Central files

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

CHAIRMAN

See SECY 82-155 f/encls.
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GCunningham, ELD
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Central files

October 4, 1982

The Honorable Thomas P. O'Neill, Jr.
Speaker of the United States
House of Representatives
Washington, D.C. 20515

Dear Mr. Speaker:

On June 26, 1981 the Nuclear Regulatory Commission (NRC) submitted a status report in response to Public Law 96-295, Section 307(b). That law required the NRC to study the feasibility and value of licensing plant managers and senior licensee officers responsible for the operation of nuclear power facilities. In that status report, the NRC noted that it had been unable to develop acceptable alternatives from the existing literature base of sufficient scope to develop the issues fully and logically. The Commission, therefore, directed the staff to expand its efforts through a study of Federal agencies who address this kind of issue and through interviews with persons knowledgeable in management assessment, licensing, and nuclear operations. The staff conducted a review of Federal licensing programs and contracted with Oak Ridge National Laboratory (ORNL) to conduct interviews and to analyze experience from other relevant sectors. This work has been completed and we are hereby transmitting the reports.

Current NRC regulations on personnel who are authorized to make operating decisions state that any person making such decisions, in either normal or off-normal situations, must hold an NRC granted license. This is specified in Chapter 10 of the Code of Federal Regulations, Part 50 paragraph 54 - Conditions of Licenses:

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and

> (l) The licensee shall designate individuals to be responsible for directing the licensed activities of licensed operators. These individuals shall be licensed as senior operators pursuant to Part 55 of this chapter.

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1-41, pt. 55

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Nonetheless, questions were also asked about whether licensing would be appropriate for the technical aspects of managerial positions. The ORNL study indicates that, even though some technical functions are inherent in all managerial positions, a specific license, particularly a Senior Reactor Operator license, though possibly desirable for a position such as Superintendent for Operations or its equivalent, should not be required for managerial positions. The study notes that the primary reason for this is that technical responsibilities normally decrease as managerial responsibilities increase. Also, the American Nuclear Society (ANS) Standard (ANS-3.1-1981), Selection, Qualification, and Training of Personnel for Nuclear Power Plants and the NRC Regulatory Guide 1.8, Personnel Selection and Training, which endorses the ANS Standard, recommend that certain managerial and supervisory positions -- specifically those managers and supervisors directly responsible for operations -- should be filled by persons who hold or have previously held a Senior Reactor Operator license. For example, the Plant Manager or the principal alternate should hold a Senior Reactor Operator license or have held a license for a similar unit; the Operations Manager and the Training Manager or the person responsible for training licensed operators should hold a Senior Reactor Operator license; and the Technical Manager should hold or have held a Senior Reactor Operator license.

Commissioner Gilinsky prefers to have additional personnel in a nuclear power plant's organization licensed. Current NRC regulations do not require the supervisor of operations to hold a license. As a minimum, Commissioner Gilinsky believes that the Commission should change its regulations to close this loophole. In addition, the plant manager, who has greater responsibility than anyone else on his staff, should hold a Commission license.

Though the ANS Standard and Regulatory Guide are not binding requirements, the utilities abide by the criteria set forth in the ANS Standard or provide justification as directed by the Regulatory Guide. Therefore, we are confident that the operational personnel of the utilities are qualified to operate the plant safely. In point of fact, a Reactor Operator who actually manipulates the controls which affect plant operations can only take direction from a qualified Senior Reactor Operator. Reactor Operators who respond to operating direction from any non-licensed person actually jeopardize their license and would be subject to a fine or prosecution, or both. Plant managers and senior licensee officers who provide directions regarding plant operation do so through the plant operations supervisor or shift supervisor who do hold valid senior operator licenses and are both qualified and authorized to provide directions to the operators of the plant. Further, during the conduct of our Emergency Preparedness Appraisals, it has been our experience that only appropriately licensed operators direct the licensed activities of operators at the controls. The ORNL report also concludes that plant managers and senior licensee officers should not be licensed for managerial competence.

In addition to the ORNL study, the staff contacted the following agencies to determine whether there was a precedent for the concept of licensing senior officers as managers either within the Federal Government or as a requirement set by it on the private sector. Nine agencies were contacted: two of them (Housing and Urban Development and Interstate Commerce Commission) administer licensing programs for organizations only, e.g., interstate trucking firms; five agencies (U.S. Coast Guard, Federal Communications Commission, Federal Aviation Administration, Federal Maritime Commission and U.S. Customs Service) license both organizations and individuals; and one agency (Office of Personnel Management) was interested in the concept of government licensing requirements in general and the Senior Executive Program in particular. Also, the U.S. Navy Prospective Commanding Officers (PCO) program was reviewed. None of the Federal agencies contacted license for managerial ability; further, there appears to be no Federal Government precedent for licensing managers by virtue of their holding management positions. However, the SES program provides for certification of individuals for managerial positions and the Navy PCO program provides special training for Prospective Commanding Officers. Though these are not formal licensing programs, they do demand satisfactory completion of a specified program.

In preparing the accompanying report, ORNL and their subcontractor, Science Management Corporation (SMC), performed a survey study of NRC Inspection and Enforcement personnel and private sector personnel familiar with management assessment and the nuclear industry. The study consisted of 68 personal interviews; 35 interviews with utility representatives, 18 with NRC Inspection and Enforcement personnel, 10 with individuals familiar with assessment techniques, and 5 with professional organizations. The ORNL/SMC study is enclosed.

We recognize the need to improve nuclear utility management capabilities and will continue to monitor efforts by the Institute for Nuclear Power Operations to achieve this goal. The staff has also been directed to explore other means, e.g., increase training, to ensure management capabilities. The staff recommends against the establishment of an NRC licensing requirements for nuclear power plant managers and other senior licensee officers. However, we intend to continue to pursue other means of assuring improving management competence.

Sincerely,

Original signed by
Nunzio J. Palladino

Nunzio J. Palladino

Treated as Chairman Correspondence
Ref.-CR-82-102
See also SECY-82-155
Identical letter sent to:
The Honorable George H.W. Bush
President of the Senate

Enclosures:
As stated

Originating Office: EDO/NRR

OFFICE	SECY	OCA	OCM	OCM	OCM	OCM
SURNAME	TCombs		JMcDermott		NHaller	NPalladino
DATE	9/28/82	9/28/82	9/ /82	10/ /82	10/1/82	9/ /82

NRC FORM 318 (10/80) NRCM 0240 OFFICIAL RECORD COPY USGPO: 1980--329-824

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EDO R/F	VStello
HDenton	

Identical letter to The Honorable George Bush, President of the Senate

Approved per Commission comments on SECY 82-155.
Originated by NRR: J. Persensky

OFFICE	OCM						
SURNAME	Chairman						
DATE							

Enclosures:
As stated

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SUMMARY OF SELECTED U. S. GOVERNMENT AGENCY LICENSING PROGRAMS

Nine Federal agencies were contacted to discuss their licensing programs to determine if commonalities or parallels existed with the contemplated licensing of nuclear power plant managers and senior licensee officers. Representatives of two of these agencies, Housing and Urban Development and the Interstate Commerce Commission, indicated that their licensing programs related only to organizations, not to individuals. Further, they were not aware of any attempt to license individuals by their agencies. The six representatives of the other agencies, U. S. Coast Guard (USCG), the Federal Communications Commission (FCC), the Federal Aviation Administration (FAA), the Federal Maritime Commission did discuss programs concerning licensing. The U. S. Navy was also contacted regarding the Prospective Commanding Officer (PCO) training program. The information from each of these agencies is discussed below. The question of feasibility and value were not discussed in detail because of the respondents' lack of familiarity with the nuclear utility industry.

U. S. Coast Guard

The USCG program of licensing Merchant Marine personnel most closely tracks what might be a model for licensing of nuclear utility management personnel. The Coast Guard licenses both the deck officers and the engineering crew of commercial vessels. The authority for licensing is Title 46 CFR 10, "Licensing of Officers and Motorboat Operators and Registration of Staff Officers," and is intended to assure minimum levels of competence and qualifications standards. The license is based on experience, physical examination and professional competency as determined by written technical examinations.

There are four levels of license for deck officers and the engineering crew. Deck officers are licensed as 3rd Mate, 2nd Mate, Chief Mate and Master. Engineers are 3rd Assistant, 2nd Assistant, 1st Assistant and Chief Engineer. The engineering crew is primarily responsible for the power plant of the vessel whereas the deck officers are responsible for seamanship, navigation and cargo. Currently, each level within each career requires a separate examination. It was brought to our attention that the Coast Guard is considering reducing the examination requirements to two for each career, entry level and 1st Assistant Engineer or Chief Mate.

In addition to minimum physical and health requirements, entry into the licensed ranks requires a minimum of three years experience. Training is accomplished through union, Federal and State operated schools. The USCG develops, administers and scores the licensing examinations prior to issuing the license. Each increasing level of license examination tests for increasing depth and scope of knowledge and are based on analysis of the technical requirements of the job. The Merchant Marine career path most similar to the utility management role would be the deck officer. Deck officers are tested for items such as marine law, rules and regulations, seamanship, lifesaving and firefighting. Though the Master's job is primarily administrative and managerial, these skills are not tested.

Federal Communications Commission

The FCC licenses both individuals and organizations (broadcast stations) under two authorities: the Communication Act of 1930 and the International Communications Agreement through the United Nations. Only individual licensing was discussed.

Individual licenses are issued to amateur radio operators and to commercial repair technicians based on examinations. The amateur licenses are in five categories ranging from "novice" to "amateur extra." The higher class licenses permit the licensed operator the use of more radio frequencies and allows use of shorter call signs. The examinations for amateur licenses consist of two parts, a written technical test and a telegraphy test which involves code transcription from a tape. The higher class licenses require more technical knowledge and a demonstration of greater facility at transcription.

The repair technicians for radio-telephone equipment are examined for knowledge of the technical aspects of equipment and equipment repair before a license is issued.

There are four categories of commercial licenses. Safety Service (ship and aircraft), Standard Broadcast, Radio-Telephone, and Broadcast Endorsements. The FCC has eliminated all examinations for commercial licenses except for repair technicians. Other commercial licenses require only a post-card registration.

The FCC representative indicated that the agency is attempting to eliminate commercial licensing requirements, but international agreements and the Communications Act prevent such action at this time. However, legislation has been proposed to change the requirements.

Federal Aviation Administration

The FAA licenses both organizations, including Air Carriers, Air Carrier Airports, Pilot Schools and Repair Stations, and individuals, including Pilots, Maintenance Personnel and Air Traffic Controllers. The majority of the discussion focused on individual licenses.

There are four categories of pilot licenses with ratings or levels in each category. The categories are Student, Private, Commercial, and Air Transport. The ratings in each category differentiate among the equipment type, e.g., type of plane, navigation system, engine type, etc. The licenses are based on training requirements, written technical examination, medical examination, and check rides in the same equipment for which a license is sought. Both check rides and medical examinations are conducted periodically for certain types of pilots.

Repair technicians are licensed for specific air frames and power systems. They must receive certified training and pass a written examination specific to the equipment type intended to be serviced. Level and type of examination is determined by the equipment to be serviced.

Air traffic controllers are Government employees and are not actually licensed. However, they must undergo training by the FAA, pass a written and a simulator examination, and pass a medical examination prior to assuming their duties.

Federal Maritime Commission

The FMC certifies the companies which operate commercial vessels and licenses freight forwarders. The certification is economically based and requires that a bond or insurance policy is posted to protect U. S. waters against damage, e.g., oil spills. This is to assure that if the company does not repair the damage, e.g., clean-up an oil spill, then the bond or insurance can cover the costs.

The licensing of freight forwarders is also primarily economically based. The freight forwarder represents companies with regard to the export of international cargo. The license applicant must demonstrate financial capacity, show evidence of good character in business dealings and meet certain experience requirements. This is accomplished primarily through provision of references and posting of a bond. The FMC does investigate the individual prior to granting a license. No testing of skills or knowledge is required.

U. S. Customs Service

The U. S. Customs Service licenses custom house brokers, both individuals and corporations. The corporation is licensed if two officers involved in supervision are licensed as individuals. Brokers represent importers with regard to customs law and payment of duty on goods.

A license is granted by the Customs Service if the individual is a U. S. citizen and after a character and facility investigation and the individual passes an examination. The examination tests for knowledge of customs law, importing procedures, rates and duty, and other agency requirements.

Office of Personnel Management

The OPM does not license any organizations or individuals but the OPM individual interviewed did have an overall knowledge of licensing in the Federal Government. The interview covered three topics: licensing of Federal employees, Federal licensing requirements in the private sector and procedures and criteria used in recruitment, selection and promotion of managers in the Government.

As an employer, the Federal Government requires little licensing of its employees primarily because of the strict legal guidelines imposed on licensing requirements. As a general rule, the Government requires licensing of employees only if the individual provides a service to individual citizens where the service is too critical to expect the citizen to make a rational choice regarding the competency of the employee. This primarily includes the medical professions.

Even in cases where non-Government employees who provide services to the Government must be licensed, Government employees providing the same service need not be licensed. This includes lawyers, appraisers, barbers, etc. In such cases, the Government assumes the responsibility of assuring qualifications and competency.

As regards Federal licensing activities in the private sector, the major examples of individual licensing discussed were the FCC, FAA and NRC. The respondent indicated that other than these, licensing appears to be directed to organizations rather than individuals.

Recruitment, selection and promotion of managers in the Government was also discussed. Assessment center techniques have been used by some agencies to select GS-14 and 15 employees as candidates for Senior Executive Service (SES) programs but costs have caused most agencies to return to standard merit procedures. The merit procedures include approval of technical and professional qualifications and approval of managerial qualifications by the agency Executive Review Board and an OPM Qualifications Review Board (QRB). The QRB rules on whether an individual has:

- Demonstrated success in executive work
- Successfully participated in an approved executive development program
- Special or unique qualities indicating likelihood of executive success

The SES programs are developed by each individual agency utilizing guidelines established by OPM and published in the Federal Personnel Manual (FPM) and Bulletins. The agency SES programs are reviewed and approved by OPM. Each agency establishes an Executive Review Board which is responsible for development and implementing systems relating to

- Establishing qualifications standards
- Recruiting of SES candidates, including candidate development programs
- Establishing selection systems
- Handling inquiries
- Documenting merit staffing actions

After an agency selects an individual for an SES vacancy, he must also be certified by an OPM, QRB. The QRB utilizes documents from the agency and reviews the candidate for executive qualifications in terms of competence

to assume leadership responsibilities in the broad areas of:

- Integration of Internal and External Program/Policy Issues
- Organizational Representation and Liaison
- Direction and Guidance of Programs, Projects, or Policy Development
- Resource Acquisition and Administration
- Utilization of Human Resources
- Analysis and Review of Implementation and Results Achievement

Once certified by the QRB, the individual retains SES reinstatement rights even if separated from Government service.

Though the formal certification process is the responsibility of the OPM, each agency is responsible for the more extensive processes of recruitment, selection, development and maintenance of executives.

U. S. Navy - Prospective Commanding Officers Program

Admiral H. G. Rickover provided testimony before the House Subcommittee on Energy Research and Production on May 24, 1979, concerning the training that Prospective Commanding Officers undergo.

Prospective Commanding Officers (PCO) of all nuclear-powered submarines have qualified to serve as Engineering Officers and, therefore, have undergone all training related to that position including nuclear power school and prototype. After selection into the PCO program, training in addition to that required of Engineering Officers is required in: nuclear propulsion, including mechanical, fluid and electrical systems; plant materials; reactor engineering and theory; reactor safety and chemistry; and radiological controls. The PCO is examined in each area, including two oral examinations and a final, seven and one-half hours, comprehensive examination covering all areas. In addition, a final oral examination on reactor safety is given by a four member Naval Reactors Board. Special briefings by senior naval officers and training in subjects that will aid the PCO in running his ship are included in addition to the technical training.

Summary of Licensing in Other Federal Agencies

Of the nine agencies contacted, five license individuals: Coast Guard, FCC, FAA, Federal Maritime Commission and U. S. Customs Service. Technical knowledge of the specific activity is the basis for the licensing examinations in four of these five programs. The Maritime Commission license is based on an investigation of financial capabilities and previous experience. Of the programs described, the Coast Guard's licensing of deck officers and masters most closely approximates the potential for licensing nuclear power plant management. The Coast Guard license is based on technical skills rather than managerial abilities.

Two other programs described, SES and PCO, might be considered models for assuring the competence of management without being based on a license. The common aspect of these two programs is the long-term development and intensive training of the individuals selected, as well as a continuing monitoring of performance and upgrading of capabilities.

The OPM representative also suggested review of a Supreme Court decision (Griggs vs Duke Power Co.) which may have a bearing on the subject of licensing of individuals. In that case, the Supreme Court rules that Title VII of the Civil Rights Act of 1964 requires that the use of tests and diplomas as job requirements must be eliminated if they disqualify blacks at a higher rate than whites, unless the employer can show that the test or diploma bears a "demonstrable relationship" to successful job performance.

In conclusion, through discussions with several other agencies with licensing authority of non-Government organizations and individuals, there appears to be no Federal Government precedent for licensing of managers of corporate officers for managerial abilities.

