SESSION 8

PANEL SESSION: GAS PROCESSING

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Co-Chairmen:	J. L. Kovach
	J. Jacox
Panel Members:	J. R. Kriskovich
	T. M. Punch
	R. F. Vance

OPENING COMMENTS OF SESSION CO-CHAIRMAN KOVACH

The panel title is Gas Processing. Gas processing primarily takes place at DOE sites, rather than in power reactors, at least as far as safety related systems are concerned. One of the reasons we decided to have a panel session on this topic is to discuss some of the problems and differences in air and gas treatment systems as they are applied to nuclear processing facilities versus conventional HVAC-type facilities. Conventional facilities are fairly well standardized, although not in a manner to make them user friendly for many applications.

GAS PROCESSING IN THE NUCLEAR INDUSTRY 8-1

J.L.Kovach
NUCON International Inc.

The American Society of Mechanical Engineers (ASME) maintains the Committee on Nuclear Air and Gas Treatment (CONAGT) which developed the AG-1 Code (1). CONAGT also maintains the ASME N509 (2) and ASME N510 (3) Standards, relating to the construction and testing of nuclear air cleaning systems. The AG-1 Code sections and the above standards were developed for the safety related air cleaning and treatment systems of nuclear power reactors. In the past, the criteria for "safety related" were generally established on the basis of the US Nuclear Regulatory Commission (NRC) guidelines. However, there are major nuclear engineering projects which do not fall under the purview of the NRC and are based mainly at US Department of Energy facilities. Additionally, the nuclear fuel cycle's gas processing activity is broader than that for power reactors, and particularly outside the USA, it also includes fuel reprocessing also. At the present time, the currently written sections of the AG-1 Code cover mainly HVAC and low pressure air cleaning activities.

The USDOE only recently established a DOE standard for the "Evaluation Guidelines for Accident Analysis and Safety Structures, Systems, and Components." (4) The evaluation guidelines established by the USDOE are somewhat different from the USNRC criteria for safety related items. This divergence also causes problems in strictly applying the AG-1 Code sections for other than NRC (or similar agency) regulated power reactor sites.

The USDOE classification for Safety Class Structures, Systems, and Components (SCSSCs) and Safety Significant Structures, Systems, and Components (SSSSCs) has a different definition both in accident levels and worker safety protection than the conventional USNRC criteria, the former being much broader than those established by the USNRC.

Thus two major problems face the applicability or expendability of the ASME AG-1 Code to areas where the major design and construction activity is taking place. One is the clarification of the appropriate applicability of the safety classification, the other is the current narrow scope of the component sections of the AG-1 and the specificity of the N509 and N510 standards to power reactor NRC dictated systems. At the same time the USDOE has endorsed the use of the two standards and is considering the endorsement of the AG-1 Code for applicability to USDOE sites.

The solution to the safety classification problem is more administrative than an engineering issue, and probably the ASME Board of Nuclear Codes and Standards needs to act for resolution of the issue. However, the current disharmony between existing standards and the lack of component sections specific to areas other than power reactors, in the AG-1, is an extensive and time consuming engineering problem.

At the same time, there are numerous military application uses of air treatment and gas processing, particularly in chemical agent demobilization, where some sections of the existing nuclear codes and standards are used. However, the existing codes and standards do not exactly match the nuclear power air cleaning applications either. At some point it will be important both from an availability and cost standpoint to use common consensus standards, rather than customizing for each specific application. Thus the possibility of including other than nuclear safety related structures, systems and components also needs to be considered.

The typical non-power reactor nuclear application, as an example, include air cleaning systems for the Tank Waste Remediation Systems (TWRS) project, which relate to the treatment of both non-standard air filtration systems and components which are not defined in any of the code sections.

Typically, the power reactor safety grade use would occur only for limited periods, i.e. after an accident, while for waste processing application air and gas cleaning, the design life has to be years under high input load conditions. Continuously operating systems, mainly installed for worker protection in the nuclear power reactor industry are not considered safety grade.

