

24th DOE/NRC NUCLEAR AIR CLEANING AND TREATMENT CONFERENCE

THE FIRST TWENTY YEARS OF THE ASME COMMITTEE ON NUCLEAR AIR AND GAS TREATMENT - A RETROSPECTIVE BY A FOUNDING MEMBER

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Abstract

Since the 1996 Winter Meeting of CONAGT was the twentieth anniversary of CONAGT a review of the Committee and its members seems in order.

This Paper will cover the background and formation of CONAGT as well as the history to date.

This history will include not only the basic accomplishments but some of the less successfully met goals and a look at some of the personalities involved in the Committee work. General future plans will be included.

The intent of the Paper is less a formal history than a personal recollection of the Committee and those who worked so hard to create the best possible Codes and Standards for the industry to use.

Introduction

The Committee On Nuclear Air and Gas Treatment (CONAGT) grew from a basic industry need. In the 1960s there was an unprecedented growth in building nuclear power plants. Since these were unique in history, there was no historical base of industry or governmental standards to use to build them. The only technical information was from the military programs that initiated the nuclear age. These were of considerable assistance but far from what was required for an industry that had to meet the twin needs of safety and profitability, while growing many fold. To meet this need in the area of gas treatment a group of technical experts met under the auspices of the American National Standards Institute (ANSI) Nuclear Technical Advisory Board (NTAB). The American Society of Mechanical Engineers was the direct sponsor of the effort. This group met in the early 1970s and produced the first editions of N509 "Nuclear Power Plant Air-Cleaning Units and Components" ¹ and N510 "Testing of Nuclear Air Treatment Systems" ². These two documents in their latest editions are still the most widely used Nuclear Air treatment System (NATS) standards in use. I was fortunate to have participated as a guest at some of these meetings.

Discussion

As productive as this first effort was there was one defect. The writing group was an ad hoc group that dissolved upon completion of the Standards. The need for revision and expansion of these milestone Standards had been recognized even before they were published. ASME was chosen to be the sponsoring society for an ongoing Code committee to be responsible for NATS equipment Codes and Standards. This effort was, at the time, to include noble gas delay carbon beds and hydrogen

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recombiners. The first meeting of the ASME "Committee on Nuclear Air and Gas Treatment" (CONAGT) was held at ASME Headquarters in New York on 26 February 1976. This meeting was organizational in nature and set the initial structure and membership for a permanent ASME Code Committee. The attendees at this meeting were largely those who had been on the ad hoc NTAB committee but a few of us were new comers. While a relatively brief meeting it was the critical first step in creation of what is now a maturing Code Committee recognized internationally. Minutes of this first meeting are reproduced as Appendix A along with our first organization chart.

Our second meeting was held on 6 May of 1976 where we continued to work on more detailed organizational matters. I find it interesting that organizational considerations have continued to be on the Committee's agenda throughout its life. Continued shifting of Subcommittee and Subgroup structure appears to be a life long effort. In the early 1980's we had a major restructuring of all our Subcommittees after special Executive Committee meetings and long Main Committee discussion. As we expand to include DOE facility needs our organizational structure is still evolving. This ability to adapt to both changing industry needs and our recognition of existing weakness in our internal organization for which we provide solutions is one of our greatest strengths.

It is very important to note that the initial mandate of CONAGT was limited to nuclear power plants, more specifically in practice, United States designed light water reactors. The presence of an NRC representative and the membership of the Committee at all levels reflects this as, much as it reinforces it. In retrospect it is perhaps well that we started with a limited scope so as not to be overwhelmed by our mission. However, this limitation has become a weakness we are just now starting to overcome. In our first two decades CONAGT had become too focused on USNRC Regulatory Guides 1.52 "Design, Testing and Maintenance Criteria for Atmospheric Cleanup System Air Filtration and Adsorption Units of Light-Water-Cooled Nuclear Power plants" ³ and 1.140 "Design, Testing and Maintenance Criteria for Normal Ventilation Exhaust System Filtration and Adsorption Units of Light-Water-Cooled Nuclear Power plants" ⁴. In recent years we have found that there is far more to Nuclear Air Treatment Systems than these two Regulatory Guides.

