29, 4632-33, 4810, 4824-25). As Dr. Smith-Horn and Dr. Lundy indicated, an elevated or extended reach can be measured in terms of its length or height, but neither doctor was able to indicate how far or how high a reach an employee could safely perform before the potential for injury arises (Tr. 4391-93, 4824-25).⁴⁷

This weakness in the Secretary's case is best illustrated by the inability of her witnesses to provide a consistent and specific answer to the question: how long may an employee stand before the onset of potential injury?⁴⁸ When asked what constitutes a long period of standing, Besser's testimony was consistent with his report: "I'm not sure there's any quantifiable time" (Tr. 6070). Among the

⁴⁶Dr. Schulze conceded that he cannot say how much force or how many repetitions places an employee at risk of injury (Tr.1533-34, 1537, 1559-62, 2002, 2133-34, 2136, 2140, 2148-49, 2158, 2161, 2176-78, 2619-20, 2657, 3255-56).

⁴⁷Three of the Secretary's witnesses - Besser, Dr. Root, and Dr. DeHart - indicated that studies which attempt to quantify the level of repetition at which harm develops do exist (Tr. 4546, 4631-36, 5529-30, 5533-36, 5587, 5600, 6037, 6045, 6239-40, 6320, 6331-32). However, none of these studies, which were not clearly identified, was offered into evidence by the Secretary, nor were they reviewed in sufficient detail by these witnesses to establish any type of consensus on the issue. In addition, Besser's claims are contradicted by his report which not only acknowledges the difficulty in quantifying this concept, but also fails to apply any of these alleged principles to the jobs he evaluated. Similarly, neither Dr. Root nor Dr. DeHart related the studies they referenced to the work actually performed at the Dayton plant.

⁴⁸Although Dr. Schulze initially testified that even with some movement, standing on a concrete floor for eight hours is "too long", he later revised his comments to take into account the scheduled breaks which each employee is entitled to take during an 8-hour shift (Tr. 1436-37, 3992-93). He also indicated that what actually constitutes a "long period" is job dependent and varies from task to task, suggesting that what may be too long for a belt loader may not be too long for some other type of job (Tr. 1437, 2321-22). In the end, Dr. Schulze conceded that he "can't put a number of how many hours" is too long a period to stand, and admitted that the standing required of a belt loader is not likely to cause injury (Tr. 1954-55, 3262-63, 3277).

plant doctors, only Dr. Smith-Horn was asked to provide a definition for the phrase, a question which prompted her to distinguish between a “long” and a “prolonged” period of time. Based upon her experience, a long period of standing is one that consists of 50% of an employee’s time, while a prolonged period is one that consists of over 80-85% of an employee’s time (Tr. 4393). This opinion was not related in any way to the likelihood of injury resulting from long or prolonged standing nor does the opinion survive *Daubert, supra*. With no consensus on the record regarding the point at which long periods of standing, or for that matter, elevated and extended reaches, will pose a hazard to the belt loader, the Secretary has failed to prove how these activities pose the potential for harm. *Cf. Waldon*, 16 BNA at 1059 (hazard of HBV transmission exists in cited nursing homes where studies of patient infection rates coupled with work activities which provide the opportunity for transmission establishes potential for harm to employees).

The final “stressor” alleged under this instance is frequent lifting. As discussed *supra*, Besser concluded that the lifting of rubber bales by the belt loaders constitutes an ergonomic stressor that increases their risk of back injury. Even Dayton seems to have recognized this possibility, indicating in its job evaluation form that a physical demand of the job is “occasional strained position” and an “unavoidable hazard” of the job is “strain or pull muscles” (Exhibit C-666).

The use of the NIOSH guidelines and the calculation of a recommended weight limit suggest that the risk of harm from this particular task has been, to some extent, quantified (Tr. 6033-34). Indeed, one could reasonably argue that the lifting equation and its accompanying guidelines, as researched and promulgated by a respected, national research organization, provide some measure or standard of when a lift becomes hazardous (Tr. 4612-13, 5530, 5588-89). But Besser has cautioned against treating the NIOSH guidelines as a permissible exposure limit (Tr. 6311-13; Exhibit R-5674). Also, the record indicates that the revised NIOSH guidelines have not yet been validated by an independent study (Tr. 2529-34, 6314).

More importantly, it is the *frequency* of the lift that is the focus of this particular stressor and Besser had problems with this element in his calculations. Because belt loaders have the option of using a strong arm to lift rubber bales, no witness could be precise as to how many times the lifts are performed manually versus mechanically (Tr. 3244, 6043). As indicated, Besser omitted the frequency component of his lifting analysis because he lacked this information (Tr. 5838-40, 6043,

6249-50; Exhibit R-5586 at 9). Although the two belt loaders who testified at the hearing stated that the strong arm frequently malfunctions, no conclusion can be drawn from the evidence regarding the frequency with which belt loaders as a whole are required to perform lifts manually.

Finally, in addition to not being validated, the NIOSH guidelines cannot account for the multitude of ways in which belt loaders may perform such a lift. As Judge Frye observed in *Beverly*, “the nature of [a lifting] hazard differs markedly from most hazards in that it does not involve a danger presented to the worker by something outside of himself or herself [but] [r]ather...involves a danger resulting from the worker’s own individual efforts.” *Beverly*, slip op. at 13. Indeed, the elements of either NIOSH calculation will vary from belt loader to belt loader, the only true constant being the weight of the load.⁴⁹ Accordingly, the Secretary has not established that the “frequent lifting” required of a belt loader poses the potential for injury.

Even if the Secretary had established harm, actual or potential, the record fails to support her claims of causation under this instance of violation. In many cases, injuries that were attributed to the alleged stressors of the belt loader job are not specific, diagnosed cumulative trauma disorders, but are vague symptoms or conditions such as generalized fatigue or reduction in arm strength (Tr. 1945-55, 4838-39, 6070-71, 6105). Even in those instances where diagnosed disorders have been identified, the data linking these disorders to the work being performed is seriously lacking. In *Pepperidge Farm*, the Commission weighed several factors in its analysis of causation: the opinions of the medical personnel who actually treated plant employees, the opinions of the clinical experts who testified at the hearing, the injury incidence rate at the plant, and the considerable epidemiological evidence that was made part of that record. *Pepperidge Farm* at 2016-29. Here, the Secretary presented no “expert clinicians” as witnesses at the hearing and submitted no epidemiological evidence of the type reviewed in *Pepperidge Farm*. Furthermore, there is no evidence linking the activities labeled as ergonomic stressors under this instance to any type of injury

⁴⁹ Depending upon the version used, the NIOSH formula’s components include the distance the load is held above the floor, the distance between the employee’s hands to ankles, the angle at which the load is displaced from the front of the employee’s body (also known as the symmetry of the lift), and the position of the body (Exhibit R-5675 at 5-6). Even Dr. Schulze acknowledged that the NIOSH guidelines do not take into account the individual actually performing the lift (Tr. 1659).

or harm suffered by belt loaders.⁵⁰

Clouding the issue of causation even further is the fact that the record indicates there are a multitude of non-occupational risk factors for cumulative trauma disorders (Tr. 2618, 3529-31, 3537, 3541, 4414, 4509-11, 4615-18, 4630, 4634-35, 4676-77, 4728, 4779-80, 4836-38, 6901-02, 6989-93). As discussed *supra*, these factors include obesity, age, gender, and pregnancy. An individual's medical history and personal characteristics can also play a part in determining whether they will develop a cumulative trauma disorder (Tr. 2219, 4614, 4728, 4779-80, 4783-84, 4803-04,

⁵⁰Although given the assignment to identify potential stressors at the Dayton plant and recommend abatement, both Dr. Schulze and Besser recognized that they offered little to the issue of causation. Although Besser expressly links each stressor identified in his report with the development of various cumulative trauma disorders and musculoskeletal injuries, he conceded that these injuries cannot accurately be attributed to an individual's work activities without considering actual injury incident rates (Tr. 6061-68, 6175, 6281, 6338-39, 6399; Exhibit R-5674). As he explained, a significant injury incident rate allows one to legitimately conclude that the cause of the identified injuries may be occupational (Tr. 6061-63, 6338-39). Dr. Schulze echoed this notion, admitting on cross-examination that his conclusions regarding the potential injuries which may occur from the ergonomic stressors he identified were based in part on the *actual* injuries that occurred at Dayton (Tr. 2181-89, 2192-93, 2202-04, 2208, 2215-17). According to Dr. Schulze, actual injury data also plays a critical role in quantifying the likelihood of injury occurring as the result of an individual's work activities, as well as alerting an employer to the fact that a particular job may be causing harm to employees (Tr. 2177, 2181, 2187, 2194, 2225, 2336, 3540, 3543-48). Even Dr. DeHart acknowledged that one cannot determine causation simply by viewing a videotape of each individual job. Injury data must also be considered (Tr. 5370-73). Under these circumstances, neither Dr. Schulze nor Besser provided the basis and analysis required to make an accurate determination of causation.

Dr. DeHart, the Secretary's key witness on this issue, also fails to support this critical element of the Secretary's case. As discussed *supra*, his incident rate analysis is seriously flawed by inadequate data and a poor information gathering process. By his own admission, his comparison of incident rates fails to prove causation on an individual basis and despite his vague assurances to the contrary, there is no convincing evidence establishing causation on a population basis. Finally, since none of the plant doctors identified or reviewed any actual belt loader injuries to the belt loaders, the record lacks their relevant opinions as to the specific cause of any such injuries under this instance. The Secretary's counsel specifically stated at the hearing that the plant doctors were offered solely as fact witnesses and were not presented to address the issue of causation (Tr. 4498-99). However, given their medical expertise, as well as their personal experience in treating many Dayton employees suffering from the injuries alleged, I believe their opinions as to the specific cause of injuries suffered by specific employees to be relevant (Tr. 4579-80). See *Pepperidge Farm* at 2017-18, 2029 (opinions of medical personnel who treated injured employees as to the cause of their injuries considered relevant to issue of causation).

4825). Having failed to account for such factors in his analysis, Dr. DeHart was unable to identify the degree to which occupational sources, as opposed to non-occupational ones, caused or contributed to the injuries which he identified. *Cf. Pepperidge Farm* at 2028-29 (based on record regarding causation, Commission concludes that work was significant contributing factor to employees' actual injuries).

For all of these reasons, the Secretary has failed to prove that any of the work activities alleged under this instance of violation are hazardous to the employees who perform them.

Instance B - Tuber Operators

Under this instance, the citation states in relevant part:

B) Department #126 - Tubing; Tuber Operator(s) operating tubing machine(s), selecting and installing dies and preforms were exposed to cumulative trauma disorders involving ergonomic stressors such as frequent torso flexions, lifting from awkward postures, and long periods of standing and working in hot environments.

Three employees testified in connection with this instance: Steven Bailey (Tr. 2967-94); William Howard Taft Jones (Tr. 3051-73); and Bob Dale Williams (Tr. 3828-66). Tuber operators are generally responsible for overseeing the operation of the tubing machine, a job which includes changing the machine's dies and preforms (Tr. 2973, 2979-80, 3068-70, 3836, 3840; Exhibit C-962, Segment starts 0:04:12). Tubing machines produce either treads or sidewalls by extruding rubber through a die which rests inside a steel preform. Each time that a new width of rubber is to be run through the machine the die and its corresponding preform must be changed (Tr. 2976, 2982, 3829-30). Preforms range in weight from 80 to 110 pounds (Tr. 2977, 3058, 3837, 3839).

In order to change the die, the tuber operator first releases the preform, which is heated during processing, from the machine dropping it onto an apron draped underneath (Tr. 2977, 2984, 3057, 3834-35, 3844, 3851). The tuber operator then carries the preform to a small work area located several feet away at the top of a set of stairs where it is cleaned and the die is removed. A new preform is then taken from a heated cabinet known as a "hot box", the proper die placed inside, and the preform carried back to the machine and installed (Tr. 2977-79, 2990-91, 3057-58, 3836-40, 3851). The total number of changes made on a tubing machine over the course of an 8-hour shift depends on the material being processed and the length of the run (Tr. 2978, 3067-68, 3841-43).

According to the testimony of the employee witnesses, a tubing machine which produces treads requires approximately 10 to 13 changes per shift, while a tubing machine which produces sidewall requires approximately 16 to 18 changes per shift (Tr. 2978, 2992-93, 3058, 3841-43).

In order to release a preform and lift it from the apron, the tuber operator must bend underneath the upper portion of the tubing machine (Tr. 2977, 2980-81, 3058, 3830, 3835-36, 3838). According to two of the employee witnesses, tuber operators are required to assume “awkward positions” while working in this area of the machine (Tr. 3059, 3830, 3836-37). All of these duties are performed while standing on a concrete floor (Tr. 2980, 2989, 3056, 3829, 3831). In addition, all three employees indicated that their work environment can reach temperatures as high as 120 degrees in the summer (Tr. 2973-74, 3056, 3830).

Mr. Williams, who has worked as a tuber operator since 1993, testified that in that year, one of the onsite plant doctors diagnosed him with severe tendinitis in his left elbow (Tr. 3845-46). He previously reported having problems with the same elbow in 1991 and 1992, the latter of which he occasionally spent working as a tuber operator (Tr. 3847-48, 3862). Since his diagnosis, Mr. Williams has been treated with cortisone shots, wears a brace, and was off work for about six months (Tr. 3848-49). About two months after returning to work, the left elbow pain returned and worsened. At the hearing, he reported that both elbows were painful (Tr. 3849, 3863). Mr. Williams testified that he has played softball, performed significant projects on his house, and engaged in regular weight lifting (Tr. 3856-61). In fact, he was encouraged by his physician to continue weight lifting to strengthen his muscles (Tr. 3864).

Mr. Jones, who worked as a tuber operator in 1993, testified that towards the end of his workday, he experienced lower back pain which he reported to his supervisor, but chooses self-treatment with over-the-counter medication rather than visit the onsite clinic or his personal physician (Tr. 3060-61). Mr. Jones has been a participant in various sports activities and also lifted weights for 21 years (Tr. 3062, 3071-72). Mr. Bailey, who worked as a tuber operator in 1993, testified that he pulled a muscle in his lower back when he “grabbed a preform wrong” (Tr. 2970, 2984). He reported the injury to his supervisor the following day, but was not sent to the onsite clinic and continued to perform his work (Tr. 2984-85). Mr. Bailey testified that he lifts weights to strengthen

his arms for lifting preforms (Tr. 2981).⁵¹

Although Besser's report mirrors the citation in terms of identified stressors, his testimony indicates that like Dr. Schulze, he was most concerned with the preform lift (Tr. 6057-59; Exhibit R-5586 at 11-14). He testified, however, that his lifting analysis calculations indicate the preform lift *can* be safely performed by the majority of the population and is not "inherently dangerous" to the tuber operator, but that there is the *potential* for the lift to pose a hazard of low back injury to an employee who is not properly trained in safe lifting techniques (Tr. 6058-60; Exhibit R-5586 at 12). Besser also noted that in order to determine whether this lift poses a hazard, the injury rate among tuber operators must be considered (Tr. 6060-61).⁵² Among the plant doctors, Dr. Smith-Horn specifically testified that she never treated any tuber operators during her tenure at Dayton, while the other doctors made no mention of the tuber operator job (Tr. 4407-08).

As evidence of actual injury, the Secretary relies upon the testimony of all three tuber operators who appeared at the hearing (Secretary's Brief at 50). However, as with the previous citation instance, there is no documentation to support the testimony of these employees. Of the three, only Mr. Williams' injury was reported and treated by onsite personnel. Neither Mr. Jones nor Mr. Bailey suffered from conditions diagnosed by any type of medical personnel, onsite or otherwise. Though apparently reported to Dayton, Mr. Williams' condition does not appear in the OSHA 200

⁵¹According to Dr. Schulze, the stressors associated with the tuber operator job stem primarily from the tuber operator's lifting of the preform (Tr. 1982-83, 3162-65; Exhibit C-628 at 353). Although he found that this is an infrequent lift that is performed only once every 30 minutes, Dr. Schulze concluded that the awkward body posture and asymmetry of the lift create an ergonomic hazard whose likely result is injury to the back (Tr. 1982-83, 3151, 3160-62, 3165-66; Exhibit C-628 at 355).

⁵²Dr. DeHart and his team concluded that as a group, tuber operators suffered a total of 21 musculoskeletal injuries from 1989 to 1993 (Tr. 5306). According to a data entry form for one of the tuber operators evaluated, the stressors which the team considered under this job were frequent torso flexions, lifts from awkward postures, long periods of standing, frequent awkward postures, hot environment, and forceful exertions such as pushing or pulling (Tr. 5644-45; Exhibit C-548). According to Dr. DeHart's calculations, the tuber operators had an injury incident rate of 56 which, when compared to the BLS rate of 8.4, results in a relative risk of 6.67 (Tr. 5305-08; Exhibit C-978). Based upon this data, as well as his review of the job, Dr. DeHart concluded that the elevated rate of injury was caused by the "ergonomic issues and problems" present in this job (Tr. 5308).

log for 1993 or any of the other relevant injury records submitted into evidence here. In addition, none of the plant doctors provided testimony regarding specific injuries suffered by any tuber operators.⁵³ Thus, there is nothing in the record which can properly be considered proof of actual harm under this instance. Therefore, the Secretary must establish potential harm and indicate, with some specificity, the “threshold” at which injury may occur.

The ergonomic stressors alleged by the Secretary to be associated with this job are frequent torso flexions, lifting from awkward postures, long periods of standing, and working in hot environments. There is no question that all of these activities and conditions are part of the tuber operator job. Indeed, Dayton itself acknowledges in its job evaluation form for the tuber operator that bending, carrying, lifting, and standing are all physical elements of this job (Exhibit C-658). In addition, to alleviate the high heat experienced in this department, Dayton apparently provided fluids for the employees to drink and also installed fans (Tr. 3056).

Having failed to establish the point at which long periods of standing becomes hazardous, the Secretary remains unable to sustain her claim that this activity poses potential harm to tuber operators.⁵⁴ Likewise, the Secretary has failed to prove that the high temperatures in the tubing department may cause employees harm in the context alleged here. Dr. Schulze claims that high heat can be considered an ergonomic stressor because it can cause an employee to fatigue quicker, thereby increasing the employee’s potential for injury (Tr. 1394-95, 1630-32). But this is too broad of an assertion, and too tenuous of a link, to sustain a claim of potential harm as it relates specifically to the development of cumulative trauma disorders. Fatigue is not an injury and the weakened state which it allegedly creates would presumably make an employee susceptible to a myriad of potential injuries, not just conditions of the type alleged here.

With regard to “torso flexions”, i.e. bending at the waist, the Secretary has alleged that it is the *frequency* with which this activity is performed that poses the potential for harm (Tr. 1439).

⁵³Dr. DeHart’s identification of 21 such injuries remains unreliable for the purposes of determining whether actual harm has been established. In fact, Mr. Williams’ injury does not even appear in Dr. DeHart’s final set of injury data (Exhibit C-987).

⁵⁴ In fact, Dr. Schulze concedes that his report does not identify long periods of standing as an ergonomic stressor associated with the tuber operator job because it is not a stressor of “prime importance” (Tr. 3159-60).

Based upon the employee testimony, tuber operators bend at the waist at least once per die change, for a total of 10 to 18 times per shift. There is nothing in the record, however, which establishes that bending at the waist at this frequency level can be potentially harmful. As indicated *supra*, none of the Secretary's witnesses were able to identify the level of repetition at which injury may occur. In the section of his report dealing with tuber operators, Besser describes the torso flexion as a "hidden lifting task" which is consistent with the development of low back injury (Exhibit R-5586 at 11-12). But he admits that he was unable to determine the frequency of this task, and repeats his admonition regarding the difficulty in determining the number of times an activity i.e., torso flexions, can be performed before it will cause injury (Exhibit R-5586 at 11).⁵⁵ Based on this record, the Secretary has failed to show how this activity i.e., torso flexions, poses potential harm to tuber operators.

With regard to "lifting from awkward postures", both Besser and Dr. Schulze agreed that the preform lift is infrequently performed, yet could be potentially harmful based upon its "awkwardness". Thus, it is not the weight or frequency of the lift that makes it hazardous; it is the way the lift is performed. But what exactly is an "awkward posture"? According to Dr. Schulze, "any posture that puts somebody outside of a neutral or relaxed position is awkward" (Tr. 1442). Although he concedes that this is not apparent from the face of the citation, he claims that Dayton should have been able to discern the meaning of this phrase simply by observing the tuber operator actually perform the lift (Tr. 3167-68). Certainly, this is not what the Commission contemplated when it held that the Secretary must define a hazard alleged under the general duty clause in a way that "apprises the employer of its obligations". *Pelron Corp*, 12 BNA at 1835. Leaving it to an employer to guess what citation language means or does not mean cannot constitute adequate notice of the violations with which it has been charged.