INTERIM REPORT

Accession No. _____

Contract Program Title:
Feasibility of Licensing Nuclear Utility Managers and Officers

Subject of This Document:
Report on the Feasibility of the Licensing/Certification of Nuclear Utility Managers and Officers*

Project Managers: D. Bowering (SMC)
D. Selby (ORNL)

Contributors: D. Bowering (SMC)
D. Selby (ORNL)
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INTERIM REPORT

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EXECUTIVE SUMMARY

Section 307(b) of Public Law 96-295 directed the Nuclear Regulatory Commission (NRC)

> *to undertake a study of the feasibility and value of licensing... plant managers of utilization facilities and senior licensee officers responsible for operation of such facilities.*

The Licensee Qualifications Branch of the Division of Human Factors Safety in turn contracted with the Oak Ridge National Laboratory (ORNL) to provide technical assistance in completing this study. This report presents the results of ORNL's efforts, including those of its subcontractor, Science Management Corporation (SMC).

The key words in the Section 307(b) quotation are feasibility, value, licensing, and senior licensee officers. Feasibility was interpreted in terms of whether the operation was both possible and practical. Value was addressed in terms of benefits, particularly with respect to public health and safety. Our definition and evaluation of licensing was not limited to licensing in a narrow professional or legal sense, but rather employed a much broader view of the term which included such concepts as certification. The term "senior licensee officers" was left undefined, but since the position of plant manager was specifically defined, the study centered around that position and encompassed one management level just below and one just above it.

The information required to answer the questions raised by the issue of 307(b) was acquired through interviews with

- A cross section of managers and executives in the nuclear power industry
- NRC inspection and enforcement personnel: resident inspectors, regional staff, and headquarters staff
- Persons having expertise in or experience with managerial/executive assessment and appraisal techniques
- Professional societies and other organizations which certify or license professionals.

Questionnaires and interview guides were developed for use in the field interviews. A total of 68 interviews were conducted, including 31 interviews with utility personnel.

Analysis of interview responses proceeded throughout the interview phase, and team members frequently met informally to discuss results as the study progressed. A number of specific findings began to emerge from this process and, as a result, it was possible to further sharpen the focus of particular questions. A more formal analysis was undertaken after most of the interviews had been completed.

The consensus was that the licensing of management personnel as a legal requirement administered in a process similar to that used for the SRO license is undersirable and would probably be counterprouctive in terms of both public health and safety and the effective operation of nuclear power plants. However, a need was identified for assuring that line management personnel possess the managerial and technical education, training, and experience necessary to perform their jobs with a high level of effectiveness.

Clearly, the inclination of people from all four groups interviewed was to favor a certification program. The value to the utilities in terms of public health and safety, it was felt, would depend upon the content of the program, the nature of the process by which the program is implemented, and the extent to which the program has implicatons for training and work force development. The general feeling was that such a certification program should be developed and administered by the utility industry itself. Under this concept a utility's management training and development program would be certified rather than an individual manager. This type of certification would recognize the value of management skills in plant operation and safety and the need for long-term management development as opposed to minimal managerial base-line testing.

In general, the respondents were able to identify quite specifically what they though the technical and managerial requirements for a particular position should be. But they were less certain and often skeptical of whether, or how, the managerial requirements could be assessed in any objective manner. They were generally adamant that written tests or examinations should be avoided as far as possible. The assessment-center technique was identified as a possible means of management evaluation, but one which needed to be developed and applied on a utility-specific basis.

There was general agreement that NRC input would be needed for any program implemented, since NRC is the regulatory body for the nuclear power industry. However, it was felt that NRC's role should be one of guidance. NRC would set up guidelines designed to promote the development of the program, and would perhaps at times monitor the process.

It is important to note that all four interview groups expressed philosophical opposition to further expansion of NRC's regulatory role. In their view the industry itself is best qualified to undertake development and administration of a licensing/certification program.

It is our opinion that NRC would be well advised to explore incorporating into existing organization and management procedures (such as NUREG-0731) the necessary guidelines and procedures for certifying the qualifications of nuclear power plant management personnel. Such an approach would very likely be well received by the industry, and would eliminate the need to develop a new regulatory program.

Several future efforts needed by NRC for such a program are:

- Develop guidelines:
  - Develop guidelines for collection of job audit data in the industry
  - Review other certification programs for applicability
  - Develop specifications which might be included in the program (criteria).

- Identify and review existing NRC guidelines and practices related to management qualifications and capabilities (as contained in NUREG-0731 and elsewhere) for compatability with a certification program.

- Survey industry programs related to: management requirements, assessment of management capabilities, training and management development, and evaluation of management performance.

- Survey management assessment, development, and evaluation practices utilized by other organizations as well as state-of-the-art techniques available to management specialists.

- Prepare draft certification program guidelines based on job requirements.

- Develop and test a draft format for the NRC review process which assures reliability through consistent, standardized methods and instruments.

If NUREG-0731 were chosen as the mechanism for implementing the process, two other efforts would be needed:

- Prepare draft guidelines covering management certification for inclusion in NUREG-0731, and evaluate consistency of management guidelines with guidelines for utility organizations and structures.

- Prepare final guidelines for utility management to be incorporated into final version of NUREG-0731.

Obviously the eventual benefits of any program will to a great extent depend on how well the program is developed in its initial stages. Any certification program put in place should be a mechanism for formally recognizing the professional skills, abilities, knowledge, and experience that would qualify managers to perform their duties in a safe and efficient manner. It should be an integral part of the entire human resources development program, i.e., recruitment, selection, training, and performance appraisal. Such a program should be based on a comprehensive job analysis. and the plant-specific and generic components of the certification program would depend in part on that analysis.

1.0 INTRODUCTION

Section 307(b) of Public Law 96-295 (the appropriation authority act of June 30, 1980, for the Nuclear Regulatory Commission) directed the Nuclear Regulatory Commission (NRC)

> *"to undertake a study of the feasibility and value of licensing ... plant managers of utilization facilities and senior licensee officers responsible for operation of such facilities."*

The Licensee Qualifications Branch (LQB) of the Division of Human Factors Safety (DHFS) was charged with responsibility for the study. The LQB in turn contracted with the Oak Ridge National Laboratory (ORNL) to provide technical assistance in completing the study. This report presents the results of ORNL's efforts, including those of its subcontractor, Science Management Corporation (SMC).

The purpose of the study was to evaluate whether the licensing of nuclear power plant managers and other senior officers responsible for nuclear power plant operations is feasible and, if feasible, whether such licensing would have any value to the public, particularly with respect to public health and safety. The study was exploratory in the sense that, if both feasibility and value were demonstrated, a more extensive study would then need to be conducted to confirm preliminary results and to establish the details of the licensing process.

Our definition and evaluation of "licensing" was not limited to licensing in a narrow professional or legal sense, such as that applied to senior reactor operators, medical doctors, CPAs and professional engineers; rather, a much broader view of the term was employed including the concept of certification, which would require demonstrating that individuals had achieved certain minimum professional credentials. We chose this approach because we were also concerned with assessing the feasibility of achieving the same ends as licensing (e.g., reduction of risk to public health and safety) by means other than formal licensing, such as certification. To indicate this broader definition we have used the term "licensing/certification" rather than the word "licensing."

The key words in the law cited above are feasibility and value. In planning and conducting the study, the word "value" was interpreted in terms of the positive and negative impacts of licensing/certification on public health and safety. The emphasis here was primarily, but not solely, on public health and safety. Therefore, respondents were asked to comment generally on the possible effects on the public, the industry, and the managers themselves.

"Feasibility" was interpreted as consisting of three sequential components: (a) can a licensing process be operationalized; (b) can meaningful technical and managerial criteria be developed; and (c) what should the licensing process be and who should administer it?

To ensure that study efforts were focused on the concerns outlined above, the LQB's project officer developed a set of specific questions to define both the study scope and the particular areas of inquiry and analysis to be followed. The ORNL/SMC project team then used these questions, together with preliminary study experience, to formulate the four basic issues that the study would address, namely:

- Issue #1: Does the "licensing/certification" of nuclear power plant managers and other senior utility personnel have value in terms of public health and safety and the efficient safe and effective operation of nuclear power plants?

- Issue #2: What job-related technical and managerial requirements can and should be included in the "licensing/certification" process, and what senior utility officers should be subject to the process?

- Issue #3: What would be the most valid and practical processes by which the requirements, both managerial and technical, would be assessed? Are there management assessment techniques available that could be used in the "licensing/certification" process?

- Issue #4: If a "licensing/certification" program is to be set in place, who should be responsible for the design and administration of the program, and if groups other than NRC are involved, what would be both their and NRC's roles in the program?

The information required to answer the questions outlined above was acquired through interviews with:

- Persons having expertise in or experience with managerial/executive assessment and appraisal techniques (a literature review was also conducted)
- A cross-section of managers and executives in the nuclear power industry
- NRC personnel, including resident inspectors, regional staff, and personnel in the national headquarters of the Office of Inspection and Enforcement
- Professional societies and other organizations which certify or license professionals.

Details about the samples of interviews, as well as a discussion about the methodology employed, are provided in Section 2. The study results, presented in Section 3, are stated in the form of findings for each of the four major issues outlined above, with separate subsections for each of the interviewee groups. These findings comprise syntheses of the responses. Both majority and minority viewpoints, opinions and beliefs are presented in Section 3. In addition, some "outliers" are included, specifically those for which respondents provided cogent or well-conceived support.

2.0 STUDY METHODOLOGY

This section provides an overview of the study approach and describes the methodology that was employed to develop and conduct the study. The overview includes a description of the development of the principal issues addressed in the field interviews and the approach to data collection and analysis which was decided upon as the most practical. The interview sample, the data collected, the interview guide, the protocol, and the data collection procedures are discussed in the methodology, together with the respective rationales.

2.1 Overview of the Methodology

The study was initiated with a series of planning meetings involving the NRC project officer and members of the ORNL/SMC project team. Efforts focused first on the development of a precise specification of the scope of the study and a definition of the specific objectives to be achieved. For example, considerable effort was devoted to the operational definitions of "feasibility" and "value" and to the "licensing" concept itself. Consideration was also given to the general subject of managerial assessment techniques, the functions and responsibilities of nuclear power plant managers and others, possible criteria for the licensing/certification process, and the relevant management positions upon which the study should focus. Based on guidance from the NRC project officer, it was decided to focus on the position of the nuclear power plant manager but to include one management level above and below him within the range of the target positions. This approach was necessary because of the diversity in organizational structures in the nuclear power industry.

These discussions were the basis for deciding the study approach, the data needs, the sample, the instrumentation and the field interview procedures to be used. Questionnaires and interview guides were developed for use in field interviews with managers in the nuclear power industry, the Institute of Nuclear Power Operations (INPO), management assessment professionals, NRC staff, and professional associations experienced in the professional

licensing or certification of its membership. Concurrently with the first meeting, a review of the management assessment literature was initiated, particularly with respect to the management assessment center technique.

Table 1 on the following page provides a summary of the types of respondents and numbers of interviews that were conducted. Almost all of the interviews were conducted on site by two-person teams. However, a few one-person interviews were performed, and two interviews were conducted by telephone (because of scheduling problems).

The analysis of interview responses was an on-going process throughout the interview phase, and team members met frequently on an informal basis to discuss results. Through this process, a number of specific findings began to emerge, and as a result it was possible to further sharpen the focus of particular questions. A more formal process of analysis was undertaken after most of the interviews had been completed. After initial content-analysis was completed, a 2-day review meeting was conducted to share interview results and highlight the major points in the respondent opinions, resolve any contrary results, and identify the range of opinions that should be expressed in the findings. It is important to note that there was consensus among the team members on virtually all essential points.

In the following sections the sample of respondents interviewed, the data collected, the data collection instruments (interview guides), and the field procedures are discussed.

2.2 Interview Sample Selection

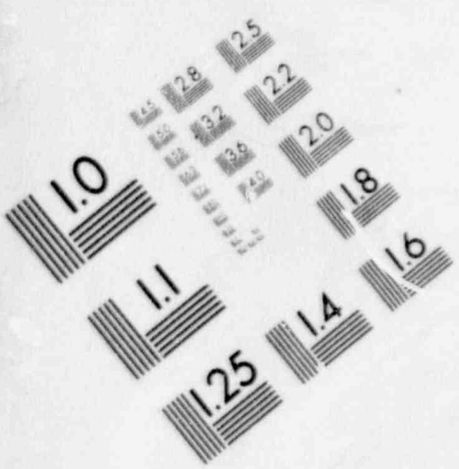
The methodology called for obtaining the views and opinions of persons from several different groups:

- Utility managers because they were the focus of the study and would be the subjects of the licensing/certification process

TABLE 1

SUMMARY OF INTERVIEWS CONDUCTED
(NUMBER OF INTERVIEWS = 68)

CATEGORY OF RESPONDENTS	NUMBER OF SITES	NUMBER OF INTERVIEWS
NUCLEAR POWER INDUSTRY		
. UTILITIES VISITED	8	
. SITES (PLANTS)	10	
. INTERVIEWS CONDUCTED		
- PLANT MANAGERS (OR EQUIVALENT)		10
- ONE LEVEL ABOVE		9
- ONE LEVEL BELOW		12
. INSTITUTE FOR NUCLEAR POWER ORGANIZATIONS (INPO)		4
		35
NUCLEAR REGULATORY COMMISSION		
. RESIDENT INSPECTORS		3
. REGIONS VISITED	3	
. REGIONAL PERSONNEL		11
. I&E PERSONNEL IN HEADQUARTERS		4
		18
RELATED TO ASSESSMENT		
. USERS OF ASSESSMENT TECHNIQUES		
- COMPANIES	5	
- INDIVIDUALS		5
. ASSESSMENT PROFESSIONALS		
- ORGANIZATIONS/COMPANIES	3	
- INDIVIDUALS		5
		10
OTHER PROFESSIONAL ORGANIZATIONS		
. NUMBER OF ORGANIZATIONS	4	
. NUMBER OF INDIVIDUALS		5
		5
TOTAL NUMBER OF INTERVIEWS		68



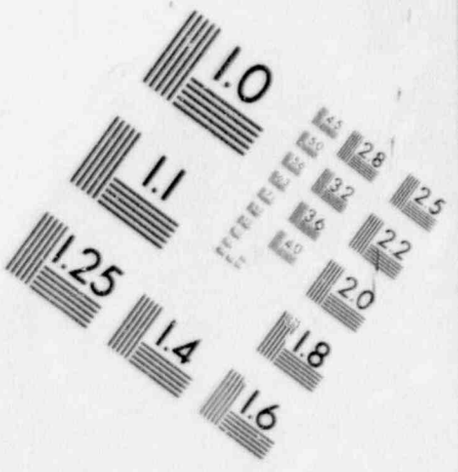
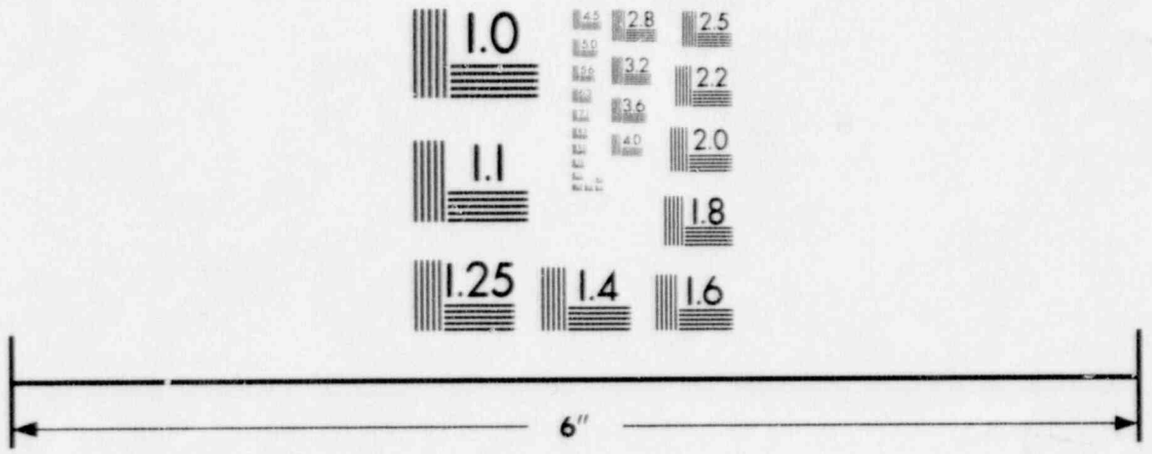
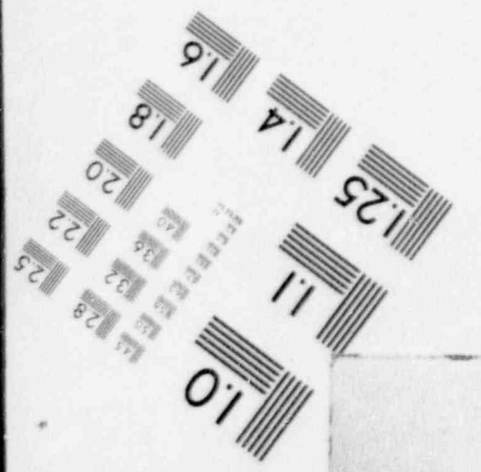
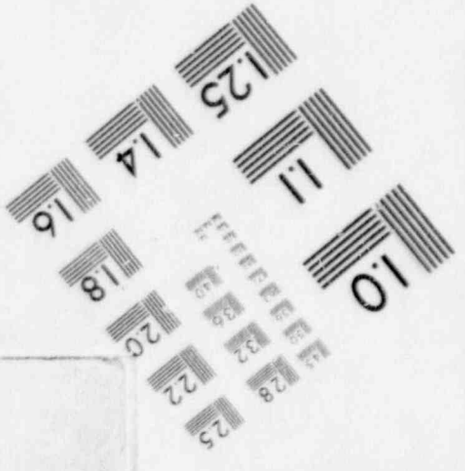
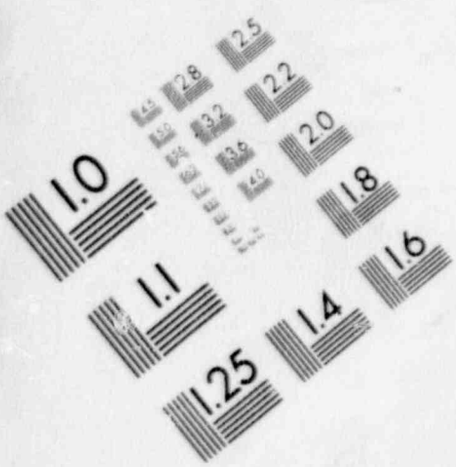