Typical differences in air and gas composition in USDOE applications are:

1) The presence of ammonia, hydrogen, and nitrogen oxides.

2) The possibility of supersaturated corrosive environments.

3) The normal presence of alpha, beta and gamma activity.

4) The potential presence of Transuranic isotopes.

5) Intrusive activity in the stored waste, generating high particulate loadings.

6) Intrusive activity potentially generating high liquid droplet levels.

7) Elevated temperature operation (from melters).

8) The potentially very high levels of nitric oxides from the decomposing nitrate salts from the melters.

9) The presence of radioactive nuclides other than iodine. (Ru, Tc, etc.)

10) Extensive condensation in the process of air cleaning

Typical components for DOE processing applications that are currently not covered in AG-1 code sections:

Scrubbers
Metallic media filters
Irrigated filters
Incineratable filters
Adsorbents for volatile isotopes
Adsorbents for mercury
Nitrogen oxide reduction catalysts
Nonflammable adsorbents
Cooling and heating components in the operating temperature ranges.
In-place regenerable adsorbents
Other than slab (Type II) or in-place fillable (Type III) adsorbers.
Instrumentation for specific processing conditions (larger number of remote readout and control).
Thermal and chemical resistance of components (gaskets, seals, damper seals, etc.) beyond the power reactor accident conditions.

Typical systems currently not considered by N-509 and N-510 standards.

Remote handling ability for component changes.
Personnel protection for alpha contaminated components.
The continuous manner of system operation.
Maintainability of highly contaminated systems.
Thermal fatigue of system and components.
Corrosion resistance of systems and components.
Instrumentation for other than HVAC type operation.
In-place testability of highly contaminated systems.
Decontamination and final disposal of components and systems.

The above tabulations are examples and can not be considered all inclusive. There are probably numerous others that need to be considered both for the applicability of the existing codes and standards and for any possible future standardization work.

One of the major problems, even in the nuclear power related standard and code writing effort, was the simultaneous development of the standards and codes and the actual design and construction of the components. This resulted in the installation of many systems which do not meet the current standards and codes either for the actual design criteria or the testability requirements, because the testing standards were developed tied to specific design requirements. At the same time, it is often claimed, that a particular system can not be tested according to a specific test conditions, while the truth is that it can be tested, but it would fail the originally presumed acceptance criteria.

Many of the processes in the DOE field of air and gas cleaning application are already in the conceptual stage and if the standardization process is going to be applied to them, it is imperative that the standard writing activity starts immediately for the currently expected components (many of which are available currently in commercial grade).

The design and standardization of systems is a much more complicated problem, because the total number of systems in many cases, but not always, will be limited, therefore the effort of standard writing has to be commensurate with the need. This is an area, where more generic "guides" rather than cast-in-stone codes or standards are required.

Regardless of the methodology used, participation from the organizations involved in the conceptual and detail design of the systems and the manufacturers of the currently "commercial" grade systems or components is very important, otherwise the writing of standards and codes will not include all of those who are intimately familiar with the specific requirements of the new applications.

Conclusions and Recommendations.

It would be desirable that the ASME Board of Nuclear Codes and Standards review the problems of the application of the AG-1 code for non-power reactor conditions and advise CONAGT of direction. It is also desirable that the USDOE reviews the AG-1 Code and the N509 and N510 Standards for the problems of applicability to different uses as an example the TWRS.

It is also worthwhile to establish whether a specific nuclear power reactor air and gas processing code and standard is needed and affordable, or the potential preparation of a broader code and standard which could include military, biohazard, pharmaceutical, etc. applications should replace the existing highly specific code sections and standards.

References.

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American Society of Mechanical Engineers.

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ASME N509-1989

3. Testing of Nuclear Air-Cleaning Systems.
ASME N510-1989 with errata.

4. Evaluation Guidelines for Accident Analysis and Safety Structures, Systems, and Components. DOE Standard DOE-STD-3005-YR, proposed.

