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MINUTES OF THE
ACRS SUBCOMMITTEE MEETING ON
TRANSPORTATION OF RADIOACTIVE MATERIALS
APRIL 14, 1982
WASHINGTON, D.C.

INTRODUCTION

The ACRS Subcommittee on the Transportation of Radioactive Materials held a meeting on April 14, 1982, at 1717 H Street, N.W., Washington, D.C., to continue its review of the adequacy of the procedures being used by the Transportation Certification Branch (TCB) of the NRC in certifying packages for transportation of radioactive materials. The entire meeting was open to public attendance. Mr. Sam Duraiswamy was the Designated Federal Employee for the meeting. A list of documents submitted to the Subcommittee and its consultants is included in Attachment A. A tentative presentation schedule for the meeting is also included in Attachment A.

ATTENDEES

ACRS: C. P. Siess (Subcommittee Chairman), M. Bender, S. Duraiswamy (Designated Federal Employee)

ACRS Consultants: J. Langhaar, L. Shappert, Z. Zudans

Principal NRC Speakers: R. Cunningham, C. MacDonald, A. Grella, R. Chappel, P. Lovendale (I&E, Region III), R. Greger (I&E, Region III).

Principal Industry Speakers: D. Ebenhack (Chem-Nuclear Systems), C. Johnson (Nuclear Assurance Corporation)

EXECUTIVE SESSION

Dr. Siess, the Subcommittee Chairman, convened the meeting at 8:30 a.m.. and reviewed briefly the schedule for the meeting, indicating that in the morning portion of the meeting the Subcommittee will hear presentation from the Office of Inspection and Enforcement (I&E) of NRC with regard to its activities associated with the transportation of radioactive materials. It will also hear a presentation from the I&E Region III office with regard to its field inspection activities. In the afternoon portion of the meeting, the Subcommittee will hear presentations from industry representatives (Chem-Nuclear Systems and Nuclear Assurance Corporation). He said that the Subcommittee had received neither written

comments nor requests for time to make oral statements from members of the public. He mentioned that this meeting will be the last one at which the Subcommittee will gather information for the ACRS report on the adequacy of the TCB procedures for certifying packages; following this meeting, he plans to prepare a draft report summarizing the Subcommittee's findings, comments and recommendations and it will be discussed at the next, probably the last, Subcommittee meeting on this matter.

NRC STAFF PRESENTATION

Introduction - Mr. R. Cunningham

Mr. Cunningham, Director of the Division of Fuel Cycle and Materials Safety, provided a brief introduction, indicating that the activities associated with the transportation of radioactive materials are complex, fragmented, and difficult to understand. The interrelationship between various groups such as international, Federal, and state agencies involved in the transportation of radioactive material is complex, and makes it difficult to assess the changes in patterns of transportation within the nuclear industry and to make timely adjustments to regulatory control to deal with such changes. The complexity in relationships between various groups also makes it difficult to:

- Demonstrate that the public health and safety is adequately protected.
- Assure that an appropriate emergency response plan is in place to cope with significant transportation events.
- Stay on top of the future needs in the transportation area and develop appropriate regulations to meet those needs.

He said that, in his opinion, the regulations associated with the transportation of radioactive materials are unduly complex and he believes that appropriate changes are necessary to make them simple so that the public can understand them easily. He stated that several steps are being taken by the NRC to solve some of the concerns addressed above:

- Steps are being taken to adopt a stronger program area management within the NRC with the outlook of having eventually a central point of control.
- A formal procedure has been established in the Division of Fuel Cycle Safety for systematic analysis of transportation and materials safety events and incidents including those that might affect package integrity.

- A letter dated April 7, 1982 (Attachment B) has been sent to the Federal Emergency Management Agency (FEMA) outlining the roles of local, state, and federal governments in responding to transportation emergencies involving radioactive materials. The NRC plans to cooperate with FEMA and other agencies in the development of a transportation component to the National Emergency Preparedness/Response Plan and also in the development of more specific details of the roles of these agencies.

- The memorandum of understanding between NRC and the Department of Transportation (DOT) is being reexamined in view of the changing patterns within the nuclear industry.

Mr. Bender asked whether the Division of Fuel Cycle and Materials Safety of the NRC expects to get ACRS comments in the following areas in addition to receiving comments on the adequacy of TCB procedures in certifying transportation packages:

- Adequacy of existing requirements for design and evaluation of packages.
- Adequacy of qualification requirements for packages.
- Adequacy of requirements for handling packages.

Mr. Cunningham responded that the transportation of spent fuel and other large quantities of radioactive materials is one of the most sensitive areas of public concern. They need ACRS comments primarily on the adequacy of the procedures being used by the TCB for certifying packages for transporting radioactive materials. However, since there are several loose ends in the transportation area, the ACRS comments in other areas would also be helpful in tightening up those loose ends.

Dr. Siess pointed out that the scope of the ACRS review is limited to the adequacy of the TCB procedures for certifying transportation packages and in the beginning it was agreed not to extend the review scope to include the suitability of existing requirements, since they are under review and subject to change. However, while commenting on the existing procedures for certifying packages, the ACRS would consider commenting on the adequacy of the flexiability of the existing procedures to adapt to future changes in regulations.

PRESENTATION BY I&E - MR. A. GRELLA

DOT Transportation Accident/Incident Reporting System

Mr. Grella said that the DOT Hazardous Material Incident Reporting (HMIR) system, to which carriers are and have been subject since 1971, is the only formal system in existence for reporting of transportation accidents and incidents involving hazardous materials. He said that the DOT reporting system applies to all carriers involved in interstate and foreign transportation of hazardous materials. The carriers are required to report all accidents that involve death, injuries requiring hospitalization, property damage above $50,000, release of hazardous material, and any suspected radioactive contamination.

Mr. Grella said that the total number of transportation events reported under the DOT HMIR system between 1971 and 1980 is about 105,182; out of this, 585 (0.56%) were related to radioactive materials. For the same period of time, the data base developed by the Transportation Technology Center (TTC) at the Sandia National Laboratories has recorded 750 incidents associated with radioactive materials. He mentioned that the TTC data base includes the incidents reported under the DOT reporting system and also incorporates information from the NRC files.

Dr. Siess asked whether the DOT reporting system applies to intrastate transportation. Mr. Grella responded that he believes that the DOT reporting systems may not apply to intrastate shipments because the are not subjected to DOT transportation regulations. Dr. Siess commented that there seems to be a loophole in the regulations associated with the transportation accident reporting system.

Mr. Bender asked about the total number of hazardous material shipments for the period between 1971 and 1980. Mr. Grella responded that the most recent estimate of total shipping activity was performed in 1975; current shipping activities are being investigated and until this study is completed it will be difficult to predict the total volume of shipments.

Mr. Bender said that he believes that the information on the total number of shipments would help the NRC demonstrate that the problems associated with

transporting radioactive materials are much less than the problems associated with the transportation of other hazardous materials.

NRC Transportation Accident/Incident Reporting System

Mr. Grella said that there are no formal NRC regulations similar to DOT reporting requirements that require reporting of transportation incidents. However, 10 CFR 20.402 requires that the theft or loss of radioactive materials be reported to NRC, and 10 CFR 20.403 requires reporting of exposure to radiation and release of radioactive materials. He mentioned that the NRC regional offices normally report many transportation events through preliminary notification of occurrences.

Dr. Siess asked whether the information gathered by the NRC on transportation incidents has ever been used to show that a particular type of package was prone to abuse either in preparation or in transportation. Mr. Grella responded that it has not been used for that purpose.

Radioactive Material Accident/Incident Experience

Mr. Grella discussed briefly the radioactive material transportation experience in the U.S. that was recorded by the TTC for the period between 1971 and 1980 (Attachment C, Page 1):

Number of Transportation accidents	101
Number of Handling accidents	125
Number of other reported incidents	554

He said that the "Other" category includes incidents that may arise from: (1) actual or suspected release of radiation or materials; (2) surface contamination on the package or transport vehicle in excess of regulatory requirements. The classification of the 101 transportation accidents by transportation mode indicates that most (86) of the accidents involved were in the highway mode (Attachment C, Page 2). He provided a brief summary of the transportation accident analysis, accident/incident data base, radioactive material handling accident and the associated analysis, and the materials involved in the transportation accidents (Attachment C, Pages 3-8).

Mr. Bender asked how the transportation accident/incident experience is used in the NRC decision-making process and what kind of conclusion one could arrive at from these experiences. Mr. Grella responded that he believes that the information obtained from the accident/incident experience could help produce accurate accident rate estimates for risk assessment studies. The results of the analysis of these accidents/incidents could also be used to provide information about the environmental impacts associated with the transportation of radioactive materials. In addition, it could be used in the formulation of regulations governing the safe tansportation of radioactive materials.

Dr. Siess asked why the number of reported accidents in 1980 is much smaller than for the previous three years (Attachment C, Page 4). Mr. Grella responded that he did not know the reason for this. However, he believes that people may be reporting fewer of the marginal cases.

Mr. Bender asked whether there is more rigor in the way in which the regulatory process reacts to the accident/incident experience. Mr. Grella responded that, since 1979, there has been more awareness by the federal regulators and state authorities and that probably is one of the reasons more incidents are being reported as compared to previous years (early 1970's).

Indicating that most of the preliminary notifications of occurrences being issued by the NRC involve radiography sources, Dr. Siess asked whether there is any way of telling that all of the incidents associated with radiography sources were reported. Mr. Grella responded that it would be very difficult to tell whether all such incidents were reported.

Mr. Grella discussed briefly some of the transportation accidents that occurred in the past involving hazardous materials, including radioactive materials.

Indicating that some of the transportation accidents are attributable to procedural errors, Dr. Siess asked whether consideration has been or is being given in package design to prevent such errors. Mr. Grella responded that packages could be designed to prevent such errors only to a certain extent. He is doubtful whether a package could be designed to be totally foolproof.

Mr. Langhaar asked whether the NRC should have any formal requirements for reporting accidents/incidents associated with the transportation of radioactive materials in view of the fact that DOT requirements do not apply to intrastate transportation. Mr. MacDonald responded that 10 CFR Part 71, Section 71.5 requires licensees to follow DOT requirements for transporting radioactive materials including accident reporting.

Mr. Langhaar commented that although the frequency of accidents involving radioactive materials seems to be much lower than that involving other hazardous materials, it is not clear whether the number of package failures associated with the transportation of radioactive materials is at an acceptable level. It seems that failures are due to several reasons; one of the reasons seems to be that the packages were not prepared properly. He believes that the number of failures could be reduced by imposing more stringent design requirements and also by imposing more stringent handling and operating procedures.

