

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

September 15, 1994

MEMORANDUM
FOR: G. W. Cunningham, Technical Director
COPIES: Board Members
FROM: Timothy J. Dwyer, Technical Staff
SUBJECT: Sitewide Training and Qualification Review at the Idaho National Engineering Laboratory (INEL), July 11-15, 1994

1. **Purpose:** This memorandum describes and provides comment on the status of the Training and Qualification Programs at the Idaho National Engineering Laboratory (INEL). A sitewide review of these programs was conducted from July 11 to July 15, 1994, by the Defense Nuclear Facilities Safety Board (DNFSB) staff members Timothy J. Dwyer and David Grover, and Outside Expert Richard L. Thompson.
2. **Summary:**
 - a. The Department of Energy (DOE) Idaho Operations Office (DOE-ID) has definitely taken a proactive role in the area of sitewide training and qualification. They have not yet achieved the standards prescribed in DOE Orders and commitments, but have developed a forward-looking effort to get there. They have aggressively pursued acquiring and maintaining a *technically capable* staff. They have assigned 40 people to technically responsible positions on location at specific facilities, 14 of whom are Facility Representatives. Individual Development Plans (IDPs) are developed and maintained for federal employees. Contractor Training Implementation Matrices (TIMs) are acted on locally in a more timely manner than observed elsewhere. They also have a maturing management assessment program and senior management is involved. However, DOE-ID has not pursued extensive documentation of these programs and policies.
 - b. The Idaho Chemical Processing Plant (ICPP) continues to struggle with overcoming old practices. Training and qualification programs are less well-developed than they could be, DNFSB staff visits typically result in observations of *recurring* shortcomings, and no improvement in the rate of progress has been noted.
 - c. The Radioactive Waste Management Complex (RWMC) has an extensive ongoing construction program that greatly impacts the daily life of existing facilities/personnel. The contractor organization is struggling to begin making training improvements in accordance with the TIM, and the assigned DOE-ID staff is involved and growing in effectiveness. The contractor organization relies heavily on matrix support for training, and the Facility Manager is not effectively involved in the training program. Among RWMC management, only the Operations Manager appears to be involved in day-to-day training.

- d. The Advanced Test Reactor (ATR) appeared to be well-managed, and is striving to pursue a balanced and forward-looking operator training and qualification program. Formal engineering training, however, is still in its infancy.
3. **Background:** The DNFSB staff reviewed conduct of operations at the Idaho Chemical Processing Plant (ICPP) in May 1993. The Board forwarded comments resulting from the May review to DOE in a staff trip report dated July 20, 1993. The report cited progress in improving conduct of operations at ICPP but also provided areas of improvement, indicating the need for follow-up review. A follow-up review was conducted in December 1993, and included observations of ICPP conduct of operations and training and qualification. The Board forwarded these observations to DOE in a staff trip report dated December 29, 1993.

The review documented by this report further expanded the scope of training and qualification observations, by reviewing training and qualification records and observing various operational evolutions at several INEL facilities, including ICPP, the Advanced Test Reactor (ATR), and the Radioactive Waste Management Complex (RWMC).

4. **Discussion/Observations:**

- a. **DOE-ID**

1. **Federal Training and Qualification:** The DOE-ID staff rather pointedly indicated that its composition has shifted over the past couple of years from 33% technical personnel to 68% technical personnel in a staff of some 450-475 people. Training for each DOE-ID employee is laid out in an IDP that is nominally in compliance with (but well in advance of) commitments made by DOE in its Implementation Plan for Recommendation 93-3. IDPs are initiated by an employee and his supervisor on Day 1 on the job; final review and assignment is completed by Day 30. IDPs include *all* of the training that an employee is intended to pursue, including such things as formal qualification cards assigned through other programs, standard new employee orientation classes, Conduct of Operations Training (note that about 200 of the DOE-ID staff have had Conduct of Operations Training), outside education (note that nearly 25% of the staff is involved in outside education programs), etc.

Progress against IDPs is tracked by each individual's supervisor, but overseen as a whole by the DOE-ID training organization. Line organizations retain responsibility for specific *certifications*. Of note, the Training Program Manager is not a direct report to the DOE-ID Manager. Rather, she reports through the Human Resources Division Director and the Assistant Manager for Institutional Development to the Manager. This was not viewed as a hindrance by either the Training Manager or the Manager - both considered their interaction levels satisfactory.