Furthermore, Besser seemed to recognize that the problem with defining this activity as a hazard is that its potential for harm depends largely upon the individual tuber operator and not with his external working conditions. Hence it is his opinion that there is no danger in performing this lift without some failing on the part of the employee. This is consistent with Judge Frye's observations

⁵⁵Dr. Schulze testified that although he observed tuber operators engage in frequent torso flexions, he did not identify this activity in his report as an ergonomic stressor because he did not focus on it as a problem of the job (Tr. 3162-65).

in *Beverly* that the potential for harm from any lift stems almost entirely from an employee's own physical exertion. Indeed, no two tuber operators will perform this lift from exactly the same position. Under these circumstances, I cannot find that the Secretary has established that "lifting from awkward postures" poses potential harm to tuber operators.

Even if the Secretary had proven harm here, her case would still fail the causation element of her burden of proof. As discussed *supra*, without the proper foundation, neither Besser nor Dr. Schulze are qualified to attribute the development, potential or actual, of cumulative trauma disorders among tuber operators to the work activities alleged to be ergonomic stressors. Moreover, their respective analyses lack the element which they themselves acknowledge is critical to any determination of causation: actual injury data.⁵⁶ Finally, absent serious consideration of the various non-occupational sources which the Secretary's witnesses admit can cause or contribute to the development of cumulative trauma disorders, the issue of causation cannot be adequately resolved on this record. Accordingly, the Secretary has failed to prove that any of the work activities alleged under this instance of violation are hazardous to the employees who perform them.

Instance C - Bookers

Under this instance, the citation states in relevant part:

C) Department #126 - Tubing; Booker(s) repeatedly lift tire treads from a conveyor belt and place them on a tread tray/rack system, which involves ergonomic stressors such as frequent lifts with twisting, extended and elevated reaches, and long periods of standing that contributed to and/or resulted in cumulative trauma disorders (CTD).

Two employees testified in connection with this instance: William Dale Davis (Tr. 1060-1137) and Karla Ramirez (Tr. 1138-1207). Bookers are primarily responsible for loading tread trays with treads lifted from a conveyor belt that runs from the tubing machine (Tr. 1062-63, 1069, 1083-84, 1148-49; Exhibit C-962, Segment starts 0:09:31). Tread trays are six to eight-foot tall units that consist of 41 stacked and hinged trays or "leaves", each of which measure 87 inches by 48 inches (Tr.

⁵⁶Given its numerous flaws, reviewed *supra*, Dr. DeHart's incident rate analysis fails to reliably assess causation and the plant doctors offered no relevant testimony regarding the tuber operator job.

1072-73, 1080, 1082, 1124, 1127-28). Starting from the bottom of the tread tray, the booker throws three or four treads inside each leaf. Once full, the booker lowers the next leaf and repeats the process (Tr. 1072-74, 1079, 1084, 1126-27, 1129-31, 1144, 1448-49, 1155, 1167, 1172).

Depending on the type of tubing machine, up to three bookers are assigned to work on a machine at one time (Tr. 1088-90, 1162-63). On a dual tread line, two bookers stand along the conveyor belt side-by-side, loading treads into their respective tread trays; one booker lifts treads from the row passing closest to the workers, the other from the parallel row above that (Tr. 1105, 1150-51). The third booker alternates between loading tread trays and operating the fork lift which transports trays to and from the booking stand (Tr. 1065, 1105, 1182, 1193-94). According to both employee witnesses, bookers assist each other whenever possible (Tr. 1168, 1088-90). Bookers are also required to take scrapped treads to a nearby pallet at the start of each new run (1191-92).

In order to load a tread tray, the booker bends to lift a tread from the conveyor belt running along one side of the booking stand, twists or turns to the open leaf on the other side, and throws the tread into place (Tr. 1069, 1073-74, 1078, 1084-86, 1156-57). Each tread weighs between three to twelve pounds (Tr. 1105, 1122). In order to pull down the upper leaves of a tray, the booker must jump up or even stand on a small ledge (Tr. 1079, 1082-84, 1129-31, 1155, 1173). Both employees indicated that on some occasions the leaves stick, do not close all the way, or do not stay up (Tr. 1128, 1155, 1168-69, 1172). If a tread sticks to or overlaps another tread in the leaf, the booker may have to bend and/or reach into the leaf to straighten it (1071-72, 1122-25, 1153). In addition, on a dual tread line, one of the bookers must reach about an arm's length to lift treads from the top row on the conveyor belt (Tr. 1086, 1150-52). While loading tread trays, bookers stand on a steel platform elevated about six to twelve inches from the floor with a mat underneath their feet (Tr. 1063, 1066-67, 1069, 1088, 1107-08).

Mr. Davis, who has worked as a booker for 15 to 20 years, testified that in August of 1992, he experienced a sharp pain in his shoulder whenever he lifted a tread and threw it or had to reach for a leaf in the tray (Tr. 1060, 1078, 1094-95; Exhibit C-861). Upon reporting the pain to his supervisor, an accident analysis form was completed and Mr. Davis was sent to the onsite clinic where he was treated with medication and assigned to light duty work for three weeks (Tr. 1096-97, 1099, 1101-02; Exhibit C-861). Mr. Davis also participated in an offsite rehabilitation program for

three weeks and was given cortisone shots in both shoulders by an offsite physician (Tr. 1097-98). His condition was recorded in Dayton's OSHA 200 log for 1992 (Exhibit C-672). Mr. Davis indicated that he has played golf for 30 years (Tr. 1062).

Ms. Ramirez, who has worked as a booker for 8 to 9 years, testified that in 1992, she experienced swelling and pain in her knee (Tr. 1138-39, 1173-74). She reported the pain to her supervisor and visited the onsite clinic where she was given anti-inflammatory medication (Tr. 1174-75). However, Ms. Ramirez continued to have problems with her knee, which she again reported to her supervisor (Tr. 1176). She was subsequently examined by her personal physician who gave her medication and instructed her to keep the leg elevated and iced twice a day (Tr. 1176-77). Apparently, surgery was also performed on the knee (Tr. 1203-04, 1207). According to Ms. Ramirez, her physician told her that her knee injury was due to repetitive twisting and bending and he recommended that she transfer to a different job (Tr. 1177-78). On cross-examination, however, Ms. Ramirez acknowledged that sometime in 1992, she had injured her knee outside of work during a physical incident with another individual, but claims that she did not experience serious problems with the knee until several months later (Tr. 1204-07). She also claims that a workers compensation claim was filed in connection with her injury (Tr. 1179).⁵⁷

Mr. Besser identified frequent lifting, twisting, torso flexion, extended and elevated reaches, and long periods of standing as the stressors associated with the booker job (Tr. 6069-70; Exhibit R-5586 at 14-16). In his report, these stressors were associated with various conditions including low back injury, bursitis, and varicose veins (Exhibit R-5586). Having determined that bookers lift treads ranging in weight from eight to twelve pounds at a rate of 10 times per minute, Besser found that the action limit for this task was greater than or equal to the weight actually lifted (Exhibit R-5586 at

⁵⁷Dr. Schulze identified several stressors as associated with the booker job. According to his testimony, requiring the booker to twist from the conveyor belt to the tread tray with one leg planted and bearing his entire body weight stresses the knee of that leg, as well as the lower back, and could result in strains to either area (Tr. 1583-84, 3300; Exhibit C-628 at 122). Having determined that a booker lifts a tread weighing an average of eight pounds 13 times per minute, Dr. Schulze found that the high frequency of this task results in a recommended weight limit of zero under the 1991 NIOSH guidelines (Tr. 1584-85, 1588, 3285-88, 3295-97, 3300; Exhibit C-628 at 124-29). He also identified extended and elevated reaches, and long periods of standing, as stressors which could result in injuries to the knee, back, or shoulder (Tr. 1587-89, 3300-02; Exhibit C-628 at 122).

16).⁵⁸

At the hearing, two of the plant doctors provided specific testimony about the booker job. Dr. Root recalled discussing the booker operation at weekly meetings with members of Dayton management including Ms. Mattocks, the safety section manager (Tr. 4531-35). According to Dr. Root, the possibility of eliminating the use of the top and bottom leaves of tray was discussed, but she could not recall why (Tr. 4535-36, 4583-84). She also recalled discussing “overhead work” at these meetings, work which included the booker’s use of the top racks of the tread tray (Tr. 4577-79, 4583). Dr. Root testified that employees who perform overhead work are subject to an increased risk for shoulder disorders (Tr. 4577).

Dr. Parrish recalled observing the booker job at some point during his tenure at the Dayton plant (Tr. 4870-71). He testified that he recommended to the safety director at that time that use of the bottom five and top five shelves of the tread tray be eliminated so that bookers would not have to bend over or reach up to place treads there (Tr. 4871-72, 4874). According to Dr. Parrish, some employees had complained of pain and discomfort in the neck and back areas due to this activity, (Tr. 4872-73). He believed these complaints to be due to spasms in the neck and back, and considered them to be “stress related injuries” (Tr. 4873).

In terms of evidence of actual injury, the Secretary relies upon the testimony of both of the bookers who testified at the hearing (Secretary’s Brief at 55-57). Although Mr. Davis’ shoulder condition is recorded in a related accident analysis form and OSHA 200 log entry, neither of these documents indicate a definitive diagnosis, making it difficult to determine whether Mr. Davis actually suffered from a cumulative trauma disorder as alleged by the Secretary.⁵⁹ Ms. Ramirez’ condition,

⁵⁸Dr. DeHart and his team concluded that as a group, bookers suffered a total of 13 musculoskeletal injuries from 1989 to 1993 (Tr. 5312). According to Dr. DeHart’s calculations, the bookers had an injury incident rate of 17.4 which, when compared to the BLS rate of 8.4, results in a relative risk of 2.1 (Tr. 5312 ; Exhibit C-980). Based upon this data, as well as his review of the job, Dr. DeHart concluded that “the ergonomic stressors that are present in that job are attributable to the musculoskeletal injuries that are occurring” (Tr. 5312-13).

⁵⁹ Mr. Davis testified only that Dr. Lundy “thought” he might be suffering from a torn rotator cuff (Tr. 1101).

on the other hand, is not documented in any of the relevant injury records submitted into evidence, nor is it recorded on Dayton's OSHA 200 log for 1992. Despite her claim that she received workers compensation benefits for this injury, there is also some doubt as to whether Ms. Ramirez' knee injury actually occurred as the result of a work-related event.

Dr. Parrish's testimony that bookers, in general, complained about pain and discomfort seems to suggest that as a group, these employees were experiencing some sort of physical harm. However, Dr. Parrish attributed these complaints to spasms occurring in the neck and back, a condition which has not been identified as a type of cumulative trauma disorder. Moreover, Dr. Parrish provided no specific data about these conditions nor are they consistent with the conditions experienced by Mr. Davis and Ms. Ramirez. As such, his testimony does not definitively prove that actual harm of the type alleged by the Secretary existed among the bookers.⁶⁰ As such, there is nothing in the record which can properly be considered proof of actual harm under this instance of violation. Therefore, the Secretary must establish potential harm and indicate, with some specificity, the "threshold" at which injury may occur.

The ergonomic stressors alleged by the Secretary to be associated with this job are frequent lifts with twisting, extended and elevated reaches, and long periods of standing. All of these elements to some degree are part of the booker job. Dayton itself acknowledges in its job evaluation form for the booker that bending, carrying, lifting, standing, turning, and reaching are all physical elements of this job (Exhibit C-660).

As discussed *supra*, the Secretary remains unable to identify the point at which the reaches and standing required of the booker job become potentially harmful. This is particularly important with regard to reaching, since this task can vary significantly depending upon which position the booker has assumed in the three-person operation and which leaf he is filling on a tread tray (Tr. 3289, 3306). Although Dr. Root claimed that "overhead" work, apparently defined as work which requires an employee to reach over above his head, increases an employee's risk for developing a shoulder disorder, she did not indicate how far of a reach or how frequently the reach must be

⁶⁰ Dr. DeHart's identification of 13 musculoskeletal injuries from 1989 to 1993 remains unreliable. His final set of injury data lists Mr. Davis' injury type only as "both shoulders", and does not include Ms. Ramirez' knee injury (Exhibit C-987).

performed.

With regard to the final activity, frequent lifts with twisting, it is the frequency of the lift and the twisting involved which the Secretary has alleged poses the potential for harm. One cannot deny that the tread lifting performed by bookers is “frequent”. Dayton’s job evaluation form describes the job as a “fast and continuous operation” which requires “continuous handling of light weight treads” (Exhibit C-660). What remains unclear, however, is how frequent is too frequent for the purposes of establishing harm. As with the frequent lifting performed by the belt loader, there is nothing in the record to indicate the point at which injury will occur. Without such evidence, it cannot be determined whether the 10 to 13 lifts per minute estimated by Dr. Schulze and Besser are harmful as alleged.⁶¹ In fact, having calculated an action limit that is equal or greater than the actual weight lifted by the booker, Besser’s lifting analysis indicates that this activity poses no hazard at all (Exhibit R-5586 at 16).

The “twisting” element of the tread lift raises the same concerns that “awkward posture” did under the previous instance. Is one twist harmful or is it the frequency with which the twist is performed that creates a potential hazard? Besser indicated that twisting is a “problem” because the muscles in the back are essentially working in opposite directions, creating a “stressful posture” (Tr. 6072-73).⁶² Confusing the issue further is the fact that both employee witnesses indicated that bookers perform the tasks associated with the booking process differently (Tr. 1123, 1128, 1132, 1202-03). Indeed, no two bookers will move or position their bodies in the exact same way when loading a tread tray (Tr. 1132, 1202-03). Under these circumstances, the Secretary has failed to show how “frequent lifts with twisting” poses potential harm to bookers.

Even if the Secretary had proven harm here, her case would still fail the causation element of

⁶¹ In determining his frequency rate, Dr. Schulze indicated that he did not account for the scheduled breaks to which bookers are entitled nor did he seem aware that the third booker assigned to an operation alternates between loading tread trays and operating a fork lift (Tr. 3288-90).

⁶²Dr. Schulze, on the other hand, seemed most concerned with the fact that the twist is performed while lifting and with the booker’s leg planted in one spot (Tr. 1583-84, 3300). In general, he maintained that twisting during a lift is hazardous because “you’re twisting your spinal cord...[and] vertebra at the same time...so you put a rotational torque on the spine, as well as a compression force” (Tr. 1444-45).

her burden of proof. As discussed *supra*, without the proper foundation, neither Besser nor Dr. Schulze are qualified to attribute the development, potential or actual, of cumulative trauma disorders among bookers to the work activities alleged to be ergonomic stressors. Moreover, their respective analyses lack the element which they themselves acknowledge is critical to any determination of causation: actual injury data. Given its numerous flaws, reviewed *supra*, Dr. DeHart's incident rate analysis also fails to reliably assess causation.

Although testimony from two of the plant doctors suggests that they believe there to be a link between some of the activities performed by bookers and risk for physical harm, neither doctor established the degree to which such activities, as opposed to non-occupational activities, may cause or contribute to these conditions. Indeed, both Dr. Root and Dr. Parrish acknowledged that non-occupational factors can play a role in the development of cumulative trauma disorders (Tr. 4616-18, 4624, 4634-35, 4836-37). Dr. Root also admitted that she was not always able to obtain a complete history for a particular employee such that these factors could be considered (Tr. 4625-26, 4634-35). Absent consideration of the various non-occupational sources which can contribute to the development of cumulative trauma disorders, the issue of causation cannot be adequately resolved on the basis of this testimony alone. Accordingly, the Secretary has failed to prove that any of the work activities alleged under this instance of violation are hazardous to the employees who perform them.

Instance F - Beadwinders

Under this instance, the citation states in relevant part:

F) Department #124 - Bead Building; Beadwinder(s) operates a wire insulating and bead forming machines which involves ergonomic stressors such as frequent extended reaches to both sides to access materials from the machine, frequent pinches and long periods of static posture that are consistent with the development of acute shoulder, upper arm, upper back muscle, and tendon fatigue such as strains, sprains, tears or UECTD's such as; bursitis, tendinitis, and rotator cuff injuries.

One employee testified in connection with this instance: Larry Dorian Collier (Tr. 1872-1921). Beadwinding machines produce a round, rubber-coated, steel wire known as a "bead" (Tr. 1878, 1882-83; Exhibit C-969). The beadwinder is responsible for removing each bead from the machine,

aligning its overlapping layers of rubber and wire, and placing the finished bead onto a rack (Tr. 1878-79, 1883-85, 1886, 1890; Exhibit C-962, Segment starts 0:25:44). While performing this task, the beadwinder is permitted to sit in a chair positioned between the machine and the rack (Tr. 1878-79). From this position, the beadwinder reaches on one side to remove a bead from the machine's chuck, and reaches on the other side to place the finished bead onto a rack (Tr. 1879, 1889-90, 1892). Aligning the bead requires the beadwinder to use both hands to press or pinch the overlapped rubber and wire together (Tr. 1879-80, 1884-87, 1892-93). Mr. Collier indicated that each beadwinder performs this task "just a little bit different" (Tr. 1887-88). He was required to produce between 6,000 and 9,000 beads per 8-hour shift; about 14 to 15 beads are produced per minute (Tr. 1876, 1894-95). Other duties performed by beadwinders include loading the beadwinding machine with raw rubber and reels of wire, setting up the machine for production, repositioning bead racks, and cleaning up the work area (Tr. 1876, 1891, 1905-10). According to Mr. Collier, about 6 ½ hours of his 8-hour shift was spent producing beads (Tr. 1873, 1920).

Mr Collier, who worked as a beadwinder for five or six months, testified that while working in this position in October of 1992, he experienced pain in his right elbow, which was examined by a nurse at the onsite clinic (Tr. 1897-1901). His condition was recorded in Dayton's OSHA 200 log for 1992 (Exhibit C-672). Mr. Collier also suffered joint pain and swelling in both of his hands which he attributed to pressing down on beads in order to align them (Tr. 1901-02). He testified that he left the beadwinder job after five to six months to "get away from the repetition." After changing jobs the swelling in his hands subsided (Tr. 1873-74, 1902).⁶³

⁶³Although Dr. Schulze testified that pinching, twisting of the wrists, sitting for long periods of time, and reaching with arms elevated, are all stressors associated with the beadwinder job, his report focused largely on those activities associated with the task of aligning beads (Tr. 1474, 2655, 2658-59, 2660-66, 3344, 3349; Exhibit C-628 at 73). He explained that this specific task creates a combination of force, repetition, and wrist deviation, the three main factors associated by epidemiological studies with the development of a wrist malady, such as carpal tunnel syndrome (Tr. 1475-76, 1478-79, 1510-13, 1515, 1519-20, 2162, 2618-19). According to Dr. Schulze, this was the most significant problem associated with the beadwinder job; hence his failure to specifically identify either static posture or frequent extended reaches as stressors in his report (Tr. 2660-66, 3349-50). Dr Schulze argues, however, that his recommendation that the beadwinders be provided with an ergonomic chair, and his observation that the beadwinder maintains his head in a "flexed posture" 33% of the (continued...)

Having served as the source for the citation's language, Besser's report identified frequent extended reaches to the sides, frequent pinches, and long periods of static postures as the stressors associated with this job (Tr. 6074-75; Exhibit R-5586 at 23-25). He calculated that a beadwinder performs an average of 1900 pinch grips per hour at the high end of the 1500 to 2000 range of repetitions which he claims have been shown to cause tendon and sheath swelling (Tr. 6075; Exhibit R-5586 at 23). Besser also indicated that frequent extended reaches to the sides stretches the muscles of the arm and shoulder creating fatigue and possible tendon inflammation consistent with the development of cumulative trauma disorders of the upper extremity such as tendinitis (Tr. 6076; Exhibit R-5586 at 24). Finally, he testified that the beadwinders he observed on the videotape were working from chairs that were not adjustable or padded, creating "contact trauma to the muscles, nerves and blood vessels in the back of the legs" (Tr. 6076-77; Exhibit R-5586 at 24).⁶⁴ None of the plant doctors testified as to any specific injuries suffered by beadwinders or the beadwinder job in general.

As evidence of actual injury, the Secretary relies upon Mr. Collier's testimony that he suffered from pain in his right elbow and swelling in his hands (Secretary's Brief at 61-62). However, there is nothing in the record to indicate whether Mr. Collier's condition, though recorded in Dayton's OSHA 200 log, was ever diagnosed. Indeed, his condition does not appear in any of the relevant injury records in evidence here. Without a diagnosis, it is impossible to determine if Mr. Collier's elbow pain falls within any of the various injuries listed in the citation under this instance. In addition, the plant doctors did not testify to any specific injuries suffered by beadwinders. Thus, there is

⁶³(...continued)
time, constitute indirect references to the static posture stressor (Tr. 2661, 3344-47).