As a newcomer to Code and Standard writing I had a great deal to learn. Not the least of which was the time required to bring a consensus document to publication. I vividly recall talking to Jim Fish, our first Chairman, just after the decision was made to revise N510. I told him I saw no reason it should take more than six months. Five years later when the revision was published I had become much more knowledgeable about the process. Jim was kind enough not to remind me of my earlier comment.

Another early learning experience was when we were working on the Housing and Frame Leak Tests in N510. The Pressure Decay calculations seemed very simple and straight forward. They are, but the sensitivity of the calculated Leak rate to temperature was not recognized by most of us. Paul Estriech spent nearly a year educating the rest of the Subcommittee on this critical point. We held probably four meetings devoted to trying to avoid the limitations this sensitivity creates to a Leak Test. Unfortunately as the saying goes, "You can't fool Mother Nature" so we had to admit to the limitations and revise the testing limits and acceptance criteria. There has been continued refinement of Pressure Decay Leak Testing Procedures and Calculations through out the revisions of N510. The Code and Standards are better for this exercise and many of us who participated are wiser for it.

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Throughout our work we have had major success and as well as some failures, as is true in all endeavors. There are two efforts that did not result in success I would like to mention as they are of considerable personal interest to me.

In our original planning Boiling Water Reactor Off Gas Systems were included in our scope. Specifically the hydrogen/oxygen recombiners as "Safety" systems and the carbon delay beds as "Non-safety". A Subcommittee was formed to write the equipment and testing standards. Subgroups for Equipment and Testing worked for years on these tasks. Work went slowly since these groups of experts were starting from zero. There was nothing in existence to build on as N509 and N510 provided in NATS area. More importantly one of the Subcommittee members who was also a member of the Gas Processing Equipment Subgroup, and later the Subcommittee Chairman and Main Committee member, had a different agenda than we had thought. This individual had a specific goal. That was to see that there would not be any new requirements published for BWR Off Gas Systems. He worked for a major nuclear utility with two large BWR plants. By using the CONAGT rules he was able to block the efforts of the Subcommittee for enough years that the effort was dropped. I guess this individual's political expertise was proven valuable to him since he became a very young vice president of the utility.

Fortunately this original goal has recently been put back on track and work on a variety of gas processing systems is again well underway. This time the Subcommittee is under a strong leader and there is no obstacle to completion of the work.

One of the initial goals of the Testing Subcommittee (of which I was chairman for over a decade) was to publish a standard for Personnel Qualification. Dr. Melvin First was the Subgroup Chairman. We worked for years to develop technical requirements to compliment and expand on the existing time based experience requirements in ANSI N45.2.6 "Qualifications of Inspection, Examination, and Testing Personnel for Nuclear Power Plants" ⁵ and ANS 3.1 "Selection, Qualification and Training of Personnel for Nuclear Power Plants" ⁶. These documents specify periods of time necessary to be qualified at various levels for testing but do not specify what the technical experience must be during these periods. This has allowed some organizations to qualify personnel who know all the bureaucratic requirements but none of the technical requirements. The Testing Subcommittee, with the Main Committee's initial endorsement, wrote a draft of a Personnel Qualification Standard to provide technical guidance for the specific types of education and experience required to test NATS. After the draft was developed by the Subcommittee it was submitted to the Main Committee. Many of the utility members objected to any additional training requirements at all. Over a period of a year or more the Subcommittee met with many utility representatives at two special meetings hosted by the utilities. We wrote and rewrote the draft in accordance with the utilities requests until it became obvious that no additional training requirements would ever be accepted. The final draft of this standard was published for the record as "Proposed Appendix to ANSI/ASME N510-1986" ⁷ in the Proceedings of the 20th Air Cleaning Conference in 1988. I still believe it is a very valuable document and should be used for guidance in planning a training and certification program for testing to N 510. At least on DOE facility has done so, that I know of.