Documentation supporting the process outlined above is sparse; however, the resulting IDPs and apparent progress to date will easily meet the Recommendation 93-3 Implementation Plan schedule at this site. The DOE-ID Manager has impressed upon his staff that he doesn't intend that they should work on "administrative requirements;" he wants them to work directly on the desired end product.

A further example of this thinly-documented but apparently functional style is the DOE-ID Management Assessment program. It appears to have an effective report and follow-up program, and seems to be functioning better than it is described in less than a complete set of procedural documentation.

2. **Oversight of Contractor Training and Qualification:** DOE-ID endorsed Performance Based Training for operators before the issuance of DOE Order 5480.18A, *Accreditation of Performance-Based Training for Category A Reactors and Nuclear Facilities*, and DOE Order 5480.20, *Personnel Selection, Qualification, Training, and Staffing Requirements at DOE Reactor and Non-Reactor Nuclear Facilities* required it. As a result, the DOE-ID contractor training and qualification program for operators includes many of the elements of an effective program, including fundamentals training, process specific classroom and on-the-job training, performance evaluations, and certification by line management.

TIMs were approved for all 12 INEL facilities by November 6, 1992. The ICPP TIM is on schedule for full implementation on September 30, 1995; revision 2 to the ATR TIM (just approved) is scheduled for full implementation on October 1, 1995 (revision 3 is currently in draft form to delete references to accreditation of Maintenance Technicians); and the RWMC TIM is being revised, with full implementation targeted for December 1, 1995. Training Program Accreditation Plans (TPAPs) have been impacted by facility mission changes, budget reductions and apparent DOE headquarters internal delay in reaching decisions. ICPP did submit one program for accreditation, but it was rejected - a re-submittal has been prepared but DOE-ID management reports that there is no active accreditation mechanism through DOE headquarters at this time, ATR is also prepared to submit two programs (Shift Manager and Operation/Technician) for accreditation in the spring of 1995 should the program re-open. Other ATR accreditation programs have been indefinitely put on hold.

DOE-ID management has also stationed 40 technical people (7 Facility Managers, 19 Program Managers/Engineers, and 14 Facility Representatives) in the field. They have implemented a policy of "management by walking around" at the direction of the DOE-ID Manager as a mechanism for informal overviews. DOE-ID intends to formalize this process with a Facility Representative Oversight Program and an Independent Assessment Program.

- b. **Contractors:** Further details concerning contractor training and qualification,

conduct of operations, and operations observations are included in Attachments 1 through 3.

1. **Training and Qualification:** Training support organizations observed varied from three separate units under one Training Manager (at ATR), who is a direct report to the Department (area) Manager, to a fully matrixed training support organization (at RWMC), wherein the Facility Manager acts as her own Training Manager. Significantly, of the three facilities visited, RWMC is the only one for which TIM implementation is seriously behind schedule, the training program is essentially in its infancy, training program documentation/records are haphazard at best, and none of the personnel tasked with training program development are qualified or certified at the facility.

Specific programs have been/are being prepared for submission for accreditation at ICPP and ATR, but DOE-ID is doubtful that DOE-headquarters will process the submittal.

Operator qualification cards varied in quality from recently revised and fully satisfactory (at ATR), to outdated and in need of improvement (at ICPP), to essentially non-existent (at RWMC). Written examinations are required upon completion of qualification cards at all facilities, but the examinations reviewed were only challenging at ATR.

No formal engineering training programs were available except at ICPP. Maintenance training programs appeared effective at ATR, sporadically established at ICPP, and non-existent at RWMC. Shift Supervisor/Manager training continues to be a point of contention; they are only trained to a higher technical standard than operators at ATR

2. **Conduct of Operations:** The EG&G *Conduct of Operations Manual*, dated May 27, 1994, appears to be an effective supplement to DOE Order 5480.19, *Conduct of Operations*. EG&G Idaho considers this order to be fully implemented at ATR; DOE-ID concurs. EG&G Idaho's Management Self-Assessment Program appears to be effective.

WINCO's Conduct of Operations includes a Management Self-Assessment Program that is administered by the Performance Evaluation branch of the Quality Assurance Division. It was observed that Performance Evaluation did not have a very strong sense of ownership concerning self-assessment findings, trend analyses, or determining root causes and lessons learned.