Mr. Langhaar asked whether the NRC Staff has determined the most common cause of failure of these packages based on the accident/incident experience. Mr. Grella responded that the packages that failed during accidents were designed only for normal conditions of transport and they were not required to meet the kind of accident conditions that they encountered.

Dr. Siess commented that, in view of the fact that some of the accidents are due to procedural errors, he thinks that the Quality Assurance (QA) program and operating procedures should have minimized such accidents. Mr. Grella said that he believes that a better QA program would reduce the probability of such events.

Dr. Siess asked whether the NRC has a reporting system similar to the Licensee Event Report (LER) system for reporting events associated with package preparation, handling, and maintenance, etc. Mr. MacDonald responded that they get only the preliminary notification of occurrence report from the I&E.

Dr. Siess asked whether a licensee has to report a procedural mistake that he found by using his own procedures. Mr. MacDonald responded that such incidents are not required to be reported unless someone is exposed to radiation.

Dr. Siess commented that there seems to be a loophole in the NRC requirements. If a licensee did not report a mistake that he found and corrected on his own, then nobody would have had the benefit of it. He believes that learning from experience is the best way of learning. There should be some way of disseminating one's experience so that others would not make the same type of mistake. Based on operating experience, he believes that package designs have been satisfactory. However, he is much concerned about the procedural or human errors associated with the package preparation, handling, etc.

NRC Transportation Inspection Program

Mr. Grella discussed the history of the development of the NRC inspection program associated with the transportation of radioactive materials. He said that prior to late 1979, the NRC transportation inspection program had a very limited scope. As a result of the concerns (Attachment C, Pages 9 and 10) expressed by the Governors of Nevada, Washington, and South Carolina states at the July 10, 1979 Governor's Conference, about the insufficient inspection and enforcement activities of the NRC and DOT in the transportation area, the NRC had made significant changes to its regulations associated with transportation (Attachment C, Page 11). In August 1979, I&E had issued Bulletins 79-19 and 79-20, "Packaging, Transport and Burial of Low-Level Radioactive Wastes" to call for the immediate attention of all NRC licensees to improve their programs for packaging and transporting of wastes and to eliminate discrepancies that were being noticed in the shipment of wastes. These Bulletins listed certain specific corrective or administrative actions that the NRC expected of its licensees (Attachment C, Page 12). These Bulletins were also sent to the NRC Agreement States for transmittal to Agreement State licensees. In addition, procedures were sent to the NRC regional office inspectors for inspecting packages. He discussed briefly the number of inspections performed by the NRC inspectors between July 1979 and September 1981 (Attachment C, Pages 13 and 14).

NRC Enforcement Policy on Violation of Transport Regulations

Mr. Grella said that in December 1979 the NRC issued a written notice to all licensees establishing specific criteria for enforcement actions for failure to comply with transport regulatory requirements; violations were categorized in four different severity levels. In October 1980, the NRC issued a new

proposed general statement of policy and procedures for enforcement actions. In this policy statement six, rather than four, severity levels were established. In March 1982, the NRC issued the final statement of policy and procedure for enforcement actions in which the severity categories were reduced from six to five. He discussed briefly the base civil penalties for violations of the various severity levels (Attachment C, Pages 14-18).

Mr. Grella said that, in the period between January 1980 and March 1981, NRC had completed 18 civil penalty cases involving 25 items (Attachment C, Page 19). Out of these 25 items, 8 involved excessive radiation levels; 5 involved failure to use strong, tight packages for low-specific-activity materials; 3 involved failure to secure packages to prevent movement; and 9 involved an assortment of items.

Mr. Grella stated that since March 1981, the NRC has not had any civil penalty cases. One of the main reasons for this is that several states have started imposing civil penalties. If a particular state has imposed a civil penalty and/or suspended a licensee's permit, then the NRC action will normally involve issuance of a notice of violation to the licensee requiring submittal of description of corrective action taken by him. However, if the violation is similar to a previous violation by the licensee, or if the state action was inordinately low relative to the action which might have been taken by the NRC, then the NRC will consider taking further enforcement action in addition to that by the state.

With reference to one of the requirements (Attachment C, Page 12) of I&E Bulletin 79-19, which requires that the licensees should designate, in writing, persons responsible for waste transport program, Mr. Bender asked how the NRC inspectors make sure the that person designated by a licensee is qualified to do the job. Mr. Greger, I&E, Region III, responded that normally I&E inspectors will talk to the person designated by the licensee and determine whether that person is competent to perform the job.

Dr. Zudans asked whether the NRC has some specific minimum requirements to provide guidance to the licensees in developing their training programs. Mr. Grella responded that they do not have any such guidelines.

Dr. Siess asked about the frequency of inspection for power reactors as compared to material licensees. Mr. Grella responded that power reactors are normally inspected once a year. In the case of material licensees, some (radiographers) are inspected once a year and some others (seal gauge users) are inspected once every ten years.

Mr. Bender asked whether every package has an accompanying set of maintenance requirements. Mr. Greger responded that a majority of the packages includes such requirements and some of them do not. Mr. MacDonald added that the package designers are required to provide maintenance procedures along with their packages.

Dr. Siess asked whether the NRC Agreement State inspection programs are comparable to the NRC programs and the frequency and thoroughness of inspections are similar to those of the NRC inspection program for Non-Agreement States. Mr. Grella responded that he did not know much about the state programs and it is the responsibility of the Office of State Programs of the NRC. In his opinion, to a great extent the Agreement States' activities in the transportation area may not be at the same level of NRC's activities.

Dr. Siess commented that the NRC regulations do not seem to require that the Agreement States should have a transportation program equivalent to that of the NRC. He is not sure whether NRC really makes an effort to find out whether the Agreement States are doing an adequate job and he has not seen any evidence of the NRC checking up to see whether Agreement States do what they say they are doing.

Dr. Siess asked whether there were any instance where enforcement action was taken against a shipper for his mistake before the shipment was actually made. Mr. Grella responded that to his knowledge, there were no such instances and so far they did not have to face this issue. Mr. Greger added that the scope of the NRC inspection program is to protect the public health and safety; until a shipment that has some problems leaves the site, the public is not considered to be at risk. Therefore, if a shipper makes some mistakes at the site, the NRC will not take any enforcement action. However, if the shipment was made without correcting that mistake, appropriate enforcement action would be taken.

Mr. Bender commented that if the NRC acts on the assumption that a shipper would correct a certain problem before the shipment was made, then it may not have a proper way of monitoring the effectiveness of the shipper.

Dr. Siess commented that the NRC should do whatever is necessary to make sure that the licensee is trying to do everything right; they should make sure that the licensee's procedures associated with his review, correction and modification are working well.

PRESENTATION BY I&E REGION III - MR. R. GREGER AND MR. P. LOVENDALE

Mr. Greger said that the transportation inspection activities in I&E Region III are performed by two groups: (1) Resident Inspectors Group, and (2) Specialist Inspectors Group. The Specialist Inspectors Group is divided into two sections: (1) Byproduct Materials Inspection Section, and (2) Facilities Radiation Protection Section.

He said that the transportation activities in the Resident Inspectors Group have been reduced in the past year. There are about 13 operating reactors in Region III and he believes that the Resident Inspectors Group expends about one-half man-year effort for transportation activities.

The Byproduct Materials Section, which is responsible for inspecting radiographers, radiopharmaceuticals, and waste collectors, etc., performs a relatively large number of inspections (about 80 to 100 inspections per inspector) each year. The majority of the byproduct materials licensees are not involved with Type A fissile or Type B material shipments. He believes that the Byproduct Material Inspection Group expends about one to one and a half man-years per year of inspection effort in the transportation area.

The Facilities Radiation Protection Section deals with the inspection of 13 operating facilities and 6 fuel facilities that are in Region III and it expends about ten percent (about one-half man-year effort) of its time in inspecting transportation activities. He said that this Section is also responsible for inspecting the 9 research reactor facilities that are in Region III. However, they did not inspect these facilities last year

and they do not plan to inspect them this year also due to budget constraints. The Facilities Radiation Protection Section deals with the inspection of Low-Specific-Activity materials, Type A fissile and Type B materials. He believes that about 10 to 20 percent of the shipments that they inspect involve Type A fissile or Type B materials including Low-Specific-Activity materials. He said that because of budget constraints, their activities in the transportation area have been diminished and they perform less frequent inspections now.

In response to a question from Dr. Siess about the improvement in licensees' performances, Mr. Greger said that he believes that the licensees performance have been improved since the requirements for QA programs and procedures had gone into effect.

Mr. Lovendale discussed briefly what the inspectors normally look for during a field inspection. Some of the things that they normally do are as follows:

- Determine the responsible individual or group of individuals for carrying out the transportation activities.
- Determine that applicable procedures or instructions and QA program are in place.
- Interview the health physicist and possibly a QA program representative to determine whether they prepare packages for shipment in accordance with the applicable procedures.
- If a NRC certified cask is used for shipment, the inspectors will get a copy of that certificate from the shipper and check to see that the procedures outlined in the certificate were complied with.
- Look to make sure that necessary shipping papers are in place identifying, as appropriate, the contents of each package, name of each radionuclide, activity content of the package, etc.
- Discuss the Shipper's audit program with some randomly selected employees to check the degree of their knowledge of the program and to aid in assuring that the Shipper has been performing proper audit.
- Check the maintenance records to make sure periodic maintenance has been performed on reusable casks.

- In the case involving solidified waste shipments, review the package preparation, including dewatering methods, methods used to determine solidification acceptability.
- Check to make sure that proper labeling and marking are done in accordance with the NRC and DOT requirements.
- Perform an independent radiation survey to make sure that the package complies with the radiation level limits.
- Open random packages to verify that the gasket is in proper condition and to ascertain that the packaging is proper for the content.

Dr. Zudans asked whether the receiver will receive some kind of document along with the package to check whether the shipper has done everything he is supposed to do prior to shipping the package. Mr. Greger responded that the shippers are not required to send all the documents along with the package other than those required by the DOT regulations to identify the radionuclides, radioactivity level, and contamination level. However, some of the shippers send along with the package the necessary papers that show what they have done prior to shipping the package. 10 CFR Part 20 requires that the receiver has to do a contamination survey on all incoming packages and a radiation survey on all Type B and Type A fissile packages. By doing his own survey, the receiver can tell whether the radiation level is the same as that claimed by the shipper.

Dr. Siess asked whether there is enough information for the receiver to determine whether the package was degraded in transit. Mr. Greger responded that by doing a radiation-level check, the receiver could be able to find out whether the radiation level exceeded the limit specified by the shipper and whether it caused any danger to the public. By doing maintenance and other necessary checks, he might be able to tell whether the package condition has been degraded significantly.