⁶⁴Dr. DeHart and his team concluded that as a group, beadwinders suffered a total of six musculoskeletal injuries from 1989 to 1993 (Tr. 5317-18). According to Dr. DeHart's calculations, the beadwinders had an injury incident rate of 17.1 which, when compared to the BLS rate of 8.4, results in a relative risk of 2.04 (Tr. 5317-18; Exhibit C-982). Based upon this data, as well as his review of the job, Dr. DeHart concluded that "the ergonomic stressors that are present...contributed in causation to the increase in musculoskeletal injuries...[and] was the source for the injuries that were occurring" (Tr. 5318-20). Mr. Collier's condition is listed on Dr. DeHart's final set of data as "right shoulder, elbow pain" (Exhibit C-987 at 3). However, Mr. Collier never mentioned suffering pain in his shoulder and a definitive diagnosis is still lacking with regard to his elbow.

nothing in the record which can properly be considered proof of actual harm under this instance of violation. Therefore, the Secretary must establish potential harm and indicate, with some specificity, the “threshold” at which injury may occur.

The ergonomic stressors alleged by the Secretary to be associated with this job are frequent extended reaches to both sides to access materials from the machine, frequent pinches, and long periods of static posture. As discussed *supra*, there is nothing in the record to indicate the point at which an extended reach, even one performed frequently, becomes a hazard. None of the Secretary’s witnesses were able to identify how often a reach must be performed, or how far, before the potential for harm develops. Furthermore, Besser’s claim that these reaches stretch the muscles of the arm and shoulder, creating fatigue and possible tendon inflammation, which may in turn develop into a cumulative trauma disorder of the upper extremity, is a tenuous assertion that is not supported by the record (Tr. 6076; Exhibit R-5586 at 24).⁶⁵

Having focused on the frequent pinching aspect of the alignment task, Besser made an attempt to quantify the harm to the beadwinder by calculating the average number of pinch grips performed, then comparing it to a range of repetitions which he contends have been shown to result in tendon and sheath inflammation (Tr. 6075; Exhibit R-5586 at 23). Besser’s conclusion however, lacks the proper foundation since he failed to identify the study on which he relies and did not provide any

⁶⁵ Dr. Schulze focused on bead alignment as the most hazardous component of this job. For Dr. Schulze, this task is harmful because it requires beadwinders to deviate their wrist which, when combined with repetition and force, contributes to the development of wrist maladies including carpal tunnel syndrome (Tr. 1475-76, 1478-79, 1510-13, 1515, 1519-20, 2162, 2618-19). Though he repeated this trilogy several times throughout his testimony, Dr. Schulze provided no concrete basis for his conclusion that repetition, force, and wrist deviation causes wrist maladies (Tr. 2749). His references to research performed by a “Dr. Rempel” regarding wrist deviations also fail to support the purported link between this activity and cumulative trauma disorder. According to Dr. Schulze’s testimony, Dr. Rempel’s study establishes only that deviating the wrist from the neutral position places an increased amount of pressure on the median nerve; it apparently does not identify the result of such pressure nor does it establish how much of a deviation is required to create this effect (Tr. 1476-77, 2141, 2746-47). However, the Secretary has not alleged wrist deviations as a stressor under this instance of violation, apparently electing instead to use Besser’s language, “frequent pinches”. In any case, Dr. Schulze admitted that he does not know how many wrist deviations can be considered harmful since it depends upon the individual and the force with which the movement is made (Tr. 1476-77, 2146-47, 2619-21, 2746-48, 2750). He also testified that he cannot say how many pinches are too many, or even how much pinch force would be too much (Tr. 1477, 2126-40, 2619-21, 2657-58).

specific details about how the study was performed or what type of repetitive activity was examined. Therefore, the Secretary has failed to prove that performing frequent pinches poses potential harm to beadwinders.

Finally, as was the case with long periods of standing, there is nothing in the record to indicate how long one must remain in a “static posture” before the onset of harm. What actually constitutes a “static posture” is not clear from the record. Indeed, according to the various definitions offered by Dr. Schulze, it simply means non-movement or holding a posture for some unspecified period of time (Tr 1437-38, 2013-14, 2662, 3107). Here, both Besser and Dr. Schulze concluded that beadwinders should have better designed chairs from which to perform their work but failed to indicate how sitting in the “wrong type” of chair leads to the development of a cumulative trauma disorder. Indeed, Besser’s testimony that sitting in an unadjustable, unpadded chair “causes contact trauma to the back of the legs which reduces the blood flow to the feet” does not establish the type of harm alleged here by the Secretary (Tr. 6077).

Even if the Secretary had proven injury, her case would still fail the causation element of her burden of proof. As discussed *supra*, without the proper foundation, neither Besser nor Dr. Schulze are qualified to attribute the development, potential or actual, of cumulative trauma disorders among beadwinders to the work activities alleged to be ergonomic stressors. Moreover, their respective analyses lack the element which they themselves acknowledge is critical to any determination of causation: actual injury data. Moreover, the plant doctors offered no relevant testimony regarding the beadwinder job. Finally, absent consideration of the various non-occupational sources which the Secretary’s witnesses admit can cause or contribute to the development of cumulative trauma disorders, the issue of causation cannot be adequately resolved on this record. Accordingly, the Secretary has failed to prove that any of the work activities alleged under this instance of violation are hazardous to the employees who perform them.

Instance J - Tire Builders

Under this instance, the citation states in relevant part:

J) Departments #130, 173, 174 - Tire Builders go through several stages of laying strips of rubber, placing bead rings and removing the product to a storage rack. Ergonomic stressors are created during this process such as frequent forceful pinch grips, elevated reaches and

lifts, torso flexions, increased compressive force, and high periods of standing. These stressors are consistent with the development of musculoskeletal injuries, low back injuries, UECTDs, and varicose veins.

Eight employees testified in connection with this instance: Gerald Keith Wright (Tr. 370-533); Stephen Ray Newby (Tr. 538-661); Jim B. Wisby (Tr. 662-702); Robert J. Pietrowicz (Tr. 703-818); Donna Luretha Nolan (Tr. 827-911); Larry Gene Reeves (Tr. 911-998); Larry Conaway (Tr. 1010-54); and Ronald Eugene Lindsey (Tr. 4946-89). Tire builders are primarily responsible for assembling a tire's components into one unit, a process that occurs in two stages. In the first stage,⁶⁶ the tire builder places two beads inside the rings of a tire assembly machine and using floor-level pedals to operate the machine, spools rubber inner liner onto the machine's drum (Tr. 377, 386-88, 434, 756-57, 841; Exhibit C -962, Segment starts 0:42:10 & 1:00:35). This requires the tire builder to reach for the beads which hang from an elevated pin, and bend, twist, and reach, to place them inside the machine's rings (Tr. 386-88, 436-37, 484-86, 561, 569, 765, 842). After a complete revolution of the drum, the tire builder cuts the liner with a sliding blade, then splices and seals the ends of the liner together (Tr. 377, 388-89, 438, 582-83, 619-20, 756).

The same process is then repeated for the application of one or two layers of body ply, but instead of a sliding blade, a hot knife is used to cut the ply (Tr. 378-82, 389-90, 438, 756). To cut and splice the body ply, the tire builder must bend and use some force, making at least one cut per tire with a hot knife which, according to Mr. Pietrowicz, is gripped tightly (Tr. 438-39, 562-63, 766-67). In an automatic process, the tire assembly machine then sets the beads into the tire "carcass" created on the drum (Tr. 382-83, 386). The final step of the first stage process requires the tire builder to spool, cut, and stitch black and white sidewall strips onto the tire carcass (Tr. 383-84, 392-93, 398-400, 486-87, 756-57).⁶⁷ To stitch the sidewall, the builder uses a hand tool and applies

⁶⁶ The process which follows relates specifically to the first stage machines found in Department 130 of the plant, one of the three tire building departments cited here. The machines found in Department 173 are different in that they consist of two first stage stations and one second stage station, known as a 2-on-1 module machine (Tr. 405-06, 421-22, 1015). These machines are more automated than the assembly machines since materials are automatically spooled onto the machine's drum from "server trays" rather than manually applied by the tire builder, as indicated *infra* (Tr. 406, 423-25, 1044-45; Exhibit C-962, Segment starts 53:02).

⁶⁷ This step is not performed for tires designed for use as spares, known as "tempa-spares" (Tr. 801).

pressure with both hands; the sidewall is stitched at least three times per tire (Tr. 487-88, 562, 766-67, 836-37, 939, 996, 1040). To spot materials onto the machine's drum, the tire builder must use both hands (Tr. 378, 383). Once the process is complete, the carcass is broken free of the drum and placed on either a two-foot high tire rack or a two-foot high conveyor belt (Tr. 387-88, 391, 440, 565-66, 757, 768-69)

At the second stage of the tire building process, the tire builder takes the carcass from a conveyor belt or BPA rack and places it onto a lubricated drum where the steel belts and treads are applied in an automatic process that inflates the tire (Tr. 412, 414, 426-27, 920, 926-28, 935-36, 974-75, 984). In Department 173, the tire builder lifts tire carcasses from a one-foot high conveyor belt, while in Department 174, the tire builder reaches as high as eight feet to remove carcasses from the upper pins of a BPA rack (Tr. 442-44, 926-27, 976). To create the steel belt band, the tire builder spools steel belt around a drum, clips it into place with a metal clip, cuts it with a hot knife, then splices the belt together (Tr. 412-13, 523, 921, 927, 940-41).

The tire builder then takes a tread from the tread tray and loads it onto the machine's "server" (Tr. 409-10, 414, 922-23).⁶⁸ This requires the tire builder to lift treads from the tread tray, a task which requires him to bend, twist, and reach, to access the treads located in the upper and lower leaves of the tray; each tread tray is about six feet high and about one foot off the ground (Tr. 426, 444-47, 525-26, 923, 935-37, 994, 4954, 4974-75). Once the automatic inflating process is complete, the tire builder pulls or breaks the uncured or "green" tire free of the machine's drum and hangs it onto a beehive rack, bending to place tires onto the lower pins of the rack located about two feet from the floor, and reaching to place tires onto the upper pins of the rack located at least five feet from the floor (Tr. 407, 415-20, 447, 924-25, 929, 941-45, 977). At this point of the manufacturing process, a green tire weighs about 25 to 30 pounds (Tr. 417).

Other duties performed by tire builders include sharpening and cleaning hot knives, placing their builder number on inner liner, lubricating the machine's drum, and changing stock rolls (Tr. 382-83, 399-403, 440, 501-02, 564, 566, 600-01, 759-60, 798, 881, 931, 991, 1040-41). Most stock roll changes are performed anywhere from two to twelve times per shift; for tempa-spares, tread roll

⁶⁸ This step is not performed when tempa-spares are being produced because the tread is fed through the back of the machine from a continuous roll (Tr. 923, 973-74).

changes are done every hour (Tr. 617-18, 649, 838, 992, 1043).

Since the tires tend to stick to the drum of each machine, all tire builders must reach, bend, twist, and pull in order to break a tire carcass free from the drum of the tire assembly machine (Tr. 439, 564-65, 767-68, 942-43, 1041-42, 1049). While performing most of their job duties, the tire builder stands on a concrete floor which is sometimes covered with a mat (Tr. 386, 427, 435-36, 524, 561, 678, 764, 841, 928, 934, 1027-28). Mr. Newby testified that he initially bought his own mat, but by 1994 the plant began providing them (Tr. 561, 651). When changing rolls of stock, however, some employees indicated that they stood up on the side of the machine in order to reach the area where the new reel is fed (Tr. 566-67, 618).

Tire builders are compensated with an hourly rate of base pay plus incentive pay for each tire produced over their base tire production rate. If the base production rate is not met, the builders are docked pay and/or written up (Tr. 423, 430-32, 540, 663-64, 704-06, 831, 915, 1014, 4949). The base tire production rate varies depending upon the size of the tire being produced but ranges from about 170 to 250 tires per 8-hour shift. Most of the employee witnesses indicated that they produced well over their base rates producing as many as 400 tires per shift (Tr. 503, 540, 567-70, 593, 705-06, 831, 915, 966, 970, 1014, 1051, 4955).

Mr. Wright, who worked as both a first stage and second stage tire builder from 1990 to 1994, testified that in this position he suffered injuries to his shoulder, right elbow, and right wrist (Tr. 372-73, 430, 495, 449). In June of 1993, Mr. Wright experienced “unbearable” pain in his shoulder whenever he pulled or reached for something. He reported the problem to his supervisor who sent him to the onsite clinic for treatment (Tr. 451-52). He testified that he was diagnosed with a muscle strain, treated with medication and assigned to light duty work (Tr. 455-56). In 1991, Mr. Wright reported having wrist pain to his supervisor which, according to the associated accident report, was described as a recurring injury due to a “stress factor” (Tr. 462-68; Exhibit C-842). He was supplied with a wrist brace by the plant doctor (Tr. 468; Exhibit C-842). In July of 1992, Mr. Wright developed pain in his elbow which apparently worsened whenever he was building tires (Tr. 458-59, 475-78; Exhibit C-914N). According to the associated accident analysis file, this pain was attributed to repetitive motion (Exhibit C-914N). Mr. Wright reported his condition and visited the onsite clinic where heat was applied and he was assigned to light duty work for a week (Tr. 459;

Exhibit C-914N). In terms of prior injuries, Mr. Wright indicated that he injured his right wrist in 1984 when the leaf of a tread tray fell on it, and also fractured the wrist in a motorcycle accident when he was fifteen years old (Tr. 507, 511, 531).

Mr. Newby, who worked as a first stage tire builder for 14 years, testified that while changing the stock on his machine in 1991 he suffered a back injury which he claims was initially diagnosed as a pulled muscle, but later rediagnosed as a damaged disk (Tr. 539, 545-46, 549). According to the associated accident analysis file, he was pulling out an empty liner spool when he developed pain in his lower back (Exhibit C-802). Mr. Newby reported his condition to his supervisor and was sent to the onsite clinic where he was supplied with a heat pack and assigned to light duty work (Tr. 546, 552-53, 555-56; Exhibit C-802). He was also treated at an offsite facility where x-rays were taken and he participated in physical therapy (Tr. 554-55). Mr. Newby stated that upon returning to his position as a tire builder, he continued to experience pain in his back for which he was provided with medication and exercises (Tr. 556, 571-72). He claims that he filed a workers compensation claim in connection with his injury (Tr. 574-75). Mr. Newby also testified that while serving in the Navy he was a boxer and at that time developed an osteoarthritic knee for which he receives a disability check. He was told by one of his physicians that his knee problem contributed to his back injury (Tr. 544, 597-99)

Mr. Wisby, who became a tire builder in 1983, testified that while working in this position he suffered from a cyst on his right wrist (Tr. 670-73). He reported the problem to his supervisor and was sent to the onsite clinic where he was supplied with a wrist brace and assigned to light duty work for three weeks (Tr. 671-73, 676). Mr. Wisby testified that he was told by the plant doctor that his injury was caused by repetitive motion (Tr. 673-76). Since his return to tire building the cyst has not returned and he has not experienced further pain (Tr. 676-77, 698). Mr. Wisby also testified that in 1985 he had a cyst on his left wrist which, according to the plant doctor, was the result of a sprain (Tr. 690-91, 698-99).

Mr. Pietrowicz, who worked as a tire builder for 13 years, testified that while working in this position he developed carpal tunnel syndrome in both hands and cubital tunnel syndrome in both elbows (Tr. 703-04, 717-18, 806). In August of 1991 Mr. Pietrowicz experienced pain in his left shoulder and wrist while pulling a bead loose from a bundle. According to the accident report, his

pain was attributed to repetitive use (Tr. 742-45; Exhibit C-812). In 1992 he reported to his supervisor that he was having pain in his right hand and visited the onsite clinic where he was given medication and assigned to light duty work for two to three weeks. According to the associated accident report, the pain was attributed to repetitive motion (Tr. 721-24, 751-52; Exhibit C-903). After returning to tire building his pain recurred and when he visited the onsite clinic he was told that his symptoms were consistent with carpal tunnel syndrome (Tr. 725-29). Mr. Pietrowicz was given medication and his arm was splinted for three weeks, then put in a cast (Tr. 729-30, 736-37). After the cast was removed he was sent to physical therapy for 21 days, then returned to work for two weeks of light duty (Tr. 730-34). In March of 1993 Mr. Pietrowicz visited his personal physician for this injury and was diagnosed with right carpal tunnel syndrome and cubital tunnel in his right elbow. Surgery was performed for both conditions (Tr. 738-39, 806-07). In 1994 surgery was also performed on his left elbow and hand, apparently for the same conditions (Tr. 718, 739-41, 806-07). Mr. Pietrowicz filed a workers compensation claim in connection with these injuries (Tr. 814-15; Exhibit C-948).

Ms. Nolan, who worked for at least three years as a tire builder until 1993 testified that in March of 1991 she reported to her supervisor that she was experiencing back pain (Tr. 828-29, 869-70, 876-79; Exhibit C-808). According to the accident analysis file, she was diagnosed with a muscle spasm, treated with medication, and assigned to restricted work activity (Exhibit C-808). Also in 1991 Ms. Nolan sustained an injury to her shoulder and neck when she was struck in the back by a chain (Tr. 845-47, 896-99). She was treated with medication and assigned to light duty work, but continues to experience pain in her neck (Tr. 898-900).⁶⁹ In 1994, she injured her right knee and broke her toe (Tr. 848-49). It is not known, however, whether these injuries were work related. Ms. Nolan also testified that while working as a tire builder, she developed a cyst on her left wrist and her condition required surgery (Tr. 903-05, 908). A workers compensation claim was filed by Ms. Nolan in connection with this injury (Exhibit C-945).

Mr. Reeves, who has worked as a tire builder for eight years, testified that in 1993 he

⁶⁹ Although an accident analysis file dated May 7, 1992, indicates that Ms. Nolan was experiencing neck pain due to an “old injury”, she could not recall providing the information contained in the file and denied that the signature on the file was actually hers (Tr. 866-67, 870-71; Exhibit C-899).

developed numbness and swelling in both hands (Tr. 982, 948). He was seen by the plant doctor who diagnosed carpal tunnel syndrome in his left hand and radial tunnel in his right elbow (Tr. 949-51, 984-85). The plant doctor then referred him to an offsite physician who operated on Mr. Reeves' left hand and right elbow in April and June, respectively, of 1994 (Tr. 951, 955). Mr. Reeves was out of work from June 1994 until October of 1996 due to his recovery and the labor strike (Tr. 955-56). The offsite physician placed permanent restrictions on Mr. Reeves upon his return to work, telling him that he could not perform any repetitive work (Tr. 951-54). Mr. Reeves testified that after returning to tire building for one day, he was unable to continue due to the pain in his arms and he has not returned to work since (Tr. 952-58). He claims to have filed a workers compensation claim in connection with these injuries (Tr. 959).

Mr. Conaway, who worked as a tire builder from 1988 to 1994, testified that at an unknown date while pulling a tire from a drum he suffered a back injury which he reported to his supervisor. He did not lose any work (Tr. 1011-12, 1021-23). In 1990, Mr. Conaway's right wrist was pierced by a bead wire and when he was sent by the plant doctor for treatment at an offsite facility, he was told he had carpal tunnel syndrome (Tr. 1025, 1046).⁷⁰ In 1992, he developed a cyst on the same wrist and at the time the cyst was surgically removed, Mr. Conaway underwent carpal tunnel release surgery. He was out of work for four months (Tr. 1024-26, 1046).

Mr. Lindsey, who worked as a tire builder for over 17 years until 1993, testified that in 1991 he developed a muscle spasm under his left shoulder blade (Tr. 4957, 4959, 4975-76, 4979). When he called the plant two days later to report the problem, a security guard recommended that he visit an offsite facility where he was treated with medication and referred back to the onsite clinic's physician (Tr. 4959-60). Mr. Lindsey reported to the plant doctor who provided him with muscle relaxers (Tr. 4960). However, the pain in his left shoulder continued and in 1993 he was referred to a physician who told him that his problem was due in part to a slipped disk in his neck. In 1994 he had separate surgeries on his neck and shoulder (Tr. 4961-62, 4977-79). He also testified that he had relief from his shoulder pain whenever he would move it and acknowledged that building tires

⁷⁰ An single-page accident analysis file referencing a right wrist pain complaint by Mr. Conaway was submitted into evidence by the Secretary (Exhibit C-857). It is not clear, however, whether this particular complaint is related to Mr. Conaway's testimony because the date of injury is illegible.

alleviated the pain. He testified, however, that he took medication for his shoulder when he was at work (Tr. 4976-77, 4988-89). A workers compensation claim was filed in connection this condition (Exhibit C-939). Mr. Lindsey testified that he works on race cars as a hobby outside of work (Tr. 4979-82, 4986-87)⁷¹.