I could say that CONAGT's greatest accomplishment is that after twenty years we are alive and still growing. Certainly this is a major achievement, but that we have established the ASME "Code AG-1, Code On Nuclear Air and Gas Treatment" ⁸ is indeed our major accomplishment. There are too many success stories to try to relate them all. In fact there are so many I am not qualified to do so. I will

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mention a few that I find significant. Not all are official CONAGT activities. Some are simply the result of the extraordinary efforts of CONAGT's members.

In the early 80s many CONAGT members recognized that there were serious deficiencies in the radioiodine testing of carbon used in nuclear power plants. All currently operating power plants then and now require, through their license, testing of the carbon used in the plant NATS. This testing is required for new carbon and periodically for in service carbon. The results from the commercial testing laboratories appeared to vary much more than made sense to the experts in the field. At that time these tests were performed to an old government standard that had not been subject to consensus peer review. The testing Subcommittee arranged for a series of round robin tests with all the laboratories performing this testing in the U.S. and a number of international facilities. Again Dr. First again took the lead in this special effort. Used carbon was provided by the NRC. When the results were received and analyzed they were found to vary up to three orders of magnitude for the same sample and set of test parameters. Clearly a serious problem existed. The NRC used the CONAGT results as the basis for a major program to improve the accuracy of required radioiodine efficiency testing. A number of meetings of technical experts were hosted by the NRC to determine why the results varied so much and how to improve the situation. The Idaho National Engineering Laboratory was contracted to hold additional round robin tests and suggest how to improve the test protocol and instrumentation. The results of this multi year effort include ASTM a new radioiodine test standard D3803-89 "Standard Test Method for Nuclear-Grade Activated Carbon" ⁹, an excellent INEL report on the technical background of this test (INEL EGG-CS-7653, "Final Technical Evaluation Report for the Nuclear Regulatory Commission/Idaho National Engineering Laboratory Activated Carbon Testing Program" ¹⁰) and NRC recommended laboratories. Given the sensitivity of this type of test, research and improvements still continue but the CONAGT testing Subcommittee round robin is the basis for today's vastly improved radioiodine efficiency test results.

For many years those of us who have enjoyed and benefited from these Air Cleaning Conferences had discussed an industry organization on Nuclear Air Treatment Technology. In the late 1980s a group of us from CONAGT took the step of incorporating a non-profit organization to bring this idea to reality. The "International Society of Nuclear Air Treatment Technologies" (ISNATT) was formed. As you see at this Conference ISNATT is a cosponsor of the Conference, has a commercial exhibit and Professional Development courses. While not an official development of CONAGT it certainly exists due to the efforts of CONAGT members and their dedication.

Based on technical inquiries about N509 and N510, CONAGT decided to hold two public meetings to learn what the users of these documents thought of them, learn where there were weaknesses and how to improve them. These were exceptionally valuable exercises. From them grew the idea of "short courses" where CONAGT members could both teach the attendees about the CONAGT documents and obtain user input to improve them. A number of these Professional Development courses have been held under the auspices of ASME and are now offered by ISNATT. The scope of the courses and seminars has broadened from N509 and N510 to include AG-1 and DOE facility cleanup subject matter.

These accomplishments are not the only ones CONAGT has provided the industry but are significant to me in that they are beyond the scope of simply writing codes and Standards.

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Summary

AG-1 is CONAGT's major achievement. It has greatly extended the scope of equipment covered by N509, it has significantly improved the depth of coverage of the equipment included and is in the process of a major expansion to include DOE facility needs. During our twenty years of existence there has been nearly 100% turnover of Committee personnel but CONAGT remains as strong or stronger as ever. The structure and composition of the various levels of committees continues to evolve to meet ever changing industry needs and technological advances.