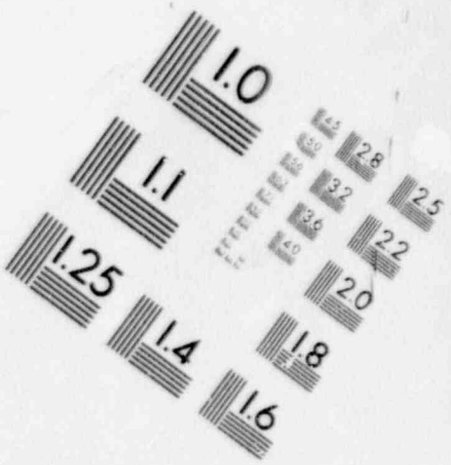
IMAGE EVALUATION
TEST TARGET (MT-3)











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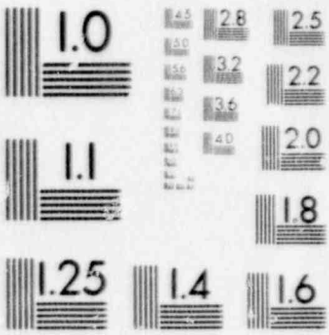

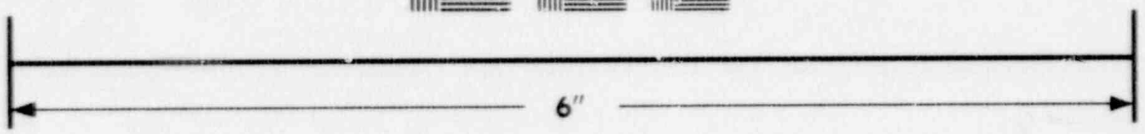

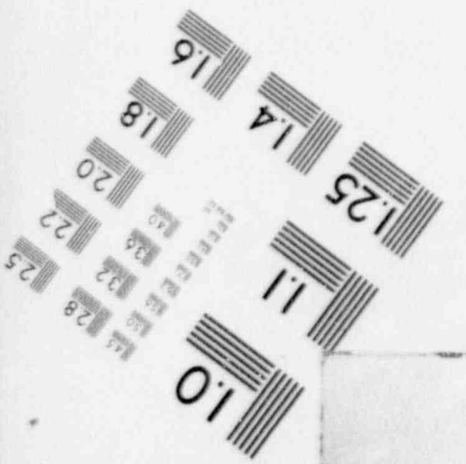

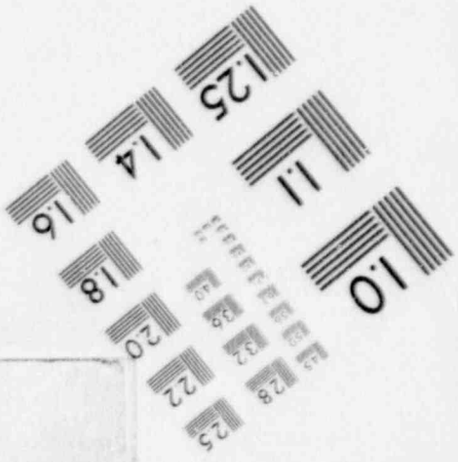

- Utility corporate executives as representatives of the industry and because they too might be included within the the scope of the process

- Representatives of INPO [illegible] of their knowledge of the industry and because INPO might be called upon to assist in or to develop and administer the program.

- NRC personnel because of their knowledge of nuclear power plant operations, the regulatory process, etc., as well as the fact that NRC would be a prime candidate for adminstering or at least monitoring any licensing/certification program that might be developed

- Professional societies and associations, preferably in fields concerned with public health and safety, in which licensing or certification of professionals is required

- Users and practitioners of management development and management assessment techniques, including specifically users of such techniques in the power industry.

The approach selected to obtain the necessary information for persons representing these groups was that of face-to-face interviews. This approach was selected over the alternatives of questionnaire mail-outs and telephone interviewing because it would provide an interviewer with the opportunity to explore topics in greater detail, as well as to stimulate respondents to provide support and rationale for their views.

The decision to conduct face-to-face interviews resulted, however, in the need to restrict interviews to selected samples in each of the target groups. This was necessary because of the limited resources available and the tight schedule. The approaches employed to select the sample in each of the group are described briefly below.

The Nuclear Power Industry

Because of resource limitations, a target of conducting interviews in 8 utilities with nuclear plants was established. This, it was felt, would provide a sufficient cross-section of industry views, since three to four interviews per plant were planned (representing several levels of management.) The issue then became that of establishing the particular utilities and plants that should be visited.

To ensure the selection of a representative cross section, we first formulated a set of selection criteria applicable to both activities and plants. The more important of these were to ensure the inclusion of:

- At least one large multiplant utility
- A spread between small and large utilities and plants
- Several single-plant utilities
- At least one plant located in close proximity to a large metropolitan area
- A range of managerial and functional organizational structures
- Both BWR and PWR plants
- Age (vintage) representation
- Geographical dispersion.

A preliminary sample of utilities and plants was selected using the criteria listed above. Several "back-ups" were also identified for use in the event of scheduling difficulties.

Interviewee Sample from NRC Inspection and Enforcement Division

It was decided that the NRC sample should consist of resident inspectors at the plants included in the utility sample, plus representatives (three to four persons) from all of the regions in which interviews were conducted. It was left to the Regional Directors to nominate the individual interviewees.

The basic NRC sample was augmented with a small sample of four persons from the headquarters offices of the Office of Inspection and Enforcement, including its Director.

Users and Practitioners of Management Assessment Techniques

The selection of organizations and persons in this category was based on a combination of professional knowledge and experience resident in the project team, the literature review that had been conducted at the onset of the study, and referrals by the initial group of persons interviewed.

Two samples were required in this category: companies (preferably utilities) that employ management assessment techniques, and professionals in the field who provide such services. For example, personnel from two utilities who are responsible for the development and implementation of training and personnel assessment programs were interviewed. They currently use a number of assessment approaches and employ the services of assessment center professionals to assist them. In addition, we interviewed persons from one of the leading proponents of the use of management assessment techniques in business and industry, including the assessment center approach.

Professional Societies and Associations

Several professional societies and associations that are involved (directly or indirectly) in the licensing or certification of professionals were known to the project team, and others were identified during the literature review. A minimum sample of three such organizations was established, with provision for expansion in the event results of the initial interviews indicated that this would be desirable.

2.3 Instrumentation and Data Collection

Prior to initiating interviews, interview guides were developed for use by project staff in leading the discussion with interviewees. Each of these guides (except those used for other associations and societies, which were organizationally specific) went through at least two iterations.

Copies of the interview guides that were developed are included in Appendix B. Organization-specific instruments were developed for use in interviews with representatives of professional societies and other organizations in which professionals are licensed or certified.

Nuclear Power Industry Interview Guide

A semi-structured interview instrument was developed for use in guiding interviews with persons in the nuclear power industry (including INPO). It included:

- A personal information summary to record key educational and work experiences of the interviewees

- Questions regarding key work experiences, training and managerial attributes/capabilities that the interviewees felt were essential or desirable requirements for the job

- A section designed to determine the orientation of the position (i.e., with whom the manager dealt most frequently)

- A questionnaire that was used to obtain each interviewee's opinion, ideas, perceptions and comments about the value and nature of licensing or its alternatives.

The questions and prompts included in the guide were developed around the four basic issues listed in Section 1.0. They were designed to provide facts (e.g. how do managers spend their time and with whom do they interact how frequently, etc.), as well as opinions (e.g., with respect to the value of licensing).

It is important to emphasize that the instrument was used as a guide and that the questions were not asked in a serial manner. Also, promising lines of inquiry were pursued in the discussions, even when these had not been addressed on the instrument.

All but two interviews were conducted face-to-face, on-site, by a two-person interview team. One person acted as the interviewer, whereas the second recorded responses and ensured that all topics were covered.

Nuclear Regulatory Commission Interview Guide

The instrument used to guide discussions with NRC personnel was similar to that used for interviews with nuclear power industry managers and executives. However, heavier emphasis was placed on the potential benefits and disadvantages of licensing or certification, the adequacy of the existing processes for plant licensing, who should develop and administer such a program, etc.

Users and Practitioners of Management Assessment

The interview guides that were used for discussions with both users and practitioners focused on uses of management assessment, the techniques involved, where their use is most/least appropriate (both jobs and attributes), benefits and disadvantages, possible legal or ethical probelms, etc.

Respondents were also briefed on the organization of nuclear power plants and provided with an overview of the results being obtained with respect to how power plant managers spend their time, essential and desirable management knowledges, skills and attributes, etc. They were then asked a series of questions to elicit their views on the appropriateness, feasibility, and value of employing management assessment techniques in the nuclear power industry.

Instruments for Use for Interviews with Representatives of Societies and Associations in Which Persons are Licensed or Certified

There were three basic objectives in conducting interviews with persons in this category. Specifically, we wanted to obtain:

- An understanding of the process and techniques used for licensing or certification in that profession
- The interviewees' views of licensing/certification, including the benefits/disadvantages, who they believe should be responsible for administration, etc.
- Their views (after a briefing on nuclear power plant organization and management) as to the value and feasibility of licensing/certification, as well as any alternative approach that they might suggest.

3.0 RESULTS OF THE FIELD INTERVIEWS

In the introduction to this report, we stated the four basic issues around which the questions posed to respondents in the field interviews and telephone discussions were framed. In this section of the report, we have summarized the opinions of those interviewed on each of the issues in question. The format chosen to present them is the narrative discussion. Majority opinions are presented together with key minority opinions and outliers that might be considered important despite their deviation from the general viewpoint.

Respondents were generally willing to discuss the issues at length, and consequently there was quite a diversity of detailed opinion collected on them. Clearly, it would not be useful in such a short and exploratory study to attempt to present all nuances of opinion surrounding each issue. Rather, we have content-analyzed the responses to highlight the major points about which there were consistent opinions; where consistency was absent, we have exercised judgment about which major points to include in the discussion and have also tried to represent the range of opinions encountered where it is useful.

Clearly, the inclination of people from all four groups interviewed was to favor a certification program over legal licensing. Furthermore, they felt that the value to public health and safety would depend upon the content of the program, the nature of the process by which it is implemented, and the extent to which the program had implications for training and workforce development. There was indication, supported by evidence presented in later sections of this report, that the respondent group favored some form of self-developed and self-administered certification program. The respondents' opinion regarding the role of NRC in such a situation is discussed later in this report.

3.1 Issue #1: Does the "licensing/certification" of nuclear power plant managers and other senior licensee personnel have value in terms of public health and safety and the efficient, safe and effective operation of nuclear power plants?

3.1.0 Background and General Comments

This issue obviously aims at the kernel of the proposed licensing/certification of management personnel -- its perceived impact on public health and safety. The interviewers did not provide respondents with the linkage between safety and managerial competence, but rather allowed them to consider the question without prompting and then conducted probing discussions around the points raised. There was, however, a preceding discussion of licensing and certification in order to expand the concept beyond the existing Reactor Operator (RO) and Senior Reactor Operator (SRO) licensing process, which is technical in nature, emphasizes cognitive knowledge, and has no management component.

Discussion of the value of licensing/certification of senior management personnel was hampered by difficulties in identifying who (i.e., what positions) were to be the subjects of the licensing process. It was clear that there was great diversity among utilities, and even among nuclear plants in the same utility, in terms of the job functions associated with what initially appear to be comparable positions. There is no standard organizational structure through which the nuclear facilities are operated, and this also made the clustering of responses in terms of specific positions more difficult. For this reason, we have resisted the temptation to separate the respondents into position categories in the analyses.

With the utilities personnel, and to some extent with NRC personnel also, we encountered considerable skepticism regarding the feasibility of defining valid management criteria, and even more doubt regarding the ability to measure management capabilities in a valid and reliable way. This made discussion of the first issue -- the value of licensing/certification -- somewhat difficult and required that respondents be asked to suspend their doubts and presuppose that it was possible to do so.

3.1.1 Viewpoints from the Nuclear Power Industry

There was a clear consensus that the licensing/certification of management personnel, if conceived as a legal requirement in the same way as the SRO licenses, is undesirable and would probably be counterproductive in terms of both public health and safety and the safe and effective operation of nuclear power plants. Respondents felt that senior management personnel are already burdened and their time is limited; any additional regulation which took them away from their duties on site would threaten their ability to fulfill their responsibilities adequately and thus threaten the safe operation of the plants. One possible advantage (which the respondents perceived as being heavily outweighted by the disadvantages) was the possible positive impact it might have on the industry's public image, but even that was considered very uncertain.

There was, however, support for the concept of certification if indeed some process for recognizing and requiring formal professional credentials of senior managerial personnel were to be put in place. Certification was seen to differ from the licensing concept in that it would not be conceived as a privilege that could be granted or withheld at the volition of a legal regulatory body; rather it would be viewed as evidence that the holders had attained certain minimum standards of professional ability, skill and accomplishment that are considered necessary to effectively discharge the requirements of their positions.

There were some respondents who rejected the notion of placing any additional regulatory requirements on senior management personnel beyond those already present in the periodic management reviews performed by NRC on a utility-wide basis. These individuals felt that the current process provides NRC with the necessary leverage for achieving the desired objectives of licensing.

Those who favored the certification approach offered the following reasons for their viewpoint:

- Screening would be improved for all utility management positions, thereby increasing the calibre of all key decision-making management personnel

- The certification requirements would serve to help define job requirements and standards upon which manpower development, manpower planning and training programs could be based, thereby improving the calibre of future managers.

- The certification process, if appropriately publicized, would help to promote greater public confidence regarding the safe operation of nuclear power facilities.

The supporters of certification were at pains to point out, however, that their support presupposed that a careful job analysis of the positions to be certified would be performed to define criteria and set both general and plant-specific requirements, and that these would go beyond the ANSI/ANS 3.1 standards currently under review, particularly in the area of training. Further, their support would also depend on the nature of the process and procedures that would be employed to implement the program.

A minority of respondents who oppose both licensing and certification raised the following objections:

- The basic goal of enhanced public health and safety would not be served in any way and could be jeopardized, as stated earlier.

- Current NRC inspections of the utilities are adequate to control and regulate managers by auditing utility management as a whole without additional regulatory requirements

- The calibre of management personnel would not be improved in that the self-interest of utilities is currently directed toward identifying, training and selecting the best people available.

- There might be a tendency on the one hand to set minimum criteria to cover the diversity of the industry, which might fail to distinguish among different calibres of personnel and impede selection on the basis of merit by setting the standards that tend to be over-broad. On the other hand, there might be a tendency to set very detailed, idealistic or impractical requirements which few could meet, thereby discouraging or excluding otherwise qualified people.

It should be pointed out that even those persons opposed to licensing and/or certification were nevertheless able to identify quite specific job qualifications and performance requirements that they considered either

essential or very desirable (discussed below under Issues 2 and 3). Their central point was not that personnel qualifications and position requirements were not or could not be established, but that there were alternatives available that could achieve the same goals without the need for further regulation, such as self-policing management training programs, or professional certification by the industry itself.

3.1.2 Viewpoints from the NRC Inspection and Enforcement Division

The majority of those interviewed, while opposing legal licensing, did see a need for some kind of certification process for the industry. Certification was seen as a process wherein standards would be established for formal professional credentials to ensure that managers had met certain minimum standards of both education and experience. Those respondents who favored certification over licensing cited the following reasons for support:

- The certification process would provide a means of screening individuals who enter into utility management to ensure that potential managers have the necessary skills and abilities.
- Certification would provide a consistent approach to qualifying individuals in management positions by defining job requirements and standards.
- Certification would both improve the safety of the utilities and improve the public's perception of their interest in safety in operating nuclear power stations.

A minority favored the licensing of utilities rather than individuals. These respondents believed that by using this approach the NRC would be able to exercise a greater degree of control over utility management (which is also precisely why others strongly opposed this approach). Under this concept, the utility would be licensed with a qualified management personnel "team" as authorized users under the license.

Only a small minority of NRC personnel expressed a positive attitude toward the concept of licensing of nuclear power utility managers (as a process similar to that used in acquiring an SRO license). Those respondents who did favor licensing did so because they felt that direct health

and safety benefits would result from requiring personnel to be more effective and responsible and that licensing could promote this. Licensing of individual managers was also perceived as a means of assuring the public of the qualifications of nuclear power utility management.

Finally, there were a few individuals who saw no need for either licensing or certification. Objections were based on the following grounds:

- There is an already existing review process for utilities whereby NRC can determine which utilities are performing up to standard and which are not.
- Management is too difficult to quantify. Technical skills may be necessary for the team but not for every individual. Licensing/certification is too prescriptive, and would prevent utilities from developing workable staffs.
- Licensing/certification could result in false confidence in the efficacy of the process.

3.1.3 Viewpoints from Professional Organizations and Societies

Professional association executives typically reject the notion of licensing by government in favor of self-administered certification programs. One organization contacted, the American Institute of Certified Public Accountants, does require certification by a state board of accountancy as a requirement for membership. Another, the National Society of Professional Engineers, administers a certification program for engineering technicians, although architects and engineers are presently licesed by state boards in all 50 states.