3. **Operations Observations:**

1. **ICPP:** Once again, poor initial planning prevented the scheduled performance of maintenance jobs. A poor prejob briefing was also observed, although the briefing was sufficiently effective that premature performance of the maintenance was identified and prevented. ICPP radiological control practices also remain deficient,

including a general lack of concern with personnel and equipment crossing radiological control boundaries, inadequate frisk/swipe survey practices, etc. Documentation inadequacies were also observed, including recurring Lock Out/Tag Out problems, sample identification (chain-of-custody), and post-repair configuration management.

2. **ATR:** No significant observations.
3. **RWMC:** RWMC is undergoing an *extensive* construction program, while at the same time continuing the management of waste on site. It was observed that line management appeared to be spread thin and that perhaps this accounted for the operator training and qualification program receiving even less attention from the line organization than from the Central Training Organization.

Operators observed were very concerned with radiological controls and ALARA principles. However, potential radiological controls concerns were not always identified for investigation.

5. **Future Staff Actions:** The DNFSB staff intends to continue to monitor the DOE-ID Training Program progress. This will be particularly significant after the transition to a single contracting organization is completed at INEL, given the fact that DOE-ID has emphasized products for use in the Training Program above formal documentation of the program itself.

Attachment 1

Idaho Chemical Processing Plant (ICPP)

Detailed Training & Qualification Observations

1. **Training and Qualification:** WINCO operates several chemical processing facilities and fuel basins under the ICPP Facility Manager. The ICPP Training Manager is a direct report to the facility manager, and operates a training organization under the control of *WINCO Standard Operating Procedure (WSOP), Training*, which includes WT-1 through WT-7. The *Performance-Based Training Manual (TAP-2)* and DOE *Guide to Good Practices for On-The-Job Training (DOE-STD-1012-92)* are typical of the basis documents for this program. The procedures for qualification and certification processes in the WSOP were upgraded in May 1994 to include such items as a requirement for first line managers/supervisors to review individual operator performance during their last qualified period to determine performance deficiencies to be included in their individual requalification program. Discussions with several Shift Supervisors indicated that they take such requirements seriously: in fact, because most

shifts are manned with one extra operator, Shift Supervisors will rotate operator assignments on a daily basis to improve skills or maintain proficiency, occasionally assigning operators "under-instruction" to gain new certifications.

The ICPP TIM is on schedule for full implementation on September 30, 1995. ICPP submitted one qualification program for accreditation, but was rejected - a re-submittal has been prepared but not yet forwarded. The ICPP training program for operators includes initial training, qualification training and continuing training. ICPP currently operates on a five-shift rotation, to facilitate these programs.

The initial training runs for six weeks, although not all operators complete the entire program *before* commencing shift assignments. For example, Waste Processing Operators go to 2.5 weeks of core courses, then go on shift as a Laborer until an Operator-Helper position is available. The Laborer then takes the remaining 3.5 weeks of initial training before moving to the Operator-Helper assignment. - The fundamentals program is *not* based on the DOE Fundamentals Handbooks, although it incorporates much of the same material. Due to changes in mission, and budget reductions, there were no trainees in the initial training pipeline at the time of the DNFSB staff visit.

The operator qualification program (Operator and Senior Operator) is mostly self-study and on-the-job training (OJT). Qualification Standards (qualification card included) exist, as well as related lesson plans (where there is associated classroom training) and examinations. These documents have not been improved since previous DNFSB staff reviews; typically, prerequisites are not clear, references are vague or undocumentable, level of detail needs upgrading, and examinations are not challenging (although the mix of question types is within the parameters recommended in DOE standards).

Continuing training is generally revisitation of the same topics as the operator qualification program, but tailored to best suit the experience and level of demonstrated operator proficiency. Two continuing training lessons were observed. They consisted of off-the-shelf video training programs (CRM- and NUS-developed) supplemented by instructor interaction and insertion of plant-specific material. Only self-graded (non-record) quizzes are given, if any. The five shift rotation nominally leaves four-hour training periods every 16 days for each shift.

Technical Shift Engineer (TSE) Training is handled by the Engineering Department rather than the Training Department. TSEs complete a formal certification program culminating in written and walk-through examinations and an interdepartmental oral examination board.

