MODULE 9

BUILDING THE TOTAL TEAM

MODULE 9 OBJECTIVE

- To examine ways to broaden the capability of the station organization by developing staff; utilizing and building support outside the station.
- To recognize the importance of assessing the limits of capability within an organization and when and where to seek external help.

OBJECTIVE

- To show that building a total team is a major challenge for management

TOPICS TO BE COVERED

- Staff development
  - Staff selections
  - Diversity of functions
  - Training and retraining
  - Training organizations

TOPICS TO BE COVERED

- Building a contact network with external organizations
  - Station design groups - EPRI
  - Equipment manufacturers - COG
  - IAEA - NMAC
  - INPO
  - WANO
  - Other Utilities

ISSAC NEWTON - QUOTE

- "If I have seen further than other men, it is by standing on the heads of giants"
- Put another way; To make the job possible surround yourself with smart knowledgeable people.

STAFF DEVELOPMENT: STAFF SELECTION

- To meet the demands and high standards required for the Nuclear Industry, all staff must be well trained.
- The basis for successful plant operation and maintenance is a good training program for ALL staff.

STAFF DEVELOPMENT: STAFF SELECTION

- The first step is to hire bright people.
- Much management time must be devoted to preparing staff development and training needs.
- Systematic approach to training follows:

APPENDIX H
THE SYSTEMATIC APPROACH TO TRAINING

Development of training material first entails conducting a Needs Analysis, Job Analysis and Task Analysis. The analyses provide a method of responding to changes in human resource requirements, solving performance problems and learning from operating experience. This analysis is necessary to make sure that apparent concerns can be resolved through training. If the facts confirm a valid training need, job analysis uses existing job data and incumbent employees to identify and rate job tasks. Tasks rated difficult and important are selected for training. Their exact methods of correct performance and underlying competencies are then determined through task analysis. Completing this process reveals reliable information on safe work practices. The skills, knowledge and attitudes identified provide a task-specific content reference for both new and existing programs.

The Design of training uses the task performance information collected during analysis to specify, in measurable terms, the job skills, knowledge and attitudes that training will develop in the staff member. Job performance evaluations are prepared and they focus development efforts to support in-plant training and qualification. Learning objectives are developed for groups of task-related knowledge and skills. These written statements define exactly when, what and how well the staff member must perform during training. Tests and assessments are produced to ensure that these competencies are reliably evaluated. Decisions on training settings, trainee entry qualifications and organization of learning objectives are also made. Design concludes with development of a training plan.

The *Development of the training* *entails the organization of the instructional materials needed for staff to achieve the learning objectives. Emphasis is on maximizing the use of existing materials and resources. Instructor/facilitator and staff activities are defined using learning objectives and small working group tasks. These activities describe how the instructor and staff will perform during training to achieve the learning objectives. Existing, suitable training materials and lesson plans are selected, new ones are produced as required.* **Resulting training materials are reviewed** *for technical accuracy, tried out with a group of staff members, and revised as necessary. Performance-based training materials are the products of the phase.*