No association executive contacted expressed a positive attitude toward legal licensing of senior nuclear power plant managers, although several did not feel they had sufficient information to legitimately comment on the idea. An executive with an association that administers an accreditation program for its members felt personally that licensing nuclear plant managers would probably lower standards by focusing solely on NRC's concern with technical safety as opposed to covering a wide range of both technical and managerial requirements. The interviewee supported

this contention by comparing the management of U.S. airports to those in Canada where airports are owned and operated by government personnel. He claimed that U.S. airport management was far superior to Canadian management and that U.S. airport operating costs were much lower.

While association executives had no comment or were opposed to licensing of nuclear plant managers, the consensus favored some form of self-developed and self-administered certification program. Although these interviewees did not know enough about nuclear plant management to specify the content of a certification program, most felt that management capabilities as opposed to technical knowledge should constitute an important dimension of the program. Hypothesized benefits from a certification program included more efficient and safer plant operation through enhanced management, increased public assurance that plant managers are well qualified for the positions they hold, and an upgrading of utility management in general.

Several association and society representatives expressed strong opinions in favor of professional "self-policing" (including voluntary, non-mandatory accreditation or certification by the organization) as a means of improving professionalism, upgrading knowledge and skills, and generally enhancing the profession's stature.

3.1.4 Viewpoints from Management Development and Assessment Professionals

Executives involved in personnel and organizational development generally held views similar to those of persons from professional societies, albeit they expressed stronger positions on the negative consequences of licensing and the desirability of self-administered certification.

The most common negative position expressed by interviewees whose responsibilities presently include management training and development was that licensing would be an additional burden on the nuclear industry with no corresponding benefits either to safety or real managerial competency. Formal licensing by NRC, they felt, would inevitably focus on narrow

technical issues where plant managers were already qualified. The critical areas of concern are managerial and interpersonal skills where plant managers, because of their technical backgrounds, are often deficient. More appropriate and beneficial to both the public and the utility, they felt, would be a certification process based on a training and development program for management personnel. Under this concept, the utility's management training program would be certified rather than the individual manager. This type of certification would recognize the value of management skills in plant operation and safety, the general lack of emphasis on such skills in the training of many plant managers, and the need for ongoing, long-term management development as opposed to a minimal managerial base-line testing.

3.2 Issue #2: What job-related technical managerial requirements can and should be included in the licensing/certification process, and what senior licensee officers should be subject to the process?

3.2.0 Background and General Comments

The questions formulated to address this issue hypothesized that some form of licensing/certification program would be set in place, although what form it might take and what its content might be were allowed to remain undefined. Respondents were asked to give their opinions on the managerial and technical qualifications and accomplishment that they thought should be demonstrated by managers to hold senior management positions. They were asked about the background experiences, training and education that they considered were minimum requirements, and those managerial attributes managers should possess to be able to successfully discharge the responsibilities of their position. They were also asked to identify those management levels or specific positions which they thought should be subject to the licensing/certification process.

In general, the respondents were able to identify, quite specifically, what they thought the technical and managerial requirements should be; however, they were less certain (and often skeptical) of whether, or how, those

requirements could be assessed in any objective manner, with the exception of technical knowledge. They were generally adamant that written tests or examinations should be avoided as far as possible.

3.2.1 Viewpoints from the Nuclear Power Industry

Generally, it was thought that the plant manager's role and those of other senior officials, both above and below the plant manager, were more managerial than technical and that any licensing program should recognize this. Most respondents referred to ANSI standards of experience, training and education when asked to recommend requirements, particularly those for plant managers. Most felt that, while the standards were generally acceptable, they were not sufficiently targeted on the individual position requirements, particularly in the area of training; more detail was thought to be needed. There were varied opinions on the degree requirements in ANSI/ANS 3.1, and many felt that more flexibility was required to accommodate the exceptional person who did not meet the standards. Most felt that the degree requirement was probably unnecessary below the plant manager level. They also felt it likely that future managers would have a degree; i.e., that the passage of time and the maturity of the industry would take care of any degree requirements felt to be necessary.

Some respondents pointed out that to dichotomize technical and managerial skills and abilities was a false distinction in that managerial activity and decision-making ultimately involved the technical nature of the plant, particularly under high-stress situations (decisions regarding outages, for example).

Technical skills, knowledge and abilities were thought to become increasingly important as one moved down the organization from the plant manager. Above the plant manager at the corporate level in the nuclear chain, management attributes became increasingly important as management activities moved more toward planning, resource development and organization. There was, however, some variation of opinion regarding the level of technical ability that positions above the plant manager required. One Vice President of Nuclear Operations asserted that not only was he involved quite deeply in the technical subject matter of his subordinates but that he actually made important technical decisions that required specific scientific and engineering knowledge.

This was an exception, but it underscores the differences between utilities in terms of the functional responsibilities and behavior of people in apparently similar positions.

One aspect of this issue is the question of the organization level at which "senior licensee officers" should be included in the licensing/certification process. Respondents, however, in some cases extended their responses beyond senior management to the organization as a whole. The opinions are summarized on two levels: (1) for senior managerial positions only and (2) for all positions, plant-wide, both managerial and technical.

If there was a trend at all in terms of managerial personnel, it leaned toward the opinion that the highest level included should be the plant manager or that person on-site with the highest decision authority (in some cases the Vice President for Nuclear Operations may be located at the plant site rather than at headquarters). There was some opinion on the part of the corporate level managers that the process should reach as high as the senior Vice President for Nuclear Operations, or whoever is the senior nuclear officer, particularly if the licensing program is a professional certification program with training implications rather than a legal, regulatory requirement. Very few of those interviewed at the plant level felt there was a need to extend the process to the corporate level.

Most felt that the top supervisory level (Superintendent of Operations, Superintendent of Technical Services, etc.) was probably the lowest level at which managerial personnel should be certified, although there were some who extended this all the way down to first-line supervisors. There was also some feeling that not <u>all</u> supervisors at the top level need to be included, but that the focus should be on operations and maintenance mainly and possibly technical services. Again, it was pointed out that this would vary because of the differing organizational structures among the utilities and the different functional responsibilities assigned to positions.

When asked about non-management positions, respondents felt that some form of certification was appropriate down at least to the engineer level, although obviously below line management positions such licenses would involve technical skilss and abilities almost exclusively.

Below are the major points summarized in terms of the managerial and technical requirements:

Managerial Requirements

- Plant managers, corporate managers and other line managers should have a minimum of several years' experience in the nuclear power industry, depending on the individual and the positions previously held. (Minimum estimates ranged from 1-2 years to as many as 4-5 years, largely depending upon the amount of additional experience in fossil plants.) Some of the nuclear experience should be in the particular plant or utility in which the manager will or does work.

- There was some variation regarding how much experience in the electrical power industry in general (either fossil or nuclear) was necessary for the plant manager; the range was anywhere from a minimum of 5 to 15 years. Many persons cited ANSI 3.1 standards as the appropriate criteria. Vice-presidents were seen to require longer periods of experience in the nuclear power industry, as all stressed that nuclear operations differed greatly from those of fossil plants.

- Plant managers and executives above them should have experience supervising large numbers of staff (more than 20 persons at least).

- Mobility through a number of key areas of plant operations was seen to be a necessary career route for plant managers, particularly operations and maintenance (although one manager is a health physicist), since mobility provides a broad understanding of plant systems and the interrelatedness of the many functional units in the plant's organization.

- More than their fossil counterparts, nuclear plant managers should have a good knowledge of the government regulatory process and how plant operations relates to this process.

- The need for experience and training in areas such as public relations and labor relations varied from plant to plant, depending on the functional responsibilities of the positions in question as defined in the organization. Some respondents considered that labor relations experience and ability was essential while others saw it as a desirable attribute but not a critical one because such a function was assigned to others quite frequently.

- Virtually all interviewees expressed the opinion that management training was an essential prerequisite for senior management personnel. Most felt that such training programs already existed in their organizations to accommodate this need or were in development. This opinion was expressed in both large and small

utilities. (All of the utilities visited in the course of this study have committed resources to management training programs. It should be pointed out that this study did not assess the management programs per se, and we cannot make any judgments regarding the quality of the different programs. However, at least one utility has shown its serious recognition of the importance of management training by its commitment in terms of dollars per year for this aspect.) The utilities felt that (a) they were already addressing the felt need for management training, both general and industry/utility-specific; (b) they are doing so in a variety of ways but not necessarily solely through a formal degree program; and (c) their programs of training and education are tailored to the industry's needs, which they feel is the most effective course of action.

- Although a general opinion was not evident, it was suggested on several occasions that certification requirements should examine some plant-specific aspects of the job. For example, managers should demonstrate a sound knowledge of the management systems at both the plant and corporate levels. The implication of this (and one that was occasionally expressed) was that the possibility of certifying the managers on the specific plant (just as operators are) should be considered.

The background experience, training and education described above can be readily assessed through a records review in most instances or through techniques such as oral board interviews or peer reviews. However, most felt that it would be difficult to define the behavioral attributes of managers which contribute to successful managerial performance on the job, and to objectively measure them. For example, all respondents stressed the importance of human-relations skills and team building. How to incorporate such an attribute in a certification program is a difficult question to answer, and would require a more detailed study.

Those management attributes considered essential to the plant manager's job were:

- An understanding of the management team approach and an ability to function as part of such a team
- Strong planning abilities
- Good public relations skills
- A commitment to, a knowledge of, and an ability in workforce development, including manpower planning, human resource development, and related skills.

Most interviewees felt that the senior managers should have progressed on at least a 5-10 year career path through the ranks. Major utilities with established nuclear programs maintained that this was a fait accompli and thus unnecessary for anyone to monitor or regulate in any way.

Technical Requirements

Few respondents felt that in-depth technical knowledge in specific scientific and engineering disciplines was a requirement of positions at the plant manager level and above. Rather, persons at these levels need to have demonstrated a solid understanding of the technical consequences of the systems in their plants. Thus, a broad technical knowledge of the technology involved, cutting across the different functional areas they must manage, should be demonstrated. The main points of respondents' opinions were:

- A formal academic degree in science or engineering was generally considered desirable. However, it was thought that the licensing system should be flexible enough to accommodate the exception. Thus some form of equivalency should be incorporated, but it should have very rigorous standards and not merely reflect, say, years on the job.

- Although interviewees agreed that senior managers (excepting supervisors of operations perhaps) should not be required to hold or have held an operator's license, a number of persons felt that they should have undergone the training programs leading to such licenses. Such training, it is felt, provides a good understanding of what is involved in the operation of the plant, which was considered essential. Few felt that it was necessary to have had actual experience as an operator. Several did say that some shift management experience might be desirable, however.

- Systems training, education and experience was considered highly desirable in the senior managers' backgrounds.

- Specific in-depth training in special areas such as fire protection was not thought to be necessary, but managers should be able to demonstrate an understanding of the relationships of all aspects of plant operation to health and safety concerns, and the systems available to them in addressing them. Many persons stressed that a plant manager's responsibility is to set policies requiring such awareness all the way down the organization and that he should actively monitor the organization to ensure that these policies were in effect.

3.2.2 Viewpoints from the NRC Inspection and Enforcement Division

The views expressed by the majority of interviewees from the Nuclear Regulatory Commission were surprisingly similar to the consensus positions from persons in the nuclear power industry. However, NRC staff placed more emphasis on the technical requirements of the positions. Utility managers emphasized that their jobs were more heavily oriented toward management skills and abilities. The exception to this was the common opinion held by NRC and utility personnel interviewed that it was desirable for managers to have obtained SRO license training at some time, which is largely technical in nature. Both groups felt that while the license need not be maintained (should not), the SRO training would be helpful to the plant manager. A very small minority of NRC staff felt that it should be a requirement.

When NRC personnel were asked to cite those requirements that should be included in a licensing or certification process for someone at the plant manager level, there was a clear consensus on the most important managerial and technical skills. All respondents cited supervisory experience as a necessary requirement; however, the number of years of prior experience suggested varied from 2 to as many as 10 years. Almost all respondents agreed that prior technical experience in the nuclear power industry, plus experience in a variety of positions in the power industry, were also requirements that should be addressed in a licensing/certification process. Conversely, previous experience in the areas of public relations, governmental relations, and negotiations and labor relations were viewed by the majority of NRC interviewees as being desirable but not mandatory.

Regarding education and training, almost everyone agreed that a degree in engineering or in a "hard" science was appropriate, with the stipulation that allowances had to be made for those individuals who have the knowledge without the formal degree. Training, particularly in the area of crisis management, was viewed by all respondents as being desirable but difficult if not impossible to provide. Virtually all NRC personnel expressed the belief that plant managers should receive special training in a variety of management disciplines, but few persons were willing to go so far as to say that this should be a requirement. Many NRC staff expressed the belief that the knowledges and skills that would be developed through special training would have had to have been demonstrated at lower levels of the

organization in order for a manager to have advanced. However, a vocal minority took strong exception to this position.

There was some reluctance on the part of many NRC personnel to address the specific managerial attributes and knowledge that plant managers and others should possess. Most were willing to agree that nuclear power plant managers probably did spend in the range of 60-80 percent of their time on managerial and administrative vis-a-vis technical matters. A number of these persons observed that the distribution of managers' time was unlikely to provide guidance with respect to the criticality of their various technical and managerial responsibilities.

3.2.3 Viewpoints from Association Executives and Management Assessment Professionals

The almost universal opinion among association executives and management assessment professionals, both in and out of the nuclear industry, is that licensing -- or their preferred option, voluntary certification -- should focus on managerial skills. These skills include interpersonal relations, decision-making, communications, resource management, team building, leadership, and a wide variety of others which are generic to management in almost any environment. Interviewees from these groups were not concerned about technical skills which they tended to consider of secondary importance.

People interviewed from outside the nuclear utility industry were not familiar with nuclear plant organizational structures and functional responsibilities and had no opinion on who should be included in a licensing program. Since they were opposed to licensing, utility training and personnel executives involved with management development also would not express an opinion about who should be licensed. When the focus of discussion changed from licensing to certification, several of these executives held that a management development program should be applied to all levels of utility management, from the plant level to the corporate level.

The exact conduct of a management training and development program established to meet certification requirements would depend on three factors: the overall organizational and functional structure of the utility, position requirements and career paths, and the managerial strengths and weaknesses

of each manager. As described by one utility training director, the organizational structure and each managerial position should be analyzed to identify managerial skills requirements, and managers should be assessed based on those requirements. Where areas of weakness were identified, a specific training and development program would be established and carried out. Managers would be reassessed on a regular basis to track the progress of the development program and to revise the program as needed. Certification of the management development program would involve an outside review (by INPO, NRC, or an assessment professional) of (1) the organization and position analysis, (2) the management assessment program, (3) the management and its implementation training program, and (4) the system of management reassessment and training program improvement. The certification process would be designed to ensure that the management development program was in place and regularly and systematically applied and updated.

It was pointed out by several assessment professionals (practitioners and users) that the managerial requirements of nuclear plant managers and other supervisory positions could be systematically identified and defined using existing task analysis and assessment techniques, and that managers could be tested and judged based on those requirements. The general feeling, however, was that the specification of requirements and the assessment of managers was more appropriate in the context of training and development rather than a single "pass-fail" decision. From this perspective, managerial certification is seen as a process rather than an event and certification is program-related rather than manager-specific.* The objective would not be to ensure that plant managers meet minimal requirements, since this is already done through the normal selection process, but that plant managers were improving their managerial capabilities. This is a movement beyond the "minimum requirements" approach to a more developmental concept.

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*Our impression is that many of the NPP managers and NRC staff who were interviewed would concur fully with this view. In retrospect, it is now clear that a number of persons "grappled" with this concept but were unable to articulate it.

3.3 Issue #3: What is the most practical and valid process by which the managerial and technical requirements of senior management positions could be assessed? Are there proven managerial assessment techniques (such as the assessment center approach) that could be used in the licensing/certification process?

3.3.0 Background and General Comments

One of the difficulties encountered in addressing this question was the tendency for respondents to think in terms of licensing/certification as the granting of a piece of paper -- a "ticket" -- on the basis of a written test, that is, as a result of a process similar to that employed in SRO licensing. It was frequently necessary to pull respondents back to the broader alternatives from the more narrow definition implied by the written testing procedure. This was done when it appeared to the interviewer that the respondent was indeed responding on the basis of a procedure that was conceived as being similar to SRO licensing. Nevertheless, it is not clear to what extent this tendency on the part of interviewees may have confounded responses in terms of the intent of the questions.

3.3.1 Viewpoints from the Nuclear Power Industry

Most respondents indicated that their opinions on how the licensing program should be implemented and the procedures most appropriate to assess managerial qualifications and competencies would depend on the content of the program and the criteria that were established. Nevertheless, the respondents were quite firm on a number of points about the procedures that should not be used, and there was consensus on the general approach that should be employed. The major points were:

- Written tests of technical or managerial knowledge should be avoided. Such tests were considered to be usually unrelated to effective job performance.
- Current NRC management assessment procedures applied through the management review process were already adequate to identify management problems. Perhaps some greater specificity or targeting of the evaluations to specific positions could be accomplished, but by and large it was felt that the appropriate mechanism is already in place.

- An overwhelming majority of respondents considered that the most practical and relevant approach to licensing or certifying management personnel would be through a process involving one or several of the following: oral board interviews, record and background reviews, testimony of significant past supervisors and peers, peer review panels comprised of other persons in the same positions, and/or some plant-specific simulation exercises that would examine knowledge of the particular plant operations and utility organization.