Dr. Siess commented that by requiring that the receiver perform some sort of QA check after receiving the package and report all discrepancies, it might be possible to determine the ability of the package to withstand the conditions of transport. Further, it might also help pick up the defects in the shipper's operating procedures.

Mr. Bender commented that since the I&E Staff performs inspections only occassionally, it will not be possible for them to know whether appropriate procedures are being satisfied all the time. On the other hand, the receiver checks all of the packages that he receives, and just by requiring the receiver to report all discrepancies that he found in his check would help determine whether appropriate procedures have been followed at the shipping end. Although the shipper wants to do a good job and does everything acording to his procedures, there might be some deficiencies in his system that he might not be aware of. He believes that input from the receiver would be a tremendous feedback to the improvement of the shipper's QA program and operating procedures.

Dr. Zudans commented that by having some requirements for the receiver to check and report all discrepancies that he found after receiving the packages would help improve the quality of shipping.

Mr. Greger said that the NRC Staff's position has been to make sure that the shipper has a good QA program and well organized operating procedures. However, he believes that having some requirements on the receiver to report non-conformance items will have some advantages.

After further discussion, the Subcommittee recommended that the NRC Staff develop some reporting requirements for the receivers to report non-conformance items.

Dr. Siess asked whether the I&E Staff's inspection activities have indicated any changes that should be made in the shipper's operating procedures. Mr. Lovendale responded that there has been some minor changes made in the procedures as a result of their inspection activities.

In response to a question from Dr. Siess about inspection procedures for reusuable packages, Mr. MacDonald said that they normally inspect such packages prior to initial use and also prior to each use.

PRESENTATION BY CHEM-NUCLEAR SYSTEMS - MR. D. EBENHACK

Mr. Ebenhack, Director of the Regulatory Affairs Division of the Chem-Nuclear Systems, discussed briefly the organizational setup in Chem-Nuclear Systems

(Attachment D, Pages 1-3). He said that Chem-Nuclear Systems has the largest transportation group (40 over-the-road long-haul tractors and 87 trailers, including flatbed and shielded vans) and the largest fleet of shipping containers in the U.S. It has about sixty Type A and Type B containers and a majority of them have certificate of compliance from the NRC (Attachment D, Page 4). Some of these containers are used as strong-tight containers only. He mentioned that Chem-Nuclear Systems had designed a stainless steel cask for transporting the steam generators from the Turkey Point Nulcear Power Plant to the Barnwell Site for disposal. However, the Governor of South Carolina State did not give approval for burying the steam generators from Turkey Point at the Barnwell Site.

Mr. Ebenhack discussed briefly the qualification and training programs for the drivers. He said that they hire only well qualified drivers and all the drivers are well trained before driving the Chem-Nuclear's trucks on the road. The drivers are also required to spend about four days working with health physics and disposal personnel at the Barnwell burial site to learn how to survey radioactive shipments and how to operate Chem-Nuclear's shipping containers. He mentioned that because of such a thorough training program, they have had no major transportation incidents although their drivers drove about 1.6 million miles in 1980 and about 2.9 million miles in 1981.

Mr. Ebenhack said that Chem-Nuclear's inspection and maintenance programs are much stricter than those required by DOT. Chem-Nuclear inspects the vehicles, not only every 5,000 miles as required by DOT, but also prior to every trip. All the certified shipping containers are maintained strictly in accordance with the requirements of the certificate of compliance. All of the Chem-Nuclear's drivers have a copy of the emergency response procedures in their possession and they are familiar with these procedures. The drivers also have Chem-Nuclear's emergency notification procedures. Chem-Nuclear's emergency response team will respond to any incident, anywhere and anytime. Provisions have been made to fly the emergency response team and the necessary equipment within one hour's notice.

Mr. Ebenhack said that when receiving a package, Chem-Nuclear's QA personnel inspect the package very thoroughly. If they find any problems, they fill

out a non-conformance report and notify the shipper, state authorities, and also the DOT and NRC, as appropriate. He said that Chem-Nuclear never sends a truck carrying packages back because of some problems with the packages; if the contents of the package are acceptable for burial, they normally will fix the problem and then bury the package. However, if it is not acceptable for burial, they will fix the package prior to sending the truck back. In cases like this, they also inform the shipper, DOT, state authorities, and NRC, as appropriate.

Dr. Siess soliciated comments from Mr. Ebenhack on state regulations as compared to NRC regulations. Mr. Ebenhack said that South Carolina, which controls the Barnwell burial site operated by Chem-Nuclear, always checks the burial site very thoroughly. It also inspects the shipper's as well as Chem-Nuclear's activities; it reviews all of the shipping papers that accompany the shipment as well as all of the Chem-Nuclear's papers (inspection, QA check, etc.) associated with that shipment. He said that different states have different regulations. New Jersey requires that a truck carrying hazardous materials should have an escort when crossing the Delaware Bridge; Maryland requires that the trucks should be run only in the day time, up to 5:00 p.m.

Mr. Bender asked whether Chem-Nuclear handles all type of wastes at the Barnwell Site. Mr. Ebenhack responded that they mostly take all wastes that do not contain trans-uranic materials, and they do not deal with pure radium, in compliance with the state regulations, unless it is mixed with some other acceptable radioactive materials. They do not take liquid wastes. Also they do not deal with toxic chemicals since they may have some detrimental effect on the burial capacity of the site in terms of leachability and migration. Further, such chemicals may affect the ion exchange property of the soil.

Mr. Bender asked how Chem-Nuclear, as a receiver, deals with the shippers. Mr. Ebenhack responded that they always provide the shippers with a copy of the burial ground criteria and make sure that the shippers comply with those criteria.

Mr. Bender asked whether Chem-Nuclear has any mechanism to feed back information to the shippers based on its experience as a receiver. Mr. Ebenhack responded that if Chem-Nuclear's QA personnel found some problems with the packages, then they call the shipper's QA personnel and inform them about those problems. Further, they prepare a non-conformance report and keep it available for NRC or DOT for inspection or send that report to the State, DOT, and NRC, as appropriate, depending on the severity of the problem.

Dr. Siess asked whether Chem-Nuclear had made any changes to the casks that it owns or to its operating procedures, based on its experience as a receiver. Mr. Ebenhack responded that they had made some changes (gasket design) based on their receiving experience.

Mr. Ebenhack discussed briefly the discrepancies that Chem-Nuclear found when receiving packages (Attachment D, Page 6). He said that these discrepancies fall into eight different categories such as contamination of vehicles, water in casks or containers, improper container/closure, improper bracing or loading, etc. (Attachment D, Pages 7 and 8).

Dr. Siess asked how many of these discrepancies might have occurred in transit. Mr. Ebenhack said that a majority of them normally occur in transit.

Mr. Langhaar asked what percentage of Type B casks involved in these discrepancies. Mr. Ebenhack said about three or four percert.

Dr. Siess asked about Chem-Nuclear's opinion on the adequacy of performance and capabilities of shippers, based on its experience as a receiver. Mr. Ebenhack responded that there are wide variations; some shippers perform well and some do not. Some shippers could do better, but they do not seem to have any desire to do so. By looking at the volume of non-conformance reports in Chem-Nuclear's files, they can tell the quality of performance of a particular shipper.

Dr. Siess asked whether the receiver perceptions are a good measure of a shipper performance. Mr. Ebenhack said yes.

Dr. Siess asked Chem-Nuclear's opinion on the adequacy of the NRC Staff's package review process and clarity of the criteria associated with the transportation of radioactive materials. Mr. Ebenhack said that generally the NRC Staff's review has been good. Sometimes the industry has problems with the NRC Staff and vice-versa. He believes that once in a while things could be done a little different and better. Sometimes, the industry has difficulty in understanding what the NRC criteria are and how to satisfy them.

Dr. Siess asked whether Mr. Ebenhack understands the requirements of 10 CFR Part 71. Mr. Ebenhack responded that he does not understand 10 CFR Part 71 as well as some of Chem-Nuclear's QA personnel; he is not sure whether those QA personnel understand it completely either.

PRESENTATION BY NUCLEAR ASSURANCE CORPORATION - MR. C. JOHNSON

Mr. Johnson, Vice President of the Engineering and Transportation Services Division of Nuclear Assurance Corporation (NAC), discussed briefly the organizational structure of NAC (Attachment E, Page 1). He said that NAC was established in 1968 to provide spare parts for fuel assemblies. After a period of time, NAC direction was changed and it became a consulting and data management corporation, collecting information worldwide in the nuclear fuel cycle area. He believes that NAC has the largest computerized data base of information in the fuel cycle area. They have information on all spent fuel pools in the world. They have offices in Japan and Germany primarily to collect data for their data acquisition system. He said that initially, NAC started buying the design of spent fuel shipping containers from the Nuclear Fuel Services who operated the West Valley burial grounds. They acquired the NFS-4 cask design from Nuclear Fuel Services and have built 5 spent-fuel casks based on that design; 2 of these casks are being used by the Duke Power Company. A list of NAC casks is included in Attachment E, Page 4.

Dr. Siess asked whether NAC has any projections as to what the fuel movement is going to look like if there is going to be away-from-reactor storage. Mr.Johnson responded that, based on NAC's projection, he does not believe that there will be any panic in fuel movement under such situation. He believes that few reactors will have to move the spent fuel from onsite storage pool to somewhere else before 1986.

Mr. Johnson discussed briefly the NAC QA program (Attachment E, Pages 2 and 3), indicating that it is in accordance with 10 CFR Part 71 and has been reviewed and approved by the NRC. He said that NAC's manufacturing records are audited by NRC as well as by the users of their casks.

Dr. Siess asked why NAC's manufacturing records have to be audited by the users in view of the fact that the cask has already been certified by the NRC. Mr. Johnson responded that NRC regulations require that the user of the cask has to assure himself that the cask was manufactured and maintained in accordance with the NRC approved QA program.

Dr. Siess asked why the certificate of compliance does not constitute an assurance that the cask was manufactured under an aprpoved QA program. Mr. MacDonald responded that NRC certifies only the design for the cask. However, since I&E inspectors audit NAC's manufacturing process, NAC could certify to the users of the cask that the cask has been audited by the NRC. But, it is up to the user to decide whether to accept that or to perform his own audit.

Dr. Siess commented that may be it would be helpful if the I&E regional office issued a certificate of audit.