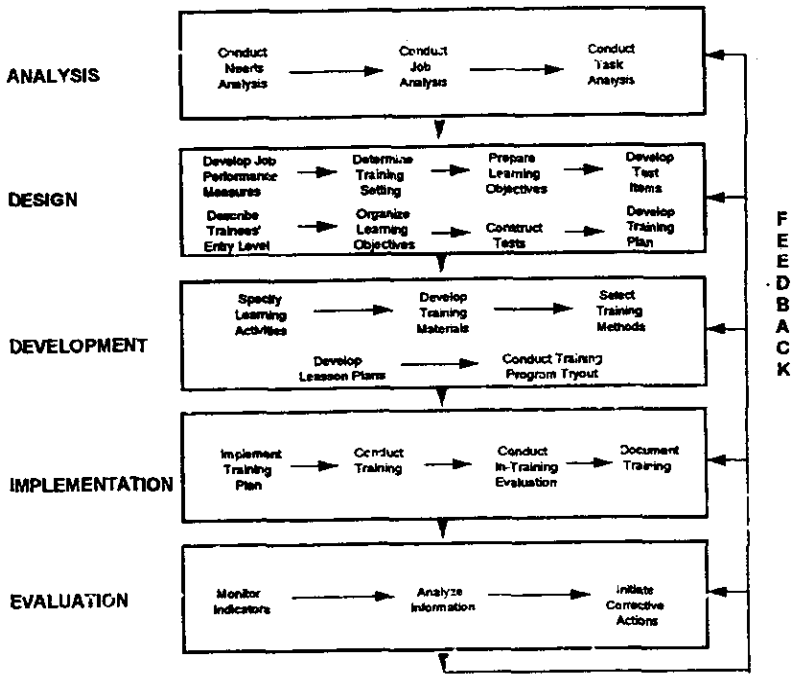
Evaluation of the training ensures training's continuing ability to produce qualified staff. By monitoring such indicators as course material evaluation, employee job performance, operating experience, evaluation helps maintain and improve the training program. **It is the dynamic process of assessing performance, identifying concerns, and initiating corrective actions.** The program feedback enables training to respond adaptively to unforeseen problems of changing conditions. Completing evaluation steps produce the performance data and feedback vital to any training program.

Clients are advised on training needs and adult learning methodology. The process of delivering training to adults is always changing as is the subject matter of the training programs. It is the duty of TSSD to bring this information to the customer and incorporate these changes into the training programs.

Implementation is the process of putting training programs into place. It begins by activating the training plan. Instructors/facilitators are selected and trained, and the availability of trainees, facilities and resources is confirmed. Training is delivered as planned and trainee and

instructors/facilitators performance is evaluated. These evaluations serve two purposes. First, they verify that trainees have achieved the learning objectives. Second, instructors/facilitators performance problems can be detected and solved. Key records are maintained to support management information needs and to document the performance both of trainees and instructors/facilitators.

Below is a flow chart which demonstrates the various phases of the Systematic Approach to Training:



STAFF DEVELOPMENT: DIVERSITY OF FUNCTION

- A nuclear power plant has a tremendously wide diversity of staff functions, consider;
  - Technical:
    - » Reactor physicist - Station chemist
    - » Electronic engineer - Metallurgist
    - » Software computer scientist - Electrical power engineer
    - » Mechanical engineer - Civil Engineer
    - » Accident analyst - Environmental specialist

STAFF DEVELOPMENT: DIVERSITY OF FUNCTION

- Maintenance I&C / electrical:
  - » Instrument specialist - Heavy electrical
  - » Armature winder - Electronic circuit board specialist
  - » Meter calibration specialist - Computer services
  - » Computer services - Software support
  - » Automation - Heating A/C and ventilation

STAFF DEVELOPMENT: DIVERSITY OF FUNCTION

- Maintenance Mech:
  - » Heavy duty fitter - Precision machinist
  - » Welders - Mechanical seal experts
  - » Turbine generator services - Diesel engine experts
  - » Pump valve, HX experts
  - » Operation of advanced analytical tools

STAFF DEVELOPMENT: DIVERSITY OF FUNCTION

- Operations
  - » Water treatment plant, tritium removal, D2O upgrade
  - » Fire crews, emergency crews, first aid crews
  - » Plant operation nuclear systems - field
  - » Plant operation nuclear fuel handling
  - » Control room operators fuel handling
  - » Control room operators for main control room
  - » Simulator operators and trainers

TRAINING & RETRAINING

- The following is an example of the Ontario Hydro Strategy after Corporate Downsizing

1 STRATEGIC ALIGNMENT

Corporate Strategy for Nuclear Excellence

The Corporate Strategic Plan for Excellence in Nuclear Operations is based on achieving performance excellence in safety, production and cost. Nuclear Excellence in the year 2000 is defined by the following quantitative targets:

- Safety: Peer average is B or better; 4 days lost/200,000 work hours.
- Production: Average capacity factor is 80%.
- Cost: Full cost is 3.5 cents/kWh; "Going forward" cost is 1.5 cents/kWh.