CONAGT will provide support Nuclear Air Treatment and Gas Processing Systems for the worlds nuclear industry for the next millennia as well as it has for the one now ending.

In closing I want to say what an honor and delight it has been to work on this Committee and to be associated with such excellent people for the past twenty years.

Dedication

I would like to dedicate this paper to the memory of three founding members who contributed so greatly to our success; Jim Fish, Cliff Burchsted and Paul Estriech

References

1. "Nuclear Power Plant Air-Cleaning Units and Components, N509", 1976, 1980 , 1989, ASME, 345 East 47th Street, New York, NY, 10017
2. "Testing of Nuclear Air Treatment Systems, N510", 1975, 1980, 1989, ASME. 345 East 47th Street, New York, NY 10017
3. USNRC, Regulatory Guide 1.52, "Design, Testing and Maintenance Criteria for Atmosphere Cleanup System Air Filtration and Adsorption Units of Light-Water-Cooled Nuclear Power Plants", 1978
4. USNRC, Regulatory Guide 1.140, "Design, Testing and Maintenance Criteria for Normal Ventilation Exhaust System Air Filtration and Adsorption Units of Light-Water-Cooled Nuclear Power Plants", 1979
5. N45.2.6, "Qualifications of Inspection, Examination, and Testing Personnel for Nuclear Power Plants", 1978, ASME, 345 East 47th Street, New York, NY 10017
6. ANS 3.1, "Selection, Qualification and Training of Personnel for Nuclear Power Plants", 1981, American Nuclear Society, 555 North Kensington Avenue, La Grange, IL 60525

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7. USDOE, CONAGT, "Proposed Appendix to ANSI/ASME N510-1986", 20th Conference, CONF880822, 1989
8. ASME, CONAGT, AG-1, "Code On Nuclear Air and Gas Treatment", 1994
9. ASTM D3803-89 "Standard Test Method for Nuclear-Grade Activated Carbon", 1989, American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959
10. EGG-CS-7653, "Final Technical Evaluation Report for the Nuclear Regulatory Commission/Idaho National Engineering Laboratory Activated Carbon Testing Program", April 1987,

APPENDIX A

Attached are a reproduction of the minutes of the meeting that created CONAGT along with our first draft organization chart. My thanks to ASME and Mr. William Miller for permission to reproduce this document.

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SARGENT & LUNDY
ENGINEERS
CHICAGO

Subject:
Notes of Meeting of
ASHE Ad Hoc Task Group
On Organization of the Committee
on Air and Gas Treatment Equipment
Held in New York at United Engineering Center
On February 26, 1976

THOSE PRESENT:

G. Beasley	)	Tennessee Valley Authority
C. Burchsted	)	Oak Ridge National Laboratory
P. Estrieck	)	EBASCO
J. Fish	)	American Air Filter
J. Jacobson	)	Nuclear Consulting Services
A. Silverman	)	United Engineers
H. Smith	)	Duke Power
C. Thompon	)	Bechtel-Gaithersburg
W. Woollacott	)	ASME STAFF
W. Miller	)	Sargent & Lundy

Purpose

This was an organizational meeting for creation of a new ASME committee to oversee preparation of codes for air and gas treatment equipment. The stated meeting objectives were as follows:

1. Review previous scope of ANSI N-45.8.
2. Prepare scope for new committee.
3. Prepare outline of activities.
4. Review potential membership.
5. Develop working organization.

Background

ASME is reorganizing the former ANSI N-45 effort into ASME Committees under the "Accredited Organization Method" for preparing American

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National Standards. One of the parts of this reorganization is to convert the N-45.8 effort* into the ASME Committee on Nuclear Gas Treatment Equipment.