Dr. Siess asked why more spent fuel casks are transported by trucks than by rail. Mr. Johnson responded that there are several reasons for not shipping more by rail:

- The capacity of the crane in most facilities are not large enough to lift the rail casks.
- Rail tracks going into the facilities are not in good condition and may not be able to support loaded cars.
- Railroad authorities require a dedicated train for shipment of spent fuel casks.
- Rail transportation using a dedicated train is much more expensive than by truck.

Mr. Johnson discussed briefly NAC's maintenance program (Attachment E, Pages 5 and 6), indicating that they perform quarterly and annual maintenance on spent fuel casks.

Mr. Bender asked does the NRC Staff determine whether there is any rate of degradation associated with spent fuel casks, based on the maintenance records and corrective actions taken. Mr. MacDonald responded that the NRC Staff has been requiring a requirement that the user should submit all maintenance records, corrective actions, and other experience with the cask when applying for a license renewal. By looking at that information, he believes that the NRC Staff would be able to determine whether some parts of the cask are progressively degrading or whether it experiences only randomm type of problems.

Mr. Johnson discussed NAC's package preparation program (Attachment E, Page 7) and NAC's personnel training and the cask user's training programs (Attachment E, Page 8).

Dr. Siess asked whether NAC gives any kind of examination to test the personnel at the end of the training period. Mr. Johnson said that they do not have any such practice.

With regard to operating experience with the spent fuel casks, Mr. Johnson said there has been only one spent fuel shipment accident in about two million miles of spent fuel movement. Although the driver of the truck was killed in the accident, no radioactive material was released.

SUBCOMMITTEE REMARKS

Dr. Siess provided a brief summary of his observations:

- There seems to be a complex regulatory system in the transportation area involving several offices of NRC, several other agencies within the federal government (DOT, DOE, FEMA, etc.), and the Agreement States.

- He is still not convinced that any one person or group inside or outside of NRC has a clear and complete picture of the full spectrum of activities in the transportation area and of the effectiveness with which they are being carried out.
- The divisions of responsibility and authority among NRC, DOT, DOE, and the Agreement States do not seem to be clearly defined or understood in all cases.
- He is not convinced that the NRC criterion for an Agreement State pays as much attention to transportation as it does to other things. He is not sure that some of the Agreement States are doing a job equal to what the NRC does in the Non-Agreement States.
- He believes that there may not be a need for two types of packages: NRC certified packages and DOT specification packages. Since the Subcommittee has not explored the economic and other factors associated with the elimination of DOT Specification packages, he does not believe that the Subcommittee should recommend elimination of these packages. However, he believes that it would be better if the DOT specification packages were brought under NRC cognizance.
- He believes that some of the issues that are not considered in the review process may become important due to changes in regulations or changes in the industry practice. The NRC Staff should start thinking about such issues, although it would take some imagination, and should not wait for an accident to tell them what those issues are.

Dr. Siess said that he will try to draft a report, based on the information obtained from the several Subcommittee meetings on the Transportation of Radioactive Materials. The report will include the Subcommittee's findings on the adequacy of the procedures being used by the TCB in certifying packages for transportation of radioactive materials. He plans to include also some other issues that came to light during the course of the review of the NRC package certification procedures, such as criteria for the receivers to check and report non-conformance. If other members of the Subcommittee and the consultants have any input to the report, they should give them to him in writing and he will try to factor them into the report. The draft report will be discussed at the next Subcommittee meeting and will then be submitted to the full Committee for consideration.

Mr. Cunningham suggested that it would be helpful if the Subcommittee wrote two separate reports; one on the adequacy of the TCB procedures in certifying transportation packages, and the other to include other issues that came to light during the course the Subcommittee's review.

Dr. Siess said that he will consider Mr. Cunningham's suggestion for writing two reports instead of one.

Mr. Bender reiterated that the Subcommittee consider including the following issues in its report:

- Criteria for the receivers for reporting non-conformance items.
- How much responsibility the user of the cask and the cask owner should have to assure that the cask is used safely and in accordance with the procedures.

With regard to the fracture toughness requirements being developed by the NRC Staff for casks, Mr. Bender commented that the NRC Staff should rethink whether cold environment is really an important factor in determining the fracture toughness requirements for materials if there is lot of heat left in the system and the system itself is going to keep the material at a higher temperature. He believes that considering such factors in developing the criterion will make it more realistic.

Dr. Siess thanked all participants and adjourned the meeting at 5:00 p.m.

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NOTE: Additional details can be obtained from the transcript located in the Public Document Room, 1717 H Street, N.W., Washington, D.C. 20555 or from Alderson Reporting, Inc., 400 Virginia Avenue, S.W. Washington, D.C. (202) 554-2345.

LIST OF DOCUMENTS SUBMITTED TO THE SUBCOMMITTEE AND ITS CONSULTANTS

1. SAND 81-1330C, TTC-0220, "The Nature of Transportation Accidents Involving Radioactive Material Packagings," E.L. Emerson and J. D. McClure, Sandia National Laboratories.

2. IAEA-SR-1015, "A Review of Five Years Accident Experience in the U.S.A. Involving Nuclear Transportation (1971-1975)," by A.W. Grella.

3. IAEA-SM-147/19, "Accident Experience with Type B Packaging in the United States of America," A.W. Grella.

4. Working Arrangements Between the DOT and NRC with respect to Inspection/Enforcement and Accident/Incident Investigation.

5. Summary of NRC Inspection-Enforcement Activities Relating to Transportation of Nuclear Wastes.

6. Experience in the NRC Program For Inspection and Enforcement of Nuclear Waste Transportation in the U.S.A, by A.W. Grella.

7. Transportation Activities, Procedure Number: 86740B, dated 4/1/80.

ATTACHMENT A

4/13/82

TENTATIVE PRESENTATION SCHEDULE

ACRS SUBCOMMITTEE MEETING ON
TRANSPORTATION OF RADIOACTIVE MATERIALS
APRIL 14, 1982
ROOM 1046
1717 H STREET, N.W.
WASHINGTON, D.C.

I.	Executive Session	8:30 - 8:45 am
II.	Introduction (Richard Cunningham)	8:45 - 9:00 am
III.	Transportation Accidents/Incidents - (Al Grella, I&E, Bethesda)	9:00 - 9:45 am
	A. DOT and NRC Reporting Systems	
	B. Summary of Transportation Accident/Incident Record	
IV.	NRC Inspection Program - (Al Grella, I&E, Bethesda)	9:45 - 10:45 am
	A. Background for Developing Inspection Program	
	B. Current Transportation Inspection Program	
	C. Enforcement Activities/Criteria	
	*** BREAK ***	10:45 - 11:00 am
V.	Transportation Inspections - (Paul Lovingdale, I&E, Region III)	11:00 - 12:00 pm
	A. Field Inspection Program	
	B. Inspection Procedures	
	C. Observations and Inspection Findings	
	*** LUNCH ***	12:00 - 1:00 pm

TENTATIVE PRESENTATION SCHEDULE

VI. Waste Shipments - (David Ebenhack, Chem-Nuclear Systems) 1:00 - 3:15 pm

A. Corporate Organization and Transportation Activities

B. QA Program

C. Package Types/Maintenance

D. Package Preparation/Training

E. Receipt Experience

F. Carrier Activities/Experience

*** BREAK *** 3:15 - 3:30 pm

VII. Spent Fuel Shipments - (Charles Johnson, Nuclear Assurance Corporation) 3:30 - 4:30 pm

A. Corporate Organization and Transportation Activities

B. QA Program

C. Package Types/Maintenance

D. Package Preparation/Training

E. Carrier Experience

VIII. Subcommittee Remarks 4:30 - 5:00 pm

*** ADJOURN *** 5:00 pm

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

- J. Davis
FL: Lunsford
cc FL

APR 07 1982

Mr. Lee M. Thomas
Associate Director for State and
Local Programs and Support
Federal Emergency Management Agency
Washington, D.C. 20472

Dear Mr. Thomas:

As you know, the movement of radioactive materials throughout the transportation network brings the general public into closer contact with the nuclear industry than does any other aspect of the industry. Thus, the public has a sensitive concern about any type of accident involving transportation of radioactive materials. Although no radiation injury is known to have resulted from any transportation accident involving millions of shipments over several decades, a coordinated response to such accidents is still needed because the risk of radiation injury cannot be completely eliminated. We believe that it would be advisable that FEMA place a high priority on expanding the National Radiological Emergency Preparedness/Response Plan to include a component for responding to Transportation Accidents Involving Radioactive Materials.

Portions of the existing National Radiological Emergency Preparedness/ Response Plan for Commercial Nuclear Power Plant Accidents (Master Plan) (45 FR 84910-84917) that discuss offsite response activities are applicable to transportation accidents. However, the Federal focus in a transportation accident should be targeted at assisting the States rather than managing the response to the accident.

The nonradiolcgical response characteristics of transportation accidents, e.g., extinguish fires, emergency first aid, and control traffic, are the clear responsibility of local and State governments and need not be addressed further in the Federal response plan. The radiological response characteristics should be considered in two phases--the emergency phase and the cleanup phase. The emergency phase is characterized by urgency and consists of determining whether radioactive material has been released and, if so, confining the spread of the material (erecting dikes, covering with tarpaulins, etc.). Once the material is confined, the cleanup phase can proceed at a deliberate pace. Management of both phases of the radiological problem are the responsibility of the State's emergency management agency and/or its radiological health agency.

We believe that the Federal role in a transportation accident involving radioactive materials is one of supporting the State where requested to do so. The Federal support may be in the form of assistance in (1) determining whether radiological material has been released, (2) determining the nature of the radiological hazard represented by the release, (3) monitoring the extent of the release, (4) recommending protective action, and (5) suggesting a cleanup strategy.

The NRC considers its role in a transportation accident involving NRC-licensed material to be one of monitoring the situation and, when requested, providing advice and assessments of radiological hazards based on information provided to us concerning the conditions at the accident site. If a serious situation involving NRC licensed material so warrants, NRC would activate its Operations Center (either regional or national, or both) and maintain awareness of ("monitor") the situation until any dispersed radioactivity is safety confined. NRC staff would be prepared to provide technical advice, and in particular could consult on packaging characteristics, provide recommendations on any other technical aspects of the situation, and interact with the licensee-shipper when appropriate.

The radiological monitoring and data evaluation capability of Federal agencies are coordinated by DOE under the Interagency Radiological Assistance Plan (soon to become the Federal Radiological Monitoring and Assessment Plan). This assignment has already been made by FEMA in response to the President's direction that FEMA "assure that DOE resources and capabilities for responding to radiological emergencies are made available and augmented as needed to service civilian related radiological emergencies." In situations involving NRC licensees, DOE will provide its assessments to NRC plus the primary State or local authority.