The focus of the Strategic Plan is to make improvements in the following areas:

1) Focus and strengthen accountability.
2) Align to a common vision and strategies.
3) Improve Peer results.
4) Reduce human performance errors in operations.
5) Improve management and leadership.
6) Improve plant maintenance.
7) Improve measurement of performance.

The quality of work in operations and maintenance within our nuclear plants is significantly less than that required to assure the long-term viability of the business and position Ontario Hydro as a world leader in safe and efficient nuclear operation. Pressures arising from internal "due diligence" assessments, Peer evaluations and regulatory audits are all contributing to our uncertain operating climate requiring greater attention to the training and qualification of staff.

Improvements in each of these areas will only be achieved through excellence in human performance. For individual staff to be effective, individual, leadership, and organizational behaviours along with the appropriate supporting management processes must be aligned. Training can coach individuals on how their actions or inactions influence the margin of safety and on the potential consequences of mistakes.

Supervisors must be held accountable to ensure that their staff receive the training they need to accomplish tasks safely, effectively, and efficiently. They must also ensure that the workplace environment supports excellence in human performance.

TSSD acknowledges that excellent human performance requires continuous learning and improvement. We will ensure that:

- Through on-the-job training (OJT) and on-the-job evaluation (OJE) programs, front-line workers are trained to recognize task-specific conditions that could lead to error and to practice methods to effectively eliminate or minimize the potential for errors.
- Through continuing training programs, individuals are provided opportunities to regain familiarity with tasks that are infrequently performed before they actually perform the task.
- Processes are established, during our evaluation of the effectiveness of training programs, to readily detect and correct weaknesses or performance problems.
- Corrective actions, implemented to prevent recurrence of training or knowledge-related performance problems, as part of our support to station supervisors in the assignment of work, are effective.

Training's role in the drive to Nuclear Excellence has been highlighted in TSSD's Vision and Mission statements. These are documented in Appendix A, along with a comparison between TSSD and the line organization regarding their roles and responsibilities for training.

Nuclear Recovery Plan

TSSD has been specifically assigned the accountability in the Nuclear Recovery Plan (NRP) to:

- Develop strategies enabling all Nuclear station employees at the journeyperson level in designated "job families" to achieve full qualification for their job by December 31, 1999, and to facilitate the retention of that qualification through continuing training and requalification by December 31, 2000. (NRP.13) (This is consistent with the OHN Policy 0890 "Conduct of Training".)
- Put in place an Ontario Hydro Senior Nuclear Plant Managers (SNPM) course. (NRP.33)
- Put in place an Ontario Hydro Shift Supervisor Personal Development Seminar (SSPDS). (NRP.34)
- Develop a strategy for developing a training program for technical staff. (NRP.38)

TSSD will also be required to play a key support role for several other important initiatives in the approved Nuclear Recovery Plan, eg, CoMPaSS training to facilitate business process convergence. (These are further discussed in Section VII, "TSSD Improvement Initiatives".)

Station Training Priorities

While relative priorities for training programs may vary by individual station customer, TSSD's efforts should satisfy the following core training needs of the stations:

a) Meet legal requirements (eg, WHMIS training).
b) Meet regulatory requirements (ie, licensing issues and special qualifications).
c) Support the Nuclear Recovery initiatives being undertaken by the stations.
d) Ensure all employees at the journeyperson level achieve and retain full qualification.

II THE CURRENT POSITION OF THE BUSINESS

STATE OF TSSD PRODUCTS AND SERVICES

The current state of TSSD's products and services is evaluated in the areas of:

- quality of current training programs and courses (ie, how effectively the required capability has been defined and the required training material developed);
- effectiveness and efficiency in delivery of the products and services;
- evaluation of training effectiveness; and
- support of work assignment in the stations.