Meeting Report

As a prelude to the meeting, Mr. W. Woollacott explained that ASME now has approved procedures to develop standards that will be recognized by ANSI. The new committee on Air and Gas Treatment Equipment (AGTE) must prepare and submit a scope statement to ANSI for distribution to public and other societies to identify any potential scope infringements. Representatives of ASHRAE, IEEE, ANS and NRC will be invited to join the committee.

The new standards should be written like codes ("shalls" not "shoulds") and be unified into a single book with many chapters, as opposed to "white paper" issue. The addenda issue basis should be used. Only mandatory requirements should be contained in body of the standard with non-mandatory sections referenced as appendicies.

A long discussion ensued on the scope of this endeavor. It was generally agreed that the standard should cover only equipment for nuclear power generating stations. As to what constitutes air and gas treatment equipment, the task group decided to include offgas equipment, post LOCA hydrogen mixing fans and blowers, recombiners, and the full contingent of HVAC equipment. While the primary concern of the Standard should be safety related equipment, the overall objective should be to define and possibly upgrade the quality and reliability of all equipment associated with the power generation objective.

The task group unanimously approved the following scope and title for the committee:

Title: Committee on Air and Gas Treatment Equipment

Scope: TO DEVELOP, REVIEW, MAINTAIN AND COORDINATE CODES AND STANDARDS FOR DESIGN, FABRICATION, INSTALLATION, TESTING, AND INSPECTION OF EQUIPMENT FOR GAS TREATMENT FOR NUCLEAR POWER PLANTS. AS USED HEREIN "GAS TREATMENT" INCLUDES BOTH HVAC AND GAS PROCESSING

* Prepared ANSI 510-1975, Standard for Testing of Nuclear Air Cleaning Systems

ANSI 509-T, Standard for Nuclear Power Plant Air Cleaning Units and Components

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- a) HVAC - the moving and conditioning of air which is supplied, exhausted, or recirculated into or from enclosed spaces to maintain prescribed ambient conditions. Conditions include pressure, temperature, humidity, and contaminant.
- b) Gas Processing - transport of gas and separation, isolation, and disposal of its constituents by physical, mechanical, chemical, delay, electrical and thermodynamic means.

The task group attempted to develop a list which may not be all inclusive of equipment standards as follows:

Conveying & Transport

Fans
Dampers
Ducts (incl. Hangers & Supports)
Compressors
Blowers
Pumps
Vessels
Pipes
Housings

Processing

Recombiners
Heaters
Coils
Filters
Humidifiers
Moisture Separator
Adsorber
Refrigeration Units

Mr. W. Woollacott explained that tentatively the committee should consist of approximately 30 members. Representatives of utilities, constructors, A/E's, manufacturers, societies, regulatory agencies should be included. No more than 33% of total committee membership may be from any single group. The tentative committee membership was read and commented on. Mr. Woollacott will forward solicitations for committee membership in the near future.

The first committee meeting will be held on April 22, 1976, at ASME Headquarters in New York. Members of task group were asked to forward their ideas on organization of working groups to Mr. Woollacott by March 15, 1976. An executive committee, which performs administrative and staff functions must be elected at the first meeting. Future committee meetings would be held quarterly.

The Ad Hoc Task Group was unanimously disbanded, its function fulfilled.