We shall be happy to participate in the development of a transportation component to the National Emergency Preparedness/Response Plan. In particular, we will be pleased to work with you and other agencies, which you belive should be involved, to develop more specific details of agency assignments.

Sincerely,

(Signed) William J. Dircks

William J. Dircks
Executive Director for Operations

cc: Mr. William A. Vaughan, DOE
Mr. Howard J. Dugoff, DOT

TABLE I

US RADIOACTIVE MATERIAL ACCIDENT/INCIDENT EXPERIENCE

(1971-1980)

TRANSPORTATION ACCIDENTS	101
HANDLING ACCIDENTS	125
REPORTED INCIDENTS, OTHER	554
TOTAL	750

THE 101 TRANSPORTATION ACCIDENTS LISTED IN TABLE I WERE CLASSIFIED BY TRANSPORTATION MODE AS SHOWN IN TABLE II.

TABLE II

RADIOACTIVE MATERIAL TRANSPORTATION ACCIDENTS BY MODE

TRANSPORT MODE	NUMBER OF ACCIDENTS	NUMBER OF PACKAGING FAILURES	
		STRONG & TIGHT*	TYPE A
AIR	7	--	3
RAIL	7	1	--
HIGHWAY	86	60	4
COURIER SERVICE	1	--	--
	101	61	7

*49 CFR 173.392 (LSA)

TABLE III

TRANSPORTATION ACCIDENT ANALYSIS SUMMARY

RAM PACKAGES INVOLVED IN ACCIDENTS	PACKAGE DESCRIPTION	DESCRIPTION OF EVENTS		DESCRIPTION OF MATERIAL RELEASED
PACKAGING FAILURES* (WITH RELEASE)	53 STRONG & TIGHT 5 TYPE A	9 RELEASE EVENTS	6 URBAN	• URANIUM CONCENTRATE • MONAZITE SAND • RAM NOS • RADIOPHARMACEUTICALS
			3 NON-URBAN	• URANIUM CONCENTRATE
PACKAGING FAILURES* (NO RELEASE)	8 STRONG & TIGHT 2 TYPE A			
PACKAGINGS IN ACCIDENT WITH NO FAILURES	761 STRONG & TIGHT 237 TYPE A 48 TYPE B			
TOTAL	1114 PACKAGES INVOLVED IN 101 ACCIDENTS			

*THE 68 PACKAGING FAILURES INVOLVED 58 PACKAGES WHICH RELEASED RADIOACTIVE MATERIAL.

TABLE IV

ACCIDENT/INCIDENT DATA BASE CHRONOLOGICAL SUMMARY

YEAR	ANNUAL NO. INCIDENTS	HMIR* INCIDENTS	OTHER** INCIDENTS	TRANSPORTATION ACCIDENTS	HANDLING ACCIDENTS	ANNUAL NO.*** RELEASE
1971	12	12	NA	5	0	7
1972	21	21	NA	1	2	5
1973	24	24	NA	0	11	7
1974	60	60	NA	5	16	10
1975	44	44	NA	5	23	8
1976	62	58	4	4	6	14
1977	113	97	16	10	15	17
1978	149	92	57	20	15	22
1979	171	120	51	30	24	23
1980	95	57	37	21	13	20
	750	585	165	101	125	133

*REPORTED EVENTS RECEIVED FROM HMIR SYSTEM, DOT.

**REPORTED EVENTS RECEIVED FROM NRC AND OTHER SOURCES.

***REPORTED EVENTS WHERE MATERIAL OR EXCESSIVE RADIATION WAS RELEASED (ALL CATEGORIES).

TABLE V

RAM TRANSPORTATION ACCIDENT SUMMARY

YEAR	TRANSPORTATION ACCIDENT TOTAL	TRANSPORTATION MODE				RELEASES
		RAIL	HIGHWAY	AIR	OTHER	
1971	5	1	4	0	0	1 RELEASE-1971-HWY
1972	1	0	1	0	0	
1973	0	0	0	0	0	
1974	5	1	4	0	0	
1975	5	0	5	0	0	
1976	4	0	4	0	0	
1977	10	1	9	0	0	1 RELEASE-1977-HWY
1978	20	0	19	1	0	1 RELEASE-1979-AIR
1979	30	2	24	4	0	1 RELEASE-1979-RAIL
1980	21	2	16	2	1	2 RELEASE-1979-HWY
				(COURIER)		1 RELEASE-1980-AIR
	101	7	86	7	1	9 RELEASE EVENTS

TABLE VI

RAM HANDLING ACCIDENT SUMMARY

YEAR	HANDLING ACCIDENT TOTAL	TRANSPORTATION MODE				RELEASES
		RAIL	HIGHWAY	AIR	OTHER	
1971	0	0	0	0	0	0
1972	2	0	0	2	0	1, AIR
1973	11	0	2	9	0	2, AIR
1974	16	0	1	15	0	2, AIR
1975	23	0	6	14	2, FREIGHT FORWARDER 1, MARINE	2, HWY 1, AIR 1, FRT FRD 1, MARINE
1976	6	0	2	4	0	1, HWY
1977	15	1	4	9	1, WAREHOUSE	3, HWY 1, RAIL 1, WAREHOUSE 2, AIR
1978	15	0	8	7	0	2, HWY
1979	24	0	9	14	1, COURIER	2, AIR 3, HWY
1980	13	0	8	5	0	1, AIR 2, HWY
	125	1	40	79	5	

TABLE VII

RAM HANDLING ACCIDENT ANALYSIS

PACKAGE DESCRIPTION	NO. FAIL	NO. RELEASE	TRANSPORTATION MODE (NO. OF EVENTS)		MATERIALS INVOLVED
STRONG AND TIGHT	9	8	HIGHWAY	4	RAM SMALL QUANTITY
			WATER	1	RAM NOS
			FREIGHT FORWARDER	1	URANIUM CONCENTRATE
			WAREHOUSE	1	RAM LSA
			RAIL	1	
TYPE A	65	33	AIR	10	RADIOPHARMACEUTICALS
			HIGHWAY	9	RAM LSA
					RAM NOS
					RADIOGRAPHY SOURCES

CAUSE FOR HANDLING ACCIDENT REPORT

DROPPED IN HANDLING	46
RUN OVER BY VEHICLE	27
FELL IN TRANSIT	24
EXTERNAL PUNCTURE	21
MISCELLANEOUS	7
	125

RADIOACTIVE MATERIALS BEING TRANSPORTED IN THE ACCIDENTS NOTED IN THE DATA BASE INCLUDE THE FOLLOWING:

NO.	MATERIAL
4	SPENT FUEL CASKS (2 W/SPENT FUEL, 2 EMPTY)
24	LOW LEVEL WASTE (RAM LSA)
14	RADIOPHARMACEUTICALS
22	RADIOGRAPHY OR OIL WELL LOGGING SOURCES
8	URANIUM CONCENTRATE
1	MONAZITE SAND
8	URANIUM HEXAFLUORIDE
1	TELETHERAPY SOURCE
19	RAM LSA OR RAM NOS

CONCERN EXPRESSED BY GOVERNORS (BURIAL SITES)ON JULY 10, 1979 JULY

- Disregard by Shippers for Existing Transport Rules
- Insufficient Inspection and Enforcement
- Lack of Corrective Measures

REQUESTS TO DOT AND NRC BY GOVERNORS OF NV. WASH, AND S.C. (JULY 10, 1979)

Submit Plan to Upgrade Inspection/Enforcement of Nuclear Waste Transport, Including:

- Dispatch of Inspectors to Burial Sites to Inspect Incoming Shipments
- Consistent, Vigorous Enforcement Actions on Violations
- Submittal of Periodic Reports to Governors Detailing Inspection Findings
- Issuance of Notices to all Waste Generators, Alerting them to New Efforts to Upgrade Compliance.

NRC ACTION PLAN TO UPGRADE TRANSPORT OF NUCLEAR WASTES BY ITS LICENSEES

- Adopt Regulatory Change to Impose and Enforce all DOT Shipper Requirements on NRC Licensees
- Issue Bulletins to all Waste Generators/Shippers Warning of Need to Upgrade their Waste Transport Programs
- Issue Information Notices to Inform/Educate Waste Generator/Shippers of Regulations
- Increase Inspection Program of Waste Generators/Shippers at Point of Origin
- Dispatch Inspectors to Burial Sites to Inspect Incoming Shipments
- Issue Guidelines for Enforcement of Violations and Adopt Aggressive Program for Penalties Against Violations

BULLETIN 79—19, AUGUST 10, 1979

Actions to be Taken by NRC Licensees

- Maintain Current Set of DOT/NRC Regulations
- Maintain Current Set of Waste Burial Facilities' Requirements
- Designate, in Writing, Persons Responsible for Waste Transport Program
- Provide Management-Approved Instructions as Procedures for Waste Transport
- Provide Training to Involved Persons
- Implement Ma. gement-Audit of Waste Transport Program and Perform Audit Within 60 Days
- Report to NRC in 45 Days Information on Volumes and Types of Waste Generated and Process Used to Solidify Liquid Wastes

NRC INSPECTIONS AT WASTE BURIAL SITES

(JULY 1979 – SEPT 1981)

	Number of Inspector-Days On-Site	Number of Shipments Inspected
Beatty, Nevada	196	325
Barnwell, S.C.	107	1011
Hanford, Wash.	379	836
Totals	682	2172

NRC INSPECTIONS AT WASTE GENERATOR FACILITIES (JULY 1979— SEPT 1981)

Power Reactors	159
RES REACTORS	13
Fuel Facilities	— 68
Materials Licensees	1964
outgoing waste shipments	604

NRC ENFORCEMENT POLICY

MARCH 9, 1982

10 CFR PART 2, 47 F.R. 9987

TRANSPORTATION BASE CIVIL PENALTIES

(FOR SEVERITY I VIOLATIONS)

	TYPE OF PACKAGE/SHIPMENT	
	HIGH LEVEL WASTE; SPENT FUEL; TYPE B	LOW SPECIFIC ACTIVITY TYPE A LIMITED QUANTITY
A. POWER REACTORS	$80,000	$5,000
B. TEST REACTORS	10,000	2,000
C. RES REACTORS/CRITICAL FACILITIES	5,000	1,000
D. FUEL FACILITIES	40,000	5,000
E. INDUSTRIAL USERS	5,000	2,000
F. WASTE DISPOSAL LICENSEES	6,000	3,000
G. ACADEMIC OR MEDICAL INSTITUTIONS	2,500	1,000
H. OTHER MATERIAL LICENSEES	2,500	1,000

NRC

ENFORCEMENT POLICY

MARCH 9, 1982

SUPPLEMENT V - SEVERITY CATEGORY TRANSPORTATION

SEVERITY I - VERY SIGNIFICANT VIOLATIONS OF NRC TRANSPORTATION REQUIREMENTS INVOLVING:

1. ANNUAL WHOLE BODY RADIATION EXPOSURE OF A MEMBER OF THE PUBLIC IN EXCESS OF 0.5 REMS, OR
2. BREACH OF PACKAGE INTEGRITY RESULTING IN SURFACE CONTAMINATION OR EXTERNAL RADIATION EXCEEDING 10 TIMES THE NRC LIMITS.