- Certification should take place on entry to a position and should not necessarily be repeated, although a requirement for periodic "refresher" training could be included. Any process that required the managers to be taken away or distracted from their duties at the plant for inordinate periods of time was to be avoided at all costs. Managers are already extremely burdened it was felt, and the pay-off for such distractions was likely to be marginal in terms of enhanced public health and safety.

With respect to the first point above, most individuals rejected testing (including use of assessment centers) because they are convinced that is is impossible to objectively "measure" or assess managers in any field, much less their own, through testing, and they are highly skeptical about any claims to the contrary.

3.3.2 Viewpoints from the NRC Inspection and Enforcement Division

There was greater diversity in the views of the NRC personnel who were interviewed than in the industry groups, and a clear consensus did not emerge on any key points. For example, although NRC staff were generally as skeptical as industry about the value, effectiveness and validity of managerial assessment, a larger proportion were willing to suspend their disbelief and "assume that valid techniques could be developed." Despite this caveat, however, a substantial majority of the interviewees were still opposed to written examinations.

Those individuals who thought that written examinations would be a valid part of the licensing/certification process tended to focus this method of testing on specific knowledge of nuclear engineering principles and technical systems and in-depth knowledge of plant-specific technical specifications. This group tended to see licensing in terms of technical rather than managerial skills, even though they agreed that at the senior management positions the emphasis of the job was heavily on managerial rather than technical activities and responsibilities.

Many NRC interviewees advocated a process involving a combination of oral testing by an established review board and procedures to ensure that certain minimum education and experience standards are met. It should be noted, however, that every person interviewed favored the notion of equivalency. Although establishing standards was felt to be desirable, most felt that rigid standards would be unfair to at least a minority of persons who, although perhaps not meeting the standards, were nevertheless fully qualified to manage nuclear power stations.

One idea that was suggested in one of the regions was the establishment of a federally-funded nuclear safety school. The school would concentrate on non-technical areas such as nuclear regulations and programs, which are focused on the managerial roles of utility managers. Periodic attendance would be required by plant managers and others, with no certification or licensing involved.

Mixed opinions were expressed on the question of whether the current NRC management review process (as it now exists or strengthened in some way) is an adequate alternative to licensing or certification of managers. Some felt that the two processes (the present review process and a licensing or certification program) should be combined.

3.3.3 Viewpoints from Association Executives and Societies

All of the professional associations contacted employ a combination of procedures to assess requirements for certification. Typically, these include some combination of education, experience and demonstrated ability to carry out the responsibilities of the profession. In the case of the Institute for Management Consultants, certification requires a college degree, 5 years of direct experience, attendance at a 3-day training program, the submission of written essays describing several specific consulting techniques and their application, and an oral examination by a panel of three senior consulting practitioners. The American Association of Airport Executives has a similar set of procedures which include submission of a lengthy thesis as well as oral and written examinations, and which requires 3 years of direct experience in airport management.

All of the association and assessment interviewees agreed that licensing/certification requirements for plant managers should focus on managerial skills and consequently could not be "measured" or satisfied simply by demonstrating some combination of education and experience since these factors are unsatisfactory predictors of managerial performance. Rather, as with the association programs, they felt that other measures of managerial competence should be applied.

3.3.4 Viewpoints from Management Development and Assessment Professionals

In addition to the procedures more commonly used (and listed above under 3.3.3) such as oral and written tests and/or presentations, etc., a growing number of businesses and organizations have turned to the assessment center technique as a method of management assessment. As described by the president of the largest assessment center in the U.S., the assessment center technique involves a five-step process:

- A systematic analysis of the tasks (requirements) of a position or set of positions
- The organization of these tasks into common categories called dimensions (a form of behavioral factor analysis)
- The identification of the skills necessary to carry out these tasks
- The development of simulations where these skills are called for
- The assessment of how managers (or managerial candidates) perform in these simulations.

The assessment center technique places managers in a series of simulations, each designed to tap specific skills required by a management position. The manager's performance in these simulations is viewed and evaluated by a panel of assessors specifically trained to weigh skill and performance levels.

As verified by a review of management science literature, the assessment center technique has gained wide acceptance during the past 10 years. First developed at American Telephone and Telegraph Company, the assessment center technique is currently utilized by a large number of the "Fortune 500" companies in the U.S., as well as major companies and organizations world-wide.

A review of the literature reveals two key reasons for the increasing use of the assessment center technique for placement, promotion and diagnosis of personnel in business and industry. One reason is that the assessment center technique seems to provide a more objective and reliable measure of management ability than the more traditional assessment techniques such as paper tests and interviews. Byham has compared traditional selection processes and the assessment center and found a higher degree of consistency among the assessor ratings from among test scores or the results of multiple interviews.[1] In a more statistically based analysis, Morse and Wagner found significantly higher correlations between assessment center measures than between responses to paper tests.[2]

In addition to this issue of reliability, a review of management science literature also reveals a strong belief in the practical validity of the assessment center technique. Such validity, however, is less substantiated and is based primarily on testimonials on how well it works by business executives who use the assessment center technique. Indeed, no rigorous methodological study was found that clearly demonstrated that the assessment center technique actually predicts better managers.[3] In essence, the technique has gained widespread acceptance because (a) it provides an internally consistent method of evaluating managers and (b) many practitioners, users, and others believe that it works. A selected bibliography of literature on management assessment and the assessment center approach upon which these conclusions are based in presented in Appendix A to this report.

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[1] *William Byham, "Helping Managers Find the Best Candidate for the Job with Assessment Center Techniques," Training, Vol.16, No. 11, Nov. 1979*

[2] *John Morse and Francis Wagner "Measuring the Process of Managerial Effectiveness," Academy of Management Journal, Vol. 21, No. 1, 1975*

[3] *Richard Kleinosici and William Strickland, "Assessment Centers - Valid or Merely Prescient?", Personnel Psychology, Vol. 30, No. 3, Autumn 1977.*

A number of nuclear and non-nuclear utilities currently use the assessment center technique for placement and career development of entry and mid-level personnel. Assessment practitioners and assessment professionals among the utilities contacted were unable, however, to identify any utility currently using the assessment center technique as the basis for filling plant and other senior manager positions; but all agreed that the assessment center technique could be used for licensing/certification at this level. This technique was viewed by all interviewees as far superior to written tests or even licensing/certification based on some education-experience formula.

If the assessment-center concept were adapted for use in licensing/certification, and the five-step procedure described earlier were followed, plant manager and other supervisory positions would be systematically analyzed to determine managerial components and corresponding skill requirements; management candidates would then be assessed through use of multiple simulations viewed by multiple assessors. Licensing would be based on a satisfactory rating by the assessors on all of the skill dimensions. Assurance that licensing requirements had been met could be achieved by using NRC personnel as assessors, through use of NRC approved assessment professionals as assessors (somewhat like third-party inspectors) or through NRC review of assessment center records including, as one practitioner pointed out, videotapes of the simulations and assessment proceedings.

3.4 Issue #4: If a licensing/certification program is to be set in place, who should be responsible for the design and administration of the program, and if groups other than NRC are involved, what would be both their and NRC's roles in the program?

3.4.0 Background and General Comments

Interviewees were offered a number of choices as to who should administer a licensing/certification program. These included:

- The NRC
- A special accrediting agency set up for the purpose
- A university
- A private group or concern
- Industry through, for example, INPO
- A professional society.

As discussed below, several interviewees offered other suggestions, such as the utilities themselves (with or without audit/monitoring by NRC and/or INPO).

3.4.1 Viewpoints from the Nuclear Power Industry

Most respondents felt that the industry or its representative organizations should conduct and administer a licensing or certification program if such a program were to be set in place. INPO was the overwhelming choice of nuclear power plant managers and others as the organization that was probably most appropriate. Approximately two-thirds of the interviewees selected INPO as their first choice, but there was a strong, vocal minority that was opposed to INPO. Also, much of the support for INPO can be characterized as lukewarm at best; a number of persons felt that INPO was simply the least objectionable among the possibilities because it was an industry organization.

Opposition to INPO involved two principal concerns. First, many people (including many who favored INPO's leadership in licensing) felt that it lacked the internal capabilities for developing such a program. Second, some individuals felt that such a role could compromise INPO in meeting the goals and objectives that have been established for it. Conversely, however, several persons felt that the selection of INPO would enhance its image and strengthen its role as both a spokesman and servant of the industry. They felt that the nuclear power industry needs a strong self-regulating professional organization and that this would strengthen INPO's role in this regard.

A few persons recommended that the utilities themselves administer the program, several suggested NRC, and about an equal number favored some organization (undefined) other than those on the list. On the other hand, there was strong opposition to NRC in this role by well over half the industry people interviewed.

Opposition to NRC was basically on two grounds: philosophical opposition to an increase in the scope of NRC's responsibilities and the belief that NRC lacks the resources to properly administer such a program, even if it were developed by a qualified outside group or organization.

The findings outlined above must be viewed in the context of the industry's general opposition to licensing or certification. As discussed previously, most industry managers and executives would prefer to see guidelines only.

3.4.2 Viewpoints from the NRC Inspection and Enforcement Division

A clear majority of the NRC personnel who were interviewed strongly opposed NRC administration of a licensing program other than perhaps in a monitoring and audit role. Most of this group felt that such a role should not have a legal or regulatory basis. The minority that favored NRC administration tended to believe that such a program should be operated through NRC's regional offices rather than from headquarters.

Opposition to NRC's administration of the program invariably involved several of the following concerns:

- Belief that NRC lacks the resources to develop and properly administer such a program
- Philosophical opposition to further expansion of NRC's regulatory role, particularly on the management side of the utility business
- The feeling that NRC's participation would place an imprimatur on the program that was not warranted; that is, the belief that NRC's administration could place it in an untenable position in the future in the event of utility "problems" due to mis-management.

- The view that the industry itself (e.g. through INPO) was best qualified to undertake development and administration of such a program. Some felt that this would help to "professionalize" the industry.

It should be emphasized that most of those opposed to a formal role for NRC in this process had also been opposed to licensing and, for the most part, to certification as well. Most of these persons also expressed their opposition to NRC's administration of the program rather forcefully. However, there was far less confidence and conviction when attention turned to who then should administer the program. Nevertheless, a clear majority cited INPO as the organization that should be responsible. Some made this recommendation because they felt that INPO has (a) the respect and support of the industry, (b) a good "handle" on the problems faced by the industry, and/or (c) the management and technical skills to administer the program. Others disagreed with these views but felt that assigning the program to INPO would help to raise its stature, and that the necessary technical resources required to develop and run the program could be acquired.

The majority view that NRC should administer such a program was based on the following rationale:

- NRC is the regulatory body for the nuclear power industry and, therefore, administration of such a program is a responsibility that it cannot ignore.
- There is far more knowledge about the nuclear power industry (both industry-wide and plant-specific) resident in the NRC than in any other organization, which makes it the logical choice to develop and administer such a program.
- Only NRC has the "muscle" (i.e., the necessary legal/regulatory authority) to ensure that such a program would work.

3.4.3 Viewpoints from Association Executives and Management Assessment Professionals

None of the associations executives interviewed felt that NRC was the proper body to administer a licensing program for plant managers, and all spoke in favor of a certification program administered either by an industry association or by the utilities themselves. Although several respondents

felt NRC should provide guidance and review of the requirements and procedures of a certification program, they differentiated this from NRC control and administration.

The view against licensing by NRC came from the following perspectives:

- General philosophical bias against government licensing
- Belief that NRC does not have the appropriate personnel and resources to conduct a management (as opposed to technical) licensing program
- Belief that the assessment center technique should not constitute a major component of a licensing program and that this technique should be developed and applied on a utility-specific basis.

Although there was general agreement regarding the need for input from NRC into specification of requirements and review/audit of application of licensing process, there was not a consensus on who should administer the program, i.e., each utility or a utility association. In particular, the question had little relevance for assessment center practitioners who felt that either INPO (or some other organization) or the utilities themselves could administer the program.

4.0 SUMMARY AND RECOMMENDATIONS

The answers to the four basic questions presented in the introduction to this report are now considered in terms of our "best judgment" regarding the consensus of the responses to the survey.

The first question was concerned with evaluating the potential value of a licensing/certification program. The one clear-cut opinion among nuclear industry management, NRC staff, and management development and training specialists in and out of the nuclear industry was that NRC should not license, in a legal sense, nuclear plant managers. It was the consensus that formal licensing by NRC would inevitably focus on narrow technical issues, placing a sizable burden on the nuclear industry without offering compensating benefits either in safety improvement or real managerial competency.

However, many interviewees did identify a need for setting some minimum standards of managerial education, training, and experience, with emphasis on the training and experience requirements. Such standards, if properly developed, were felt to offer positive value in achieving the goal of assuring the efficient, safe, and effective operation of nuclear power plants. Most people interviewed felt that these standards could be applied through some sort of "certification" program, though the exact nature of the certification program was not well-defined.

We concur with these opinions. We do not feel that a formal "single-event" licensing process similar to that used for control room operators would be effective. However, based on specific interview comments and opinions formed during the course of this study, we do agree that some form of certification would help to upgrade utility management qualification and establish some level of consistency throughout the industry. It is our opinion that the certification process should focus on the management

training program rather than on the individual manager. This type of certification would recognize the value of management skills in plant operations and safety and the need for ongoing, long-term management development as opposed to minimal managerial base-line testing.

The second question was concerned with identifying the job-related technical and managerial requirements needed to serve as a basis for any type of review process. In general, the respondents were able to identify, quite specifically, what they thought were the technical and managerial requirements for their own positions. However, they were quick to point out that the requirements should probably differ from one position to another and from one utility to another. Therefore, it was felt that the requirements should probably be based on site-specific job/task analysis. This would ensure that the education, experience, and training requirements actually fit the needs of each individual job and each utility.

Our experience in visiting some of the utilities would lead us to agree with these statements. Utility organizational structures differed, and even at different plants within a utility the job characteristics were not always the same. Thus a certification program relying on site-specific job/task analysis would tend to encourage standardization while permitting industry and individual utilities the flexibility necessary to deal with site-specific variations.

The third question was concerned with how the managerial and technical attributes could be assessed. Most respondents indicated that their opinions on this issue would depend on the content of the program and the criteria established. Nevertheless, the respondents were quite firm on a number of points that need to be assessed. These were discussed in the body of the report.

Despite many differing ideas on specific details, there was consensus on the general approach that should be employed. The interviewees felt that written tests of technical or managerial knowledge should be avoided. Such tests were considered to be usually unrelated to effective job performance. An overwhelming majority of respondents felt that the most practical approach to assessing abilities would be through a process which involved an oral interview with a peer review board (comprised of other persons with recent or current experience in the same position) and/or some plant-specific exercises that would examine knowledge of plant operations and utility organization. Those interviewees familiar with assessment center techniques felt that such techniques could be very useful as part of the exercises to evaluate abilities.

One of the points raised by almost everyone was that their job was primarily managerial in nature. Information collected during our literature review of management assessment techniques has clearly shown that written examinations are not the best means of measuring management abilities, although they might be used to assess some technical knowledge. However, if the exams were performed outside of the utility, managers would probably associate these tests with operator exams, which they do not think adequately measure abilities. This could result in significant opposition to such testing. Thus we would again agree with the interviewees that formal written testing should be avoided whenever possible.

The fourth question was concerned with identifying who should be responsible for the design and administration of any type of management review. Most respondents felt that if any program were to be set in place, the individual utility or representative utility organizations should conduct and administer it. It was felt that the industry itself was best

qualified to undertake development and administration of such a program. In addition, it was felt that NRC's endorsement of a self-policing policy could promote a feeling of professionalism in the industry which could do more toward upgrading knowledge and skills than could government regulation.

There was some agreement regarding the need for input from NRC since NRC is the regulating body. However, it was felt that NRC's regulatory role was to assure the development of management skills necessary for safe plant operation but not to define how they should be developed.

While responsibility for the safe operation of nuclear power plants rests with the nuclear industry, and while it is clearly in the interest of utilities to recruit and retain high-quality management personnel, the level of attention, structures and procedures, and resources that utilities have committed to management development varies widely across the nuclear industry. It is consistent with NRC's regulatory role and responsibilities, therefore, for the NRC to develop guidelines for nuclear plant management that will both provide a framework for industry practices related to management capabilities and also provide the NRC with a basis for evaluating these practices in terms of public health and safety.

If at all possible, rather than develop a new regulatory program NRC would be well advised to explore the capacity of the existing organization and management assessment procedures (e.g. NUREG-0731) to accommodate procedures for monitoring the management capabilities of plant managers and others. Such an approach is likely to be favorably received by the industry. It is our opinion that NRC should explore the possibility of incorporating guidelines for management development in the overall framework established by NUREG-0731.

The summaries of the responses to the four questions have to some extent defined a possible certification program, which could be outlined as follows:

- NRC would define, possibly through NUREG-0731, guidelines for the industry (individual utilities and/or a representative organization) to establish its own program(s) for development of necessary management skills.

- Industry would perform job/task analysis of positions to identify skill needs.

- Industry would then see that programs are developed to assure that the necessary education, training, and experience is supplied.

- Industry would develop some type of review process to see that the needs are being met.

- NRC would examine the overall industry program to assure that NRC guidelines are being followed.

Obviously there are many possible variations for each step outlined. However, it was the opinion of the majority interviewed, as well as our own, that no action should be taken if NRC is not receptive to a program along these general lines. A majority of the utilities interviewed have already recognized the need for improved management training and have developed or are in the process of developing good management training programs. Most interviewees felt that any program which had a higher level of involvement by NRC than outlined above would likely have a negative impact on the programs now in existence.

If, on the other hand, NRC would like to pursue a program along the lines outlined above, the implications for future efforts by NRC (not in any particular order) are:

- Develop guidelines:
  - Develop guidelines for collection of job-audit data in the industry
  - Review other certification programs for applicability
  - Develop specifications which might be included in the program (criteria).