Mr. Besser as Complainant's representative, identified forceful pinch grips, elevated reaches, torso flexions, and long periods of standing, as the stressors associated with this job which form the basis for the citation (Tr. 6081, 6086; Exhibit R-5586 at 28-32). He testified that torso flexions create stress on the back increasing the hazard of low back injury, and long periods of standing lead to generalized fatigue and varicose veins (Tr. 6082-83 ; Exhibit R-5586 at 29, 32). Besser also testified that extended reaches are consistent with the development of shoulder fatigue which in turn leads to cumulative trauma disorders such as strains, sprains, and tears in the shoulder and upper back (Tr. 6084; Exhibit R-5586 at 30). In his report, he associated forceful pinch grips with the wrist deviation required for the tire builder to pull rubber around the drum, and concluded that this activity is consistent with the development of cumulative trauma disorders such as tendinitis and carpal tunnel syndrome (Exhibit R-5586 at 29). Besser also analyzed the tire lifting task, but unlike Dr. Schulze, concluded that under the 1981 NIOSH lifting guidelines, the lift *was* hazardous because the weight of the tire lifted, 32 to 45 pounds, exceeded the action limit of 24 pounds (Tr. 6084-85; Exhibit R-5586 at 31-32).⁷²

⁷¹In his report, Dr. Schulze identified wrist deviations, torso flexions, extended reaches, and standing as the stressors associated with both stages of tire building (Tr. 2076, 2079-80, 2085, 2088, 2095-96, 2519-20, 3355-56, 3360; Exhibit C-628 at 269-70). Though not identified as such in his report, he agreed at the hearing that an additional stressor associated with the first stage tire builder job is forceful pinch grips, and an additional stressor associated with the second stage tire builder job is compressive force in the wrist (Tr. 2090-91, 2096, 3352). According to Dr. Schulze, the injuries likely to occur as a result of these stressors are wrist and hand injuries such as carpal tunnel syndrome and sprains, tendinitis in the elbow, shoulder bursitis, and low back injury (Tr. 2100, 2109-10, 3370). His report also contains a lifting analysis of the tire lifting task, which assumes a tire weight of eight pounds and a frequency level of one lift per minute; he concluded that the lift was not hazardous under the 1991 NIOSH lifting guidelines since it did not exceed the recommended weight limit of about 20 pounds (Exhibit C-628 at 272-76).

⁷²Dr. DeHart and his team concluded that as a group, tire builders suffered a total of 215
(continued...)

All of the plant doctors provided testimony about the tire builder job. Dr. Smith-Horn testified that she treated several first stage tire builders, including Mr. Wright and Mr. Lindsey (Tr. 4428, 4433-44, 4467, 4470). Dr. Root testified that many of the tire builders she treated suffered from shoulder or elbow problems, a potential “trend” which she believes should have been addressed by Dayton (Tr. 4541, 4544-45, 4548). Dr. Parrish testified that he recalls going out on the plant floor to observe the tire builder job because the employees were complaining of injuries (Tr. 4864-65). Of the four doctors, Dr. Lundy’s testimony was the most specific, identifying three tire builders whose injuries he believed were attributable to the repetitive and/or forceful work which they performed at Dayton (Tr. 4697-4701, 4704-06, 4712-14, 4716-20, 4739-41, 4797-99).⁷³

As evidence of actual injury, the Secretary relies upon the testimony of six of the eight tire builders who testified at the hearing, as well as the workers compensation records for three tire builders who did not appear at the hearing (Secretary’s Brief at 71-82).⁷⁴ Of the fourteen workers compensation records submitted into evidence by the Secretary, only four relate to employees who testified at the hearing, and two involve injuries which apparently occurred after the citation was issued. When these records were offered into evidence by the Secretary at the close of her case, there

⁷²(...continued)

musculoskeletal injuries from 1989 to 1993 (Tr. 5264). According to a data entry form for one of the tire builders evaluated, the stressors which Dr. DeHart’s team considered under this job were frequent forceful pinch grips, extended/elevated reaches, lifts, torso flexions, and long periods of standing (Tr. 5625; Exhibit C-427). According to Dr. DeHart’s calculations, the tire builders had an injury incident rate of 13.6 which, when compared to the BLS rate of 8.4, results in a relative risk of 1.62 (Tr. 5265-68; Exhibit C-973). Based upon this data, as well as his review of the job, Dr. DeHart concluded that the increase in musculoskeletal injuries among tire builders was associated with their work (Tr. 5271-74).

⁷³Finally, Dr. Hadler provided no specific testimony regarding the tire builder job or the stressors alleged to be associated with it.

⁷⁴It is not surprising that the Secretary did not include the conditions suffered by two of the eight tire builders as part of her actual injury proof. Mr. Newby testified that he suffered a damaged spinal disk, a condition which suggests an acute injury rather than a cumulative trauma disorder. There is also nothing in the record to confirm his diagnosis. With regard to Mr. Reeves, the conditions he testified to appear to have occurred outside the scope of the citation.

was considerable debate between the parties over their admission. At that time, counsel for the Secretary made it clear that all fourteen records were being offered to prove only that the documents “exist” and that Dayton was aware of their contents (Tr. 6550, 6579-81). The Secretary concedes that these documents were not offered for the truth of their contents but to establish knowledge of their contents on the part of Dayton (Tr. 6579-81). As such, these records have been relied upon for the sole purpose of confirming or establishing that a claim for compensation was filed in connection with an injury or condition testified to by an employee witness. Therefore, given the Secretary’s limited basis for offering these records, their factual content cannot be relied upon to establish actual harm to any employees, including those who testified at the hearing.

With regard to the tire builders who appeared at the hearing, only injuries testified to by Ms. Nolan and Mr. Lindsey were reliably confirmed by accident analysis files or medical records. For the remaining employees, the record simply lacks the adequate documentation to conclude that the injuries and conditions to which they have testified were accurately diagnosed such that they may be considered proof of actual harm as alleged by the Secretary. For instance, Mr. Pietrowicz testified that in March of 1993, he was diagnosed with carpal tunnel syndrome in both hands and cubital tunnel in his elbow, but the associated accident analysis files indicate only that he experienced pain in both hands on two separate occasions in 1991 and 1992 (Exhibits C-812 & C-903). Without his medical records, it cannot be determined whether his injuries were reliably diagnosed such that they may be properly considered here. Similarly, Mr. Wisby testified that he suffered from a cyst on his right wrist due to repetitive motion, but there is nothing in the record to confirm either his diagnosis or its alleged cause.

Of the three injuries testified to by Mr. Wright, only one appears to have been diagnosed i.e., a shoulder muscle strain occurring in 1993.⁷⁵ This injury, however, does not appear in any of the relevant injury records submitted into evidence here. Although Dr. Smith-Horn testified that she provided follow-up treatment for Mr. Wright’s shoulder condition, the actual diagnosis and any

⁷⁵ The other conditions testified to by Mr. Wright are documented in associated accident analysis files as pain complaints; there are no diagnoses indicated (Exhibits C-842 & C-914N). Although the documents completed by supervisory personnel suggest that they attributed both conditions to stress or repetitive motion, the attached medical reports contain no legible conclusions regarding causation.

determination of its cause was actually made by Dr. Root who was not questioned about Mr. Wright's injury during her testimony (Tr. 4432-34). Finally, Mr. Conaway testified that he suffered from carpal tunnel syndrome in 1990 and developed a cyst on his right wrist in 1992. Although an undated accident analysis form indicates that he suffered from right wrist pain, the form does not contain a definitive diagnosis and neither of these injuries appear in any of the relevant injury records in evidence here (Exhibit C-857).⁷⁶

In contrast, the injuries testified to by Ms. Nolan and Mr. Lindsey are sufficiently corroborated by relevant injury records. A medical report contained in the associated accident analysis file confirms that in February of 1991, Ms. Nolan reported suffering from back pain for two weeks and was diagnosed by Dr. Parrish with a muscle spasm in her upper back (Exhibit C-808).⁷⁷ As the only tire builder witness for whom detailed medical records were submitted into evidence, the injuries to which Mr. Lindsey testified are also well-documented. Indeed, these records confirm that from January through September of 1993, he suffered from muscle strains in both shoulders (Exhibit C-173).

In addition to these injuries, the record contains further proof of actual harm. Though not relied upon by the Secretary, an injury suffered by Huu Pham, a tire builder who did not testify at the hearing, is documented in a two-page medical report which has been made part of the record (Exhibit C-241). According to this report, on October 6, 1993, Mr. Pham reported experiencing pain in both elbows for the past two months and was diagnosed at the onsite clinic with bilateral epicondylitis (Exhibit C-241). Dr. Smith-Horn, whose signature appears on the medical report, confirmed this diagnosis as well as her treatment of Mr. Pham's condition (Tr. 4467, 4516).

Moreover, the fact that all four plant doctors testified that they treated tire builders for similar

⁷⁶ The entry for Mr. Conaway which appears in Dayton's 1992 OSHA 200 log indicates a March 9th diagnosis of tendinitis in his right wrist, not a cyst (Exhibit C-672). Without the underlying medical documentation, such an inconsistency raises questions about the reliability of either diagnosis.

⁷⁷ The other injuries testified to by Ms. Nolan fail to support the Secretary's case. The injury she sustained to her shoulder and neck when she was struck in the back by a chain is obviously acute in nature and the cyst which she developed on her left wrist at some unidentified time does not appear in any of the relevant injury records submitted into evidence here. The fact Ms. Nolan filed a claim for compensation in connection with the latter condition does not in and of itself establish the reliability of her diagnosis where these records, as discussed *supra*, were not submitted into evidence for the truth of their contents.

medical problems is significant. In terms of specific employees, Dr. Lundy provided testimony about an upper back injury suffered by Mr. Lindsey, as well as two first stage tire builders, Homer Dade and a Mr. Jolley, both of whom he diagnosed with carpal tunnel syndrome (Tr. 4697, 4712, 4717-19, 4723).⁷⁸ Dr. Smith-Horn indicated that she also treated Mr. Lindsey, as well as Mr. Pham and two additional tire builders, Brent Quintero and Darryl Adams, both of whom were diagnosed with shoulder strains (Tr. 4467).

For the reasons discussed *supra*, Dr. DeHart's identification of 215 tire builder injuries is unreliable for the purposes of establishing actual harm. Indeed, most of the tire builders who testified at the hearing either are not included in his analysis or appear for injuries that are unrelated to those to which they testified. For instance, Mr. Wright's only diagnosed condition was a shoulder strain in 1993, but Dr. DeHart's data references three pain complaints from 1990, 1991, and 1992 for Mr. Wright's right hand, wrist, and arm, respectively (Exhibit C-987 at 9, 14). Similarly, Mr. Conaway testified to suffering carpal tunnel syndrome in 1990 and a cyst on his right wrist in 1992, but Dr. DeHart's data only references a "left L/S strain" occurring in 1993 (Exhibit C-987 at 8). On the other hand, it is not surprising that Dr. DeHart's data includes some of the tire builder injuries which have been found to constitute reliable proof of actual harm, such as Mr. Jolley's 1991 carpal tunnel syndrome and Mr. Lindsey's 1993 shoulder strain.

Taken together, this evidence supports the Secretary's claims with regard to proof of actual harm or, as the Commission described it in *Pepperidge Farm, supra* at 2014, the "evidence of effect". However, as with previous citation items, the Secretary's case begins to falter when it comes to proving the cause, both specifically and generally, of any established harm. Beginning with Ms. Nolan's upper back injury, the citation specifically alleges that the stressors alleged under this instance of violation are consistent with the development of *low* back injuries. It is also not evident from the record whether a muscle *spasm*, as opposed to a muscle strain or sprain, can be considered a musculoskeletal injury of the type that is consistent with the stressors alleged. Indeed, if their testimony were to be credited, both Dr. Schulze and Besser identified only low back injury as a likely

⁷⁸ There are no injury records in evidence which relate to either of the latter two employees, but Mr. Jolley's name appears in Dayton's OSHA 200 log for 1991 with an indication that his hands and arms were numb (Exhibit C-671 at 4398).

result of the stressors associated with the tire builder job, and both mentioned only strains, sprains, or tears to various muscle areas, not spasms, as other potential injuries. Without a definitive link between Ms. Nolan's injury and the stressors alleged, causation has not been established.

Mr. Lindsey's injuries raise additional concerns. First, his medical records suggest that his injuries may have been acute in nature since they were precipitated on at least four occasions by the performance of a specific task, e.g. pulling on a tread or popping a tread loose (Exhibit C-173 at 6941, 6973, 6928, 6927). In fact, Dr. Smith-Horn, who testified that she treated Mr. Lindsey's right shoulder strain, admitted on cross-examination that as described in the associated medical report, this injury "sounds like" an acute injury (Tr. 4467, 4515; Exhibit C-173 at 6927). Moreover, the medical reports generally confirm Mr. Lindsey's testimony that tests performed by an offsite physician indicated he was suffering from a disk problem in his neck which required him to have surgery in September of 1993 (Exhibit C-173 at 6982, 6940). According to Mr. Lindsey, this physician told him his shoulder problems were due, in part, to his neck problem (Tr. 4961-62, 4977-79).

Dr. Lundy testified that he believed Mr. Lindsey's "upper back" injury was attributable to his work as a tire builder, caused by either the manner in which he had to pull on tire carcasses in order to remove them from the machine's drum, or the manner in which he had to reach in order to access treads at the top of a tread tray or a combination of the two tasks (Tr. 4697-4701, 4704-06, 4793, 4798-4801). But it is not entirely clear to which injury Dr. Lundy is referring. According to his testimony, Dr. Lundy worked at the Dayton plant from August of 1991 until November of 1992, well before Mr. Lindsey's shoulder problems developed in 1993 (Tr. 4726). Not surprisingly, therefore, Dr. Lundy's signature does not appear on any of the medical reports in evidence here. Although one of these reports documents a March 8, 1991 injury that seems to correspond with Dr. Lundy's description of Mr. Lindsey's injury as one affecting his "upper back", it is not clear how Dr. Lundy became aware of this condition since he did not begin working at the plant for another six months (Exhibit C-173 at 6973).

Dr. Lundy also attributed Mr. Dade's and Mr. Jolley's respective carpal tunnel syndrome diagnoses to their work, specifically the manner in which they extend their arms and flex their wrists while cutting rubber liner with a knife (Tr. 4712-14, 4716-20, 4723-25, 4718-21, 4797, 4814-46). For all three men, Dr. Lundy was concerned with the force and frequency with which the identified

tasks were performed, but did not identify the levels at which these activities became hazardous or even measure the force or frequency at which the men actually performed these tasks (Tr. 4798-4804, 4739-40). He also acknowledged that he did not know the production rates at which any of the men actually built tires (Tr. 4745, 4800). This is critical given that the tire builders who appeared at the hearing indicated that each employee, apparently driven by the incentive pay system, sets his own tire building pace, and that their individual production rate varied depending on a wide range of factors including which machine they were assigned, what stock was available and how well it performed, how much down time they experienced, and what type of tire was being produced (Tr. 502-05, 520-21, 586-87, 591-96, 631-32, 679-81, 683, 694-95, 785-86, 792-94, 901, 966-70, 980-81, 1051-52). Under these circumstances, the frequency and even the force with which certain tasks may be performed will vary from tire builder to tire builder and may even depend, as Dr. Lundy conceded, on the individual tire builder's size or stature (Tr. 4799-4804).

Finally, Dr. Lundy conceded that it is not possible to identify the degree to which any of these injuries may be attributed to work (Tr. 4727-28). He testified that taking a history of the patient's activities both in and out of the workplace is necessary to determine the cause of an injury (Tr. 4728). There is no evidence, however, that he obtained such a history from any of the three tire builders in question, or whether he considered such factors in reaching his conclusions regarding the cause of their injuries. Given these gaps in Dr. Lundy's testimony, his conclusions regarding the cause of these injuries cannot be credited.

In addition to these factors, the same general problems which have plagued the Secretary's proof of causation under previous citation items make it impossible to determine if any of the other tire builder injuries identified here can be associated with their work. Indeed, there is nothing in the record to even suggest the cause of the injuries suffered by Mr. Pham, Mr. Quintero, or Mr. Adams. The record also lacks the kind of detailed epidemiological evidence which might shed some light on any alleged link between these injuries and the stressors alleged to be present in the tire builder job.⁷⁹

⁷⁹The Secretary has been unable to establish the point at which any of the cited tire builder activities cause harm. It has already been established that the Secretary is unable to make her case with regard to standing, bending, and reaching. With respect to "increased compressive force" and "forceful pinch grips", Dr. Schulze could not state what an acceptable level of compressive force
(continued...)

Also, as indicated *supra*, neither Dr. Schulze nor Besser possess the medical expertise necessary to associate the activities they consider ergonomic stressors under this instance to any type of injury suffered by tire builders.

Moreover, as Dr. Lundy recognized, the issue of causation is further clouded by the multitude of non-occupational risk factors for cumulative trauma disorders, as well as the role an individual's medical history and personal characteristics can play in the development of such injuries. Having failed to account for such factors in his analysis, Dr. DeHart, like Dr. Lundy, was unable to identify the degree to which occupational sources, as opposed to non-occupational ones, caused or contributed to the injuries identified.

For all of these reasons, the Secretary has failed to prove that any of the work activities alleged under this instance of violation are hazardous to the employees who perform them.

Instance K - Radial Dopers

Under this instance, the citation states in relevant part:

K) Department #132 - Curing; Radial Doper(s) lift tires from storage spools and place them on a roller conveyor for further processing. After tires are processed they are lifted from the conveyor back to the storage spools. Ergonomic stressors are created during this operation such as high lifting frequencies, long periods of standing, repeated reaches above the shoulder height, and torso flexions. These stressors are consistent with the development of low back pain and injury, musculoskeletal injuries, various UECTDs in wrist, arms and shoulder, and varicose veins.

Four employees testified in connection with this instance: Philip V. Burrous, Sr. (Tr. 1208-61); Daryl Robert Kindrick (Tr. 1262-1319); Willy Lee Hill, Jr. (Tr. 1321-51); and Brian Lane Ferguson (Tr. 1689-1763). Radial dopers are primarily responsible for loading and unloading the

⁷⁹(...continued)

would be, let alone the point at which an "increased" level constitutes an ergonomic stressor (Tr. 2096-98). Furthermore, the "forceful pinch grips" stressor suffers from the same problems as the "frequent pinches" stressor discussed under the previous citation instance, namely the Secretary's inability to establish the level of pinch force or the number of pinches at which harm will develop.

Furthermore, Dr. DeHart's incident rate analysis remains seriously flawed for the purposes of establishing causation. Indeed, as discussed *supra*, he readily admitted that his rate comparison fails to prove causation on an individual basis and there is no convincing evidence to establish his claims of causation on a population basis.

doper machine with “green” tires (Tr. 1227-29, 1698; Exhibit C-962, Segment starts 1:03:40). The doper machine consists of a series of conveyor belts, one of which carries each tire into a paint cabinet where it is sprayed with three materials: blemish paint, tread wash, and a mold release agent known as “dope” (Tr. 1210-11, 1221-22, 1229, 1255, 1280). Once this automatic process is complete, the tire exits the machine on another conveyor belt (Tr. 1228-29). Other duties performed by radial dopers include initialing dope weight charts, cleaning the paint cabinet and its spray nozzles, adjusting the spray nozzles, and repositioning the “beehive” racks on which the tires are transported to and from the work area (Tr. 1256-57, 1272-73, 1290-91, 1310, 1348, 1702-04, 1708-09, 1741, 1752-53). Radial dopers are required to stand on a steel platform with a mat underneath their feet while loading and unloading tires (Tr. 1241, 1327).