SEVERITY II - VERY SIGNIFICANT VIOLATIONS OF NRC TRANSPORTATION REQUIREMENTS INVOLVING:

1. BREACH OF PACKAGE INTEGRITY RESULTING IN SURFACE CONTAMINATION OR RADIATION LEVELS EXCEEDING NRC REQUIREMENTS;
2. SURFACE CONTAMINATION OR EXTERNAL RADIATION LEVELS EXCEEDING THREE TIMES NRC LIMITS, THAT DID NOT RESULT FROM A BREACH OF PACKAGE INTEGRITY; OR
3. FAILURE TO MAKE REQUIRED INITIAL NOTIFICATIONS ASSOCIATED WITH SEVERITY LEVEL I OR II VIOLATIONS.

SEVERITY III - SIGNIFICANT VIOLATIONS OF NRC TRANSPORTATION REQUIREMENTS INVOLVING:

1. BREACH OF PACKAGE INTEGRITY;
2. SURFACE CONTAMINATION OR EXTERNAL RADIATION LEVELS IN EXCESS OF, BUT LESS THAN A FACTOR OF THREE ABOVE NRC REQUIREMENTS, THAT DID NOT RESULT FROM A BREACH OF PACKAGE INTEGRITY;
3. ANY NONCOMPLIANCE WITH LABELLING, PLACARDING, SHIPPING PAPER, PACKAGING, LOADING OR OTHER REQUIREMENTS THAT COULD REASONABLY RESULT IN THE FOLLOWING:
   A. IMPROPER IDENTIFICATION OF THE TYPE, QUANTITY, OR FORM OF THE MATERIAL; OR
   B. FAILURE OF THE CARRIER OR RECIPIENT TO EXERCISE ADEQUATE CONTROLS; AND
   C. SUBSTANTIAL POTENTIAL FOR PERSONNEL EXPOSURE OR CONTAMINATION; OR IMPROPER TRANSFER OF MATERIAL; OR
   D. FAILURE TO MAKE REQUIRED INITIAL NOTIFICATION ASSOCIATED WITH SEVERITY LEVEL III VIOLATIONS.

SEVERITY IV - VIOLATIONS OF NRC TRANSPORTATION REQUIREMENTS INVOLVING:

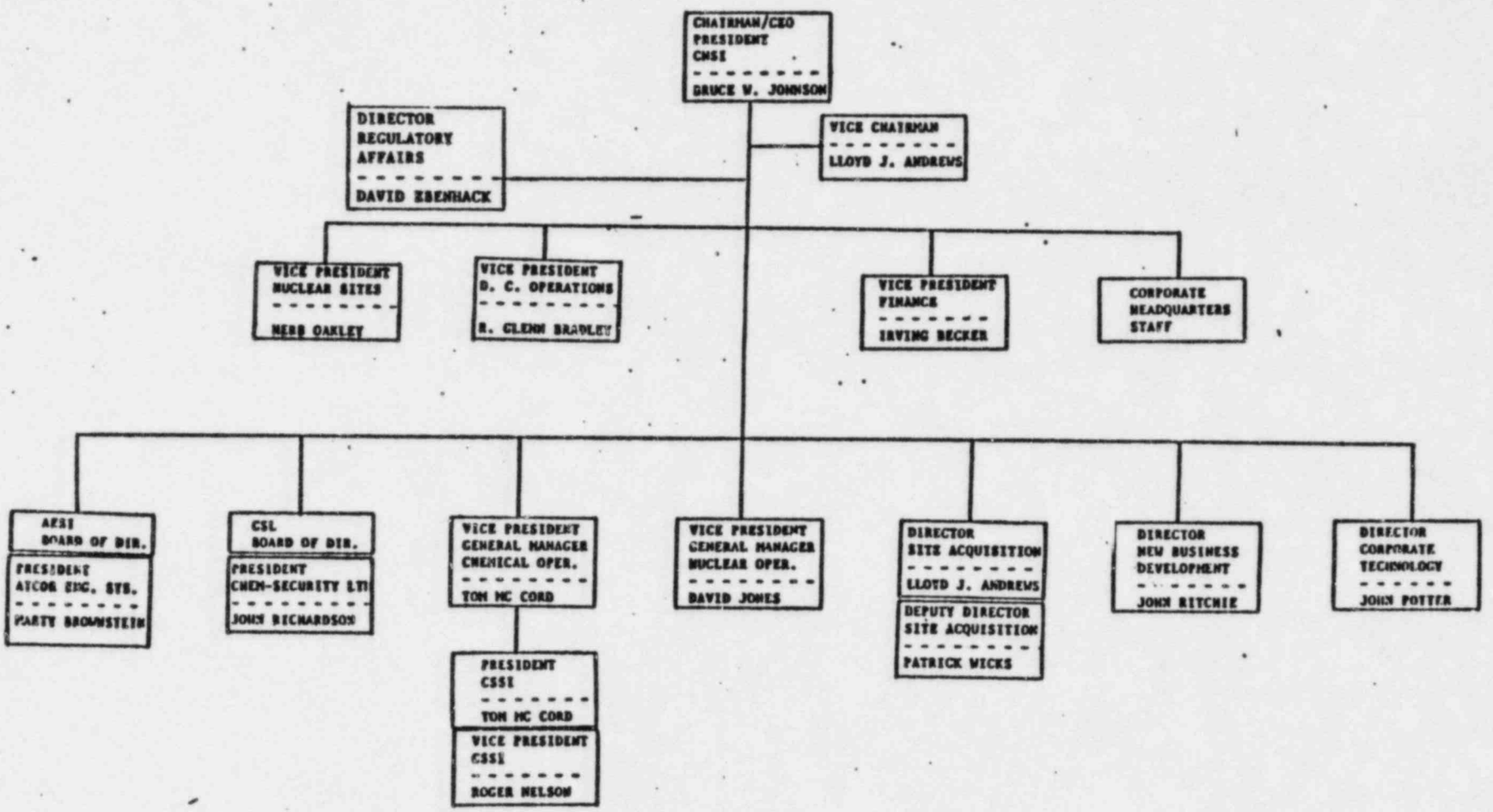
1. PACKAGE SELECTION OR PREPARATION REQUIREMENTS WHICH DO NOT RESULT IN A BREACH OF PACKAGE INTEGRITY OR SURFACE CONTAMINATION OR EXTERNAL RADIATION LEVELS IN EXCESS OF NRC REQUIREMENTS; OR
2. OTHER VIOLATIONS THAT HAVE MORE THAN MINOR SAFETY OR ENVIRONMENTAL SIGNIFICANCE.

SEVERITY V - VIOLATIONS THAT HAVE MINOR SAFETY OR ENVIRONMENTAL SIGNIFICANCE.

ESCALATED TRANSPORTATION ENFORCEMENT ACTIONS (CIVIL PENALTIES) COMPLETED BY NRC (JAN 1980-MAR 1981)

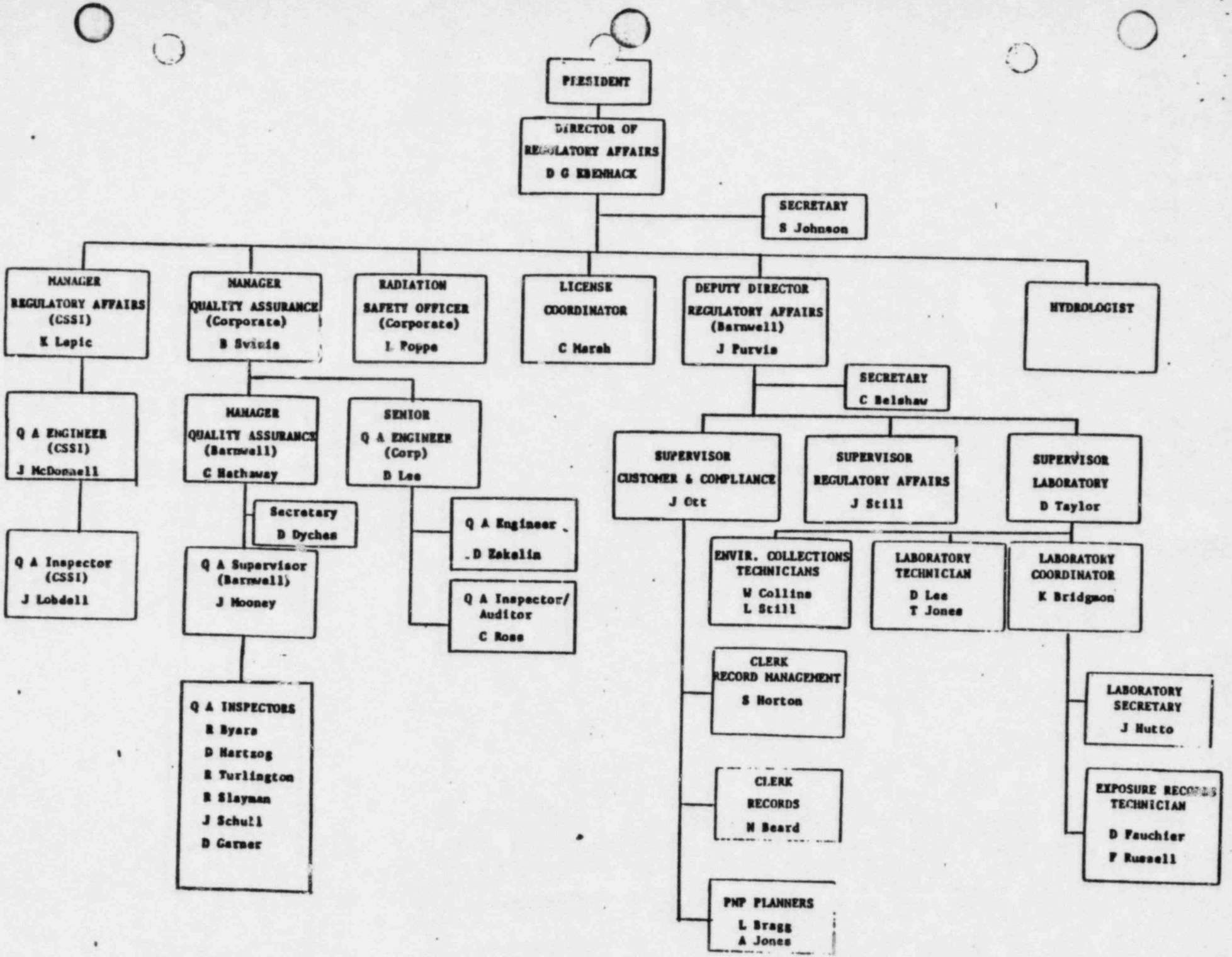
. 18 CASES (25 ITEMS)TOTALING	$68,500
. 8 OF 25 ITEMS INVOLVED EXCESSIVE RADIATION LEVELS	$30,000
. 5 OF 25 ITEMS INVOLVED FAILURE TO USE STRONG, TIGHT PACKAGES FOR LSA	$13,000
. 3 OF 25 ITEMS INVOLVED FAILURE TO SECURE PACKAGES TO PREVENT MOVEMENT	$ 5,000
. 9 OTHERS INVOLVED AN ASSORTMENT OF ITEMS	$20,500