APPLICATION OF NUCLEAR AIR CLEANING AND TREATMENT CODES

James R. Kriskovich
Westinghouse Hanford Company
Richland, Washington

ABSTRACT

All modifications to existing ventilation systems, as well as any new ventilation systems used on the Hanford Site are required to meet both American Society of Mechanical Engineers (ASME) codes N509 and N510. Difficulties encountered when applying code N509 at the Hanford Site include the composition of the ventilation air stream and requirements related to ventilation equipment procurement. Also, the existing ventilation systems for the waste tanks at the Hanford Site cannot be tested in accordance with code N510 because of the current configuration of these systems.

I. INTRODUCTION

The Hanford Site is a 1,424-km^2 (550-mi^2) Department of Energy Environmental clean-up site. The site originally was constructed in the early 1940's and it continued operation throughout the cold war. The Hanford Site's mission was to produce nuclear materials for the war effort. In the process, millions of liters of liquid waste products were generated. The highly radioactive wastes were pumped into underground tanks. These tanks were to be used as temporary storage. However, to this day the waste remains. There are currently a total of 177 underground waste storage tanks in the Tank Farms on the Hanford Site. They consist of 149 Single Shell Tanks (SSTs) and 28 Double Shell Tanks (DSTs), ranging in size between 208,000 L (55,000 gal) to 4,390,000 L (1,160,000 gal) on the Hanford Site.

As the cold war ended, the Hanford Site's mission changed from producing nuclear material to environmental restoration. The center of this effort includes the waste stored in the 177 waste tanks. To ensure the safety of facility workers as well as the offsite population, the waste in the tanks is continuously monitored. This includes monitoring the liquid level, temperature, and pressure to ensure these parameters remain within prescribed limits. To help maintain the waste (as well as the tanks) within these limits, some of the tanks are actively or force ventilated.

To date, all 28 DSTs are actively ventilated as are 18 of the 149 SSTs. A typical ventilation system for these tanks consists of duct work coming from the top of the tank, which then enters a ventilation train. In this typical system, the ventilation train consists of a de-entrainer, a heater, a pre-filter, 2 stages of HEPA filtration, a centrifugal fan, an exhaust stack, and a stack sampler. Two of the main reasons for actively ventilating these tanks are to maintain confinement (i.e., negative pressure with respect to atmosphere) and to help cool the waste.

The remaining 131 SSTs that are not actively ventilated are passively ventilated. A typical passive ventilation system consists of a HEPA filter in a filter housing connected to the top of the tank by a riser made from commercial pipe. Rather than having forced ventilation through the tank, as in the case of the tanks that are actively ventilated, the tank breathes through the HEPA filter because of changes in atmospheric pressure.

All modifications to the systems mentioned above, as well as any new ventilation systems designed and fabricated for use at the Hanford Site, are required by the Department of Energy (DOE 1989 and DOE-RL 1989) to meet ASME code N509, *Nuclear Power Plant Air-Cleaning Units and Components*, and ASME code N510, *Testing of Nuclear Air Treatment Systems*. The difficulties in applying the ASME codes to the ventilation systems at the Hanford Site are the topic of the following discussions.

II. DIFFICULTIES APPLYING ASME N509

Some of the difficulties encountered when applying code N509 at the Hanford Site are related to the composition of the ventilation stream and requirements related to ventilation equipment procurement.

The exhaust stream from the waste tanks contains not only radioactive particles, but in some instances gases in excess of explosive limits (e.g, hydrogen) or toxic vapors. For those tanks that contain hydrogen gas, it is very difficult to meet code N509 in its entirety when making modifications to the existing system or designing a new system.

In Section 5.5 of ASME code N509 it is stated that, "Heaters shall be electric." Currently, for those waste tanks that are actively ventilated, steam heaters are used in most applications where hydrogen is present in the exhaust stream. If an electric heater were to be used in these applications, it would need to be intrinsically safe. As a result, the heater would be physically very large, limited in availability, and very expensive. Therefore, in this situation it is more appropriate to use a steam heater.