- Identify and review existing NRC guidelines and practices related to management qualifications and capabilities (as contained in NUREG-0731 and elsewhere) for compatability with a certification program.

- Survey industry programs related to: management requirements, assessment of management capabilities, training and management development, and evaluation of management performance.

- Survey management assessment, development, and evaluation practices utilized by other organizations as well as state-of-the-art techniques available to management specialists.

- Prepare draft certification program guidelines based on job requirements.

- Develop and test a draft format for the NRC review process which assures reliability through consistent, standardized methods and instruments.

If NUREG-0731 were chosen as the mechanism for implementing the process, two other efforts which would be needed are:

- Prepare draft guidelines covering management certification for inclusion in NUREG-0731, and evaluate consistency of management guidelines with guidelines for utility organizations and structures.

- Prepare final guidelines for utility management to be incorporated into final version of NUREG-0731.

It should be noted that the eventual benefits of any program will to a great extent depend on how well the program is developed in its initial stages. Any certification program put in place should be a mechanism for formally recognizing the professional skills, abilities, knowledge, and experience that qualify managers to perform their duties in a safe and efficient manner. It should be an integral part of the entire human resources development program, i.e., recruitment, selection, training, and performance appraisal. Such a program should be based on a comprehensive job analysis, and the plant-specific and generic components of the industry-wide certification program would depend in part on that analysis.

APPENDIX A

SELECTED BIBLIOGRAPHY

APPENDIX A

SELECTED BIBLIOGRAPHY

Alexander, Larry. "An Exploratory Study of the Utilization of Assessment Center Results," Academy of Management Journal, Vol. 22: No. 1 (1979).

Allen, Peter and Stephen Rosenberg. "Formulating Viable Objectives for Manager Performance Appraisal," Personnel Journal, Vol. 57: No. 11 (1978).

_____. "Getting a Managerial Performance Appraisal System Underway - the New York City Experience," Public Administration Review, No. 4 (1980).

Bennett, D. and M. Langford. "How to Measure Managers," Management Today (1979).

Bowonder, B. "The Research Manager and His Roles," Society of Research Administrators, Vol. 12: No. 1 (1980).

Byham, William. "Helping Managers Find the Best Candidate for the Job with Assessment Center Techniques," Training, Vol. 16: No. 11 (1979).

Child, John. "Factors Associated with Managerial Ratings of Supervisory Performance," Journal of Management Studies, Vol. 17: No. 3 (1980).

Civil Service Commission. "Federal Executive Guidelines and Their Impacts on Assessment Center Methods."

Clark, Thomas and Joseph Hedstrom. "How to Evaluate I.E's," Industrial Engineering, Vol. 9: No. 12 (1977).

Demski, Joel. "Uncertainty and Evaluation Based on Controlled Performance," Journal of Accounting Research, Vol. 14: No. 2 (1970).

Duvall, Thomas and Evan Becker. "Housing Management Accreditation: A Plan of Action," Journal of Housing, Vol. 31: No. 11 (1978).

Fritz, Roger. "Rate Yourself As A Manager," Association Management, Vol. 32: No. 8 (1980).

Geisel, Jerry. "Certify Risk Managers: No Way Say the Pros," Business Insurance, Vol. 11: No. 8 (1977).

Goodman, Claire. "Identifying Managerial Potential: An Alternative to Assessment Centers," Personnel, Vol. 57: No. 3 (1980).

Hays, Janet. "A Model of the Successful Manager," American Management Association (1979).

Howard, Ann. "An Assessment of Assessment Centers," Academy of Management Journal, Vol. 3 (1979).

Kerzner, Harold. "Evaluation Techniques in Project Management," Journal of Systems Management (1980).

Klimosici, Richard and William Strickland. Assessment Centers - Valid or Merely Prescient," Personnel Psychology, Vol. 30: No. 3 (1977).

Knart, Allen. "New Frontiers for Assessment Centers," Personnel, Vol. 53: No. 4 (1976).

Morris, Terry and Laura Ilcisin. "The Assessment Center: A New Way to Test Management Capability," Bank Administration, Vol. 56: No. 6 (1980).

Morse, John and Francis Wagner. "Measuring the Process of Managerial Effectiveness," Academy of Management Journal, Vol. 21: No. 1 (1978).

Newland, Chester. "Performance Appraisal of Public Administrators: According to What Criteria?" Public Personnel Management (1979).

Nickols, Fred. "Finding the Bottom-Line Payoff for Training," Training and Development Journal, No. 54 (1979).

OSHA. "Development of a Cergification Process for Construction Supervisors."

Reeser, Clayton. "Executive Performance Appraisal - A View From the Top," Personnel (1975).

Shakman, Richard and Ray Roberts, "An Evaluation of Management Effectiveness," University of Michigan Business Review, Vol. 29: No. 1 (1977).

Steers, Richard. "When Is An Organization Effective?" Organization Dynamics, Vol. 5: No. 2 (1976).

Villareud, Morey. "Improving Managerial Performance," Personnel Journal, Vol. 56: No. 2 (1977).

APPENDIX B

FIELD INTERVIEW GUIDES

NRC PERSONNEL

PERSUNAL INFORMATION SUMMARY

[ASK THE INTERVIEWEE TO FILL OUT THE INFORMATION BELOW AND RETURN BY MAIL AS SOON AS POSSIBLE]

'AME OF INTERVIEWEE _____ PREPARED BY: _____

POSITION _____ _____

UTILITY _____ DATE: _____

LOCATION _____

EDUCATION

YEARS	MAJOR	DEGREE	COMMENTS
/ - /			
/ - /			
/ - /			
/ - /			
/ - /			
/ - /			

SPECIAL TRAINING/COURSES

_____

_____

_____

_____

WORK EXPERIENCE

POSITION	INDUSTRY	PRINCIPAL RESPONSIBILITIES	YEARS

INTERVIEW GUIDE

FOR NRC PERSONNEL

INSTRUCTIONS: USE THE FOLLOWING QUESTIONS AS THE FRAMEWORK FOR DISCUSSIONS WITH THE INTERVIEWEES REGARDING THEIR OPINIONS ABOUT THE FEASIBILITY OF LICENSING, ACCREDITING OR CERTIFYING PLANT MANAGERS AND OTHERS IN MANAGERIAL ROLES. RECORD YOUR ANSWERS TO THE RIGHT OF EACH QUESTION.

QUESTION	COMMENTS
Q1. WHICH DO YOU THINK IS MORE PREFERABLE/PRACTICAL/USEFUL — LICENSING OR ACCREDITATION OF MANAGERIAL PERSONNEL? WHY? (EXPLAIN THE DIFFERENCE IN TERMS OF THE LEGAL REQUIREMENTS AND TESTING PROCEDURES?)	
Q2. WHAT KIND OF MECHANISM SHOULD BE USED? WHY? . TESTING? . REVIEW OF EXPERIENCE AND TRAINING? . ATTENDANCE AT REQUIRED INSTRUCTIONAL PROGRAMS?	
Q3. SHOULD LICENSEES BE REQUIRED TO PERIODICALLY RENEW AND UPDATE THEIR LICENSES/ACCREDITATION/CERTIFICATION? THROUGH WHAT PROCEDURE? WHAT ARE THE BENEFITS?	
Q4. WHAT BENEFITS OR DISADVANTAGES ARE THERE TO LICENSING NPP SENIOR MANAGEMENT PERSONNEL? . FOR THE PUBLIC? . FOR THE MANAGER? . FOR THE NP INDUSTRY?	
Q5. HOW IS PUBLIC SAFETY SERVED BY LICENSING THE NPP MANAGEMENT PERSONNEL? IN WHAT WAY? . AT ALL? . NEGATIVELY/POSITIVELY? . IMPROVE CALIBRE OF MANAGERS/UPDATE SKILLS? . ENSURE ADEQUATE SCREENING AT ENTRY?	
Q6. WHAT LEVELS OF MANAGEMENT SHOULD BE INCLUDED IN THE LICENSING PROCEDURE? VERTICALLY? LATERALLY? WHY?	
Q7. WHAT ARE THE MOST IMPORTANT BACKGROUND EXPERIENCES, EDUCATION AND TRAINING FOR PLANT MANAGERS AND OTHER SENIOR MANAGEMENT PERSONNEL? . <u>EXPERIENCE</u> - SUPERVISORY EXPERIENCE - PUBLIC RELATIONS (MEDIA AND PUBLIC) - GOVERNMENTAL RELATIONS - NUCLEAR POWER INDUSTRY/ELECTRIC POWER INDUSTRY - TECHNICAL EXPERIENCE IN THE NUCLEAR POWER INDUSTRY/ELECTRIC POWER INDUSTRY - NEGOTIATIONS AND LABOR RELATIONS - EXPERIENCE IN A WIDE VARIETY OF PLANT POSITIONS - EXPERIENCE AS A LICENSED OPERATOR	

QUESTION	COMMENTS
. <u>EDUCATION AND TRAINING</u> - A FORMAL DEGREE (KIND)? - MANAGEMENT TRAINING (ACADEMIC OR SEMINARS, ETC.)? - CRISIS MANAGEMENT TRAINING? - SPECIAL TRAINING (E.G., PLANT SAFETY, FIRE PROTECTION, ETC.)? - OPERATOR TRAINING? - OTHER	
Q8. WHAT ARE THE MAJOR ELEMENTS OF THE PLANT MANAGER'S JOB THAT SHOULD BE CONSIDERED IN THE LICENSING/ ACCREDITATION PROCEDURES? OTHER SENIOR MANAGEMENT PERSONNEL?	
Q9. SHOULD SENIOR NP MANAGERS HOLD A REACTOR OR SENIOR REACTOR OPERATOR LICENSE? WHY?	
Q10. SHOULD MANAGERIAL OR TECHNICAL CAPABILITIES BE MAINLY STRESSED IN THE LICENSING PROCEDURES? BOTH? WHY? HOW IS THE SENIOR MANAGER'S TIME ALLOCATED BETWEEN MANAGERIAL AND TECHNICAL ACTIVITIES? DOES THIS ALLOCATION CHANGE AS ONE MOVES VERTICALLY IN THE ORGANIZATION? HOW?	
Q11. HOW DOES THE NPP MANAGER DIVIDE HIS TIME AMONG VARIOUS GROUPS WITH WHICH HE WORKS, IN TERMS OF PERCENTAGES? (HINT: SUGGEST INTERVIEWEE THINK IN TERMS OF A PIE-CHART) . <u>INTERNAL GROUPS</u> - TOP MANAGEMENT? - PLANT OPERATIONS? - PLANT MAINTENANCE? - QUALITY CONTROL? - UNION AND LABOR RELATIONS? - OTHER? . <u>EXTERNAL GROUPS</u> - MEDIA, SPECIAL INTEREST GROUPS, ETC.? - GOVERNMENT OFFICIALS (E.G., NRC)? - VENDORS? - ARCHITECTS/ENGINEERS? - CONTRACTORS? - OTHER?	
Q12. DO YOU THINK LICENSING OR ACCREDITING NP MANAGEMENT PERSONNEL WILL ASSIST OR HINDER YOU IN YOUR WORK? WHY?	

QUESTION	COMMENTS
Q13. WHO SHOULD ADMINISTER A LICENSING/ACCREDITATION/ CERTIFICATION PROCEDURE? WHY? . NRC? . INDUSTRY (INPO)? . PROFESSIONAL SOCIETY? . A UNIVERSITY? . OTHER PRIVATE GROUP?	
Q14. IF NRC DOES NOT ADMINISTER THE LICENSING/ACCREDITATION PROGRAM, WHAT SHOULD NRC'S ROLE BE IN THE PROGRAM?	
Q15. WHAT ARE THE MAJOR PRACTICAL PROBLEMS INVOLVED IN A LICENSING/ACCREDITATION PROGRAM?	
Q16. ARE THERE ANY OTHER COMMENTS OR OBSERVATIONS YOU WOULD LIKE TO MAKE ABOUT THE FEASIBILITY OF LICENSING NUCLEAR POWER PLANT MANAGERS?	

NUCLEAR POWER PLANT MANAGER

PERSONAL INFORMATION SUMMARY

[ASK THE INTERVIEWEE TO FILL OUT THE INFORMATION BELOW AND RETURN BY MAIL AS SOON AS POSSIBLE]

NAME OF INTERVIEWEE _____ PREPARED BY: _____

POSITION _____ _____

UTILITY _____ DATE: _____

LOCATION _____

EDUCATION

YEARS	MAJOR	DEGREE	COMMENTS
/ - /			
/ - /			
/ - /			
/ - /			
/ - /			
/ - /			
/ - /			

SPECIAL TRAINING/COURSES

_____

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_____

_____

WORK EXPERIENCE

POSITION	INDUSTRY	PRINCIPAL RESPONSIBILITIES	YEARS

QUESTION	RESPONSES
Q9. BASED ON YOUR EXPERIENCE, IN WHAT WAYS CAN MANAGEMENT ASSESSMENT PROGRAMS BE USED TO LICENSE OR CERTIFY MANAGEMENT PERSONNEL IN THE NUCLEAR POWER INDUSTRY? . DEVELOPMENT OF CRITERIA AND REQUIREMENTS . TRAINING FOR ENTRY/CAREER PLANNING . DIAGNOSIS . EVALUATION OF PERSONNEL FOR ENTRY TO LICENSED POSITIONS	
Q10. WHAT ARE THE PRACTICAL PROBLEMS ASSOCIATED WITH USING MANAGEMENT ASSESSMENT PROGRAMS FOR LICENSING/CERTIFICATION? . TIME/COSTS . MANAGEMENT ACCEPTANCE OF PROGRAM VALIDITY . NEED FOR NRC/INDUSTRY CERTIFICATION OF M.A. PROGRAM . SPECIFICITY/OBJECTIVITY OF CRITERIA	
Q11. ARE THERE ANY LEGAL AND/OR ETHICAL PROBLEMS WHICH YOU COULD EXPECT FROM SUCH AN APPROACH?	

QUESTION	RESPONSES
Q12. IN YOUR OPINION, WHAT WOULD BE THE ADVANTAGES OF INCLUDING MANAGEMENT ASSESSMENT AS PART OF THE LICENSING/CERTIFICATION PROCESS FOR SENIOR MANAGEMENT IN THE INDUSTRY? DISADVANTAGES? IS IT A PRACTICAL/ACCEPTABLE APPROACH?	
Q13. DO YOU HAVE ANY OTHER RECOMMENDATIONS/SUGGESTIONS/OBSERVATIONS ABOUT USING ASSESSMENT TECHNIQUES (SUCH AS THE ASSESSMENT CENTER) FOR LICENSING/CERTIFYING MANAGEMENT PERSONNEL IN THE NUCLEAR POWER INDUSTRY (OR SIMILAR INDUSTRIES)?	

American Association of Airport Executives (AAAE)

Could you please provide me with an overview of the AAAE's testing and certification program.

SPECIFIC QUESTIONS

1. Is accreditation mandatory for the managers of airports managed by the Federal government.

2. Is any effort being made with the Feds (e.g., the FAA) to make accreditation a condition for being an airport manager? A major airport manager?

3. Is there one exam or several versions? When and how is it updated? To what extent is the exam the same from one year to the next? If quite similar, doesn't that give the repeater an advantage?

4. How are test questions developed (what's the process)? What criteria are used? How are they validated? Are the examiners given the answers? In what form are they, particularly for the essay questions?

5. Are principals -- and more important -- practices and problems treated in the examination? If so, how are they handled (i.e., via essays, short-answers, multiple choice)? And/or are they handled in the oral interview? How?

6. Does the test (or the interview) go beyond knowledges? That is, do you attempt to address behavioral traits? If so, how? If not, why not and do you think that it would (a) be desirable to do so and (b) feasible?

7. Ensuring that a test is objectively-designed and "fair" is always a problem, and the difficulties are even greater with interviews. How have these problems been addressed?

8. If one were to attempt to "validate" the tests (in the sense that a psychologist would use), it would be necessary to demonstrate in some way that the test questions represented both all and only the most important aspects of <u>performance</u> on the job. First, would you say that the AAAE's test does this and, second, how would you demonstrate it?

9. The average nuclear power plant employs quite a number of persons in a number of different areas including both licensed and unlicensed. Reactor room operators are of course licensed; unlicensed personnel include engineers, technical support and maintenance personnel, technicians and QC inspectors, and others. There is also a plant manager who runs everything on a day-to-day basis. He also functions as an "emergency" director. In other words, he is the "boss" including having responsibility and authority over the licensed personnel. What merit do you see in licensing managers? What kinds of technical difficulties would you foresee?

10. It's been suggested that we are actually dealing with a spectrum of possible approaches with accreditation at one end, something that we might call certification in the middle, and licensing at the other extreme. Would you make those kinds of distinctions? If so, would you see the requirements (i.e., the comprehensiveness and difficulty) increasing as one moved toward licensing?

11. Would you furnish us with a copy of one of the tests?

12. One of the basic problems involved in <u>licensing</u> plant managers is that the criteria with which nuclear power industry management measures (and then rewards) individual competency and performance are a great deal different than those used by the NRC. The latter is only a subset of the former, and one can easily suggest conditions in which utility ownership concerns would seriously conflict with NRC's objectives. We're also dealing with a situation in which utility management "scores" managers on a continuum or scale ranging, perhaps, from unacceptable to poor to fair and on up, whereas the NRC deals with a broader concept of accountability that emphasizes public safety. Therefore, its decision process is really binary -- that is, YES or NO in terms of licensing. In an accreditation process, one can attempt to address both concerns independently or separately, with the view that they're both critical dimensions of the whole job.