Chem-Nuclear Corporation



ATTACHMENT D

D-1


PRESIDENT
DIRECTOR OF REGULATORY AFFAIRS
D G EBENHACK
SECRETARY
S Johnson
MANAGER REGULATORY AFFAIRS (CSSI)
K Lepic
MANAGER QUALITY ASSURANCE (Corporate)
B Svinia
RADIATION SAFETY OFFICER (Corporate)
L Poppe
LICENSE COORDINATOR
C Marsh
DEPUTY DIRECTOR REGULATORY AFFAIRS (Barnwell)
J Purvis
HYDROLOGIST
Q A ENGINEER (CSSI)
J McDonnell
Q A Inspector (CSSI)
J Lobdell
MANAGER QUALITY ASSURANCE (Barnwell)
C Hathaway
SENIOR Q A ENGINEER (Corp)
B Lee
Secretary
D Dyches
Q A Supervisor (Barnwell)
J Mooney
Q A INSPECTORS
R Byars
D Hartzog
R Turlington
R Slayman
J Schull
D Garner
Q A Engineer
D Ezkelin
Q A Inspector/ Auditor
C Ross
SECRETARY
C Belshaw
SUPERVISOR CUSTOMER & COMPLIANCE
J Ott
SUPERVISOR REGULATORY AFFAIRS
J Still
SUPERVISOR LABORATORY
D Taylor
ENVIR. COLLECTIONS TECHNICIANS
W Collins
L Still
LABORATORY TECHNICIAN
D Lee
T Jones
LABORATORY COORDINATOR
K Bridgmon
CLERK RECORD MANAGEMENT
S Horton
CLERK RECORDS
N Beard
PNP PLANNERS
L Bragg
A Jones
LABORATORY SECRETARY
J Hutto
EXPOSURE RECORDS TECHNICIAN
D Fauchier
F Russell

69 Permanent

1 Part-Time Permanent

COLUMBIA OFFICE

VICE PRESIDENT
NUCLEAR OPERATIONS
D. JONES

VICE PRESIDENT
L. B. HEBBARD

DIRECTOR, TRANSPORTATION
J. MASON

SECRETARY
M. FROST

REGIONAL SALES MANAGERS
D. BURROUGHS - SE
J. HARRISON - MW/W
P. SIGLER - NE

SECRETARY
S. NEILSON

OPERATIONS MANAGER
L. TONER

TRANSPORTATION CLERK
R. WILLIAMS

DISPATCHER SUPERVISOR
W. FAULKNER
L. FRIAR
W. GOUTHRO

DRIVERS

E. BUSSELS	R. BERRY
D. BYRD	K. BOYD
H. CAPELL	B. CRITTENDON
R. CHEEK	J. FLESHMAN
N. DUVALL	M. GAUGHAN
L. GIBSON	S. LAWSON
A. MC NAIR	L. LYNCH
M. NORTHCRAFT	J. ORROCK
A. ODOM	G. THOMAS
C. OWENS	C. BUSH
E. PINNEY	D. COX
L. THOMAS	C. CRENSHAW
J. TODD	S. HALTERMAN
D. TRIPP	R. LAUGHTER
G. TRIPP	W. ODOM
R. WARD	S. SEABROOKE
C. WEBB	E. THOMAS

MAINTENANCE MANAGER
B. FAUCHIER

MAINT. SUPV.
C. B. LENARD

OPEN

OPEN

MAINT./INVENTORY CONTROL
B. JOHNSON

PARTS CLERK
L. STILL

SITE DRIVER
B. JENNINGS

PAINTER/MECH. II
O. MC LEOD

MECHANIC II
J. CREECH
B. CROFT
B. MC DANIEL
P. MISKELLY

MECHANIC I
F. BODIFORD
H. DICKERSON

ADMINISTRATIVE MANAGER
N. SEELIG

TRANSPORTATION CLK.
D. DE FREEST
N. O'REAR
S. SANDERS
A. TROTTIE

OPERATIONS ANALYST
S. JOHNSON

WELDER II
W. CREECH

WELDER I
G. FRAZIER

WELDER
J. TOOLE

EQUIP. CONTROL MGR.
OPEN

SAFETY/TRAI MANAGER
OPEN

SAFETY SUPV.
C. DERMITT

EQUIPMENT INS
J. GREEN
J. WALL
W. WOOD

PM OILER
M. ANDERSON
R. BARDEN
T. BRADLEY

PM PERSON
A. CHAMPY - PART-TIME PERMANEN

Attachment 7
Page 1 of 1

TYPE A CASKS

CASK NUMBER	C OF C NUMBER	C OF C EXPIRATION DATE
CNS 6-75	USA/9108/A	6/30/83
CNS 6-80-1	Strong Tight Container	
CNS 6-80-2	USA/9111/A	7/31/83
CNS 6-101	USA/9105/A	3/31/83
CNS 7-100	USA/9080/A	5/31/83
CNS 12-180	Strong Tight Container Type A Quantities Only	
CNS 14-195L	Strong Tight Container Type A Quantities Only	
CNS 14-195H	USA/9094/A	3/31/85
CNS 14-220L	Strong Tight Container Type A Quantities Only	
CNS 14-220H	Strong Tight Container Type A Quantities Only	
CNS 15-160S	Strong Tight Container Type A Quantities Only	
CNS 18-450	USA/9122/A (This cask can only be used as a STC, because our cask does not match the license)	10/31/83
CNS 21-300	USA/9096/A	3/31/85
CNS 14-170 (HN 100 Series 2)	USA/9079/A	7/31/82

TYPE B CASKS

CASK NUMBER	C OF C NUMBER	C OF C EXPIRATION DATE
CNS 1-8	USA/9070/B	5/31/82 NuPac will renew
CNS 1-13G	USA/9044/B ( )	3/31/82 G. E. will renew
CNS 1-13C	USA/9081/B ( )	7/31/82
CNS 3-55	USA/5805/B ( )F	12/31/80 Extension 1/27/81 Response Due 5/3/82
CNS 4-45	USA/6375/B ( )F	11/30/81
CNS 4-85	USA/6244/B ( )	5/31/84
CNS 8-120	USA/6601/B ( )	12/21/84
CNS 14-190	USA/5026/B ( )	1/31/85
CNS 15-160B	USA/6144/B	1/31/85
CNS 1-13CII	USA/9152/B	In for licensing

CNS BTC-C	Bulk Shipment Only
CNS BTC-S	Strong Tight Container

Monitoring Point	1979	1980	1981
Vehicle Contamination	4.1%	1.0%	0.8%
Water in casks/containers	3.7%	0.8%	0.5%
Improper container/closure	1.1%	0.4%	0.3%
Improper bracing/loading	1.5%	0.6%	0.7%
Radiation levels> D.O.T. allows	0.2%	0.2%	0.2%
Improper/inadequate paperwork	0.9%	2.5%	0.9%
Improper/missing placards/labels	0.1%	1.5%	0.5%
Rejected shipments	1.3%	0.4%	0.1%
Total shipments received	2573	5877	4380

1979 covers the period June through December, only. No discrepancy recording occurred prior to this time.

MEMO

CHEM-NUCLEAR SYSTEMS, INC.

Date: April 7, 1982

To: David Ebenhack Location: Corporate

From: John Ott Location: Barnwell

Subject: INFORMATION FOR TRANSPORTATION PRESENTATION

Records of shipment discrepancies were promulgated in June, 1979. The records have been categorized into eight general categories for recording purposes. Each of the categories is discussed below with some pertinent comments written by each as to what areas are observed for the compilation of each category.

1. Contamination of vehicles requiring decontamination prior to release. Site imposed release limits are 10% of that allowed by D.O.T. Vehicles for unrestricted use are released with smearable contamination levels less than 22 dpm/100 cm^2 Alpha; less than 220 dpm/100 cm^2 Beta-Gamma and less than 0.1 mR/HR radiation level on contact with all exposed surfaces. Vehicles for exclusive use of radioactive materials are released with smearable contamination levels less than 220 dpm/100 cm^2 Alpha; less than 2200 dpm/100 cm^2 Beta-Gamma and less than 0.5 mR/HR on contact with all exposed surfaces.

2. Water in casks or containers - random inspections are conducted on containers to insure compliance with license conditions. Casks loaded in the rain or liners/drums with snow and ice frozen on them when placed in a cask will usually result in water in the cask cavity. This water must be removed and solidified before the unit can be used again.

3. Improper container/closure - may or may not be a leaking container but presents a "suspicious" appearance. Some containers may have holes but no leakage occurred.

4. Improper bracing or loading - D.O.T. requires bracing to prevent the load from shifting in transit. If a vehicle has no bracing and even if the load didn't shift, it is documented as a discrepancy. The site disposal criteria is quite specific on palletized drum loading, box loading and clearances, non-palletized drum loading. Any loading not IAW these criteria is a discrepancy. Casks require some shoring inside to alleviate excess movement of the container(s) inside. Lack of shoring or insufficient shoring is recorded whether or not a shift occurred.