Radial dopers first remove green tires from a beehive rack then lift them onto the intake conveyor belt. Once processed through the paint cabinet, the tires are lifted from the exit conveyor belt and placed back onto the beehive rack (Tr. 1224, 1228, 1278-80, 1704-05, 1707). The tires vary in both size and weight but weigh anywhere from 5 to 35 pounds (Tr. 1257-59, 1350-51). Depending upon the size of the tire, each beehive rack contains 12 or 16 arms or “pins” on which the tires are placed and each rack is about six feet tall (Tr. 1227, 1231, 1258, 1278). Tires lifted from or placed upon the upper pins of each beehive rack require the radial doper to reach above his or her shoulders and tires lifted from or placed upon the bottom pins of each beehive rack require the radial doper to bend (Tr. 1225-30, 1233-34, 1277-78). Because the tires tend to stick to the beehive pins, the radial doper often must use force to break them loose (Tr. 1230). At the time that the citation was issued, one radial doper was assigned to each machine and he was required to process between 1,988 and 2,000 tires during an 8-hour shift (Tr. 1219-21, 1271-72, 1324-25, 1700-02, 1754).⁸⁰ According to Mr. Ferguson, about 6 ½ hours of his 8-hour shift was spent loading and unloading tires (Tr. 1763).

Mr. Burrous, who worked as a radial doper for three years, testified that within two months of starting his job he complained to his supervisor that the “rates” were too high and continued his complaints throughout his three-year tenure (Tr. 1208, 1238-39). In terms of injuries, Mr. Burrous

⁸⁰ Prior to 1989, this job was a three-man operation, and after the 1994 strike, it became a two-man operation (Tr. 1219-20, 1701-02).

indicated that as a radial doper he incurred a neck injury in April of 1994, and a lower back injury in July of 1995 (Tr. 1239, 1241-43, 1249). He testified that he played football in high school, at which time he sustained a shoulder injury, and has played darts for a couple of years (Tr. 1216-17, 1249-50).

Mr. Kindrick, who became a radial doper in 1992, testified that he began experiencing wrist pain in 1991, which he reported to his supervisor. He was referred to an offsite facility by the plant doctor and diagnosed with carpal tunnel syndrome (Tr. 1264, 1282-85, 1305). He was treated with medication, supplied with wrist braces, and assigned to light duty work (Tr. 1273, 1283, 1307). Mr. Kindrick also testified that working as a radial doper has strengthened his back muscles and “substantially decreased” the back pain he felt prior to taking the job (Tr. 1297-98). In addition, he indicated that the amount of work he performed as a radial doper did not always correspond with the amount of pain he experienced (Tr. 1300-02, 1309-10, 1314-15).

Mr. Hill, who worked as a radial doper from 1986 until February of 1993, also claims to have complained to management about the working conditions he experienced as a radial doper (Tr. 1323, 1327-28). According to Mr. Hill he incurred a back injury, a wrist injury, and a shoulder injury (Tr. 1328-29, 1331, 1334-35). The wrist injury persisted throughout his tenure as a radial doper and was treated at the onsite clinic where he was supplied with a wrist band (Tr. 1329-30). Mr. Hill claims that he was questioned by Dayton management regarding the number of injuries he had incurred and was told he would be suspended if he was involved in another incident (Tr. 1340-43). Mr. Hill testified that he has engaged in non-occupational weight lifting most of his life (Tr. 1346-47).

Mr. Ferguson, who has worked as a radial doper for two years, claims that he recommended to the plant’s safety director that a study be conducted of the radial doper job because of the large number of injuries incurred by the dopers (Tr. 1732-33). He also testified that in July of 1991, he began experiencing numbness in both hands at night. He reported his symptoms to his supervisor in August of 1991 (Tr. 1691-92, 1713-15, 1720-21, 1743-44, 1761). After multiple visits to the onsite clinic, he was treated with medication, supplied with wrist braces, and assigned to light duty work (Tr. 1721-23). Mr. Ferguson was ultimately diagnosed with carpal tunnel syndrome and elected not to have surgery (Tr. 1745-46, 1763). Mr. Ferguson testified that he was previously employed as a

jeweler and continues to perform jewelry work (Tr. 1695, 1746).⁸¹

Mr. Besser identified frequent lifts, torso flexions, repeated overhead reaches, and long periods of standing as the stressors associated with the radial doper job (Tr. 6087; Exhibit R-5586 at 33-36). According to his report, the repeated overhead reaches performed by the radial doper “loads” the shoulder muscles and upper arms, a condition which, according to the Secretary is consistent with the development of muscle fatigue, pain and injury (Exhibit R-5586 at 34). The report also indicates that performing frequent torso flexions while carrying a load increases low back stress and the hazard of low back injuries (Exhibit R-5586 at 34). Using the 1981 NIOSH guidelines, Besser analyzed the tire lifting task using two different frequency levels, one provided by Kearney and one which he calculated after viewing the job on videotape (Tr. 6087-89; Exhibit R-5586 at 35). According to his calculations, at the videotape’s frequency level of 15 lifts per minute, the action limit for this task is zero; at Kearney’s frequency level of 8 lifts per minute, the action limit is seven pounds, well below the tire weights lifted by the radial dopers (Tr. 6087-89; Exhibit R-5586 at 35). Based on his calculations, Besser’s report states that the lift is hazardous and consistent with the development of low back and shoulder injury (Exhibit R-5586 at 36).⁸²

⁸¹Although Dr. Schulze identified standing and lifting as the main stressors associated with the radial doper job, he indicated that the tire lifting task includes stressors such as twisting, extended reaches above the shoulder, and torso flexions (Tr. 1607-08; Exhibit C-628 at 195). Specifically, he testified that the reaching and bending required for the radial doper to remove tires from and place tires onto the top and bottom pins of the beehive racks posed a significant risk for back injury (Tr. 1608-09, 3390-91). Having determined that radial dopers lift tires, each weighing an average of 13 pounds, at a rate of 20 lifts per minute, Dr. Schulze found that the high frequency of this task, as well as the position of the tire during the lift, results in a recommended weight limit of zero under the 1991 NIOSH guidelines (Tr. 1603-07, 1612; Exhibit C-628 at 197-206). Finally, he testified that standing all day results in generalized fatigue and stress to the lower back, increasing the risk for injury (Tr. 1611).

⁸²Dr. DeHart and his team concluded that as a group, radial dopers suffered a total of 30 musculoskeletal injuries from 1989 to 1993 (Tr. 5278). According to a data entry form for one of the radial dopers evaluated, the stressors which Dr. DeHart’s team considered under this job were frequent lifts, frequent overhead reaches, long periods of standing, and torso flexions (Tr. 5629-31; Exhibit C-493). According to Dr. DeHart’s calculations, the radial dopers had an injury incident rate of 33.8 which, when compared to the BLS rate of 8.4, results in a relative risk of 4.023 (Tr. 5280-81; Exhibit C-974). Based upon this data, as well as his review of the job, Dr. DeHart concluded that
(continued...)

Among the plant doctors, only Dr. Root made what could be construed as a reference to the radial doper job. She recalled discussing the beehive racks at medical committee meetings as an area of concern since the top levels of the rack are above shoulder level and the lower levels of the rack require employees to bend down (Tr. 4537-38, 4579). However, beehive racks are used by employees in several of the other jobs cited here and Dr. Root did not indicate whether her concern extended to all such jobs or one in particular.

As evidence of actual injury, the Secretary relies upon the testimony of three of the four radial dopers who testified at the hearing (Secretary's Brief at 92-93).⁸³ Mr. Kindrick, however, appears to have been diagnosed with carpal tunnel syndrome *prior* to his becoming a radial doper. Moreover, his condition was not documented in any of the relevant injury records in evidence here nor is it recorded in Dayton's OSHA 200 log for 1991. Mr. Hill testified that throughout his seven-year tenure as a radial doper, he suffered injuries to his back, wrist, and shoulder. However, there is no definitive indication that Mr. Hill's conditions were ever diagnosed and none appear in the relevant injury records in evidence here.

Finally, Mr. Ferguson testified that he was diagnosed with carpal tunnel syndrome. Without documentation to support his testimony, however, it cannot be determined whether an accurate diagnosis was made such that his injury may be properly considered as proof of harm in the context alleged here. Dayton's OSHA 200 log for 1991 contains an August entry which indicates that Mr. Ferguson's right wrist "hurts from regular work", but there are no subsequent entries in the log indicating a diagnosis of carpal tunnel syndrome. His condition does not appear in any of the other relevant injury records in evidence here. Although Mr. Ferguson testified that electrodiagnostic testing indicated he had carpal tunnel syndrome, there is nothing in the record to confirm that his test results were judged to be abnormal (Tr. 1723, 1745). Accordingly, I am not persuaded on the basis of his testimony alone that this injury can reliably be considered proof of the harm alleged by the

⁸²(...continued)
the increased rate of injury experienced by the radial dopers was caused by their work (Tr. 5282-83).

⁸³ The injuries testified to by Mr. Burrous occurred in 1994 and 1995, and are therefore beyond the scope of the citation.

Secretary.

As indicated *supra*, the plant doctors failed to provide any testimony regarding specific radial doper injuries and Dr. DeHart's identification of 30 such injuries cannot be considered reliable for the reasons discussed above. This remains the case even though Dr. DeHart included two entries for Mr. Ferguson in his final set of injury data - bilateral carpal tunnel on July 24, 1992, and carpal tunnel on an illegible date, also in 1992 (Exhibit C-987).⁸⁴ The fact that Mr. Ferguson's condition was apparently counted twice, coupled with Dr. DeHart's admission that many of the underlying medical records he reviewed lacked a diagnosis, makes it impossible to assume that these entries are accurate. Thus, there is nothing in the record which can properly be considered proof of actual harm under this instance of violation. Therefore, the Secretary must establish potential harm and indicate, with some specificity, the "threshold" at which injury may occur.

The ergonomic stressors alleged by the Secretary to be associated with this job are high lifting frequencies, long periods of standing, repeated reaches above the shoulder height, and torso flexions. There is no question that these elements are part of the radial doper job. Indeed, Dayton itself acknowledges in its job evaluation form for the radial doper position that standing, lifting, carrying, bending, and reaching, are all physical elements of this job (Exhibit C-650).

As established *supra*, the Secretary has been unable to prove that long periods of standing pose potential harm to employees. With regard to the three remaining activities - lifting, reaching, and bending - the Secretary has alleged that it is the *frequency* with which they are performed that poses the potential for harm.⁸⁵ However, as discussed *supra*, there is nothing in the record which establishes the number of times these activities must be performed before a hazard is presented. Moreover, Besser admitted to having difficulty establishing the frequency of the lifting task because the frequency level depicted on videotape did not correspond with that supplied by Kearney. This is not surprising given that all four employee witnesses acknowledged they control their own work

⁸⁴ Mr. Kindrick's condition does not appear in Dr. DeHart's final set of injury data, but Mr. Hill is the subject of five entries. These entries all indicate that Mr. Hill suffered from pain in the lower back or shoulder, and it was not explained, nor is it apparent, why the word "strain" is included parenthetically at the end of all five entries.

⁸⁵ This is evidenced by the Secretary's use of the qualifying language "high frequency" and "repeated", as well as the plural "torso flexions".

flow simply by the number of tires they place on the intake conveyor. They also decide the order in which the tires are lifted from or placed onto the beehive racks, and can stop the conveyor belts at any time (Tr. 1252-53, 1258-59, 1281-82, 1293-94, 1320, 1349-50, 1705, 1756-59). As such, each radial doper performs these activities at varying paces, making it difficult to determine with any degree of certainty the level at which harm may occur. This is particularly true of the lifting task whose impact, as discussed *supra*, depends upon the physical exertion of each individual employee.

Even if the Secretary had proven harm here, her case would still fail the causation element of her burden of proof. As discussed *supra*, without the proper foundation, neither Besser nor Dr. Schulze are qualified to attribute the development, potential or actual, of cumulative trauma disorders among radial dopers to the work activities alleged to be ergonomic stressors. Moreover, their respective analyses lack the element which they themselves acknowledge is critical to any determination of causation: actual injury data. Given its numerous flaws, reviewed *supra*, Dr. DeHart's incident rate analysis fails to reliably assess causation and the plant doctors offered no relevant testimony regarding the radial doper job. Finally, absent serious consideration of the various non-occupational sources which the Secretary's witnesses admit can cause or contribute to the development of cumulative trauma disorders, the issue of causation cannot be adequately resolved on this record. Accordingly, the Secretary has failed to prove that any of the work activities alleged under this instance of violation are hazardous to the employees who perform them.

Instance L - Curing Press Operators

Under this instance, the citation states in relevant part:

L) Department #132 - Curing; Curing Press Operator(s) lift tires from storage spools and place them on a mandril from which an automated arm retrieves them and performs an operation. Ergonomic stressors are created during this task such as increased static posture times, repeated reaches above shoulder height, frequent torso flexions, high lifting frequencies, and high amounts of heat. These stressors are consistent with the development of low back pain and injury, musculoskeletal injuries, various UECTDs (tendinitis, bursitis, swelling, frozen shoulder syndrome), reduction of blood flow and excessive fatigue.

One employee testified in connection with this instance: Gladys Joyce Wilson (Tr. 4200-26). Cure press operators are required to keep the curing machines loaded with tires (Tr. 4203 ; Exhibit

C-962, Segment starts 1:06:33). Each operator is assigned to 50 machines, each of which has two floor-level “top hats”, the apparatus which holds the tire until the machine’s automated arm retrieves it for processing (Tr. 4206). The curing press operator walks up and down the concrete aisle along which her assigned machines are located, filling empty top hats with tires taken from a nearby beehive rack (Tr. 4204, 4206, 4217-18; Exhibit C-962). The beehive rack, brought to the work area from the dooper machine, rests on a large rotating disc known as a “turntable” (Tr. 4208). Tires lifted from the upper pins of the rack require the cure press operator to reach above her shoulders, and tires lifted from the lower pins of the rack require her to bend (Tr. 4207-09, 4216-17). Each tire weighs at least 12 to 14 pounds (Tr. 4209-10). According to Ms. Wilson, it takes about fifteen minutes to load all 100 top hats and each operator processes about 3,000 tires per 8-hour shift (Tr. 4206-07, 4209-10, 4217). Other duties performed by cure press operators include running the curing machines, reporting any malfunctions to the supervisor and cleaning tires with a wire brush as needed (Tr. 4203, 4207-08). Because the environment in which the cure press operators work is very hot, plant management provides liquids and fans, which are often inoperable, and allows workers to take heat breaks every thirty minutes (Tr. 4204-05, 4219).

Ms. Wilson, who worked as a cure press operator for an unspecified period of time in 1993, indicated that she began experiencing numbness in her fingers while at home, particularly in the morning (Tr. 4202-03, 4210, 4219-20). When she visited her personal physician for a routine check-up, she told him about the numbness in her hand and he ultimately diagnosed her with carpal tunnel syndrome (Tr. 4211, 4221-22). She also reported the numbness to her supervisor who sent her to the onsite clinic where she was offered light duty work, but did not take it, and was supplied with wrist braces. The plant doctor apparently thought she had tendinitis (Tr. 4211-12, 4222-23). Ms. Wilson also testified that she experienced pain in her leg and back, while working the cure presses, both of which she reported to her supervisor, but was not sent to the onsite clinic (Tr. 4212, 4214-15, 4220-21, 4224). She indicated that she treated these pains with over-the-counter medication (Tr. 4212-13, 4215).⁸⁶

⁸⁶Dr. Schulze identified the tire lifting task as the primary stressor associated with the curing press operator job, a task which he claims includes a number of stressors such as torso flexions, (continued...)

Mr. Besser identified frequent lifts, frequent torso flexions, frequent overhead reaches, continuous periods of walking, and high heat as the stressors that the Secretary associated with this job (Tr. 6110 ; Exhibit R-5586 at 37). In his report, he associated torso flexions and overhead reaches with conditions such as low back injury and frozen shoulder syndrome (Exhibit R-5586 at 38). According to Besser, the continuous walking required of the curing press operator fatigues the employee, making her more susceptible to the development of musculoskeletal injury (Exhibit R-5586 at 41). His report also states that the high heat in this department reduces blood flow to the muscles, producing excessive fatigue and making employees more susceptible to acute and chronic injury (Exhibit R-5586 at 41). Finally, using the 1981 NIOSH guidelines and assuming a frequency rate of 9 lifts per minute, Besser analyzed the tire lifting task and concluded that the 18 to 37 pound load lifted exceeds the action limit of ten pounds (Tr. 6111; Exhibit R-5586 at 39-40).⁸⁷

The plant doctors provided no specific testimony regarding the curing press operator job and the stressors alleged to be associated with it.

As evidence of actual injury, the Secretary relies upon Ms. Wilson's testimony that she was diagnosed with carpal tunnel syndrome and has suffered from pain in her legs and back (Secretary's

⁸⁶(...continued)

extended overhead reaches, and wrist deviations (Tr. 1622-23, 1625-26, 3396-99; Exhibit C-628 at 176). According to Dr. Schulze, extended reaches and wrist deviations can cause tendinitis, epicondylitis, bursitis, a pulled shoulder muscle, or back strain (Tr. 1628). Having determined that cure press operators lift tires at a rate of 10 lifts per minute, Dr. Schulze found that the high frequency of the lift, as well as its asymmetry, results in a recommended weight limit of zero under the 1991 NIOSH guidelines (Tr. 1626-27; Exhibit C-628 at 178-86). Dr. Schulze also testified that the high levels of heat in the curing department create the risk of heat-related injuries such as heat prostration; the heat also causes the employee to fatigue faster making him more susceptible to injury (Tr. 1631-32).

⁸⁷Dr. DeHart and his team concluded that as a group, curing press operators suffered a total of 17 musculoskeletal injuries from 1989 to 1993 (Tr. 5320-21). According to a data entry form for one of the curing press operators evaluated, the stressors which Dr. DeHart's team considered under this job were frequent lifts, reaches above shoulders, high heat area, torso flexions and extreme amount of walking (Tr. 5646-47; Exhibit C-618). According to Dr. DeHart's calculations, the curing press operators had an injury incident rate of 22.8 which, when compared to the BLS rate of 8.4, results in a relative risk of 2.07 (Tr. 5320-22; Exhibit C-983). Based upon this data, as well as his review of the job, Dr. DeHart concluded that the ergonomic stressors present in this job were the cause of the increased rate of injury (Tr. 5323).

Brief at 98). However, Ms. Wilson's only diagnosed condition does not appear in any of the relevant injury records in evidence here nor is it recorded in the OSHA 200 log for 1993. Without such documentation, it cannot be determined whether an accurate diagnosis was made of Ms. Wilson's condition such that it may be considered proof of harm in the context alleged. None of the plant doctors testified about any specific injuries suffered by cure press operators and Dr. DeHart's identification of 17 such injuries remains unreliable for the reasons discussed *supra*. In fact, Ms. Wilson's injury does not even appear in Dr. DeHart's final set of injury data (Exhibit C-987). As such, there is nothing in the record which can be considered proof of actual harm under this instance of violation. Therefore, the Secretary must establish potential harm and indicate, with some specificity, the "threshold" at which injury may occur.

The ergonomic stressors alleged by the Secretary to be associated with this job are increased static posture times, repeated reaches above shoulder height, frequent torso flexions, high lifting frequencies, and high amounts of heat. There is no question that these elements are part of the curing press operator job. Indeed, Dayton itself acknowledges in its job evaluation form for the curing press operator that bending, carrying, lifting, reaching, standing are all part of the job's physical activities (Exhibit C-651). Under work conditions, the form also lists "presence of heat and humidity" (Exhibit C-651).

As was the case with the tuber operator job, the Secretary has failed to prove that the high heat experienced in the curing department may harm employees in the context alleged here. Indeed, Dr. Schulze specifically linked the high temperatures to conditions, such as heat stress and heat prostration, that are completely unrelated to cumulative trauma. Furthermore, his contention, together with Besser, that heat causes fatigue in an employee such that injury becomes more likely is simply too tenuous to sustain a claim of potential harm.

With the exception of high static posture times, the remaining stressors - reaching, bending at the torso, and lifting - all rely upon the Secretary's ability to prove that the frequency with which these tasks are performed creates the potential for harm. But as indicated *supra*, the record fails to definitively indicate the point at which these activities become hazardous. This is particularly true of the lifting task whose impact, as discussed *supra*, depends largely upon the physical exertion of each individual employee.

Though worded awkwardly, “increased static posture times” suggests that the Secretary’s concern, as was the case with “long periods of static posture”, is with the length of time the cure press operator assumes a particular posture. However, there is nothing in the record to indicate a definitive amount of time at which a “static posture” becomes harmful, nor is it clear what constitutes a “static posture” in the context of this particular job since neither Dr. Schulze nor Besser identified this activity as an ergonomic stressor in their respective analyses.