State of Definition of Required Capability

Training requirements and specifications for most important job classifications do not exist, need significant updating, or are just being developed, e.g., core and position-specific technical training, advanced special training for conventional and radiation safety, and supervisory training. The lack of development of agreed training needs results in deficiencies in various key qualifications.

For some key job families, the critical tasks and functions of staff, along with the skills and knowledge required to perform them, have not yet been fully defined by the station line supervisors. This must be completed before TSSD training program developers can propose a list of required training products to the line organization, which will deliver the requisite skills and knowledge to perform the work.

State of Provision of Capability
(Training Development)

Our training programs and documentation have been in need of updating for several years. However, there has recently been insufficient capability in the training and course/program

analysis/development areas to support all the major improvement initiatives that are required to bring the training to minimal acceptable standards.

There is a lack of clear, consistent, and meaningful training and qualification standards for the major job families except where there are external drivers - the AECB for Authorized Nuclear Operators (ANO) and Shift Supervisors (SS), and the MCCR for welders.

Some of the key areas for improvement, recently noted as Peer findings, are:

a) Initial training design is incomplete. The knowledge and generic skills components are adequate. However, formal position-specific, on-the-job evaluation processes and approved field training programs, which directly demonstrate the skills to perform certain jobs, are lacking. This provides insufficient assurance of an individual's competence and increases the risk of error.
b) Continuing training, to maintain and enhance knowledge and skills, is infrequently provided to non-licensed operators, chemistry technicians, and maintenance personnel. There is no continuing training program defined except for Authorized staff, Emergency Response Training, and a few other areas.
c) Radiation protection training is not structured to efficiently provide, maintain (through requalification training), and upgrade (through refresher training) the required knowledge and skills necessary for effective radiological work practices and protection performance at the stations. Processes need to be implemented to prevent the occurrence of significant training backlogs in future.

The Nuclear Recovery Plan requires a significant increase in effort to develop consistent training and qualification standards and improve the quality of existing training programs for all major job families, and develop new programs to address concerns identified by various audit findings.

Station commitment is critical in providing sufficient funding and subject matter experts to do this development work. Effective leadership at the appropriate management levels by customers and TSSD is important to decide the appropriate balance between training development and delivery efforts which are required.

State of Provision of Capability
(Training Delivery)

There is a significant gap between the current, overall station staff qualification status and the Nuclear Recovery target of 95% to be achieved by December 31, 1999. While the gaps vary by station and job family, the Station Qualification Index for OHN as a whole, based on the Job Qualification Index (initial training) for the major job classifications, does not reflect a mature work force. The percentage of individuals holding certificates (indicator of completed initial training) is less than 50%.

The overall Nuclear Station Requalification Index (RQI), which is an indicator of mandatory training to maintain individuals as qualified/certified, is about 50-60%. This again represents a significant gap from the Nuclear Recovery target of 95% by December 31, 2000, especially since not all required requalification training has been defined.

Average Station Job Qualification (JQI), Position Qualification (PQI), and Requalification (RQI) Indices (% at 1996 Year-End)

	JQI*	PQI	RQI
Pickering	60	59	31
Darlington	79	74	66
Bruce A	81	83	63
Bruce B	78	81	57
Total OHN	72	72	50

*Note this includes only initial training in "core" subjects (defined differently by each station). It excludes all job specific training requirements and all "on-the-job" training. It also excludes some significant job families completely, notably design engineers.

Due to changing work priorities in the operations environment, it is often very difficult to release station personnel, particularly for requalification and continuing training. This has contributed to the significant training backlogs which currently exist. Occasionally it has also resulted in empty classrooms for scheduled training and under-utilized trainers.

Operational plans to deliver required training will be developed after the Integrated Independent Performance Assessment (IIPA) review has been completed, when staff needs at stations and overall staffing and hiring strategies have been clearly defined.