Side Notes

1. ORNL NSIC-65 will be published and available in May 1976.

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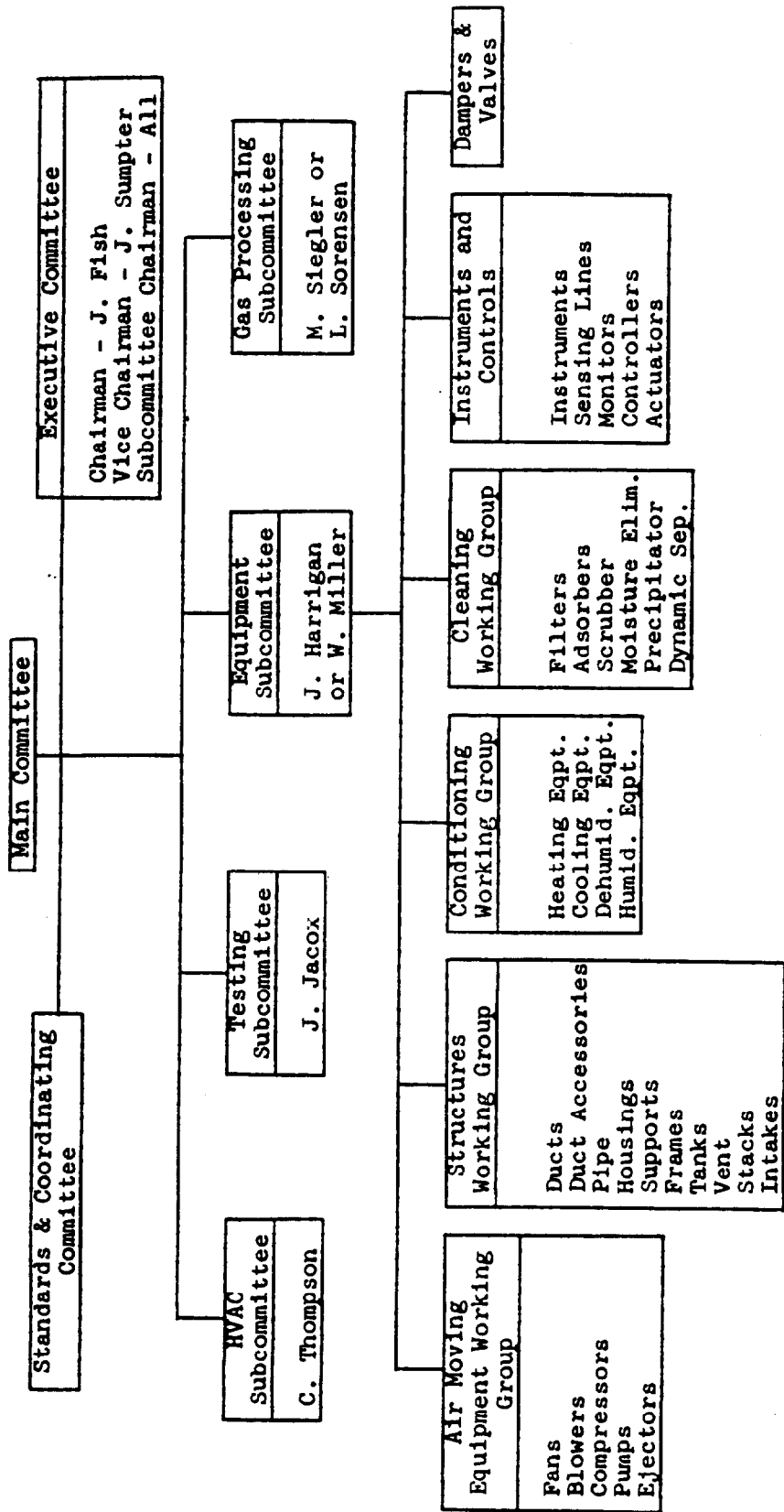
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2. Regulatory Guide 1.52 Rev. 1 will be subject of a closed ACRS meeting on March 2, 1976. Formal issue expected shortly thereafter.
3. ERDA has budgeted \$35,000,000 to initiate a waste handling and disposal management program at Oak Ridge, Tennessee. Initially ten people will be involved to study and acquire 10 sites suitable for disposing of radioactive waste.
4. Mr. C. Zitek (CECo), executive director of ANSI N-18 wanted to have ANSI N-509 balloted. This is being resisted.

W. H. Miller, Jr.

AIR AND GAS TREATMENT COMMITTEE PLAN OF ORGANIZATION*



*Names of Subcommittee Chairmen are ASME nominations and are subject to the respective member's management approval.