Although a steam heater has the potential to leak, it is not expected to have an adverse effect on a typical Tank Farm ventilation system. A likely result of a steam leak would be an increased differential pressure across the HEPA filters. The ventilation system automatically shuts down on high differential pressure across the filters well within the 25 cm (10 in.) w.g. rating for the filters.

Cleaning or decontaminating the ventilation equipment after a steam leak could be difficult because the steam leak would be located upstream of or before the HEPA filters. As a result, this area of the ventilation train would be contaminated by radiation. However, clean up of that area may be a more acceptable risk than an explosion that could be caused by an electric heater.

Procuring fans that meet code N509 for the ventilation systems is very difficult. Under paragraph 5.7.2, "Rating or Test," code N509 states the following, for engineered safety features (ESF) and non-ESF fans:

> *"ESF fans shall be tested in accordance with AMCA 210 and the applicable special sections of AMCA 211A...Non-ESF fans shall be either rated and listed in accordance with AMCA 211A or tested the same as ESF fans."*

One interpretation is that the requirements for non-ESF fans are the same as ESF fans. The reason is because any fan rated and listed in accordance with AMCA code 211A (1985) must bear the AMCA Seal because AMCA code 211A outlines the AMCA Certified Ratings Program and use of the AMCA Seal. Furthermore, for ESF fans, code N509 seems to imply that they must bear the AMCA Seal because the special sections in AMCA code 211A read as if the Certified Ratings Program is being used. Furthermore, please note that AMCA code 211A is an incorrect reference to an outdated publication. The current publication is AMCA code 211-87. In addition, WHC has asked ASME for a formal technical inquiry into this issue.

This, by itself, does not pose a difficult problem for procuring a new fan because there are numerous vendors who are AMCA approved. However, imposing this requirement in conjunction with additional code N509 requirements makes it difficult to locate qualified suppliers. One such additional requirement is NQA-1.

The Quality Assurance requirements of code N509 are stated in section 8, as follows:

> *"The design organization, manufacturers of components, and constructors (including subcontractors) shall each establish and comply with a comprehensive quality assurance program and plan which meets the requirements of ANSI/ASME NQA-1-1986."*

One of the problems is the interpretation of this section. Is this section implying vendors are acceptable, even though the vendor may not be NQA-1 certified, as long as they have a quality assurance program in place that is similar to NQA-1? Or, are they required to have an NQA-1 program in place and be certified by ASME?

If, in fact, the statement from Section 8 is interpreted to mean that a vendor needs to be NQA-1 certified, it is very difficult to locate a vendor that has obtained that certification.

III. DIFFICULTIES APPLYING N510

Another problem encountered with all the existing ventilation systems for the waste tanks at the Hanford Site is that the systems cannot be tested in accordance with code N510. Although DOE directives state the ventilation systems at the Hanford Site are to be tested to code N510, the existing systems cannot and are not required to meet this constraint. This is because the existing systems were not designed or fabricated to code N509. However, code N510 is used as guidance because it provides a basis and a method for performing the applicable tests.

Code N510 lists several tests or inspections that are required to be completed on the ventilation systems. The tests discussed herein will be the in-place leak test for HEPA filters, as well as the test for airflow distribution through HEPA filter banks.

Section 10.5 of code N510 explains the procedure for performing the in-place leak test. In this section it is a requirement to check the background (i.e., any stray particles in the air stream that may effect the test) and the concentration of the aerosol being used in the test upstream of the filters. On a few of the ventilation systems for the waste tanks at the Hanford Site it is impossible to verify the concentration upstream. Injection and sample ports are either located in the wrong locations or do not exist. As a result, the 100 percent upstream concentration sample reading is in question because it can not be taken at the appropriate location.

Several of the ventilation systems cannot be aerosol tested properly between filter stages. The housings that were designed and installed were not equipped with aerosol injection ports or sample ports. Consequently, rather than testing the second filter in the stage independently, an overall test of the system is completed to verify integrity.