Maintenance training is not formally established for all crafts personnel. Where a program does not exist, a First Class Craftsman is considered "qualified." Generally, Foreman I are qualified but non certified; they complete initial administrative functions training from a qualification card. Foreman II complete all process qualification for their area of supervision, followed by an oral examination board. Foreman III must complete an additional qualification program on administrative topics followed by a second oral examination board.

Shift Supervisors may or may not be qualified as a Senior Operator or Foreman III.

They are selected and appointed by management based on their professional background, experience and maturity. The Shift Manager position has no documented qualification requirements. Failure to train supervisors to a technically higher standard than operators has been a recurring deficiency from each DNFSB staff visit to ICPP.

2. **Conduct of Operations:** WINCO's management self-assessment program now uses Area-of-Inquiry Guides sorted by topical areas, inducing conduct of operations. The Quality Assurance Division, Performance Evaluation Branch, administers the Master Assessment Schedule and tracks progress. The assessment schedules are very extensive, but it was observed that Performance Evaluation did not have a very strong ownership feeling about closing out items, or conducting trend analyses, or determining root causes and lessons learned.
3. **Operations Observations:** During a plant tour the following were observed. It is significant that many of these are *recurring* observations:
 - a. Once again, poor initial planning prevented the scheduled performance of maintenance jobs. (As has been noted during previous reviews, although deficiencies in the execution of prejob briefs were observed, it is noteworthy that prejob briefs were effective in preventing premature performance of these evolutions.)
 - b. Pre-job briefs were observed. Items on the briefing checklist were treated as GO/NO-GO questions rather than topics to be discussed with the operators and maintenance technicians. For example, the checklist reference to radiological survey maps for the job was answered with "Yes, we have one" as opposed to presenting the map and highlighting changes/hot spots/etc. for each operator to review. It was very obvious that not all attendees had read the job procedure before the briefing.
 - c. Poor radiological control practices were noted during all ICPP facility tours, including a general lack of concern with personnel/equipment crossing radiological control boundaries, inadequate frisk/swipe survey practices, etc.
 - d. A shift turnover was observed. In the Control Room, the process was formal, with check sheets, log reviews, and one-to-one discussions led by the off-going shift. However, crane crew pre-operational checks were not noted to have included review of the tag that documents the last load testing before operating the crane. On a positive note, when the on-coming shift subsequently decided they could not be certain as to whether the previous shift had decontaminated a fuel cask as required; they conducted the full decontamination process by the procedure.
 - e. Several documentation problems were observed. A repair to the fuel movement crane operating cable (involving use of a spare lead) did not include lead identification for configuration management purposes. Five routine waste samples for EPA requirements were collected early in the off-going shift and arrived at the lab without any tag or label on them.
 - f. It was noted that ICPP has at least two different Lock Out/Tag Out procedures in

effect, and for some conditions either one can be used. Several Lock Out/Tag Out discrepancies were observed during facility tours. WINCO self-assessments also continue to report Lock Out/Tag Out deficiencies at ICPP.

Attachment 2

Advanced Test Reactor (ATR)

Detailed Training & Qualification Observations

1. ***Training and Qualification Program:*** EG&G Idaho operates ATR as a part of the Power Reactor Programs (PRP) Department. The PRP Training Manager is a direct report to the PRP Manager, with three units, totaling 36 employees, working for him. The total population in Test Reactor Area (TRA) (in which ATR is located) is about 400. ATR operates five shifts of operators, with 12 being the minimum number of operators on a shift. Currently, all on-the-job training (OTT) takes place while operators are on shift; ATR management indicated an intention to develop a program that would place new employees in a training status for their first year, allowing them to complete qualification before being assigned to a shift.

The ATR Training and Qualification Program is well managed, documented and responsive. There are 62 operators in the Training Program with 9 operations instructors. Most of the Reactor Operators and all Senior Reactor Operators have degrees. The remainder have extensive commercial or Navy experience as well as ATR experience.

The facility has an approved TIM (revision 2) that has been kept current (revision three is currently in draft form) to changing mission and budget impacts. Currently TIM activities are on schedule, but an October 1994 commitment to complete a Shift Technical Advisor Program may be impacted by budget reductions.