Based on current assumptions regarding the training requirements for qualification and requalification, the increase in planned training days in 1997, for meeting the Nuclear Recovery targets, initial training needs, and the elimination of existing training backlogs will be substantial. The total 1997 training delivery load is estimated to be approximately 175K trainee days as compared to the 1996 actual level of 97K. (Note that this is the volume of training delivery to completely close the gap over the next 4-5 years; it does not reflect a firm customer commitment given via an annual Service Level Agreement.) This represents roughly an 80% increase. Under this scenario, the delivery load will likely continue at least into 1999, with potential decreases afterward with the completion of CoMPaSS training and major development work.

State of Provision of Capability
(Evaluation of Training Effectiveness)

The OHN Performance Objectives and Criteria define the essential elements of an effective qualification program as follows:

- Initial training including station systems and equipment, field skills demonstration, safety, and operating experience;
- On-the-job evaluation (OJE) prior to performing tasks independently;
- Continuing training including station systems and equipment changes, and procedure changes; and
- Qualification standards and evaluation adequate to verify trainee competence.

There is no systematic evaluation program in place to evaluate the effectiveness of training programs. However, TSSD management recently appraised and categorized each major program's relative effectiveness and state of development. The results are summarized in **Appendices B and C**, and are indicative of the improvement efforts which will be needed in future.

State of Work Assignment Support

Recent Peer audits noted that the training programs for Shift Superintendents and Shift Supervisors currently do not have supervisory training in their curriculums. Supervisory training can improve their proficiency at motivating personnel, establishing priorities, delegating tasks, communicating expectations, and providing constructive feedback.

A strategic initiative is underway to define TSSD's business management model, and refine its critical processes. For example, the critical processes supporting the Training Information Management System (TIMS) may need to be enhanced. TIMS identifies the training requirements for job family positions, schedules courses, tracks completed courses, and maintains auditable records of the qualifications of OHN staff, thus providing the basis for informing line supervisors on the capability of their staff to perform work.

STATE OF TSSD CAPABILITY

The current position of TSSD's capability is based on the state of its: current resourcing and funding levels; ability to acquire training staff; current TSSD staff qualification; program management; asset management; business

APPENDIX G
GLOSSARY

A. General Training Terms

Training: The provision of skills and knowledge people need to do their work. The provision could take place formally in a classroom setting, on the job, through supervisor's coaching, or various other means.

Training Program: A comprehensive and integrated set of specifications, learning objectives, and courses for training in a job family which ensures staff develop and maintain the capability, and are qualified to do work in that job family.

Initial Training: The training delivered to provide new hires with the minimum knowledge and skills to safely perform initial work assignments at the work location to which they are initially assigned.

Continuing Training: The training delivered to maintain or upgrade skills and knowledge at the "Journeyperson" level. There may be a need to maintain skills for a variety of tasks, eg, important tasks which are infrequently performed, complex tasks where repetition and practice are prudent. The need to upgrade skills may arise as a result of design modification, improved procedures, new regulatory requirements, new tools and techniques, or where performance reviews indicate a need for new or improved training.

Qualification Training: The training required to acquire a formal qualification or certificate to do work in a job family.

Requalification Training: The training required to retain formal qualification in certain areas. It may include periodic retraining or practice to demonstrate proficiency to do work in the job family, eg, training to maintain welding tickets, badges for radiation protection, and regular practice by Authorized Nuclear Operators on a full-scope simulator.

On-the-Job (OJT) Training: The training provided through work experience under the direction of supervisors. OJT is structured for specific tasks and jobs, and includes a detailed procedure, steps required, references, and expected results.

On-the-Job (OJE) Evaluation: An evaluation of the trainee's capability to perform work by testing or reviewing his or her actual performance on the job. The evaluation is completed using specified Job Performance Measures (JPM) for specific tasks. The evaluation results are used to identify the need for retraining, additional training, or modifications to the training program.