The airflow distribution through the HEPA filters is also a troublesome area for some of the systems ventilating the waste tanks at the Hanford Site. These systems do not have gradual transition pieces into and out of the filter housings. Without these transition pieces it is difficult to determine if the aerosol is properly challenging the filter face and edge seals as required according to code N510, paragraph 8.6.2. As a result, the seal around the filter may in fact be breached or degraded. Since the aerosol is not able to challenge this particular area, detecting a leak is virtually impossible.

IV. CONCLUSION

There are several problems encountered in trying to comply with ASME codes N509 and N510 for the ventilation systems for the waste tanks at the Hanford Site. Problems range from interpretation of these two codes to design and field testing deficiencies. These deficiencies sometimes make it very difficult to apply code N509 and N510 to the ventilation systems for the waste tanks at the Hanford Site.

Actions are being taken to resolve these problems. New systems that will alleviate the problem with testing are being designed and fabricated. These systems, as well as modifications to existing systems are designed to meet both code N509 and N510 wherever practical. In some instances waivers to DOE and/or DOE Richland Field Office (DOE 1989 and DOE-RL 1989) are, or will be written where it is determined and justified to do so and if it does not jeopardize the safety of the facility worker, the off-site population, or equipment. And finally, DOE requirements, as well as ASME codes are being evaluated at the Hanford Site to determine if clarification or revisions to these requirements are necessary.

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23rd DOE/NRC/ISNATT NUCLEAR AIR CLEANING CONFERENCE

GAS PROCESSING AT DOE NUCLEAR FACILITIES

Jack Jacox
JACOX ASSOCIATES

Abstract

The term "Gas Processing" has many possible meanings and understandings. In this paper, and panel, we will be using it to generally mean the treatment of gas by methods other than those common to HVAC and Nuclear Air Treatment. This is only a working guideline not a rigorous definition. Whether a rigorous definition is desirable, or even possible is a question for some other forum. Here we will be discussing the practical aspects of what "Gas Processing" includes and how existing Codes, Standards and industry experience can, and should, apply to DOE and NRC Licensed facilities.

A major impediment to use of the best engineering and technology in many nuclear facilities is the administrative mandate that only systems and equipment that meet specified "nuclear" documents are permissible. This paper will highlight some of the limitations created by this approach.

Introduction

Since the 1960s, handbooks, Standards, Codes and other formal documents have been written and then given the force of law by their use in facility Licenses or by other contractual or government mandates to specify many aspects of air-cleaning and treatment components and systems. The "American Association for Contamination Control" (The AACC is now defunct. Their Standards have been taken over by the Institute of Environmental Sciences, 940 East Northwest Highway, Mount Prospect, IL 60056.) published a tentative HEPA filter standard "CS-1T, HEPA Filter Units" in 1968 and a tentative radioiodine adsorber "CS-8T, high Efficiency Gas-Phase Adsorber Cells" in 1972. The best source for information of this technical area was, and still is, these International Nuclear Air Cleaning Conferences. They have been held since the early 1950s. The first major general work on components and systems available to the public was the handbook "Design, Construction, and Testing of High Efficiency Air Filtration Systems For Nuclear Applications" (1). With very few exceptions these documents have been limited to HEPA filter systems and radioiodine carbon filter system. Control Room systems include minor expansion in scope to remove chlorine but the scope has been narrow. Some closely related components such as prefilters, moisture separators, electrical heaters, ducts, housings and frames have been historically included. However until the advent of ASME AG-1 (1) in 1988 there has been little effort to broaden this scope. Of course AG-1 had been under development for nearly a decade before its initial release. Still the original scope of AG-1 as given to the American Society of Mechanical Engineers (ASME) Code "Committee on Nuclear Air and Gas Treatment" in January of 1976 was to develop Codes and Standards for Light-Water Cooled commercial power plants. Their first assignment was to revise ASME N509-76 "Nuclear Power Plant Air Cleaning Units and Components" (3) and ASME N510-75 "Testing of Nuclear Air Treatment Systems" (4) which had been written by ad hoc committees which disbanded upon issue of the original documents.