Your industry has a similar dichotomy with "management concerns" on the one hand and public safety issues on the other. Does your accreditation program emphasize or tilt in either direction? If so, how much? Why? Would you offer a personal opinion (not for attribution) as to whether the NRC should focus solely on safety issues, or whether it should take a broader view?

13. Do you have any general guidance for us in terms of licensing? For example, should we phase such a program in gradually, making it a little bit more difficult each year and, if so, over what length of time? Should peer review be used or should the NRC take the lead? Why? Is there another approach you'd favor instead?

14. Also, How much input to the development of certification procedures and tests do you feel that industry should have? NRC officials? Academia? The public? The managers themselves?

15. Would you offer any suggestions, comments, guidance, etc., in closing? For example, is there anyone else in the AAAE to whom we should speak. In other associations or sectors, etc.?

October 9, 1981

NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

2029 K Street, N.W.
Washington D.C.
(202) 463-2300

Mr. Milton Lunch: _____

Mr. John Antrim: _____

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1. Could we begin with your providing me with an overview of the two programs: A&E licensing and the certification program?

2. PE licensing is a state function. What is the NSPE's role in this: Revie, tests? Monitor? Assist? Same for certification.

3. Are there any states where PEs are not given?

4. Without naming states, would you contrast the poorest to the best programs? Provide numbers. Ditto for certification.

5. Is there one exam or several versions in a state? When and how are they updated? To what extent are the exams the same from one year to the next? How do you ensure "fairness" from year to year? If quite similar, doesn't that give the repeater an advantage?

6. How are test questions developed (what's the process)? What criteria are used? How are they validated? In what form are they?

7. Are principles -- and more important -- practices and problems treated in the examination? If so, how are they handled (i.e., via essays, short-answers, multiple choice)? Are oral interviews used anywhere?

8. Does the test go beyond knowledges? That is, do you attempt to address behavioral traits? If so, how? If not, why not and do you think that it would (a) be desirable to do so and (b) feasible?

9. Ensuring that a test is objectively-designed and "fair" is always a problem, and the difficulties are even greater with interviews. How have these problems been addressed? Have there been any legal challenges?

10. If one were to attempt to "validate" the tests (in the sense that a psychologist would use), it would be necessary to demonstrate in some way that the test questions represented both all and only the most important aspects of performance on the job. First, would you say that the PE tests do this and, second, how would you demonstrate it?

11. The average nuclear power plant employs quite a number of persons in a number of different areas, some licensed and most unlicensed. Reactor room operators are of course licensed; unlicensed personnel include engineers, technical support and maintenance personnel, technicians and QC inspectors, and others. There is also a plant manager who runs everything on a day-to-day basis; he has a number of high level management people under him. In other words, he is the "boss" including having responsibility and authority over the licensed personnel. What merit do you see in licensing managers? What kinds of technical difficulties would you foresee?

12. We are actually dealing with a spectrum of possible approaches with accreditation at one end, something that we might call certification in the middle, and licensing at the other extreme. Would you make those kinds of distinctions? If so, would you see the requirements (i.e., the comprehensiveness and difficulty) increasing as one moved toward licensing?

13. Many of the people in the NP industry with whom we've spoken favor accreditation. What would you see as the potential benefits of such an approach? The disadvantages?

14. One of the basic problems involved in <u>licensing</u> plant managers is that the criteria with which nuclear power industry management measures (and then rewards) individual competency and performance are a great deal different than those used by the NRC. One can easily suggest conditions in which utility ownership concerns would seriously conflict with NRC's objectives. We're also dealing with a situation in which utility management "scores" managers on a continuum or scale ranging, perhaps, from unacceptable to poor to fair and on up, whereas the NRC deals with a broader concept of accountability that emphasizes public safety. Therefore, its decision process is really binary -- that is, YES or NO in terms of licensing. In an accreditation process, one can attempt to address both concerns independently or separately, with the view that they're both critical dimensions of the whole job.

15. The professional engineering community has a similar dichotomy with "management concerns" on the one hand and public safety issues on the other. Does your accreditation program emphasize or tilt in either direction? If so, how much? Why? Would you offer a personal opinion (not for attribution) as to whether the NRC should focus solely on safety issues, or whether it should take a broader view?

16. Do you have any general guidance for us in terms of licensing? For example, should we phase such a program in gradually, making it a little bit more difficult each year and, if so, over what length of time? Should peer review be used or should the NRC take the lead? Why? Is ther another approach you'd favor instead? (Mention INPO).

17. Also, how much input to the development of certification procedures and tests do you feel that industry should have? NRC officials? Academia? The public? The managers themselves?

18. Would you offer any suggestions, comments, guidance, etc., in closing? For example, is there anyone else in the NSPE to whom we should speak? In other associations or sectors, etc.?

NUCLEAR POWER PLANT MANAGER

PERSONAL INFORMATION SUMMARY

[ASK THE INTERVIEWEE TO FILL OUT THE INFORMATION BELOW AND RETURN BY MAIL AS SOON AS POSSIBLE]

NAME OF INTERVIEWEE _____ PREPARED BY: _____

POSITION _____

UTILITY _____ DATE: _____

LOCATION _____

EDUCATION

YEARS	MAJOR	DEGREE	COMMENTS
/ - /			
/ - /			
/ - /			
/ - /			
/ /			
/ - /			

SPECIAL TRAINING/COURSES

WORK EXPERIENCE

POSITION	INDUSTRY	PRINCIPAL RESPONSIBILITIES	YEARS

NUCLEAR POWER PLANT MANAGER

INTERVIEW GUIDE

PART I

WORK EXPERIENCE AND TRAINING REQUISITES OF THE JOB

INSTRUCTIONS: THE CODES BELOW ARE FOR THE CONVENIENCE OF THE INTERVIEWER IN RECORDING THE INTERVIEWEES' RESPONSES. YOU MAY RECORD THE RESPONDENT'S ANSWERS TO THE QUESTIONS BELOW USING THE FOLLOWING CODE:

ENTRY REQUIREMENT = 1
DESIRABLE BUT NOT ESSENTIAL = 2
UNIMPORTANT = 3

SPACE IS PROVIDED FOR COMMENTS AND NOTES ON THE DISCUSSION

Q1. WHAT ARE THE MOST IMPORTANT MANAGERIAL EXPERIENCES WHICH YOU THINK ARE IMPORTANT IN THE BACKGROUND OF SOMEONE IN YOUR POSITION? WHAT ARE THE KEY TECHNICAL EXPERIENCES? SHOULD THEY BE ENTRY REQUIREMENTS? ARE THEY DESIRABLE BUT NOT ENTRY REQUIREMENTS? UNIMPORTANT?

- SUPERVISORY EXPERIENCE ☐
- PUBLIC RELATIONS (MEDIA AND PUBLIC) ☐
- DEALING WITH THE GOVERNMENT ☐
- MANAGEMENT EXPERIENCE IN THE NUCLEAR POWER INDUSTRY ☐
- TECHNICAL EXPERIENCE IN THE NUCLEAR POWER INDUSTRY ☐
- EXPERIENCE AS A LICENSED OPERATOR ☐
- PLANNING AND BUDGETING ☐
- NEGOTIATIONS ☐
- MOBILITY THROUGH A VARIETY OF POSITIONS ☐
- MANAGEMENT EXPERIENCE IN THE ELECTRIC POWER INDUSTRY ☐
- TECHNICAL EXPERIENCE IN THE ELECTRIC POWER INDUSTRY ☐
- OTHER ☐

COMMENTS:

ENTRY REQUIREMENT = 1 DESIRABLE BUT NOT ESSENTIAL = 2 UNIMPORTANT = 3

Q2. WHAT EDUCATION AND/OR TRAINING DO YOU THINK IS HELPFUL IN PREPARING FOR YOUR JOB? MANAGERIAL? TECHNICAL? SHOULD THEY BE ENTRY REQUIREMENTS? ARE THEY DESIRABLE BUT NOT ESSENTIAL? UNIMPORTANT?

- FORMAL DEGREE ☐
  KIND?
- SPECIAL TRAINING (E.G., FIRE PROTECTION, PLANT SAFETY, ETC.) ☐
  KIND
- OPERATOR TRAINING ☐
- MANAGEMENT TRAINING (ACADEMIC) ☐
- MANAGEMENT TRAINING (SEMINARS, ETC.) ☐
- CRISIS MANAGEMENT TRAINING ☐

COMMENTS:

MANDATORY = 1 DESIRABLE BUT NOT MANDATORY = 2 UNIMPORTANT = 3

Q3. HOW IMPORTANT ARE THE FOLLOWING CHARACTERISTICS OF MANAGERS FOR DOING THEIR JOBS EFFECTIVELY? SHOULD THEY BE MANDATORY? ARE THEY DESIRABLE BUT NOT MANDATORY? UNIMPORTANT?

	CODE	COMMENT
ABILITY TO WORK AS A MANAGEMENT TEAM MEMBER ABILITY TO PARTICIPATE IN MANAGEMENT (CORPORATE) EFFORTS; TO ENGAGE IN PARTICIPATORY MANAGEMENT; TO SUBMERGE PERSONAL GOALS TO ACHIEVE CORPORATE AIMS AND OBJECTIVES	☐	
INTERPERSONAL SKILLS SUCH SKILLS REFLECT CONSIDERATION FOR SUBORDINATES' VALUES AND NEEDS; RECOGNITION OF ACHIEVEMENT; OPEN PERSONAL COMMUNICATION; MAINTAINING AN ATMOSPHERE OF MUTUAL RESPECT AND TRUST; WILLINGNESS TO RECOGNIZE AND ADDRESS PROBLEMS OF SUBORDINATES, ETC.	☐	
COMMUNICATION SKILLS ABILITY TO EXPRESS ONESELF ORALLY IN A CLEAR AND CONCISE MANNER; WRITING SKILLS; FACILITY IN MAKING ORAL PRESENTATIONS; PREPARING DOCUMENTS AND BRIEFS.	☐	
SUPERVISORY SKILLS ABILITY TO ORGANIZE THE ACTIVITIES OF SUBORDINATES AND TO PROVIDE LEADERSHIP WHEN NEEDED; MONITORING PROGRESS AND PERFORMANCE; DELEGATE AUTHORITY; AND GENERALLY FACILITATE THE MOVEMENT TOWARD GOALS AND OBJECTIVES IN A TIMELY AND EFFECTIVE MANNER.	☐	

MANDATORY = 1 DESIRABLE BUT NOT MANDATORY = 2 UNIMPORTANT = 3

	CODE	COMMENT
STRONG ANALYTICAL SKILLS ABILITY TO CONCEPTUALIZE COMPLEX ISSUES; DECOMPOSE PROBLEMS; INITIATE ACTION PLANS; PROVIDE LEADERSHIP IN PROBLEM SOLVING; ASSESS CONTRARY VIEWPOINTS.	☐	
KNOWLEDGE OF GOVERNMENT PROCEDURES RELATED TO THE INDUSTRY SPECIALIZED KNOWLEDGE RELATED TO GOVERNMENT REGULATIONS, ENFORCEMENT, INSPECTION, APPEAL, ETC.	☐	
OTHER NON-TECHNICAL SKILLS (E.G., SAFETY, INDUSTRIAL SECURITY, FIRE PROTECTIONS, LEGAL, UNION RELATIONS, ETC.)	☐	
PUBLIC RELATIONS EXPERIENCE AND ABILITY IN ACTING AS A SPOKESMAN FOR THE PLANT AND/OR UTILITY IN PUBLIC MEETINGS; WITH THE MEDIA, WITH SPECIAL INTEREST GROUPS, WITH THE GOVERNMENT.	☐	
RESPONSIVENESS TO CRITICISM ABILITY TO ACCEPT ADVICE FROM SUBORDINATES, PEERS AND SUPERVISORS; OPENNESS TO NEW IDEAS OR VIEWPOINTS; ABILITY TO ENCOURAGE CRITICAL APPRAISAL; ABILITY TO TURN CRITICISM INTO ACTION FOR GROWTH AND IMPROVEMENT.	☐	
WORKFORCE DEVELOPMENT SKILLS ABILITY TO ASSESS AND IDENTIFY POTENTIAL IN STAFF AND ENCOURAGE ITS POTENTIAL THROUGH DEMANDING ASSIGNMENTS, TRAINING EXPERIENCES, EDUCATIONAL PROGRAMS; PROVIDE GROWTH OPPORTUNITIES.	☐	
CREATIVITY ABILITY TO ANTICIPATE FUTURE NEEDS, DEMONSTRATE IMAGINATION IN PROBLEM SOLVING, INITIATE AND MANAGE CHANGE IN THE ORGANIZATION, GENERATE NEW IDEAS, ETC.	☐	
ABILITY TO EXECUTE ESTABLISHED POLICIES AND PROCEDURES ABILITY TO FOLLOW-THROUGH WITH POLICIES AND PRACTICES ESTABLISHED AT HIGHER LEVELS IN THE CORPORATION	☐	
CRISIS MANAGEMENT ABILITY TO DEAL WITH ABNORMAL AND CRISIS SITUATIONS, PROVIDE POSITIVE GUIDANCE, BE DECISIVE, DEAL WITH CONFLICTING OPINIONS AND/OR INFORMATION.	☐	

24. WHICH DO YOU THINK ARE MOST IMPORTANT FOR PERSONS IN YOUR POSITION -- TECHNICAL KNOWLEDGE, SKILLS AND ABILITIES, OR MANAGERIAL? ARE THEY EQUALLY IMPORTANT? DIFFERENT AT DIFFERENT TIMES IN THE ORGANIZATIONAL LIFE CYCLE?

COMMENTS:

NUCLEAR POWER PLANT MANAGER

INTERVIEW GUIDE

PART II

ORIENTATION OF THE POSITION

INSTRUCTIONS: RECORD THE RESPONSES BELOW. USE THE FOLLOWING CODE:
DAILY = 1
WEEKLY = 2
MONTHLY = 3
RARELY = 4

Q1. HOW FREQUENTLY DO YOU DEAL WITH THE FOLLOWING GROUPS. DAILY?, WEEKLY?, MONTHLY?, RARELY?, WHO ARE THEY SPECIFICALLY (FUNCTIONS/POSITIONS)?

- ☐ COMPANY TOP MANAGEMENT
- GOVERNMENT OFFICIALS
  - ☐ RESIDENT INSPECTOR
  - ☐ OTHER INSPECTORS (NRC)
  - ☐ OTHER INSPECTORS (STATE & LOCAL)
- PLANT OPERATIONS
  - ☐ SENIOR REACTOR OPERATORS
  - ☐ SENIOR TECHNICAL ADVISORS
  - ☐ UNIT OPERATING ENGINEERS
  - ☐ REACTOR OPERATORS, SUPERVISORS
- PLANT MAINTENANCE
  - ☐ SUPERINTENDENT
  - ☐ FOREMEN/OTHER MAINTENENCE PERSONNEL
  - ☐ MASTER MECHANIC(S)
  - ☐ PLANT OPERATING REVIEW COMMITTEE [PORC])
- ☐ QUALITY CONTROL
- EXTERNAL RELATIONS
  - ☐ MEDIA
  - ☐ SPECIAL INTEREST GROUPS
  - ☐ PUBLIC
  - ☐ OTHER
- ☐ UNIONS/LABOR RELATIONS PERSONS
- ACCOUNTING DEPARTMENT
  - ☐ PAYROLL
  - ☐ BUDGET
- ☐ VENDORS
- PERSONNEL
  - ☐ SELECTION
  - ☐ PROMOTION
  - ☐ PAY
- ☐ SECURITY
- ☐ PURCHASING (E.G., FUEL SUPPLY)
- ☐ CONSTRUCTION/CONTRACTORS
- ☐ CORP. ENGINEERING DEPARTMENT
- ☐ TRAINING
- OTHER
- ☐ ARCHITECT/ENGINEERS/SUBCONTRACTORS

_____

_____

_____

_____

NUCLEAR POWER PLANT MANAGER

INTERVIEW GUIDE

PART III

INSTRUCTIONS:	RECORD RESPONDENT'S ANSWERS NEXT TO THE QUESTION. USE ADDITIONAL PAPER IF NECESSARY.

QUESTIONS	RESPONSES
Q1. WHAT ARE THE BENEFITS OF LICENSING THE NPP MANAGERS? • FOR THE PUBLIC? • FOR THE MANAGER? • FOR THE NP INDUSTRY?	
Q2. HOW WILL LICENSING AFFECT PUBLIC SAFETY? • AT ALL? • NEGATIVELY? • POSITIVELY? • IMPROVE CALIBRE OF MANAGERS? • ENSURE ADEQUATE SCREENING?	
Q3. WHAT ARE THE DISADVANTAGES OF LICENSING THE NPP MANAGERS? • FOR THE PUBLIC? • FOR THE MANAGER? • FOR THE NP INDUSTRY?	
Q4. SHOULD NPP MANAGERS/OFFICERS HOLD A REACTOR OR SENIOR REACTOR OPERATOR LICENSE? WHY?	
Q5. WOULD LICENSEES HAVE TO PERIODICALLY RENEW LICENSES? IF SO, WHY? IF NOT, WHY NOT?	
Q6. WHAT DO YOU FEEL ARE THE <u>MINIMUM</u> QUALIFICATIONS FOR BEING AN NPP MANAGER? • EDUCATION? • EXPERIENCE? • TRAINING?	
Q7. IS LICENSING PREFERABLE TO CERTIFICATION? ACCREDITATION? • WHY? • WHAT ARE THE DIFFERENCES (DOES THE RESPONDENT KNOW)?	
Q8. WHO SHOULD ADMINISTER THE LICENSING PROGRAM? WHY? • AN ACCREDITING AGENCY? • NRC? • A UNIVERSITY? • A PRIVATE GROUP? • INDUSTRY? (E.G., INPO) • PROFESSIONAL SOCIETY?	