Computer-Based Training (CBT): Training that provides instructional packages to the trainee through a computer terminal or personal computer. It is a self-paced training session with self-evaluation at completion.

Training Requirements: A set of specifications, learning objectives, or courses required to demonstrate competency to perform a task or to do work.

Quality Training: Training which is job relevant, timely, technically accurate, instructionally challenging, impacts on job performance, and is provided efficiently and effectively.

Systematic Approach to Training (SAT): A structured and sequential approach for the development of new training programs or courses or the evaluation of existing ones. The approach has processes to ensure that a training program: addresses the related job responsibilities; has published objectives; has an evaluation process that lines up with the job; and has a mechanism for monitoring that the trainees' job performance is meeting the training objectives.

B. Specific Training Programs

Authorization Training Program: A prerequisite requirement in the form of a set of specifications, learning objectives and courses before a candidate is considered to receive Authorization (from Ontario Hydro and the AECB) to work in designated positions in a nuclear station, eg, Shift Superintendents and Supervisors (SS's), Shift Operating Supervisors (SOS's), Authorized Nuclear Operators (ANO's), Unit 0 Major Panel Operators (MPO (0)'s), and Unit 0 Supervising Nuclear Operators (SNO (0)'s).

Non-Licensed Operator Training Program: A comprehensive and integrated set of specifications, learning objectives, and courses for training people in the Non-Licensed Operator job family, eg, Non-Licensed Operators who will work in various specialized streams such as Fuel Handling, Nuclear Unit, Unit 0, or Tritium Removal Facility, Major Panel Operators (MPO), Supervising Nuclear Operators (SNO).

Control Maintenance Training Program: A comprehensive and integrated set of specifications, learning objectives, and courses for training people in the Control Maintenance Technician job family, eg, staff who look after all the electronic, electrical, and instrumentation equipment and systems in the nuclear stations.

Mechanical Maintenance Training Program: A comprehensive and integrated set of specifications, learning objectives, and courses for training people in the Mechanical Maintenance job family, eg, welders, machinists, pipefitters, and other staff who maintain most mechanical equipment and systems in the nuclear station.

Civil Maintenance Training Program: A comprehensive and integrated set of specifications, learning objectives, and courses for training people in the Civil Maintenance job family, eg, handypersons, service maintainers, mobile crane operators, transport and work equipment (T&WE) mechanics, stockkeepers, and building mechanics.

Technical Skills Training Program. A comprehensive and integrated set of specifications, learning objectives, and courses for training people in a number of job families which include: Chemical Technicians; Planning Technicians; Management and Professional (M&P) staff including those working in Engineering Services or Projects and Modifications; Computer Maintainers; Radiation Control Technicians; Security; Dosimetry Services; Nuclear Safety; Reactor Safety; and Material Management. It also includes courses in: Computer Skills; Environmental Qualification; Operating Policies and Procedures; and Common (Generic) Technical areas.

Safety Training Program: The collective group of training programs on Conventional Safety, Emergency Response, and Radiation Protection. The overall Safety Training Program also includes courses on Work Protection and Transport and Work Equipment operation.

Conventional Safety Training Program: A comprehensive and integrated set of specifications, learning objectives, and courses for training which is designed to enhance department safety programs, identify Corporate and legislated safety requirements, and improve worker understanding of safe work practices. The training program encompasses a variety of courses, eg, Cardiopulmonary Resuscitation (CPR), Chemical Safety, Confined Space Entry, Emergency Procedures, Fall Arrest, Fire Protection, First Aid, Reporting and Investigating Accidents, Respirator Protection, Safe Electrical Operation, Workplace Hazardous Materials Information System (WHMIS), Mechanical/Electrical Protection.

Emergency Response Training (ERT) Program: A comprehensive and integrated set of specifications, learning objectives, and courses for training a person to be a qualified member of an emergency response team.