The American Nuclear Society has written Standards on a slightly broader scope of treatment systems but their mandate is to basically define Process Standards, not to write equipment Standards. The ASME and ANS Standards are intended to be complimentary since ASME writes equipment Standards but not Process. Other than Xe and Kr control for Light-Water Cooled commercial power plants this has been essentially the limit of formal Industry Codes and Standards in the air and gas treatment area. Such important technical challenges such as incineration exhaust, hot cell exhaust, tank venting, reprocessing and general chemical processing gas streams have not been addressed. With the ever increasing pressure to reduce hazardous emissions and clean-up existing nuclear sites of all types new Codes and Standards are clearly required as quickly as possible. Equally importantly, the proper use of existing Codes, Standards and related documents is critical. Unfortunately in many cases the existing documents have been, and are being, badly misused.

Discussion

In recent years Codes and Standards written for Light-Water Cooled power reactors have been applied to a variety of new applications. This has been the result of both mandated requirements from the government as well as "unofficial" and well intentioned attempts to use existing documents rather than writing new duplicative ones. Unfortunately in most cases this excellent idea has resulted in more problems than positive results. This particular problem area is covered in other papers and a panel in this conference so will not be discussed here. The thrust of this paper is to point out the immense engineering, technical and experience base for many, if not all, the Gas Processing challenges now requiring solutions in the nuclear area.

Along with the good technical solutions formal Codes and Standards are also being administratively required. Helpful Codes and Standards are not possible until the engineering/technical solutions have been at least somewhat developed and standardized. Unfortunately various regulatory and other administrative organizations have been trying to mandate the use of Codes and Standards before the technical solutions have been developed. This forces the engineering staff in an extremely difficult, of not impossible, situation.

Few current "nuclear" Gas Processing applications are truly unique. With very few exceptions they have been solved in industrial applications long ago. Certainly such things as criticality concerns are unique, but few Gas Processing applications have a criticality aspect. Radiation fields are also unique but not too difficult to handle with shielding and some engineering fore-thought. Radioactive contamination in most Gas Processing situations is little different than contamination from chemical or biological sources. These can be extremely dangerous and even deadly but are regularly dealt with by industry. It is instructive to recall that one of the major breakthroughs in the separation of Uranium isotopes at Oak Ridge was not a "nuclear" problem but the large scale industrial handling of pure Fluorine. Few compounds or biologicals are as deadly or difficult to work with as Fluorine, whether or not it is radioactive.

The engineering for cleaning the exhaust from the storage tanks at Hanford has been largely worked out by the chemical industry for many years. Addition of more conservative design margins, seismic requirements, material traceability, use of "Qualified" welders, more comprehensive QC/QA and such requirements is not overly difficult (But certainly very expensive). Rather than mandating the use of existing "nuclear" Codes and Standards that were written for extremely different and usually narrow applications the better approach is to use well proven industry experience then add the "nuclear" safety margins as applicable. This can be done in a reasonable and cost effective manner if common sense and good judgement is used, rather than blind adherence to administrative mandates. It is in everyone's best self interest to accomplish a project in the best technical and most economic way possible. This fact can be lost by overly rigid application of and Code or Standard. In nearly ever case the project will be complete in far less time and for far less money with the "industry approach"

Every industry tends to believe it has a totally unique set of problems. Many have a few unique aspects but most are the same as other industries, they just have a different set of labels and regulations. Unfortunately regulations tend to reinforce this aura of uniqueness and foster a mind-set that restricts the use of "outside" technology. The nuclear industry has a particularly bad case of this malady. This is partly from the truly unique aspects that do exist, partly from the requirement for security classification in many areas and from the total regulation of the industry from it's creation. Breaking out of this limiting mind-set is necessary to solve the current and future gas processing problems we face.

Conclusions

The conclusions of this paper and thesis are as obvious as they are difficult to achieve.

1. To approach the solution to technical challenges from an open minded engineering point of view, rather starting with regulations, Codes or Standards.

2. Use the vast industrial experience that exists to help solve a problem. Usually it has already been solved in some industrial application.