Even if the Secretary had proven harm here, her case would still fail the causation element of her burden of proof. As discussed *supra*, without the proper foundation, neither Besser nor Dr. Schulze are qualified to attribute the development, potential or actual, of cumulative trauma disorders among cure press operators to the work activities alleged to be ergonomic stressors. Moreover, their respective analyses lack the element which they acknowledge is critical to any determination of causation: actual injury data. Given its numerous flaws, reviewed *supra*, Dr. DeHart’s incident rate analysis fails to reliably assess causation and the plant doctors offered no relevant testimony regarding the curing press operator job. Finally, absent serious consideration of the various non-occupational sources which the Secretary’s witnesses admit can cause or contribute to the development of cumulative trauma disorders, the issue of causation cannot be adequately resolved on this record. Accordingly, the Secretary has failed to prove that any of the work activities alleged under this instance of violation are hazardous to the employees who perform them.

Instance N - Final Inspectors

Under this instance, the citation states in relevant part:

N) Department #133 - Final Inspection; Tire Final Inspector(s) retrieve tires from a roller conveyor and places it on a work stand where it is inspected for defects. Ergonomic stressors are created during this task such as increased static posture, shoulder and upper arm stresses, and back injury.⁸⁸ These stressors are consistent with the development of musculoskeletal injuries, tendinitis, bursitis, generalized fatigue, and weakening of the spinal structure.

Two employees testified in connection with this instance: Shirley Ann Cooks (Tr. 2857-2967)

⁸⁸ At the hearing, the Secretary explained that this instance alleges three separate stressors - increased static posture, shoulder stresses, and upper arm stresses - and acknowledged that “back injury” does not constitute an ergonomic stressor (Tr. 2862-64, 3450).

and Nora McCuin (Tr. 2998-3047). Final tire inspectors are responsible for inspecting tires for defects (Tr. 3002; Exhibit C-962, Segment starts at 1:18:34). This is accomplished by performing a series of steps to visually and manually check the entire surface area of the tire (Tr. 2887). Tires enter the inspection area from the curing department on a conveyor belt positioned behind the tire inspector (Tr. 2889, 3003). Two inspectors are assigned to each line or belt (Tr. 3019). Each tire is first lifted from the conveyor belt and laid flat on the inspection stand. The inspector runs a hand around the tire's bead to check for defects, then flips the tire over and repeats the process (Tr. 2879-80, 2891-92, 2901-03, 2910-11, 2934-36, 3004-05, 3011-12).⁸⁹ Lifting the tire requires the inspector to use arms and shoulders, particularly if the tire is large, and manually inspecting the tire requires the use of the inspectors shoulders (Tr. 2903-04, 2906, 3012-13).

The tire is then set upright onto a roller built into the inspection stand and operated with a floor pedal. As the tire spins on the roller, it is supported by the inspector's hand as she/he feels along the surface of the tire for defects (Tr. 2879-80, 2886-87, 2892-94, 2936-37, 3013-14). In doing so, Ms. Cooks testified that her shoulders are not straight since the shoulder which corresponds with the foot operating the floor pedal is positioned lower than the other (Tr. 2894, 2900). While supporting the tire and manually inspecting its surface, the inspector's upper arm is also raised (Tr. 2895, 2900).

If defects are found, the inspector must decide whether the tire can be repaired or should be rejected, mark it accordingly with chalk, and place it onto the appropriate conveyor belt (Tr. 2906-07, 2909, 3008). Inspectors also perform minor tire repairs, such as trimming the bead of a tire with a hand held tool or knife (Tr. 2880, 2895, 3014-15). Ms. Cooks testified that her shoulder may be positioned downward and force may be used when trimming the bead of a tire (Tr. 2896, 2899). Tires that are found to be acceptable are placed onto a conveyor belt which leads to the sorting department. The tires are pushed off by the inspector onto the belt requiring the inspector to elevate arms and use force (Tr. 2899-2901, 3002, 3014-16). The inspector uses arms and shoulders to place

⁸⁹ This initial part of the inspection process was apparently instituted sometime in 1993 by the corporation which bought the Dayton plant (Tr. 2779-80, 2934-35, 3004-05). Both employee witnesses indicated that the original method of inspecting tires was easier without these additional steps (Tr. 2937-38, 3005, 3042-43).

rejected tires onto a low-level conveyor belt (Tr. 2906-07). Tire inspectors are required to process between 964 and 995 tires per 8-hour shift (Tr. 2877, 2908, 3003-04). According to Ms. McCuin, the largest tire handled by an inspector weighs about 40 pounds (Tr. 3016-17).

Ms. Cooks, who became a tire inspector in 1993, testified that since 1985, she has suffered from a range of injuries to various parts of her body, including her back, shoulder, nose, knee, and foot (Tr. 2860-61, 2924, 2926-31, 2941, 2944-45, 2948-50).⁹⁰ As a tire inspector, she aggravated a preexisting shoulder injury while pulling tires from the inspection stand (Tr. 2924-25). Ms. Cooks reported the injury to her supervisor and was sent to the onsite clinic where she was treated with medication and assigned to light duty work (Tr. 2925-26). Generally, Ms. Cooks experienced pain in her wrists, arm, elbow, shoulder, back, and neck while working as a tire inspector but never reported this to her supervisor because of her extensive prior injury history (Tr. 2938-40, 2952-53, 2963). Ms. Cooks testified that she suffered an injury outside of work to her left arm in 1992 or 1993 (Tr. 2959-60).

Ms. McCuin, who worked as a tire inspector from 1992 to 1994, testified that since 1987, she has suffered injuries to her shoulder, neck, chest, hip, and back (Tr. 3001-02, 3020-27).⁹¹ In 1989, and again in 1991, torn ligaments in her right shoulder required surgery on two separate occasions, as well as time off from work and restrictions on her lifting activities (Tr. 3020-23, 3025-26). When she first started working as a tire inspector, Ms. McCuin was restricted to lifting no more than ten pounds of weight. After a reevaluation of her condition, however, her offsite physician raised this limit to thirty pounds (Tr. 3027-29). Although she indicated that she has experienced no further problems with her shoulder since becoming a tire inspector, she acknowledged feeling pain in her arms and shoulders, particularly on the right side, from the lifting associated with the job (Tr. 3029, 3036-39). While working as a tire inspector in 1992, Ms. McCuin fell while on her way the supervisor's office injuring her right hip and back, and in 1993, suffered an injury to her left foot (Tr.

⁹⁰ Ms. Cooks also worked as a tire inspector for an unspecified period of time in 1992 while employed in the utility and service department, known as "U & S"; in this department, employees are assigned to various positions as replacements for absent employees (Tr. 2824, 2860-61, 2865-66, 3007).

⁹¹ Ms. McCuin also worked as a tire inspector for an unspecified period of time in 1990 while employed in the U & S department (Tr. 3006-07).

3027, 3029, 3047).⁹²

Mr. Besser identified frequent reaches, lifting, torso flexions, twisting, and long periods of standing as stressors which the Secretary associated with this job (Tr. 6111-13 ; Exhibit R-5586 at 45). He testified that the frequent reaches performed by the inspector stress the upper arm and shoulder and are consistent with the development of bursitis and tendinitis (Tr. 6113; Exhibit R-5586 at 45). In his report, Besser also stated that frequent lifts cause upper body strain and generalized fatigue, while repetitively twisting the torso is consistent with the development of back injury (Exhibit R-5586 at 45). His report does not contain a lifting analysis for this job.⁹³

Neither the plant doctors nor Dr. Hadler provided specific testimony regarding the final tire inspector job or the stressors alleged to be associated with it.

As evidence of actual injury, the Secretary relies upon the testimony of both tire inspectors who testified at the hearing (Secretary's Brief at 104-05). Specifically, the Secretary cites Ms. Cooks' testimony that she was diagnosed with carpal tunnel syndrome in 1986, and Ms. McCuin's testimony that she suffered a torn ligament in her right shoulder. However, Ms. Cooks' injury did not occur while she was employed as a tire inspector since, as her testimony indicates, she was assigned as tire inspector during 1993 (Tr. 2926-28). Moreover, the only relevant injury which Ms. Cooks apparently suffered while working as a tire inspector was the aggravation of a prior shoulder injury with a long recurrent history, raising serious questions as to whether the condition can be attributed to her work as an inspector. There is also no indication that Ms. McCuin's shoulder injury

⁹²Dr. Schulze identified static posture, standing, shoulder and upper arm stresses, and lifting as the stressors associated with the tire inspector job (Tr. 2036-38; Exhibit C-628 at 284). Using the 1991 NIOSH guidelines, he analyzed the tire lifting task assuming a tire weight of 13 pounds and found a recommended weight limit of almost 11 pounds (Tr. 2038-39; Exhibit C-628 at 287-93). According to Dr. Schulze, this lift creates the potential for back injury because it is asymmetrical (Tr. 2038, 3446-48). Other injuries he identified as likely given the stressors associated with this job are strains to the shoulder, wrist, and elbow (Tr. 2039-40).

⁹³Dr. DeHart and his team concluded that as a group, final tire inspectors suffered a total of 24 musculoskeletal injuries from 1989 to 1993 (Tr. 5293). According to Dr. DeHart's calculations, the final tire inspectors had an injury incident rate of 9.9 which, when compared to the BLS rate of 8.4, results in a relative risk of 1.178 (Tr. 5298-5300; Exhibit C-976). Based upon this data, as well as his review of the job, Dr. DeHart concluded that the increased rate of injury among the inspectors was "associated" with their job (Tr. 5301).

occurred at a time when she was employed as a final tire inspector. She apparently experienced pain in her arms and shoulder from lifting tires, but there is no definitively diagnosed condition.⁹⁴ Finally, none of these conditions appear in any of the relevant injury records submitted into evidence here.

None of the plant doctors testified as to any specific injuries suffered by final tire inspectors and Dr. DeHart's identification of 24 such injuries remains unreliable for the reasons discussed *supra*. In fact, neither Ms. Cook nor Ms. McCuin appear in Dr. DeHart's final set of injury data (Exhibit C-987). As such, there is nothing in the record which can properly be considered proof of actual harm under this instance of violation. Therefore, the Secretary must establish potential harm and indicate, with some specificity, the "threshold" at which injury may occur.

The ergonomic stressors alleged by the Secretary to be associated with this job are increased static posture, shoulder stresses, and upper arm stresses. However, it is not clear from the record how these conditions actually relate to the final tire inspector job. According to Dr. Schulze, "increased static posture" does not refer to the standing required of the inspector, but to the use of the foot pedal to operate the tire roller (Tr. 3441-43). Besser, on the other hand, does not identify static posture as a stressor of this job, focusing instead on long periods of standing. Similarly, as cited, "shoulder and upper arm stresses" are not necessarily activities which an inspector performs, but are essentially the result of some unnamed activity. Besser concluded that the frequent reaches which an inspector performs to access tires *stresses* the shoulder and upper arm. Dr. Schulze, however, associated these "stresses" with the tire flipping task and claimed that only inspectors who are shorter in height will experience them (Tr. 2037). With no consensus on the record as to what these vague activities may refer to or how they constitute ergonomic stressors, the Secretary has failed to adequately identify what aspect of this job she believes to be hazardous.

Even if the Secretary had proven harm here, her case would still fail the causation element of her burden of proof. As discussed *supra*, without the proper foundation, neither Besser nor Dr. Schulze are qualified to attribute the development, potential or actual, of cumulative trauma disorders among final tire inspectors to the work activities alleged to be ergonomic stressors. Moreover, their respective analyses lack the element which they acknowledge is critical to any determination of

⁹⁴ Ms. McCuin's 1992 slip and fall injuries are obviously acute in nature and it is not clear from her testimony what type of injury she suffered in 1993 to her left foot.

causation: actual injury data. Given its numerous flaws, reviewed *supra*, Dr. DeHart's incident rate analysis fails to reliably assess causation and the plant doctors offered no relevant testimony regarding the tire inspector job. Finally, absent serious consideration of the various non-occupational sources which the Secretary's witnesses admit can cause or contribute to the development of cumulative trauma disorders, the issue of causation cannot be adequately resolved on this record. Accordingly, the Secretary has failed to prove that any of the work activities alleged under this instance of violation are likely to cause injury to the employees who perform them.

Instance P - Module Operators

Under this instance, the citation states in relevant part:

P) Department #133 - Final Inspection; Module Operator(s) inspecting tires, placing labels, and stacking tires on racks were exposed to ergonomic stressors such as frequent elevated and extended reaches, long periods of standing, and repetitive actions. These stressors are consistent with the development of musculoskeletal injuries, UECTDs (tendinitis, bursitis, rotator cuff problems), and low back injuries.

Three employees testified in connection with this instance: Mary Almeda Parks (Tr. 2760-2854); Steven E. Dyer (Tr. 4226-56); and Rebecca Tomlin (Tr. 4898-4941). Module operators are primarily responsible for loading and unloading the module machine with tires (Tr. 4232, 4256 ; Exhibit C-962, Segment starts at 1:27:34). The module operator loads tires from a pallet onto an intake conveyor belt then walks around the machine to unload the tires from a conveyor belt on the other side (Tr. 2788-89, 2792, 4233, 4239-40). When loading the module machine, the operator must reach to lift tires from the top of the pallet stack, then turn to place the tire onto the conveyor belt (Tr. 2792-94, 4240). When unloading the machine, the operator must lift the tire from the conveyor belt and place it on a pallet. For tires at the bottom of a stack, the operator has to bend, and for tires at the top of the stack, the operator has to reach (Tr. 2777, 2779-80, 4237-38). Ms. Parks indicated that sometimes the operator must reach to pull a finished tire off of the conveyor belt when there are no other tires behind it to push it along (Tr. 2781).

Before removing a finished tire from the waist-high conveyor belt, the module operator marks it with a stamp and places a label on the tire's tread (Tr. 2773, 2782-83 , 4232, 4236). Each tire is stamped at least once, while defective tires are stamped twice (Tr. 2782-83, 4236). Each finished tire

is stacked onto an elevated pallet located behind the operator on a rotating turntable. The tires are usually stacked on the pallet in piles over five feet high (Tr. 2777-79, 2783-84, 4237, 4239-40). As each corner of a pallet is filled or emptied, the module operator uses force to spin the pallet around on its turntable to access the next section on the pallet (Tr. 2783-84). Defective tires are stacked onto a separate pallet designated for the classifying department (Tr. 2786, 2788, 4253-54). Each pallet holds up to 50 tires (Tr. 2778-79, 4237). Module operators are required to process anywhere from 500 to 800 tires per 8-hour shift and the tires range in weight from 25 to 40 pounds (Tr. 2771-72, 2778, 2790, 2796, 4233-36). According to Mr. Dyer, 65% of his 8-hour shift was spent loading and unloading the module machine with tires (Tr. 4255).

Other duties performed by module operators include keeping track of the different sizes of tires being run, operating the module machine from a control panel, reporting to management any problems with the machine, unjamming the machine, obtaining new tread labels and threading them into the label dispenser, cleaning paint nozzles and the marking stamp, and hand grinding tire imperfections as necessary (Tr. 2791, 2799-2800, 2840-43, 4248-52). Module operators are also required to adjust and “change” the module machine for each size of tire processed. Adjustments are made three or four times per shift, while the various changes are performed anywhere from once or twice a week to daily (Tr. 2772, 2798-99, 2831-33, 2839-40, 4233). Module operators perform all of their duties while standing on a concrete floor (Tr. 2772, 2833).

Ms Parks testified that she worked as a module operator from 1987 to 1990 and for unspecified periods of time after that as a relief module operator (Tr. 2767-69). According to her testimony, she has suffered multiple injuries to her back and wrist as a Dayton employee. In 1991, while working as a module operator, she experienced numbness and pain in her arm and wrist after lifting large tires (Tr. 2810-12, 2824-25, 2836-37). Although Ms. Parks reported the injury to her supervisor, she was not sent to the onsite clinic but visited the clinic on her own initiative (Tr. 2812-13, 2825-26). The plant doctor gave her medication placed wrist splints on her arms and assigned her to two weeks of light duty work (Tr. 2813-15). In 1992, Ms. Parks suffered a back injury when she slipped on a tire label and fell (Tr. 2802-05, 2809). She reported the injury to her supervisor and because it occurred during the graveyard shift, was sent to an offsite facility where she was treated with medication (Tr. 2805-06). The following day Ms. Parks visited the onsite clinic, was treated

with medication, and remained out of work for at least three months (Tr. 2807-08). Ms. Parks reinjured her back in December of 1992 while working as a sorter, and at some unspecified time while working as a module operator. She also reinjured her wrist in May of 1993 while working in repair (Tr. 2818-21, 2836-37). According to her testimony, she is permanently restricted to lifting no more than 25 pounds (Tr. 2770, 2826-27).

Mr. Dyer, who worked as a module operator for an unspecified period of time which included May of 1993 testified that while working in this position in 1990 or 1991, he was diagnosed with a ganglion cyst on his left wrist (Tr. 4230, 4242-43). He was treated at the onsite clinic with wrist braces and assigned to light duty work (Tr. 4242). According to Mr. Dyer, the cyst manifests itself when he is working and swells whenever he moves it a certain way. He stated that the wrist continues to be painful (Tr. 4243, 4248). As a module operator in 1993, he was placed on light duty after suffering a double hernia which he claims occurred while lifting tires (Tr. 4243-47). Mr. Dyer has also suffered sprains to his left ankle and right wrist due to slipping (Tr. 4242, 4247-48, 4254). Finally, Mr. Dyer indicated that he shattered his knee cap while playing softball in 1974 when he was serving in the military (Tr. 4228, 4247).

Ms. Tomlin testified that she worked as a module operator for seven years until November of 1992 at which time she suffered an injury to her right ankle and foot while walking around a module machine (Tr. 4901, 4904, 4924, 4927-28, 4930). She reported the injury to her supervisor and was sent by the plant doctor to an offsite facility where she was diagnosed with a fractured heel (Tr. 4928-30, 4936). She also apparently had a benign growth removed from her ankle (Tr. 4939). Ms. Tomlin wore a cast for several weeks and has been unable to return to work (Tr. 4929-30). She claims she was told by one of the seven physicians who has treated her that the bones in her foot were deteriorating due to the hard surfaces on which she walks (Tr. 4930-31, 4936-38, 4941). A workers compensation claim was filed in connection with this condition (Exhibit C-956). Ms. Tomlin states that she lives on a sixty-acre farm and shares farming duties with her husband (Tr. 4939-40).⁹⁵

⁹⁵Dr. Schulze identified lifting, elevated and extended reaches, and standing as the stressors associated with the module operator job (Tr. 2040-50, 2052-54, 3456-57; Exhibit C-684 at 320). Using the 1991 NIOSH guidelines, he analyzed one of the tire lifts performed by the module operator assuming a frequency rate of four lifts per minute and a weight of 13 pounds, but his conclusions (continued...)

Mr. Besser identified elevated and extended reaches, repeated lifting, and long periods of standing as the stressors which the Secretary asserts are associated with this job, but added torso flexions with twists to the list (Tr. 6115; Exhibit R-5586 at 47-48). His report indicates that the reaches, torso flexions, and lifts performed by the module operator are consistent with the development of low back injuries and shoulder ailments such as tendinitis, bursitis, and rotator cuff problems (Exhibit R-5586 at 47).⁹⁶ Neither the plant doctors nor Dr. Hadler provided specific testimony regarding the module operator job or the stressors alleged to be associated with it.

As evidence of actual injury, the Secretary relies upon the testimony of all three module operators who testified at the hearing (Secretary's Brief at 110-15).⁹⁷ According to Ms. Parks' testimony, the pain and numbness which she experienced in her wrist while working as a module operator was never actually diagnosed and her condition is not documented in any of the relevant injury records submitted into evidence here.⁹⁸ Mr. Dyer indicated that he was diagnosed with a ganglion cyst while working as a module operator, but his condition is also not documented in any

⁹⁵(...continued)

regarding a recommended weight limit are not clear from his report (Tr 3464; Exhibit C-684 at 322-338).

⁹⁶Dr. DeHart and his team concluded that as a group, module operators suffered a total of 26 musculoskeletal injuries from 1989 to 1993 (Tr. 5284-85). According to a data entry form for one of the module operators evaluated, the stressors which Dr. DeHart's team considered under this job were stressful work postures, frequent elevated/extended reaches, torso flexions, long periods of standing, frequent twists, and frequent lifts (Tr. 5643-44; Exhibit C-494). According to Dr. DeHart's calculations, the module operators had an injury incident rate of 8.8 which, when compared to the BLS rate of 8.4, results in a relative risk of 1.04 (Tr. 5285, 5291; Exhibit C-976). Based on this data, as well as his review of the job, Dr. DeHart concluded that "the [job's] ergonomic risk factors are the cause of this increased injury" (Tr. 5292).

⁹⁷ The Secretary also relies upon the workers compensation records for three employees who did not appear at the hearing. However, as indicated *supra*, these records were not offered for the truth of their contents and therefore, cannot be considered proof of actual harm.