QUESTIONS	RESPONSES
Q9. WHAT SHOULD THE LICENSING PROCEDURE BE? • SHOULD TESTS BE USED? WRITTEN? • SHOULD COMPETENCY ASSESSMENTS BE USED? WHAT CRITERIA WOULD BE USED? HOW SHOULD ASSESSMENTS BE MADE? • WHAT MANAGERIAL KNOWLEDGE, SKILLS AND ABILITIES ARE MOST IMPORTANT? WHAT IS THE MOST PRACTICAL WAY OF ASSESSING THEM?	
Q10. WHAT ARE THE MOST CRITICAL FUNCTIONAL AREAS THAT SHOULD BE INCLUDED IN THE LICENSING PROCESS? • OPERATIONS? • SAFETY? • MANAGEMENT (SUPERVISION AND CONTROL)? • PUBLIC RELATIONS? • INSPECTION? • ADMINISTRATIVE (ACCOUNTING AND FINANCE, ETC.)? • OTHER	
Q11. WHAT DO YOU THINK ARE THE APPROPRIATE LEVELS OF 'SENIOR MANAGEMENT OFFICIALS' THAT SHOULD BE LICENSED?	
Q12. DO YOU THINK THE CRITICAL FUNCTIONAL AREAS IDENTIFIED AS ONES TO BE INCLUDED IN THE LICENSING PROCEDURE WILL DIFFER DEPENDING ON THE LICENSING AGENCY (E.G., NRC OR INPO)?	
Q13. ARE THERE ANY OTHER COMMENTS OR OBSERVATIONS YOU WOULD LIKE TO MAKE REGARDING THE FEASIBILITY OF LICENSING NPP MANAGERS?	

ASSESSMENT CENTER PRACTITIONERS

INTERVIEW SUMMARY

NAME OF INTERVIEWEE _____ PREPARED BY _____

POSITION _____ DATE _____

COMPANY _____

LOCATION _____

EDUCATION/
TRAINING _____

EXPERIENCE _____

COMMENTS _____

INTERVIEW GUIDE
FOR ASSESSMENT CENTER PRACTITIONERS

INSTRUCTIONS: USE THE FOLLOWING QUESTIONS AS THE FRAMEWORK FOR DISCUSSIONS WITH ASSESSMENT CENTER PRACTITIONERS REGARDING THE USE OF MANAGEMENT ASSESSMENT PROGRAMS AND TECHNIQUES IN LICENSING, ACCREDITING OR CERTIFYING PLANT MANAGER AND OTHERS IN MANAGERIAL ROLES.

PREFACE INTERVIEW/DISCUSSION WITH BRIEF DESCRIPTION OF THE PURPOSE AND FOCUS OF INTERVIEW:

- EXPEPIENCE WITH USING M.A. PROGRAM FOR SENIOR MANAGERS IN TECHNOLOGICALLY-ORIENTED ORGANIZATIONS
- EXPERIENCE WITH USING M.A. PROGRAM FOR LICENSING, ACCREDITING, OR CERTIFICATION
- FEASIBILITY OF USING M.A. PROGRAM FOR PLANT MANAGER LICENSING ACCREDITING, OR CERTIFYING IN TERMS OF:
  - LEVEL OF MANAGEMENT AND MANAGEMENT FUNCTIONS
  - TECHNICAL AND PRACTICAL CONSIDERATIONS
  - LEGAL AND ETHICAL CONSIDERATIONS
  - CALIBRATION AND VALIDATION

QUESTION	RESPONSES
Q1. "HAT TYPES OF TECHNOLOGICALLY-ORIENTED ORGANIZATIONS UTILIZE YOUR MANAGEMENT ASSESSMENT PROGRAM?	
Q2. (AMONG THESE CLIENTS) FOR WHAT PURPOSE(S) IS MANAGEMENT ASSESSMENT USED? HOW DO YOU ADMINISTER YOUR PROGRAM/SERVICE? . RECRUITMENT . SELECTION . CAREER DEVELOPMENT . TRAINING . COUNSELING . CREDENTIALING	

QUESTION	RESPONSES
Q3. TYPES OF MANAGEMENT ASSESSMENT TECHNIQUES DO YOU USE? ARE THEY (WHICH) APPLICABLE TO LICENSING/ CERTIFICATION OF MANAGERS? AT WHAT LEVELS?	
Q4. IS MANAGEMENT ASSESSMENT (TECHNIQUES, APPLICATIONS) DIFFERENT FOR TECHNOLOGICALLY-ORIENTED ORGANIZATIONS THAN FOR OTHER TYPES OF ORGANIZATIONS? IN WHAT WAYS? SHOULD IT INCLUDE ASSESSMENTS TECHNICAL KNOWLEDGE, SKILLS AND ABILITIES?	
Q5. IN WHAT WAYS CAN MANAGEMENT ASSESSMENT PROGRAMS BE USED TO LICENSE OR CERTIFY MANAGEMENT PERSONNEL IN THE NUCLEAR POWER INDUSTRY? . DEVELOPMENT OF CRITERIA AND REQUIREMENTS . TRAINING FOR ENTRY/CAREER PLANNING . DIAGNOSIS . EVALUATION OF PERSONNEL FOR ENTRY TO LICENSED POSITIONS	

QUESTION	RESPONSES
26. WHAT ARE THE TECHNICAL PROBELMS ASSOCIATED WITH USING MANAGEMENT ASSESSMENT PROGRAMS FOR LICENSING/ CERTIFICATION? . DEVELOPMENT OF CRITERIA . SPECIALIZED TECHNIQUES . CALIBRATION OF TECHNIQUES . VALIDATION OF TECHNIQUES	
27. WHAT ARE THE PRACTICAL PROBLEMS ASSOCIATED WITH USING MANAGEMENT ASSESSMENT PROGRAMS FOR LICENSING/ CERTIFICATION? . TIME/COSTS . MANAGEMENT ACCEPTANCE OF PROGRAM VALIDITY . NEEDS FOR NRC/INDUSTRY CERTIFICATION OF M.A. PROGRAM . SPECIFICITY/OBJECTIVITY OF CRITERIA	
28. ARE THERE ANY LEGAL AND/OR ETHICAL PROBLEMS WHICH YOU COULD EXPECT FROM SUCH AN APPROACH?	
29. IF MANAGEMENT ASSESSMENT PROGRAMS WERE UTILIZED IN A LICENSING/CERTIFICATION PROCESS, SHOULD M.A. PRACTITIONERS MAKE (YES/NO - PASS/FAIL) <u>DECISIONS</u> RATHER THAN <u>RECOMMENDATIONS</u> TO OTHER DECISION-MAKERS? WOULD THEY BE WILLING TO DO SO?	

QUESTION	RESPONSES
Q10. IF USED FOR LICENSING, HOW COULD MANAGEMENT ASSESSMENT PROGRAMS BE COMBINED WITH OTHER REQUIREMENTS SUCH AS TRAINING AND EXPERIENCE? WHAT PROCEDURES WOULD YOU RECOMMEND TO DO THIS? IS AN ASSESSMENT CENTER APPROACH AN APPROPRIATE MECHANISM? ARE RECORD REVIEWS SUFFICIENT?	
Q11. BASED ON YOUR KNOWLEDGE AND EXPEREINCE WITH MANAGEMENT ASSESSMENT IN TECHNOLOGICALLY-ORIENTED ORGANIZATION, WHAT TYPES OF MANAGEMENT ATTRIBUTES AND/OR CAPABILITIES COULD M.A. PROGRAMS TAP FOR LICENSING/CERTIFICATION? . TECHNICAL SKILLS . EMOTIONAL/PERSONAL/INTELLIGENCE PROFILES . MANAGEMENT STYLES/SKILLS . COMMUNICATION SKILLS	
Q12. WHAT OBJECTIVE CRITERIA COULD BE APPLIED? HOW APPLICABLE ARE QUALITATIVE ASSESSMENTS TO SUCH A LICENSING/CERTIFICATION PROCESS? HOW WOULD DECISIONS BE MADE?	

QUESTION	RESPONSES
Q13. IN YOUR OPINION, WHAT WOULD BE THE ADVANTAGES OF INCLUDING MANAGEMENT ASSESSMENT AS PART OF THE LICENSING/CERTIFICATION PROCESS FOR SENIOR MANAGERS IN THE INDUSTRY? DISADVANTAGES? IS IT A PRACTICAL/ ACCEPTABLE APPROACH?	
Q14. DO YOU HAVE ANY OTHER RECOMMENDATIONS/SUGGESTIONS/ OBSERVATIONS ABOUT USING ASSESSMENT TECHNIQUES (SUCH AS THE ASSESSMENT CENTER) FOR LICENSING/ CERTIFYING MANAGEMENT PERSONNEL IN THE NUCLEAR POWER INDUSTRY (OR SIMILAR INDUSTRIES)?	

ASSESSMENT CENTER USERS

INTERVIEW SUMMARY

NAME OF INTERVIEWEE _____ PREPARED BY _____

POSITION _____

DATE _____

COMPANY _____

LOCATION _____

TYPE OF BUSINESS _____

EDUCATION/
TRAINING _____

EXPERIENCE _____

COMMENTS _____

INTERVIEW GUIDE

FOR ASSESSMENT CENTER USERS

INSTRUCTIONS: USE THE FOLLOWING QUESTIONS AS THE FRAMEWORK FOR DISCUSSIONS WITH USERS OF ASSESSMENT CENTERS REGARDING THE USE OF MANAGEMENT ASSESSMENT PROGRAMS AND TECHNIQUES IN LICENSING, ACCREDITING, OR CERTIFYING PLANT MANAGERS AND OTHERS IN MANAGERIAL ROLES.

PREFACE INTERVIEW/DISCUSSION WITH BRIEF DESCRIPTION OF THE PURPOSE AND FOCUS OF INTERVIEW:

- REASON(S)/EXPERIENCE WITH USING M.A. PROGRAMS
- REASON(S)/EXPERIENCE WITH USING M.A. PROGRAMS FOR LICENSING, ACCREDITING, OR CERTIFYING TECHNICAL OR MANAGERIAL PERSONNEL
- FEASIBILITY OF USING M.A. PROGRAMS FOR PLANT MANAGER LICENSING, ACCREDITING, OR CERTIFYING IN TERMS OF:
  - LEVELS OF MANAGEMENT AND MANAGEMENT FUNCTIONS
  - ORGANIZATIONAL AND PERSONNEL POLICY CONSIDERATIONS
  - COST, TIME REQUIRED, EPLOYEE ATTITUDES, VALIDATION

QUESTION	RESPONSES
Q1. WHAT TYPE OF PERSONNEL ARE REFERRED TO A MANAGEMENT ASSESSMENT PROGRAM? WHY WERE THESE TYPES CHOSEN? HAS YOUR USE OF MANAGEMENT ASSESSMENT GROWN OVER THE PAST FIVE YEARS?	
Q2. WHY DO YOU USE A MANAGEMENT ASSESSMENT PROGRAM? . RECRUITMENT . SELECTION . CAREER DEVELOPMENT . TRAINING . COUNSELING . CREDENTIALLING	

QUESTION	RESPONSES
Q3. WHAT ATTRIBUTES/CHARACTERISTICS ARE YOU TRYING TO ASSESS OR PREDICT? COULD MANAGEMENT ASSESSMENT TAP THESE DIMENSIONS FOR LICENSING/CERTIFICATION? . TECHNICAL SKILLS . EMOTIONAL/PERSONALITY/INTELLIGENCE PROFILES . MANAGEMENT SKILLS/STYLES . COMMUNICATION SKILLS	
Q4. WHAT TYPES OF MANAGEMENT ASSESSMENT PROGRAM AND TECHNIQUES ARE USED? IF OUTSIDE SERVICE IS USED, DID YOU (AS THE CLIENT) PARTICIPATE IN THE REVIEW AND SELECTION OF THESE TECHNIQUES? DO TECHNIQUES DIFFER FOR DIFFERENT TYPES AND LEVELS OF PERSONNEL? ARE THEY APPLICABLE TO LICENSING/CERTIFICATION OF MANAGERS? AT WHAT LEVEL?	
Q5. HOW DO YOU INTEGRATE THE RESULTS OF MANAGEMENT ASSESSMENT WITH FACTORS SUCH AS ACADEMIC BACKGROUND, TRAINING, EXPERIENCE? HOW COULD THIS BE DONE FOR LICENSING/CERTIFICATION OF MANAGERS?	

QUESTION	RESPONSES
Q6. WHAT EVALUATIONS/PROCEDURES ARE USED IN CONJUNCTION WITH MANAGEMENT ASSESSMENT PROCEDURES? . INTERVIEWS . PROBATIONARY ASSIGNMENTS . PEER RATINGS	
Q7. DO YOU SYSTEMATICALLY EVALUATE PERSONNEL PERFORMANCE IN TERMS OF THE RESULTS OF MANAGEMENT ASSESSMENT? HOW ACCURATE (IN YOUR EXPERIENCE) HAS M.A. BEEN IN DESCRIBING AND PREDICTING CAPABILITIES AND CHARACTERISTICS?	
Q8. DO YOU USE THE RESULTS OF MANAGEMENT ASSESSMENT TO ESTABLISH ORGANIZATIONAL AND PERSONNEL DEVELOPMENT PROGRAMS? (IF, FOR EXAMPLE, A MANAGEMENT ASSESSMENT REVEALED DEFICIENCIES IN COMMUNICATION SKILLS, WOULD A DEVELOPMENT PROGRAM BE ESTABLISHED FOR THAT PERSON?)	

APPENDIX C

SUMMARY OF THE BACKGROUND EXPERIENCE, TRAINING AND EDUCATION OF THE INDUSTRY INTERVIEWEES

SUMMARY OF THE BACKGROUND EXPERIENCE, TRAINING AND EDUCATION OF THE INDUSTRY INTERVIEWEES*

OCCUPATION	EDUCATION/DEGREE	CAREER EXPERIENCES					HAS HELD AN SRO LICENSE
		OPERATIONS	MAINTENANCE	HEALTH PHYSICS	ENGINEERING	OTHER	
VICE PRESIDENT, NUCLEAR	B.S./CHEMICAL ENGINEERING				X	ENERGY SERVICES	X
VICE PRESIDENT, NUCLEAR	B.S./MECHANICAL ENGINEERING				X		
SENIOR VICE PRESIDENT, NUCLEAR	B.S./ELECTRICAL ENGINEERING	X	X		X	NUCLEAR NAVY	
VICE PRESIDENT, NUCLEAR OPERATIONS	B.A./MATHEMATICS	X			X	NUCLEAR NAVY CONSTRUCTION	
PLANT SUPERINTENDENT	B.S./MECHANICAL ENGINEERING	X	X			ENERGY SERVICES	X
STATION MANAGER	B.S./MECHANICAL ENGINEERING	X			X		
STATION SUPERINTENDENT	B.S./MECHANICAL ENGINEERING	X			X	NUCLEAR NAVY	
STATION MANAGER	B.S./MECHANICAL ENGINEERING	X			X		X
STATION MANAGER	B.S./MECHANICAL ENGINEERING M.S./NUCLEAR ENGINEERING	X	X		X		X
PLANT SUPERINTENDENT	B.S./METALLURGICAL ENGINEERING M.S./NUCLEAR ENGINEERING	X	X		X		X
ASSISTANT STATION MANAGER	B.S./MECHANICAL ENGINEERING M.S./NUCLEAR SCIENCE/ ENGINEERING	X	X		X		X
ASSISTANT STATION SUPERINTENDENT	B.S./ELECTRICAL ENGINEERING M.B.A.		X		X	PLANT CONSTRUCTION	
ASSISTANT PLANT SUPERINTENDENT	B.S./ELECTRICAL ENGINEERING M.S./NUCLEAR ENGINEERING	X			X		X
MANAGER, NUCLEAR PRODUCTS DIVISION	B.S./ELECTRICAL ENGINEERING	X	X		X		
SUPERINTENDENT OF OPERATIONS	HIGH SCHOOL DIPLOMA	X	X		X	CONSTRUCTION NUCLEAR NAVY	
SUPERINTENDENT, TECHNICAL SERVICES	A.B./CHEMISTRY M.S./ENVIRONMENTAL CHEMISTRY				X	CHEMIST TECHNICAL SERVICES	

*NOT ALL INTERVIEWEE PROFILES ARE AVAILABLE AT THIS TIME.

SUMMARY OF THE BACKGROUND EXPERIENCE, TRAINING AND EDUCATION OF THE INDUSTRY INTERVIEWEES*

OCCUPATION	EDUCATION/DEGREE	CAREER EXPERIENCES					HAS HELD AN SRO LICENSE
		OPERATIONS	MAINTENANCE	HEALTH PHYSICS	ENGINEERING	OTHER	
MANAGER, TECHNICAL SUPPORT	B.S./ELECTRICAL ENGINEERING	X	X		X		X
MANAGER, ENGINEERING AND TECHNICAL SUPPORT	B.S./MECHANICAL ENGINEERING	X	X		X		X
SUPERINTENDENT, TECHNICAL SERVICES	B.S./MECHANICAL ENGINEERING	X			X		X
ASSISTANT OPERATIONS SUPERVISOR	B.S./PHYSICAL SCIENCE	X				NRC REACTOR INSPECTION	
OPERATING ENGINEER	B.S./MECHANICAL ENGINEERING	X			X		X

*NOT ALL INTERVIEWEE PROFILES ARE AVAILABLE AT THIS TIME.