3. Use the existing "nuclear" Codes and Standards knowledgeably as <u>technical guides</u> when the situation is not exactly the one the documents were written. Do not try to torture a technical problem to fit a Code or Standard!

4. Regulatory bodies and organizations that administer regulations must understand the above points and not stifle good engineering solutions to technical problems with overly rigid and inflexible enforcement of the letter of a document when it is technically inapplicable.

5. Use Codes and Standards from other industries, modified if and as necessary, for new nuclear applications.

6. New Codes and Standards must be written - or existing ones expanded - to cover these new and broader areas or general nuclear gas processing.

7. DOE facilities must support these new documents by supporting their personnel to join the committees that write the Codes and Standards.

8. DOE facilities must be more open in discussion of their challenges and share both problems and solutions with the rest of the nuclear industry and general industry to the extent national security allows. The formation of open industry groups as the nuclear power industry has so successfully promoted is a possible means to help accomplish these goal.

9. As with all industries do not be blinded by the idea you are totally unique. Use the work, mistakes and successes of others to solve your problems.

These goal are easy to state but notoriously difficult to implement since they require significant changes in mind-set and the culture of a large and highly structured industry. The fact that it is totally regulated makes the implementation much more difficult since some regulations and regulator's outlook must also change. However, to solve the gas processing problems change is inevitable.

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PANEL DISCUSSION

JACOX: When you are writing codes and standards, you are not allowed to put into them the kinds of explanations you have discussed. I am glad that you were able to find some very innovative uses for the documents. I will point out that they were written for ESF systems in light water nuclear reactors. You are absolutely right, some of the things you have to do are not covered, and that is where flexibility, rather than an administrative law approach, is necessary. When we write these standards, we rail against some of the bureaucratic rules that we have to follow. In some cases, we have put in non-mandatory appendices because they offer a great deal more freedom than is allowed in the body of a code and standard. However, we did not do it in the particular area you discussed. In retrospect, you are right; that section does need to be fleshed out. At the time it was prepared, we were looking strictly at accident mitigation and safe shut down systems. None of the other considerations were addressed.

VANCE: I would just like to say that I appreciate that we all have constraints.

KOVACH, L.: To comment further on the testing problems of two HEPA filters in series, I recall the early days of the nuclear power reactor industry and the first time people had a system with two HEPAs and a carbon bed inbetween. To test the system, they actually started out by taking out the front bank and testing the back bank, then putting back the front bank and taking out the back bank to test the front one. Finally, they put back the rear bank. It was extremely lucrative for testing companies. Then people realized that an injection manifold or a test manifold would be more helpful than continually taking out and putting back filters. To take out a bank of filters to test a second bank is eminently feasible on a system that is in a standby mode, waiting for a potential accident. But if you contaminate the filter banks, the worst thing you can do is to take them out and put them back inside the filter housing. The criteria, as written, and as applied, are different. It is only in the last issue of N-509 that the use of manifolds for testing multiple filters is discussed in order to prevent this type of a problem.

I would like to add that we have personnel here from CONAGT, from the committee chairman to a number of individual sub-committee chairmen, and if any of you are interested in contributing to better codes and standards, please volunteer to participate. I feel that it is much more useful to put a little time in up front to generate better codes and standards, written in an engineering manner, than it is to spend money and time later on either fighting them or trying to live with them. Currently, we are in the reactive mode of taking an existing standard or code and spending a lot of time and effort fighting it or trying to go around it, while it would have taken much less time to participate originally and make sure that the problems that are different in different areas are in fact covered logically in the standards.

At the same time, I would like to state that I do not believe that there ever will be a code or a standard that is applicable for all cases, there is no such thing. It is utopian to think that we can write a standard for all possible future applications. I do not think anyone should look on this code as a substitute for engineers. Unfortunately, I think some management or administrative levels, in fact, do look on these standards and codes as a substitute for engineers and inhouse technical knowledge. We cannot do anything about it in the code section itself, but maybe we can make a statement that will filter back to management and the regulatory agencies that codes and standards are not substitutes for common sense and good engineering judgement.