D-7

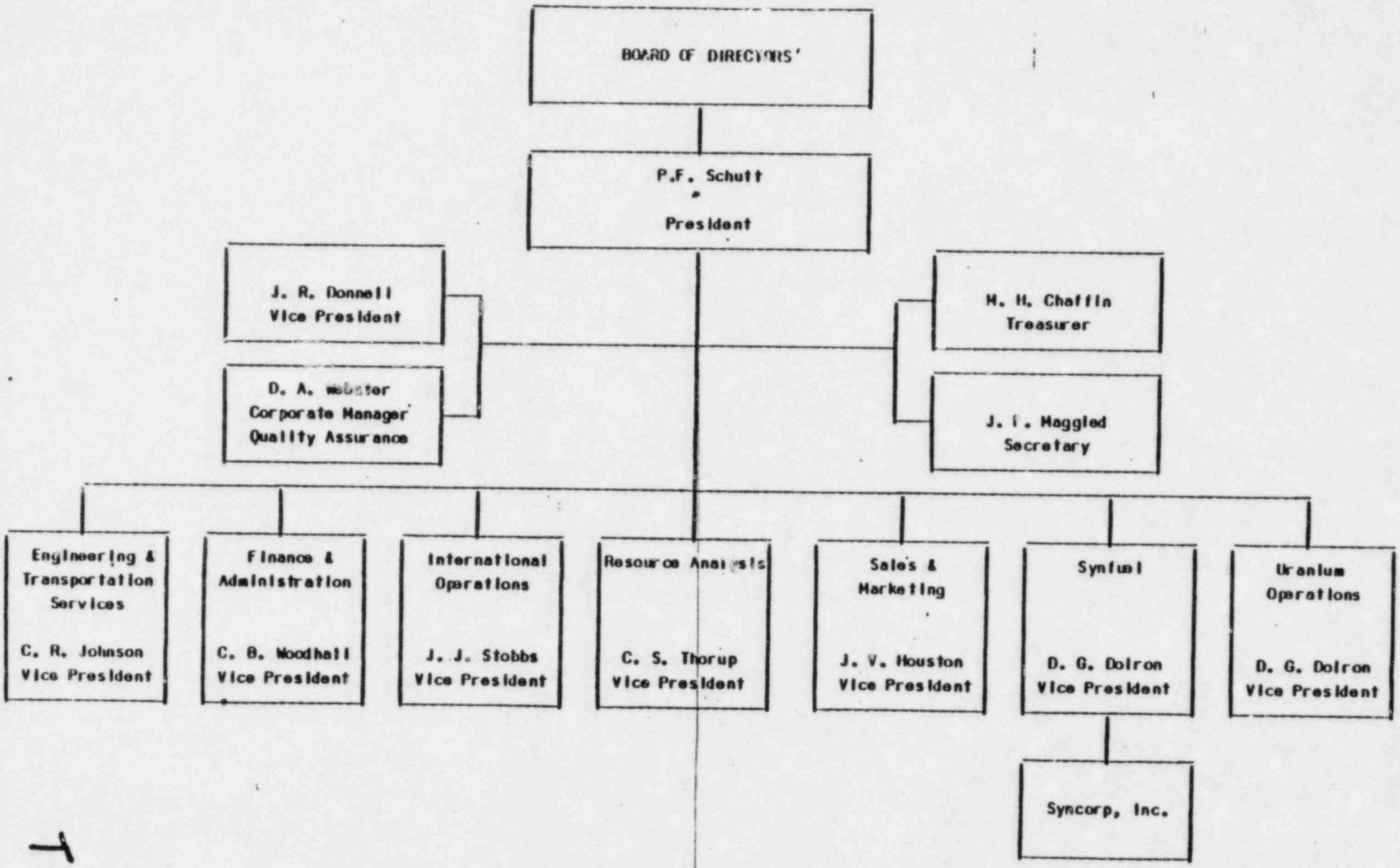
5. Vehicle radiation levels - D.O.T. states 200 mR/HR on contact with the vehicle, 10 mR/HR at six feet (2 meters), and 2 mR/HR in any normally occupied position of the tractor. The cab reading is taken against the backwall of the sleeper, if a sleeper is present, or against the backwall of a non-sleeper tractor. These positions are not normally occupied but treated as if they were. Private motor carriers (CNSI, HNDC) do not have to comply with the 2 mR/HR limit, however, it is written as a discrepancy if it is exceeded.

6. Improper/inadequate paperwork - several forms are required to accompany each RAM shipment. Several entries are redundant and inconsistencies in this area are recorded. Several certification statements are required to be signed and dated. Lack of a signature or date or greater than 48 hours elapses from the time the shipment was certified to the time the shipment was shipped is a recordable discrepancy.

7. Improper placards/missing placards/labels - vehicles are required by D.O.T. to be placarded visibly from four directions. Any missing, obliterated or faded placards are recorded. For LSA materials, the outside of the outside package must be stenciled or otherwise marked "Radioactive - LSA." Other containers may require a White I, Yellow II or Yellow III label. Lack of any labeling is recorded as a discrepancy.

8. Rejected shipments - CNSI does not reject a shipment if D.O.T. violations are recorded without first correcting the violations. Shipments may be rejected due to license restrictions, paperwork problems, lack of allocated space, etc. The U.S. government has a difficult time changing over to new requirements as they are imposed and will make up the majority of the rejected shipments. Some shipments have been refused because the specific activity of isotopes with a half life greater than five years in the shipment exceeds one microcurie per cubic centimeter and the filter media has not been stabilized by solidification or placed in an approved EnviroSAFE™ containers.

NUCLEAR ASSURANCE CORPORATION



T-14

ATTACHMENT E

QA PROGRAM GUIDANCE

- 10 CFR 71 APPENDIX E, "QUALITY ASSURANCE CRITERIA FOR SHIPPING PACKAGES FOR RADIOACTIVE MATERIAL" (42FR39364) (1977).

- DRAFT REG. GUIDE 7.XX, "ESTABLISHMENT OF A QUALITY ASSURANCE PROGRAM FOR SHIPPING PACKAGES FOR IRRADIATED FUEL, HIGH LEVEL WASTE, AND PLUTONIUM," MAY 15, 1978.

- DRAFT REG. GUIDE (FOR COMMENT) TASK TP-020-4, MARCH 1981, "ESTABLISHING QUALITY ASSURANCE PROGRAMS FOR PACKAGING USED IN TRANSPORT OF SPENT FUEL, HIGH LEVEL WASTE, AND PLUTONIUM."

- REG. GUIDE 7.9, REV. 1, 1980, "STANDARD FORMAT AND CONTENT OF PART 71 APPLICATIONS FOR APPROVAL OF PACKAGING OF TYPE B, LARGE QUANTITY, AND FISSILE RADIOACTIVE MATERIAL."

  SECTIONS 1-6 - TECHNICAL
  7 - OPERATING PROCEDURES
  8 - ACCEPTANCE TESTS AND MAINTENANCE PROGRAM

NAC CASK QA PROGRAM

1. QA PROGRAM IN ACCORDANCE WITH 10 CFR 71
2. NRC REVIEW AND APPROVAL
3. CASK MANUFACTURE IN ACCORDANCE WITH APPROVED PROCEDURES
4. THIRD PARTY OVERVIEW AND INSPECTION
5. NRC AUDIT OF MANUFACTURING RECORDS
6. OPERATIONS IN ACCORDANCE WITH APPROVED PROCEDURES
7. MAINTENANCE (QUARTERLY AND ANNUAL) SPECIFIED IN CERTIFICATE OF COMPLIANCE
8. AUDITS BY USERS - MANUFACTURING RECORDS AND MAINTENANCE RECORDS

NAC CASK FLEET

CASK	OWNER	STATUS
NAC-1C	NAC	INACTIVE
NAC-1D	NAC	ACTIVE
NAC-1E	NAC	INACTIVE
NL-1/2-1	NL INDUSTRIES	ACTIVE
NL-1/2-2	NL INDUSTRIES	ACTIVE
NL-1/2-3	NL INDUSTRIES	ACTIVE
NL-1/2-4	NL INDUSTRIES	ACTIVE
NL-1/2-5	NL INDUSTRIES	ACTIVE
NL 6502	NL INDUSTRIES	ACTIVE
NL-10/24-1	NL INDUSTRIES	INACTIVE
NL-10/24-2	NL INDUSTRIES	INACTIVE

MAINTENANCE NAC-1

- QUARTERLY
  - HYDROTEST O-RING TO 167 PSIG
  - HYDROTEST INNER CONTAINMENT TO 250 PSIG
  - INSPECT FOR DAMAGE

- ANNUAL
  - REPLACE VALVE SEAT AND SEALS
  - HYDROTEST TO 1,006 PSIG
  - TEST CAVITY RELIEF VALVE
  - REPLACE CAVITY RUPTURE DISK
  - REPLACE NEUTRON SHIELD TANK RUPTURE DISK
  - TEST NEUTRON SHIELD FOR BORON CONTENT
  - TEST IMPACT LIMITERS FOR LEAKAGE
  - INSPECT CASK FOR DAMAGE

MAINTENANCE NL-1/2

ANNUAL

- HYDROSTATIC TEST OF CAVITY - 220 PSIG
- HELIUM LEAK TEST CLOSURES
- HYDROSTATIC TEST OF NEUTRON SHIELD TANK TO 405 PSIG
- TEST NEUTRON SHIELD TANK PRESSURE RELIEF VALVE TO 200 PSIG
- TEST NEUTRON SHIELD BORON CONTENT
- INSPECT CASK FOR DAMAGE

PACKAGE PREPARATION

NAC-1

- HYDRO TEST SPECIFICALLY TO CHECK VALVES AND O-RING SEALS
- DRAIN AND ASSURE WATER REMOVAL BY VACUUM OR AIR TEST
- DECONTAMINATION - NORMALLY TO LESS THAN 2,200/DPM/100 cu^2
- RADIATION FIELD BELOW 200 MREM/HR ON CONTACT

NL-1/2

- AIR TEST AT 10 PSI - CHECK FOR LEAKS AT ALL VALVES AND O-RINGS
- EVACUATE AND BACKFILL WITH HELIUM IF THERMAL LOAD IS ABOVE 2 KW
- BACKFILL WITH 1 ATM. HELIUM IF THERMAL LOAD IS BELOW 2 KW
- DECONTAMINATE
- RADIATION FIELD CHECK

TRAINING

NAC PERSONNEL TRAINING

- REVIEW OF SAR
- REVIEW OF C OF C
- REVIEW OPERATING PROCEDURES
- ASSIST QUALIFIED OPERATOR IN TWO CASK HANDLING AND MAINTENANCE CAMPAIGNS

CASK USER TRAINING

- NAC QUALIFIED OPERATORS CONDUCT TRAINING PROGRAM FOR USER PERSONNEL - EXTENDED CAMPAIGN
- NAC PERSONNEL SUPERVISE USER PERSONNEL FOR SINGLE USE