The facility has an accreditation program with an approved TPAP. The facility continues to aggressively pursue accreditation, and is prepared to submit two programs (Shift-Manager and Operation/Technician) for accreditation in the spring of 1995, leading to implementation of the accredited programs in October 1995. Other ATR accreditation programs have been indefinitely put on hold as a result of budget reductions.

ATR management also develops specific training plans keyed to significant facility events, such as *ATR Training Plan for LIC/LOCS Upgrade Outage* [May 6, 1994], and *ATR Training Plan for PCU Outage* [March 9, 1993]. These documents appeared to be explicit, effective, and were well-executed. All lesson plans reviewed appeared to be well-balanced, and placed an emphasis on hands-on training and testing. Written examinations were a challenging mix of 20% true/false, 35% short answer, and 45% multiple choice. Qualification cards are undergoing revision (scheduled completion by September 1994); most drafts reviewed appeared to be fully satisfactory; one exception was the Instrument Mechanic Qualification Card, but further revision is expected. It was

possible to trace the relationship between job-task analyses, knowledge/skill requirements, learning objectives, lesson plans, examination questions, and OJT/qualification card signature requirements.

ATR has a full control room simulator and one loop experiment simulator. The control room simulator is used extensively for individual training, procedure validation and team training. The simulator belongs to the Training Manager and is staffed by extensively experienced instructors who are or have been qualified as Shift Manager. The loop experiment simulator was recently established and has a distributed control system, replicating the newly modified loop experiment control room.

Incentive for operator qualification is provided via pay-for-qualification standards for bargaining unit employees, and pay-for-position but bonus-for-qualification standards for non-bargaining unit employees. Shift Managers rotate watch station assignments on their shift to maintain individual operator proficiencies. Operators have an annual retest and bi-annual requalification requirement.

Maintenance training for 118 maintenance craftsmen in the program is conducted by 4 ATR maintenance instructors who hold plant operator qualifications. Instructors average 20 years experience. Two have completed formal apprenticeships and one holds an AS in electronics technology. Final qualification as an ATR Craft Technician or Foreman has no formal requirements, although it usually involves an interview and approval process through TRA Maintenance Operations Management.

Radiological Controls Technician (RCT) training is a centralized effort for which PRP is the lead. It includes fundamentals, initial training and continuing training; each section concludes with an examination. Satisfactory completion of fundamentals training is required for official entry to the RCT program. It takes about two years for an individual to complete the full RCT Training Program. Of note, RCTs assigned to ATR undergo quarterly refresher training. Full implementation of the RADCON Training Core Curriculum Program is reported on schedule for December 1994.

Engineering training is not as mature as operator training. A curriculum for engineering training has recently been developed, but no training has been scheduled due to demands of recent outages.

2. **Conduct of Operations:** ATR uses an EG&G *Conduct of Operations Manual* (dated May 27, 1994) that has been written as an implementing instruction ("how to") to meet DOE Order 5480.19, *Conduct of Operations*. This document appeared to be an effective supplement to the order, inserting specific INEL information and references.

EG&G Idaho considers DOE Order 5480.19 to be fully implemented in PRP; DOE-ID concurs.

A Management Self-Assessment Program is in place and appears to be working well. Findings appear to be clearly identified, tracked and closed. Trending and dissemination of lessons learned are active efforts and appear to be effective.

3. **Operations Observations:** During a plant tour the following were observed:

- a. The facility treats the safety envelope per their Safety Analysis Report (SAR) to identify safety systems as those required for protection of the public, who are offsite. Recognizing the need to be concerned about a safety envelope for the worker, facility management pointed out, for example, that reactor canal drains are locked closed with a special Shift Manager lock. PRP Management believes that these drains would become part of the safety envelope under current DOE SAR requirements. PRP management is preparing an update to the SAR with submission expected in the near future.
 - b. In conjunction with the ATR Reactor and using the same water canal, the facility has a critical assembly that largely duplicates the power reactor core. Two operators (an SRO and an RO) maintain qualification on the critical assembly while serving as qualified power reactor operators. Since the critical assembly only operates about six weeks a year, PRP management feels that keeping two qualified critical assembly operators is sufficient.
 - c. SROs and ROs were observed changing out fuel in the power reactor during the tour. [It was noted that SROs and ROs do most of the core work at this facility.]
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Attachment 3