⁹⁸ Although Ms. Parks indicated that she reinjured her back while working as a module operator, it is not clear from her testimony when this event occurred or what type of injury she suffered. Without further documentation, the injury cannot be considered as proof of the type of harm alleged.

of the relevant injury records submitted into evidence here.⁹⁹ Without underlying documentation to support his claims, it cannot be determined whether an accurate diagnosis was made such that his injury may be properly considered as proof of harm in the context alleged.¹⁰⁰ Finally, while Ms. Tomlin offered compelling testimony regarding the injuries she incurred to her right foot and ankle, there is no indication in the record that her conditions - a fractured heel, a benign growth, and “deteriorating bones”- can be considered injuries of the type alleged under this citation instance.¹⁰¹ That her injuries were the subject of corresponding claim for workers compensation does not alter this fact. See discussion, *supra*. Thus, none of the injuries to which these module operators testified provide adequate proof of actual harm.

The plant doctors provided no specific testimony regarding module operator injuries and Dr. DeHart’s identification of 26 such injuries remains unreliable for the reasons discussed *supra*. As such, there is nothing in the record which can properly be considered proof of actual harm under this instance of violation. Therefore, the Secretary must establish potential harm and indicate, with some specificity, the “threshold” at which injury may occur.

The ergonomic stressors alleged by the Secretary to be associated with this job are frequent elevated and extended reaches, long periods of standing, and repetitive actions. It has been previously established that the Secretary is unable to identify the point at which standing and reaching - be it elevated, extended, and/or frequent - pose the potential for harm. As for the vague “repetitive actions”, it is simply not clear from the record what type of conduct the Secretary has identified as hazardous. Module operators perform many actions repetitively. For instance, every tire a module operator handles is labeled, then stamped at least once (Tr. 2782-83, 4236). When questioned about

⁹⁹ Although Mr. Dyer also suffered from a double hernia while working as a module operator, there is nothing in the record to indicate that this condition can be considered of the type alleged under this citation instance. In addition, the injury does not appear in any of the relevant injury records submitted into evidence here.

¹⁰⁰ Although Mr. Dyer is listed in Dr. DeHart’s final set of injury data, the injury listed - left wrist/right thumb strain/swelling - does not correspond to his testimony regarding a ganglion cyst (Exhibit C-987).

¹⁰¹ Although Ms. Tomlin is listed twice in Dr. DeHart’s final set of injury data, one entry states only “right ankle”, while the other states “right knee strain”, an injury which she never mentioned during her testimony (Exhibit C-987).

the meaning of this generic phrase, Dr. Schulze reasoned, in somewhat circular fashion, that it refers only to those activities performed repetitively which constitute ergonomic stressors, such as lifting, reaching, and bending (Tr. 2055-59, 3460-64). This is simply not clear from the citation nor is it consistent with the citation as a whole. Where the Secretary has alleged that repetitive lifting or bending poses a hazard to Dayton employees, she has specifically indicated as much under previous citation instances. Even Besser was confused as to how to determine what repetitive actions this phrase refers to, indicating that he would not have used this terminology had he drafted the citation (Tr. 6116-20). This is not what the Commission contemplated when it held that the Secretary must define a hazard alleged under the general duty clause in a way that “apprises the employer of its obligations.” *Pelron Corp*, 12 BNA at 1835. Leaving it to an employer to guess what citation language means or does not mean does not constitute adequate notice of the violations with which it has been charged.

Even if the Secretary had proven a hazard, her case would still fail the causation element of her burden of proof. As discussed *supra*, without the proper foundation, neither Besser nor Dr. Schulze are qualified to attribute the development, potential or actual, of cumulative trauma disorders among module operators to the work activities alleged to be ergonomic stressors. Moreover, their respective analyses lack the element which they acknowledge is critical to any determination of causation: actual injury data. None of the plant doctors offered relevant testimony regarding the module operator job and given its numerous flaws, reviewed *supra*, Dr. DeHart’s incident rate analysis fails to reliably assess causation. In fact, his relative risk analysis under this particular instance suggests that there is no significant difference between the Dayton injury rate for module operators and the national tire industry injury rate. According to Dr. DeHart’s testimony, as the relative risk approaches one, the population groups being compared can be said to have equivalent rates of injury. The relative risk in this instance was calculated to be 1.04 (Tr. 5291-92). Finally, absent serious consideration of the various non-occupational sources which the Secretary’s witnesses admit can cause or contribute to the development of cumulative trauma disorders, the issue of causation cannot be adequately resolved on this record. Accordingly, the Secretary has failed to prove that any of the work activities alleged under this instance of violation are hazardous to the employees who perform them.

Instance Q - Classifiers

Under this instance, the citation states in relevant part:

Q) Department 133 - Final Inspection; Classifier(s) sorting tires and entering codes into a computer were exposed to ergonomic stressors such as increased static posture times, repetitive movements, increased torso flexion, stress on the shoulder, low back and abdominal muscles, forearm or wrist injury and extended periods of standing.¹⁰² These stressors are consistent with the development of musculoskeletal injuries, low back injuries, muscle strains, pulls, herniations, tendon strain, tendinitis, nerve injuries, restriction of blood flow, and varicose veins.

One employee testified in connection with this instance: Russell James Wernli (Tr. 3971-4019). Classifiers are primarily responsible for examining defective tires and determining whether they can be repaired, should be scrapped, or are acceptable (Tr. 3977; Exhibit C-962, Segment starts 1:31:04). Two classifiers are assigned to each line, splitting their time between the front end of the work station and the back end (Tr. 3994, 4013-15). One classifier loads tires from a pallet onto a conveyor belt at the back end of the work station (Tr. 3993). The tires are lifted from stacks as high as six feet (Tr. 4011-12). Once the belt is full, the second classifier examines each tire at the front end of the work station and enters the defect information written on the outside of the tire into a computer; there are 75 defect classifications (Tr. 3993, 3979, 3995). Mr. Wernli testified that every tire that comes down the line must be spun around in order to access the information that must be entered into the computer (Tr. 3989-90). Mr. Wernli testified that he uses his forearms, hands, and wrists to flip a tire. He indicated, however, that each classifier performs this task differently (Tr. 3990, 4016-17). Classifiers are also required to cover any minor imperfections on the tires with paint (Tr. 3991). When possible, the classifier assigned to the back end will help the front end classifier enter the defect information into the computer (Tr. 4013-14).

The classifier then lifts the tire and places it in the designated area for its classification. For instance, tires to be sent to repair are stacked in piles of four on a conveyor belt. If the belt is full, the tires are placed onto a pallet (Tr. 3986-87). Tires to be scrapped are placed on pallets located

¹⁰² As was the case *supra* under Instance N, forearm or wrist injury does not constitute an ergonomic stressor.

behind the computer (Tr. 3986). If a conveyor belt is full, the classifier may have to toss or throw tires into a designated area until a pallet becomes available to load (Tr. 3990-91). When stacking tires onto a pallet, classifiers must reach above their shoulders (Tr. 3992). There is no quota specified for this job but each classifier handles about 1,000 to 1,200 tires per 8-hour shift (Tr. 3976, 3994, 4015). The tires range in weight from less than one pound to thirty pounds (Tr. 4011). All job duties are performed while standing (Tr. 3995-96).

Mr. Wernli has worked in the tire inspection department for about ten years and since February of 1993, has been working as a classifier (Tr. 3973-74, 3987, 4008). Upon assuming this job, he injured his back and in January of 1994, he suffered a tear in his shoulder muscle (Tr. 3981-82, 3998, 4006-08). The back injury was recorded in Dayton's OSHA 200 log for 1993 (Exhibit C-673). Mr. Wernli has also suffered back strains while at home but indicated that his work did not make these injuries worse (Tr. 3982, 3986, 4017-18). He testified that he was on a bowling league while in the Marines thirty years ago and has been a past participant in various sports activities (Tr. 3972, 4018).¹⁰³

Mr. Besser identified frequent lifting and throwing of tires, torso flexions, and long periods of standing as the stressors which the Secretary associated with this job (Tr. 6126-27; Exhibit R-5586 at 48-51). He testified that throwing tires places stress on the classifier's shoulder, low back and abdominal muscles that is consistent with the development of strains, pulls, and herniations (Tr. 6127-28; Exhibit R-5586 at 50-51). In his report, Besser also stated that frequent torso flexions while holding a tire increases the hazard of low back injury (Exhibit R-5586 at 49). Finally, using the 1981 NIOSH guidelines and assuming a frequency rate of 5 lifts per minute, he analyzed the tire lifting task

¹⁰³Although his report fails to identify most of these activities as stressors, Dr. Schulze testified at the hearing that the stressors associated with this job include increased static posture time, torso flexions, stress on the shoulder muscles, and repetitive movements such as lifting, twisting, turning, and abduction of the elbows (Tr. 2029-30, 3465-69; Exhibit C-628 at 136). According to his testimony, these stressors are likely to result in back injuries, shoulder strains, and wrist strains (Tr. 2033). Having identified the lifting of tires varying in weight from 13 to 21 pounds as a stressor, Dr. Schulze's report contains a lifting analysis performed under the 1991 NIOSH guidelines which assumes a frequency rate of 10 lifts per minute and indicates that the recommended weight limit for this task is about four pounds (Exhibit C-628 at 136, 138-40).

and concluded that the 20 to 28 pound weight lifted exceeds, in some cases, the action limit of 25 pounds (Exhibit R-5586 at 49-50).¹⁰⁴ Among the plant doctors, Dr. Smith-Horn specifically testified that she never treated any classifiers during her tenure at Dayton, while the other doctors made no mention of the classifier job (Tr. 4407-08).

As evidence of actual injury, the Secretary relies upon the testimony of Mr. Wernli that he suffered a back injury and tear in his shoulder muscle while working as a classifier (Secretary's Brief at 120-21). According to Mr. Wernli's testimony, however, the shoulder injury occurred in January of 1994 and is, therefore, outside the scope of the citation. With regard to his back injury, neither Mr. Wernli nor the relevant OSHA 200 log entry provides a specific diagnosis for his condition. The injury is not documented in any of the relevant injury records submitted into evidence here. Moreover, Mr. Wernli admitted that he has suffered back strains outside of work raising serious questions about the cause of any back injury he may have sustained. Under these circumstances, it cannot be determined whether his injury may be considered proof of actual harm as alleged by the Secretary. As indicated, none of the plant doctors provided testimony regarding specific injuries suffered by classifiers, and Dr. DeHart's identification of four such injuries cannot be considered reliable for the reasons discussed *supra*. Indeed, Mr. Wernli does not appear in Dr. DeHart's final set of injury data (Exhibit C-987). Therefore, the Secretary must establish potential harm and indicate, with some specificity, the "threshold" at which injury may occur.

The ergonomic stressors alleged by the Secretary to be associated with this job are increased static posture times, repetitive movements, increased torso flexion, stress of the shoulder, low back and abdominal muscles, and extended periods of standing. It has been established that the Secretary is unable to identify the point at which standing and bending pose the potential for harm. Although Dr. Schulze initially equated "increased static posture times" with standing in front of the conveyor,

¹⁰⁴Dr. DeHart and his team concluded that as a group, classifiers suffered a total of four musculoskeletal injuries from 1989 to 1993 (Tr. 5326-27). He testified that the team identified lifts, torso flexions, hazardous work surfaces, forceful throws, and long periods of standing as the stressors associated with this job (Tr. 5554, 5557). According to Dr. DeHart's calculations, the classifiers had an injury incident rate of 14.2 which, when compared to the BLS rate of 8.4, results in a relative risk of 1.7 (Tr. 5327; Exhibit C-985). Based on this data, as well as his review of the job, Dr. DeHart concluded that the increased injury rate among classifiers was caused by the ergonomic stressors present in their job (Tr. 5327-28).

on cross-examination, he denied that this phrase is synonymous with standing constantly and failed to explain exactly what it means in the context of this job (Tr. 2029, 3469-70; Exhibit C-628 at 136). Indeed, it would seem redundant for the Secretary to allege both standing and static posture as separate stressors associated with this job if the latter encompasses the former. Similarly, as discussed *supra*, the “stress” which a classifier allegedly experiences on his shoulder, back, and abdominal muscles, is not an activity which the classifier performs, but the *result* of some unidentified activity. According to Besser, it is the frequent tire throws which a classifier must perform which *stress* these areas of the body; however, this activity has not been identified as a stressor in the citation. With no consensus on the record as to what the alleged activities or conditions refer to or how they constitute ergonomic stressors, the Secretary has failed to identify the aspects of this work activity which she believes to be hazardous.

Finally, the phrase “repetitive movements” creates the same problems for the Secretary as the phrase “repetitive actions” alleged under the previous citation instance. Classifiers perform a variety of movements repetitively. For instance, the defect information written on every tire a module operator handles must be entered into a computer. Dr. Schulze reiterated that this phrase refers to those activities which a classifier performs repetitively such as lifting, tire flipping, wrist deviations, and torso flexions (Tr. 3464-67). However, this is simply not clear from the citation nor is it consistent with the citation as a whole. Where the Secretary has alleged that repetitive lifting or bending poses a hazard to Dayton employees, she has specifically indicated as much under previous citation instances. Indeed, Besser again stated that had he drafted the citation he would have specifically identified the repetitive movements at issue (Tr. 6127). As indicated *supra*, leaving it to an employer to guess what citation language means or does not mean does not constitute adequate notice of the violations with which it has been charged. *See Pelron Corp*, 12 BNA at 1835 (hazard alleged under general duty clause must be defined in a way that “apprises the employer of its obligations”).

Even if the Secretary had proven harm here, her case would fail the causation element of her burden of proof. As discussed *supra*, without the proper foundation, neither Besser nor Dr. Schulze are qualified to attribute the development, potential or actual, of cumulative trauma disorders among classifiers to the work activities alleged to be ergonomic stressors. Moreover, their respective

analyses lack the element which they acknowledge is critical to any determination of causation: actual injury data. None of the plant doctors offered relevant testimony regarding the classifier job and given its numerous flaws, reviewed *supra*, Dr. DeHart's incident rate analysis fails to reliably assess causation. In fact, he admitted that the injury incident rate he calculated for the classifiers took into consideration injuries that are related to stressors not alleged in the citation (Tr. 5556-60). Finally, absent any consideration of the various non-occupational sources which the Secretary's witnesses admit can cause or contribute to the development of cumulative trauma disorders, the issue of causation cannot be adequately resolved on this record. Accordingly, the Secretary has failed to prove that any of the work activities alleged under this instance of violation are hazardous to the employees who perform them.

Instance R - Verifiers

Under this instance, the citation states in relevant part:

R) Department 791 - Warehouse; Verifier(s) pulling carts to different sections of the warehouse were exposed to ergonomic stressors such as increased pull force, which is consistent with the development of injuries to the elbow, shoulder, and ankle.

One employee testified in connection with this instance: Stephen Michael Pennington (Tr. 3759-3821). Verifiers are primarily responsible for pulling large, wheeled carts carrying pallets of tires to the appropriate trucking bay for loading (Exhibit C-962, Segment starts 1:34:40). Before pulling the carts to a designated area, the verifier checks a manifest sheet in order to ensure that each tire cart corresponds to a given customer order and is loaded into the correct truck. This requires the employee to count the number of tires per pallet (Tr. 3765, 3776, 3804-06). Depending upon the size of the tire, a full pallet can hold anywhere from 16 to 50 tires (Tr. 3766-69). The individual tires range in weight from 15 to 71 pounds and the total weight of a full tire cart ranges from 1350 to 1560 pounds (Tr. 3768-69, 3770-71). Over an 8-hour shift, a verifier pulls anywhere from 30 to 50 carts per truck, for a total of six trucks (Tr. 3771, 3810-12, 3779).

According to Mr. Pennington, the cart-pulling process generally involves grabbing the cart's handle with both hands, dropping his weight back to get the cart to start moving, then turning and pulling with one arm. He also indicated that he uses his legs and shifts his weight to pull a cart (Tr. 3780-81, 3802-03). Mr. Pennington testified that the carts are generally in poor condition and do not

roll well (Tr. 3780-81). As a result, the pulling process varies as to whether one or two hands are used depending upon the cart's rolling capability (Tr. 3802-03). The furthest distance that a verifier may have to pull a tire cart is 60 feet (Tr. 3779, 3814). The verifier may also have to pull and shift the carts around in order to access the one which corresponds to a given order (Tr. 3776-78; Exhibit C-970). Once pulled to the appropriate door, the verifier throws a tire on top of the cart so that the truck loaders, known as "lumpers", are aware the cart has been "verified" (Tr. 3796).

Mr. Pennington, who became a verifier in 1993, testified that he developed a tight burning sensation underneath his shoulder blade while pulling carts near the end of a shift, a condition which he described as a pulled muscle (Tr. 3782-83, 3786-89, 3815, 3818). The injury grew more painful after he returned home from work, and he reported his condition to his supervisor the following morning. He was treated at the onsite clinic with medication and assigned to light duty work for a few days (Tr. 3783-86, 3789-90, 3818-19). Mr. Pennington suffered a prior shoulder and back injury in 1990 when he was pinned against a wall by a pallet of tires (Tr. 3814-15).¹⁰⁵

Mr. Besser identified forceful force exertions to haul carts as the stressor associated with this job (Tr. 6130; Exhibit R-5586 at 51-52). He admitted, however, that he did not know the force required to pull the cart (Tr. 6130-31). Based on the frequency with which a verifier must exert force to move the carts, Besser concluded that this task is hazardous to the elbow, shoulder, and ankle (Exhibit R-5586 at 52).¹⁰⁶

¹⁰⁵In his report, Dr. Schulze identified the pushing, pulling, and turning of carts to be the stressors associated with this job (Tr. 3471; Exhibit C-628 at 364). He testified that pulling carts in this manner is hazardous because of the risk of injury to the back, shoulder, elbow or ankle (Tr. 2066-68). Using a device known as a "force transducer", Dr. Schulze determined that the average force a verifier must exert in order to move a cart is 55 pounds per foot, an amount which he claims is unacceptable for young healthy males according to a Liberty Mutual Insurance Company study (Tr. 2065-66, 2069-70, 3472; Exhibit C-628 at 362, 364). However, he admitted that the weight of the object being moved affects the amount of force required to move it, but he does not know the weights of any of the carts he used to measure average force here (Tr. 2071, 3476-81).

¹⁰⁶Dr. DeHart and his team did not review the verifier job as part of the relative risk analysis (Tr. 5208). Among the plant doctors, Dr. Smith-Horn specifically testified that she never treated any verifiers during her tenure at Dayton (Tr. 4407-08). Dr. Lundy testified, however, that he was
(continued...)

As evidence of actual injury, the Secretary relies solely upon Mr. Pennington's testimony that he suffered a pulled muscle in his shoulder (Secretary's Brief at 125). Without underlying documentation, however, it cannot be determined whether this condition was accurately diagnosed such that it may be properly considered as proof of harm in the context alleged. Indeed, Mr. Pennington's shoulder injury does not appear in any of the relevant injury records submitted into evidence here.¹⁰⁷ Furthermore, given his prior injury history, it is not clear whether Mr. Pennington's injury can be attributed to his verifier duties. As indicated, the plant doctors provided no specific testimony regarding verifier injuries and Dr. DeHart did not review this job as part of his analysis. Thus, without proof of actual harm, the Secretary must establish potential harm and indicate, with some specificity, the "threshold" at which injury may occur.

The only ergonomic stressor alleged by the Secretary to be associated with this job is "increased" pull force. However, the Secretary has failed to indicate the level of "pull force" at which the potential for injury develops or why the phrase "pull force" is modified by the word "increased." Although Dr. Schulze provided a measurement of the average force which he claims is required to move a cart, he was unable to explain the significance of this amount and did not know how much the carts he measured actually weighed. Dr. Lundy provided no information whatsoever regarding the force measurement which he obtained and Besser, with no information regarding the work activity, was unable to make any definitive conclusions regarding the alleged hazard. Without proof of how much force is "too much force", the Secretary has not established that this alleged activity is hazardous to the employees who perform it.

Even if the Secretary had proven harm here, her case would fail the causation element of her burden of proof. As discussed *supra*, without the proper foundation, neither Besser nor Dr. Schulze are qualified to attribute the development, potential or actual, of cumulative trauma disorders among verifiers to increased pull force. Moreover, their respective analyses lack the element which they

¹⁰⁶(...continued)
involved with measuring the amount of force required to move carts in the warehouse, but did not provide any further details regarding what the results were or how this information was used (Tr. 4789-90).