Radiation Protection Training (RPT) Program: A comprehensive and integrated set of specifications, learning objectives, and courses for providing qualification training to people who work in radioactive work areas. The RPT Program provides for a tier system of qualifications based on the employees' need to enter, work, or supervise work in a nuclear facility. The qualifications (orange, yellow, or green) are granted by station health physics personnel. The qualifications are to be maintained by requalification training every two years.

Leadership Development Training Program: A comprehensive and integrated set of specifications, learning objectives, and courses for training to develop and enhance supervisory and managerial leadership knowledge and skills. It also includes courses in: Personal Development; Instruction and Training Material Development (Train the Trainer); and Business Processes.

C. Terms on Qualification

Certification: Formal recognition granted to an employee through a certificate that he or she has completed the set of training requirements or milestones defined for the "Journeyperson" level position in his/her job family.

Job Qualification Index (JQI): A measurement of an individual's progress towards completing the initial training in "core" training requirements and achieving certification. JQI measures the ratio of the number of training "credits" completed by an individual to that required for certification at the journeyperson level position expressed as a percentage. JQI is currently defined differently by each station. It excludes all job specific training requirements and all "on-the-job" training. It also excludes some significant job families completely, notably design engineers.

Position Qualification Index (PQI): A measurement of an individual's progress towards completing the training and achieving qualification in "Special Duty Areas" identified for his/her position. (Training in Special Duty Areas is training provided to OHN staff which is not part of the core curriculum, normally specified by one generating station.) PQI is calculated as the percentage of special duty training programs complete.

Requalification Index (RQI): The average percentage of requalification training programs complete.

Station Qualification Index (SQI): The percentage of individuals at a station holding certificates, ie, an indicator of completed initial training. SQI is based on the Job Qualification Index (initial training) for the major job classifications.

D. Organizations

Atomic Energy Control Board (AECB): The Canadian federal agency responsible for the oversight and regulation of the use of nuclear power and radioactive substances.

Ontario Hydro Nuclear (OHN): The business unit of Ontario Hydro established to operate all four nuclear generating stations, the Bruce Heavy Water Plant, and associated service and support divisions.

E. Financial and Business Terms

Fee-for-Service: The practice by which internal customers communicate their needs for products and services, contracts are established by the supplier organization to indicate the commitment to deliver at a specified price, and customers reimburse the supplier organization with fees after product/service delivery.

Operations, Maintenance, and Administration (OM&A): The portion of the organizational budget used to cover the day-to-day operation of in-service facilities.

Revenue Allocation/Asset Valuation (RAAV): The revaluation of the assets of Ontario Hydro's generating business units, after organizational restructuring, to a relative market value. Less debt was correspondingly assigned to the revalued assets.

F. Other

Peer Evaluation: An audit of an organization's operation conducted by a team of individuals chosen from similar businesses in the organization.

Simulator Fidelity: The extent to which the simulator is able to replicate the appearance and dynamic response of the reference station, when operated in accordance with the approved operating documentation, for all the exercises that comprise the training program.

Training Information Management System (TIMS): The information management system and process through which every course, internal or "brokered", is scheduled by TSSD scheduling staff. The system records the successful completion of training courses or programs by trainees, and is used by TSSD to inform line organization supervisors on the capability and qualification of their staff. The system also allows the scheduler to determine when an employee's qualification is due to expire and then contact the employee's supervisor to arrange the most convenient time for requalification.

EXTERNAL SUPPORT

- Design organization(s)
- Manufacturers
- Other utilities
- Reactor type, owners group (COG)
- IAEA
- WANO

EXTERNAL SUPPORT

- INPO
- EPRI
- NMAC
- EUCG

EXTERNAL SUPPORT

- Cost effective experience, learn from others and apply the lessons.
- A network of 'AGENCIES' will supply assistance in various forms
  - Information -----Utility must SELECT help
  - Advice----------Utility must EVALUATE help
  - Assistance-------Utility must RESPOND to help
  - Service----------Utility must PAY FOR help

EXTERNAL SUPPORT

- Without such a network a utility is destined to blunder into costly situations that could have been avoided.