MYERS: I do not have a problem with what you are presenting, but I am wondering whether, in addition to attending to needs for other applications and information, there is going to be an effort to relax some of these standards. I recall that Dr. Bellamy indicated last year that some plants could apply for removal of certain components. Is it going to be up to each licensee to justify their own design? Or will there be statements in the standard to say that when you have a carbon bed there is no need for a following HEPA filter? Can you comment on that?

KOVACH, L.: I am not going to speak for the NRC. They have accused me several times of doing so and I do not want to fall into that trap again. I know of some reactors where the application of Regulatory Guide 1.52 and the ASME/ANSI code sections were relaxed. I can list a few, TMI-2, one in Long Island, one in Portland. I am not sure if this is the type of relaxation you are looking for. As far as a HEPA filter following a carbon bank is concerned, I think it was written to be super-conservative. The carbon particle size has never been at a level that requires a HEPA filter to remove it. The idea behind a second HEPA filter was that if carbon picks up radioiodine and then breaks off, it should not pass through the system. To my knowledge, several utilities requested that their second HEPA filter bank not be treated as a second HEPA bank and therefore, there would not be a need to test it. My eminent colleague, Jack Hayes, who I think participated in one of these jurisdictional disputes, is standing at the microphone and I am going to let him speak officially for the NRC.

HAYES: In the guidance presented in the NRC's Standard Review Plan (SRP) only SRP 15.7.4 states that an ESF filter system should be provided. In all other cases, such systems are only required if acceptable data cannot be obtained. Operating plants can provide revised accident analyses to the NRC to justify the elimination of ESF filters.

With respect to the comment on the need for a HEPA filter downstream of the charcoal adsorber, the NRC has approved the use of a post-filter which is not a HEPA grade filter for the Advanced Boiling Water Reactor (ABWR). The NRC would consider requests for other applications, also. This is consistent with the guidance in ASME Standard N-509-1989.

JACOX: The 1989 edition of N-509 explicitly recognizes this problem. I believe the wording states there is an afterfilter because there is a potential for carbon dusting. A HEPA filter may not be the right type of filter, so the standard designates it as an afterfilter, which can be a medium efficiency filter that does not require testing.

ARNDT: The only thing I would ask is that if anyone has experience in procuring materials, such as housings, dampers, or fans, for systems, and has either written justification for not meeting NQA-1, N-509, etc., I would love to talk with them just to determine if I might apply it at Hanford, as well. I am here to get information that will help me save as much money as possible in my area.

KOVACH, L.: I would rather get people together to see how they can meet the standard, rather than get people together to see how they can get around it. However, when there is something wrong in the standard or its application, there are prescribed enquiry methods to get clarification. The outcome may be that the standard writing group will review the questioned section and be willing to change it. An enquiry can result in an interpretation of a code or a standard; it can also result in a modification of a standard or code. Spending time to correct standards is more important than finding out how to get around them. Somebody mentioned to me that they considered N-509 and N-510 to be a bible. My answer was to point out how different religions interpret the bible in different ways. I would not have you look on the standards as a bible, but as engineering advice. They contained a number of mistakes and that is why you see revisions. The people writing them realize that they need to be changed and improved. Users are justified in making recommendations when they encounter problems and demanding technical justification for their preparation and modification. Look on them as living documents that can be changed and help make sure that poor engineering is removed from the codes and standards.

VANCE: A closing remark about the value of codes and standards: the availability of these codes and standards helps to provide us with the ability to do our jobs because they provide legitimacy and acceptance by others. When we can show through the code process that what we have done makes good engineering judgement, it becomes easier to convince people that what we are doing is sound. They provide a tool to get our jobs done. Without basic standards, engineering would be much more difficult. We just want them to be the best possible codes and standards.

KOVACH, L.: Most of us have used a hammer and hit our fingers but that is not a good reason for throwing the hammer away. I think it is how we apply codes and standards, how we use them, and how we interpret their application that is important.