¹⁰⁷ An entry for Mr. Pennington appears in the OSHA 200 log for 1993, but the recorded injury is described simply as "chest" (Exhibit C-673).

acknowledge is critical to any determination of causation: actual injury data. None of the plant doctors offered relevant testimony regarding the classifier job and Dr. DeHart did not evaluate this job under his relative risk analysis. Finally, absent serious consideration of the various non-occupational sources which the Secretary's witnesses admit can cause or contribute to the development of cumulative trauma disorders, the issue of causation cannot be adequately resolved on this record. Accordingly, the Secretary has failed to prove that any of the work activities alleged under this instance of violation are hazardous to the employees who perform them.

Instance S - Mold and Bladder Changers

Under this instance, the citation states in relevant part:

S) Department #132 - Curing; Mold and Bladder Changer(s) performing maintenance and replacement functions on tire curing presses were exposed to ergonomic stressors such as frequent arm abductions, torso flexions, extended and elevated reaches, forceful hand grips, long periods of standing, lifting, high heat, and vibrations. These stressors are consistent with the development of musculoskeletal injuries, low back injury, excessive fatigue, and UECTDs (carpal tunnel syndrome).

Two employees testified in connection with this instance: Don Perkes (Tr. 3904-53) and Roy Weil (Tr. 4019-40). Mold and bladder changers ("MB changers") are primarily responsible for installing and removing aluminum molds from the curing press (Tr. 3907, 3952, 4024; Exhibit C-962, Segment starts 1:36:37). This is required whenever the molds have to be changed or cleaned. The two processes, though similar, require somewhat different tasks (Tr. 3910, 3946). Without complications, a mold change takes approximately 45 minutes to complete (Tr. 3908, 4033). MB changers are also responsible for changing the part of the mold which inflates the tire (Tr. 3908-09). When performed in conjunction with a mold change, this task adds 30 minutes to the work process (Tr. 3809, 3926). There are two molds per curing press and the MB changer performs four to six changes per 8-hour shift (Tr. 3909, 3919). Molds range in weight from 480 to 900 pounds (Tr. 3911, 3944, 4033).

To remove the molds, the MB changer stands at the front of the curing press, bends and reaches to remove four bolts attached to each part of the mold (Tr. 3911-14, 3918-20, 4033). The maximum distance is four feet between the upper and lower sections of each mold (Tr. 3919). The

bolts are removed with an air wrench which vibrates and weighs about 15 pounds (Tr. 3912, 3914, 3920, 3945, 4031). The MB changer also bends to lift the injectors, which weigh about 60 to 100 pounds, the PCI rings, the inflating bags, known as bladders, and the split rings (Tr. 3914, 3915-18, 4030-31). The mold sections are lifted out of the curing press with a forklift operated by the MB changer and carried to a storage area where new molds are picked up and carried back to the press by forklift (Tr. 3921-24). The MB changer then bends again to fit the new molds in place and line up the bolt holes (Tr. 3924-25).

To change the PCI, the MB changer stands at the back of the press and bends to pry off the tightly secured PCI rings with a bar (Tr. 3926-27). He manually lifts the rings off of the press and carries them approximately 30 to 40 feet to other side of press, reaching up to hang them. The heaviest rings weigh approximately 30 to 40 pounds (Tr. 3928-29). The MB changer carries a new set of rings back to the press and installs them (Tr. 3929-31). Mr. Perkes indicated that he has found it is easier to use a ratchet instead of an air wrench when changing the PCI rings (Tr. 3914, 3926, 3943-44).

Other duties performed by MB changers include general maintenance of the curing presses such as tightening loose screws or plates, operating a forklift, and changing the top hats to accommodate different tire sizes (Tr. 3907-08, 3910, 3940-43). Except when they are operating a forklift or standing on a top hat to reach into a mold, MB changers perform duties at the front of the curing press while standing on a concrete floor and at the back of the press while standing on a foot-wide steel platform (Tr. 3909, 3915-16, 3925-27, 4028). According to Mr. Weil, 80% of his 8-hour shift was spent standing (Tr. 4028). The employee witnesses also testified that an MB changer's work area reaches temperatures as high as 130 degrees in the summer due, in part, to the curing press which reaches 383 degrees during operation (Tr. 3914, 3949, 4029).

Mr. Perkes, who worked as an MB changer in 1992 and 1993, testified that on April 21, 1992, he complained to his supervisor of wrist pain and was treated at the onsite clinic with medication and supplied with a hand support (Tr. 3906, 3934-37). He also testified that he was threatened by plant management with termination due to the high number of injuries he has suffered (Tr. 3937-38, 3949-51). Prior to his employment with Dayton, Mr. Perkes apparently sustained fractures in one or both of his arms (Tr. 3948).

Mr. Weil, who worked as an MB changer in 1993, testified that at that time, he suffered a left shoulder injury while trying to install an injector (Tr. 4022, 4033-34, 4037-40). He reported the injury to his supervisor and was sent to the onsite clinic where he was assigned to light duty work for two weeks and sent to therapy for one week (Tr. 4034-35).¹⁰⁸

Consistent with the citation, Besser's report identifies frequent arm abductions, extended and elevated reaches, forceful hand grips to support tools, long periods of standing, operating vibrating hand tools, and high heat as the stressors, the Secretary associated with this job (Exhibit R-5586 at 53-54). However, he added a cautionary paragraph to the beginning of the MB changer section in his report containing the following language:

“This task is varied and *it is not possible* to accurately determine [the] length of time in awkward postures, force requirement, repetitions throughout the day, or other variables *which would permit accurate analysis*....A more extensive investigation should be made, if injury data warrants, to determine if there are mechanical assists or procedural changes which can be made to reduce the risk of this task.”

(Exhibit R-5586 at 52) (emphasis added). Nonetheless, Besser's report reviews the stressors he identified, linking them to the development of musculoskeletal injuries and low back injury (Exhibit R-5586 at 53-54). He also associates the high heat experienced by MB changers in their work area with excessive fatigue, which he claims makes employees more susceptible to acute and chronic injury (Exhibit R-5586 at 54). Finally, assuming a lift weight of 20 pounds and a minimal frequency rate, Besser performed a lifting analysis under the 1981 NIOSH lifting guidelines and found that the action

¹⁰⁸Although his report fails to identify some of these activities as stressors, Dr. Schulze testified at the hearing that the stressors associated with this job include high heat, vibrating tools, infrequent lifting, torso flexions, extended reaches, and standing (Tr. 1634-41, 3482-84; Exhibit C-628 at 107-08). According to his testimony, vibration causes the blood vessels to constrict, allowing pressure to build up in joint spaces; therefore, the use of a vibrating hand tool such as a ratchet can lead to the development of epicondylitis or bursitis of the elbow, or carpal tunnel syndrome (Tr. 1660-61). Dr. Schulze also links the high temperatures in this work area with the development of heat stress problems (Exhibit C-628 at 108). Using the 1991 NIOSH guidelines, Dr. Schulze analyzed two lifting tasks performed by MB changers (Exhibit C-628 at 110-11). He found no problem with lifting a 24-pound unidentified “mold component”, but concluded that lifting a 61-pound component exposes an MB changer to the hazard of back injury such as muscle strain or disk rupture (Tr. 1643-48, 1657-58).

limit for this task is 15 pounds (Exhibit R-5586 at 53-54).¹⁰⁹

As evidence of actual injury, the Secretary relies upon the testimony of both MB changers who testified at the hearing (Secretary's Brief at 131-32). However, neither Mr. Weil nor Mr. Perkes provided actual diagnoses for their respective conditions - a shoulder injury and wrist pain - and they do not appear in any of the relevant injury records submitted into evidence here. None of the plant doctors provided testimony regarding specific injuries suffered by MB changers, and Dr. DeHart's identification of 15 such injuries cannot be considered reliable for the reasons discussed *supra*. As such, there is nothing in the record which can properly be considered proof of actual harm under this instance of violation. Therefore, the Secretary must establish potential harm and indicate, with some specificity, the "threshold" at which injury may occur.

The ergonomic stressors alleged by the Secretary to be associated with this job are frequent arm abductions, torso flexions, extended and elevated reaches, forceful hand grips, long periods of standing, lifting, high heat, and vibrations. There is no dispute that most of these activities are part of a MB changer's daily work duties. Indeed, Dayton itself acknowledges in its job evaluation form for the MB changer position that bending, lifting, reaching, and standing, are all physical elements of this job (Exhibit C-649). In addition, the form lists heat and humidity under work conditions, and the use of various tools under equipment. However, since the list of alleged stressors alleged in the citation was culled almost verbatim from Besser's report, his opening paragraph to the MB changer section of his report raises serious questions about the validity of his conclusions. Indeed, Besser's explicit admission that the very nature of this job does not allow for an "accurate analysis" significantly detracts from the Secretary's case.

¹⁰⁹Dr. DeHart and his team concluded that as a group, MB changers suffered a total of 15 musculoskeletal injuries from 1989 to 1993 (Tr. 5328-29). According to a data entry form for one of the MB changers evaluated, the stressors which Dr. DeHart's team considered under this job were forceful hand grips, awkward postures, frequent arm abductions, high heat area, torso flexions, extended/elevated reaches, heavy lifting, long periods of standing, and long periods of operating vibrating tools (Tr. 5640-41; Exhibit C-519). According to Dr. DeHart's calculations, the classifiers had an injury incident rate of 29.1 which, when compared to the BLS rate of 8.4, results in a relative risk of 3.46 (Tr. 5329; Exhibit C-986). Based on this data, as well as his review of the job, Dr. DeHart concluded that the increased injury rate among MB changers was caused by the ergonomic stressors present in their job (Tr. 5329-30).

Furthermore, the Secretary remains unable to prove that these activities and conditions cause potential harm to MB changers. It has been established *supra*, that the Secretary is unable to identify the point at which bending, reaching, and standing pose the potential for harm. Similarly, there is nothing in the record to indicate the frequency with which an MB changer must engage in an “arm abduction” - described by Dr. Schulze as lifting one’s elbow up and away from the body - in order for harm to develop (Tr. 3482). Frequency, as well as the amount of force required, is also lacking under the “forceful hand grips” alleged stressor.

As with previous citation instances, the Secretary has failed to prove that the high heat experienced in the curing department will potentially harm employees in the context alleged here. Indeed, Dr. Schulze specifically linked the high temperatures to heat stress problems, a condition that is completely unrelated to cumulative trauma. Furthermore, the contention that high heat levels causes extreme or excessive fatigue in an employee such that injury becomes more likely remains too tenuous to sustain a claim of potential harm. With regard to “vibrations”, Dr. Schulze claims that the length of time an MB changer operates a vibrating hand tool is not important to determining whether a hazard exists (Tr. 1662-63). Clearly, some amount of time must pass before, as Dr. Schulze described it, the blood flow in the arm is constricted enough to allow pressure to build up in the employee’s joint spaces, thus creating the potential for injury to occur. Without an indication of how long that period may be, it cannot be determined how this activity is harmful to the MB changer.

Finally, both Dr. Schulze and Besser performed lifting analyses assuming low frequency levels, but reached very different conclusions depending upon the weight of the component being lifted. An MB changer lifts several different components throughout his shift such as injectors, PCI rings, bladders, and split rings, and it is not clear from their respective reports which components they considered (Tr. 3914, 3915-18, 4030-31). Without a clear consensus as to which lifting task poses the potential for harm to the MB changer, the Secretary has failed to adequately identify the conduct which she alleges to be harmful. As indicated *supra*, leaving it to an employer to guess what citation language means or does not mean does not constitute adequate notice of the violations with which it has been charged. *See Pelron Corp*, 12 BNA at 1835 (hazard alleged under general duty clause must be defined in a way that “apprises the employer of its obligations”).

Even if the Secretary had proven harm here, her case would fail the causation element of her

burden of proof. As discussed *supra*, without the proper foundation, neither Besser nor Dr. Schulze are qualified to attribute the development, potential or actual, of cumulative trauma disorders among MB changers to the work activities alleged to be ergonomic stressors. Moreover, their respective analyses lack the element which they acknowledge is critical to any determination of causation: actual injury data. None of the plant doctors offered relevant testimony regarding the MB changer job and given its numerous flaws, reviewed *supra*, Dr. DeHart's incident rate analysis fails to reliably assess causation. Finally, absent serious consideration of the various non-occupational sources which the Secretary's witnesses admit can cause or contribute to the development of cumulative trauma disorders, the issue of causation cannot be adequately resolved on this record. Accordingly, the Secretary has failed to prove that any of the work activities alleged under this instance of violation are hazardous to the employees who perform them.

Instance V - Creel Attendants

Under this instance, the citation states in relevant part:

V) Department 122 - Calendaring; Creel attendant(s) loading 45 pound spools of wire from a cart to individual pegs were exposed to ergonomic stressors such as frequent lifts, torso flexions, reaches, and long periods of standing which is consistent with the development of musculoskeletal and low back injuries.

Two employees testified in connection with this instance: Terry D. Church (Tr. 4100-46) and Richard L. Johnson (Tr. 4169-4200). Creel attendants are responsible for loading spools of wire onto the creel calendar machine (Tr. 4136-37; Exhibit C-962, Segment starts 1:58:31). This machine produces steel belts by coating wire strands with rubber (Tr. 4137). To load the machine, the creel attendant lifts a spool of wire from a pallet, places it onto one of the machine's pins or spindles, lines it up, and turns it to lock it into place (Tr. 4143, 4145-46, 4177-78, 4182-84). Each spool measures about one foot across and weighs about 45 pounds. Each pallet holds about 80 spools (Tr. 4143, 4145, 4174, 4182, 4199). Creel attendants must reach a distance of two feet to access the spools located at the back of a pallet and each spool is lifted with two hands and carried to the spindle (Tr. 4178-79).

The creel room consists of three aisles, each containing 240 spindles, 120 on each side, for a total of 720 spindles (Tr. 4146, 4188-91). There are six levels of 20 spindles on each side of the

aisle. The lowest level of spindles is about one foot from the floor, the highest level, about six feet (Tr. 4144-46, 4179). To load the lower spindles, the creel attendants must bend and squat down; to load the higher spindles, they must reach above their shoulders (Tr. 4180-81). Two creel attendants are assigned to the machines and together they load about 720 to 800 spools per 8-hour shift (Tr. 4137, 4145, 4179-80, 4190-91, 4199). According to Mr. Johnson, the creel attendant sets the pace at which the spindles are loaded and can load them in any order (Tr. 4192-95). Other duties performed by creel attendants include operating a forklift to transport pallets of spools to and from the machines, cleaning up the work area and threading the machines with wire (Tr. 4176, 4196). When not operating the forklift, all of the creel attendant's duties are performed while walking or standing (Tr. 4176-77).

Mr. Johnson worked as a creel attendant from 1992 until July of 1994 (Tr. 4171, 4197).¹¹⁰ In this position, he experienced pain in his shoulder and was successfully treated at the onsite clinic with medication (Tr. 4185). In the fall of 1992, Mr. Johnson began experiencing elbow pain while working in the warehouse which worsened once he began working in the creel room lifting spools (Tr. 4185-86). He visited the onsite clinic and was told he had an injury similar to tennis elbow. He was treated with medication and given two types of elbow braces (Tr. 4185-87).¹¹¹

Mr. Besser identified frequent lifts, torso flexions, twists, reaches, and long periods of standing as the stressors which the Secretary associated with this job (Tr. 6132; Exhibit R-5586 at 59). Assuming an average frequency of 12 lifts per minute and a spool weight of 45 pounds, Besser analyzed the spool lifting task under the 1981 NIOSH guidelines and found an action limit of eight pounds (Tr. 6133-35; Exhibit R-5586 at 59-60). In his report, he associated the identified stressors

¹¹⁰ Mr. Church worked as a creel attendant from 1989 until some unspecified time in 1993 (Tr. 4101-03, 4105, 4140-41, 4159-60). Aside from a back injury he sustained in November of 1993 while working as a let-off operator, Mr. Church provided no testimony regarding his injury history as a Dayton employee (Tr. 4107, 4154-57).

¹¹¹ Although his report focuses primarily on the spool lifting task, Dr. Schulze testified that torso flexions and extended reaches are stressors which are part of the lift (Tr. 1593-94, 1596, 3502-04; Exhibit C-628 at 162). Using the 1991 NIOSH guidelines, he analyzed the lift assuming a spool weight of 44 pounds and a frequency level of two lifts per minute; he found the recommended weight limit to be 14 pounds (Tr. 1592-93; Exhibit C-628 at 164). Therefore, Dr. Schulze concluded that the spool lift is hazardous, placing the creel attendant at risk for back injury (Tr. 1596-97).

with the development of musculoskeletal injuries and back injury (Exhibit R-5586 at 59-60).¹¹²

As evidence of actual injury, the Secretary relies upon the testimony of Mr. Johnson who experienced pain in his shoulder and elbow while working as a creel attendant (Secretary's Brief at 136). However, neither condition appears to have been actually diagnosed. According to Mr. Johnson, he was told only that his elbow pain was "like tennis elbow syndrome" (Tr. 4187). Furthermore, Mr. Johnson's conditions do not appear in any of the relevant injury records submitted into evidence here. As indicated, the plant doctors did not provide any testimony regarding specific injuries suffered by creel attendants and Dr. DeHart's identification of 5 such injuries cannot be considered reliable for the reasons discussed *supra*. As such, there is nothing in the record which can properly be considered proof of actual harm under this instance of violation. Therefore, the Secretary must establish potential harm and indicate, with some specificity, the "threshold" at which injury may occur.

The ergonomic stressors alleged by the Secretary to be associated with this job are frequent lifts, torso flexions, reaches, and long periods of standing. There is no dispute that all of these activities are part of a creel attendant's daily work duties. Indeed, Dayton itself acknowledges in its job evaluation form for the creel attendant position that standing, bending, lifting, and reaching, are all physical elements of this job (Exhibit C-661). However, as discussed *supra*, the Secretary remains unable to identify the point at which any one of these activities creates the potential for harm. Indeed, the record lacks an indication of how many lifts, bends, or reaches must be performed before the onset of harm. In fact, the frequency used by Dr. Schulze and Besser in their respective lifting analyses differed dramatically. Similarly, it remains unclear just how long is too long a period of standing for the purposes of identifying potential harm.

¹¹²Dr. DeHart and his team concluded that as a group, creel attendants suffered a total of 5 musculoskeletal injuries from 1989 to 1993 (Tr. 5314). According to a data entry form for one of the creel attendants evaluated, the stressors which Dr. DeHart's team considered under this job were frequent lifting, frequent torso flexions, frequent twists and reaches, and long periods of standing (Tr. 5641-42; Exhibit C-532). According to Dr. DeHart's calculations, the classifiers had an injury incident rate of 26.7 which, when compared to the BLS rate of 8.4, results in a relative risk of 3.18 (Tr. 5315-17; Exhibit C-981). Based on this data, as well as his review of the job, Dr. DeHart concluded that the ergonomic stressors present in the creel attendant job "led to the significant increase in musculoskeletal injury" (Tr. 5316).

Even if the Secretary had proven harm here, her case would fail the causation element of her burden of proof. As discussed *supra*, without the proper foundation, neither Besser nor Dr. Schulze are qualified to attribute the development, potential or actual, of cumulative trauma disorders among creel attendants to the work activities alleged to be ergonomic stressors. Moreover, their respective analyses lack the element which they acknowledge is critical to any determination of causation: actual injury data. None of the plant doctors offered relevant testimony regarding the creel attendant job and given its numerous flaws, reviewed *supra*, Dr. DeHart's incident rate analysis fails to reliably assess causation. Finally, absent serious consideration of the various non-occupational sources which the Secretary's witnesses admit can cause or contribute to the development of cumulative trauma disorders, the issue of causation cannot be adequately resolved on this record. Accordingly, the Secretary has failed to prove that any of the work activities alleged under this instance of violation are hazardous to the employees who perform them.

CONCLUSION

For the foregoing reasons, Complainant has failed to establish the first element of a general duty clause violation, by a preponderance of evidence, that the conditions or activities in respondent's workplace as alleged in the citation, present a hazard to employees. Accordingly, Item 2 of Serious Citation No. 1 is **VACATED** in its entirety.

FINDINGS OF FACT AND CONCLUSIONS OF LAW

All findings of fact relevant and necessary to a determination of the contested issues have been made above. Fed. R. Civ. P. 52(a). All proposed findings of fact and conclusions of law inconsistent with this decision are denied.

ORDER

Serious citation 1, item 1, alleging violation of § 5(a)(1), 29 U.S.C. § 654(a)(1), is **WITHDRAWN**.

Serious citation 1, item 2, alleging violation of § 5(a)(1), 29 U.S.C. § 654(a)(1), is **VACATED**.

ROBERT A. YETMAN
Judge, OSHRC

Dated: _____
Boston, Massachusetts