EXTERNAL SUPPORT

The need to build up a support network is vital to the success of a utility. The cost of making the mistakes of others far exceeds any 'annual fees' that will be required from a support organization.

The type of support can range from informal contracts with staff at another utility to a very formal review by a team of international specialists.

It is wise for a utility to have a formal process for performance feedback to evaluate the experience of others and judge whether it is applicable for their utility. The 'peer evaluation' process has been used effectively in North America.

'Assistance' can come in many forms; from reading publications and deciding to extract 'helpful hints' calling another utility and asking how did they cope with a situation to paying for a service contract the results in some changes to your systems or equipment.

DESIGN ORGANIZATIONS

- The best source for specific design issues, design changes or design support.
- Effective analysis support and a source of information.
- Usually has a 'service' organization various contractual support arrangements can be made.

DESIGN ORGANIZATIONS

- Design organization may provide 'advisory bulletins' for problems as they emerge from similar stations.
- Can assist the utility in setting up its own design support group(s).

MANUFACTURERS

- Major suppliers (manufacturers) usually have very effective 'service' support departments.
- The main areas for this support would be:
  - Turbine / Generator
  - Boiler
  - Major pump suppliers
  - Inverts / Rectifiers / Computers
  - Electrical distribution / diesel generators

MANUFACTURERS

- Manufacturers services organization can provide a full range of services from bulletins to major overhauls.
- The information provided is very specific and usually has a significant component of experience gained from other contracts.

OTHER UTILITIES

- An alliance with another utility is a very effective way to develop support.
- The interests of each utility is very similar, the commercialism between utilities tends to be very small.
- Staff interchanges can easily be arranged with mutual benefit to each utility.

OTHER UTILITIES

- Personal contact can be made that will last for many years.
- This is a very cost effective collaboration.

REACTOR TYPE / OWNERS GROUP

- Particular problems can be described in detail as early warning to other users.
- Pressure Tube failure research projects can be done on a cost sharing basis.
- Workshops and conferences provide an excellent forum for establishing and renewing contacts for support.

IAEA

- International Atomic Energy Agency
- This international body can provide a vast amount of publication.
- Information exchanges are used to identify and publish 'good practices'
- Teams of specialists can make site visits and provide assistance from mildly encouraging to total organization restructuring.

IAEA

- Conferences and workshops, good method for support building.
- Covers every aspect of NPP functions in detail.

WANO

- World Association of Nuclear Operations
- Focused mainly on the operational aspect of inservice units.
- Promotes excellence in operations.
- Provides tangible mechanisms to achieve excellence.
- Will conduct peer reviews.
- Will provide for staff development of utility staff through short term assignments.

INPO

- Institute Nuclear Power Operators
- Similar to but an earlier organization than WANO.
- Very effective organization with vast resources of experience.
- Provides excellence in operations.
- Has a ranking system that uses performance criteria to evaluate NPP's.
- Uses the peer audit for main evaluations.

EPRI

- Electrical Power Research Institute
- A North American support organization that look at specialized issues from which member organizations can utilize vast amounts of information.

EPRI

- Exists on a commercialized basis ---- Fee for service.
- Has a very wide range of support facilities from setting up maintenance of specific equipment to setting up maintenance for a total NPP.
- Many excellent publications.

NMAC

- Nuclear Maintenance Application Center
- Is a subsidiary of EPRI set up to provide very detailed maintenance support.
- Wide range of equipment, detailed procedures:
  - Motorized and Air operated valves
  - Motors
  - Pumps
  - Seals and Valve packing
  - Maintenance requirements

NMAC

- Makes visits to specific sites, provide solutions to specific problems.

EUCG

- Electric Utility Cost Group
- International organization that provides comparative business information for participating members.
- Looks at cost and tries to provide a balance comparison.
- Has data that provides support for major project comparison for the relative merits of coal, oil, gas, and nuclear.
- Promotes the use & expansion of electricity.