Radioactive Waste Management Complex (RWMC)

Detailed Training & Qualification Observations

1. ***Training and Qualification Program:*** EG&G Idaho operates RWMC as one of three divisions of the Environmental Restoration/Waste Management (ERWM) Department. The Program Manager has matrixed training support assigned to her, nominally three (to be increased to five) people, who actually belong to the Central Training Group in the Environment, Safety, and Quality Department. [The Program Manager acts as her own training manager.] None of the three training personnel are qualified or certified at RWMC. The Operations Unit Manager is responsible for operator qualification and certification. RWMC employs 170 personnel, approximately 3040 as operators. RWMC operators are all currently *either* qualified *or* certified.

The facility has an approved TIM, but implementation is well behind schedule. The recently assigned DOE Facility Manager determined that the original document had been overly optimistic to begin with, striving for full implementation in 1993. He directed that a revised TIM be prepared. The revision will be submitted in July 1994; it adjusts scheduled full implementation to December 1995.

The facility Training Program is in its infancy. It lacks lesson plans, except for Fissile Material Handlers. The Central Training Organization has solicited subject matter expert (SME) assistance in creating material for instruction. They have also developed an OJT Checklist Guide, given OJT Instructor classroom training, and formal written examinations. The Operations Manager signature on the Qualification Checklist is the

first documented involvement by the line organization. During questioning of trainers, operators, and managers, it became apparent that the real function of managing and directing RWMC training was carried by the Operations Manager alone.

Operator training involves completion of a qualification card (where one exists, otherwise lists of stand-arc classes are provided in the TIM) and successful completion of a written comprehensive examination. If certification is *desired*, the candidate must then perform an oral examination/walk-through with the Program Manager (rarely done), or their unit manager (Engineering, Operations, Technical Programs - all three were "certified" by the Program Manager). RWMC management indicated that an oral examination/walk-through is documented on a Qualification Review Committee Oral Examination Worksheet per the *ERWM Training Program Manual*. Typically, a Specialist (e.g., Maintenance Specialist, Operations Specialist) or an Examination Technician would be required to achieve certification

Examinations were reviewed and revealed to be of only-mid-range difficulty. All questions were multiple choice or matching. Some pre-test quizzes included questions that were significantly more challenging than the examinations themselves. Qualification cards do not exist for all positions (e.g., Examination Technician). Training files tend to be a haphazard collection of initial employee checklists, OJT signoff checklists, training attendance sheets, completed examinations, and (in some cases) certification signoff sheets. Of note, OJT documentation is strictly informal (signoff checklists only), although documentation requirements are being developed.

2. **Operations Observations:** During facility tours, the following were noted:
 - a. Questioning of personnel in the facility revealed that individuals know what they are doing functionally, but that full and clear information about changes in mission and policies is not transmitted to them.
 - b. RWMC is undergoing an *extensive* construction program, while at the same time continuing the management of waste on site. It was observed that line management appeared to be spread thin and that perhaps this accounted for the operator training and qualification program receiving even less attention from the line organization than from the Central Training Organization.
 - c. An operator under surveillance of the RWMC Facility Representative performed DOP-RO-1.1.7, *Weekly TSA Waste Package Surveillance Requirements*. The following observations were made:
 1. The operator was very familiar with the procedure and facility, including all ongoing operations. He took swift corrective action for deficiencies identified during the surveillance.
 2. The operator was very concerned with radiological controls and ALARA principles. However, he failed to identify a potential streaming situation due to incomplete - - barriers around a high radiation area in the C&S Building.

3. The operator requested that a level III RCT initial for Steps 9 and 10, vice verifying conditions himself and initialing. The procedure indicates that a qualified Quality Assurance/Emergency Preparedness Planner must perform these steps.
- d. An operator performed PD-RS-2.1, *Receipt and Inspection of Radioactive Waste Shipments*. The following observations were made:
1. The operator indicated that there is one receipt inspector and one alternate assigned at RWMC. This position requires certification (independently) by RWMC management, EG&G Idaho, and the Department of Transportation (DOT).
 2. The operator was very familiar with the procedure, and especially concerned with radiological controls and ALARA.
 3. The operator correctly instructed the RCT assisting with the procedure to inspect/recheck various portions of the shipment about which she had concerns.