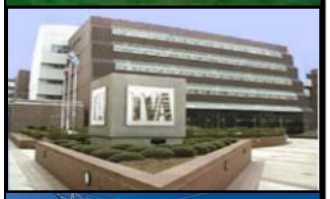
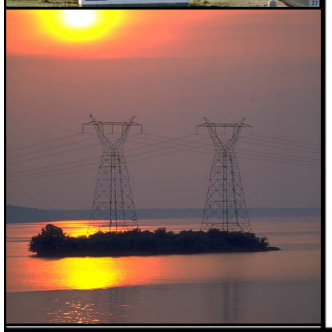




Keeping Critical Knowledge From Walking Out the Door

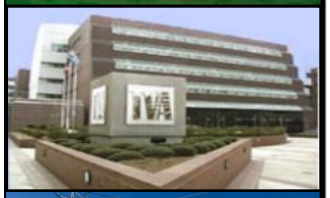
A Review of TVA's Strategy for Knowledge Retention

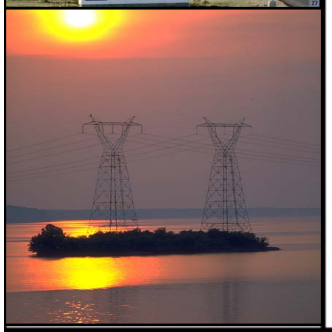
E. Richards "Dick" Brabham, SPHR
Human Resource Service Manager

Gerald R. "Jerry" Landon, SPHR
Program Manager, Talent Management

Agenda



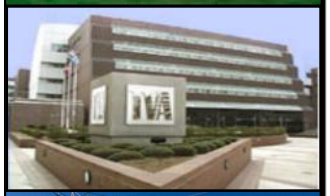




- Who's TVA?
- The Attrition Challenge
- Talent Management and "That Little Something Extra"
- Identifying and Retaining Critical Knowledge
- Lessons Learned
- Questions

Who is TVA – Quick Facts

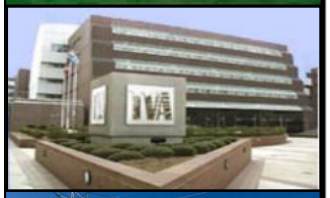


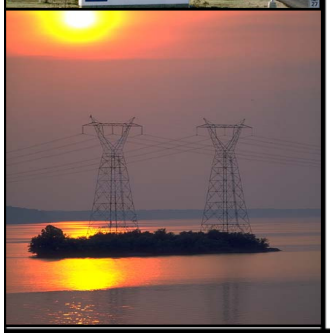



- America's largest public power producer
- 8.8 million residents; 7 states
- $9.2 billion total revenues
- 159 municipal and cooperative power distributors
- 59 directly-served industrial customers
- Over 11,600 employees
- Capacity – 34,900 MW
  - 3 nuclear plants (6 units)
  - 11 coal-fired plants (59 units)
  - 29 hydroelectric dams (109 units)
  - 1 pump storage plant (4 units)
  - 8 combustion turbine sites (83 units)

TVA's Attrition Challenge



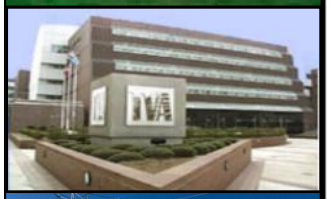


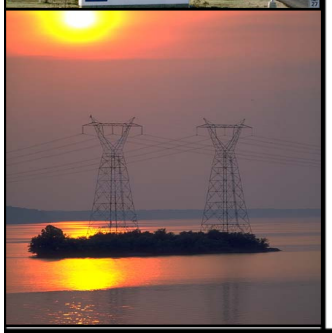


- Significant downsizing over 15+ years
- Retirement Incentives to Aid Downsizing
- 10 + Years of Very Limited Entry Level Recruiting
- Average Age – 47+
- 1/3 of work force eligible to retire within 5 years
- Pressure to Reduce Labor Cost = Not all retirees will be replaced

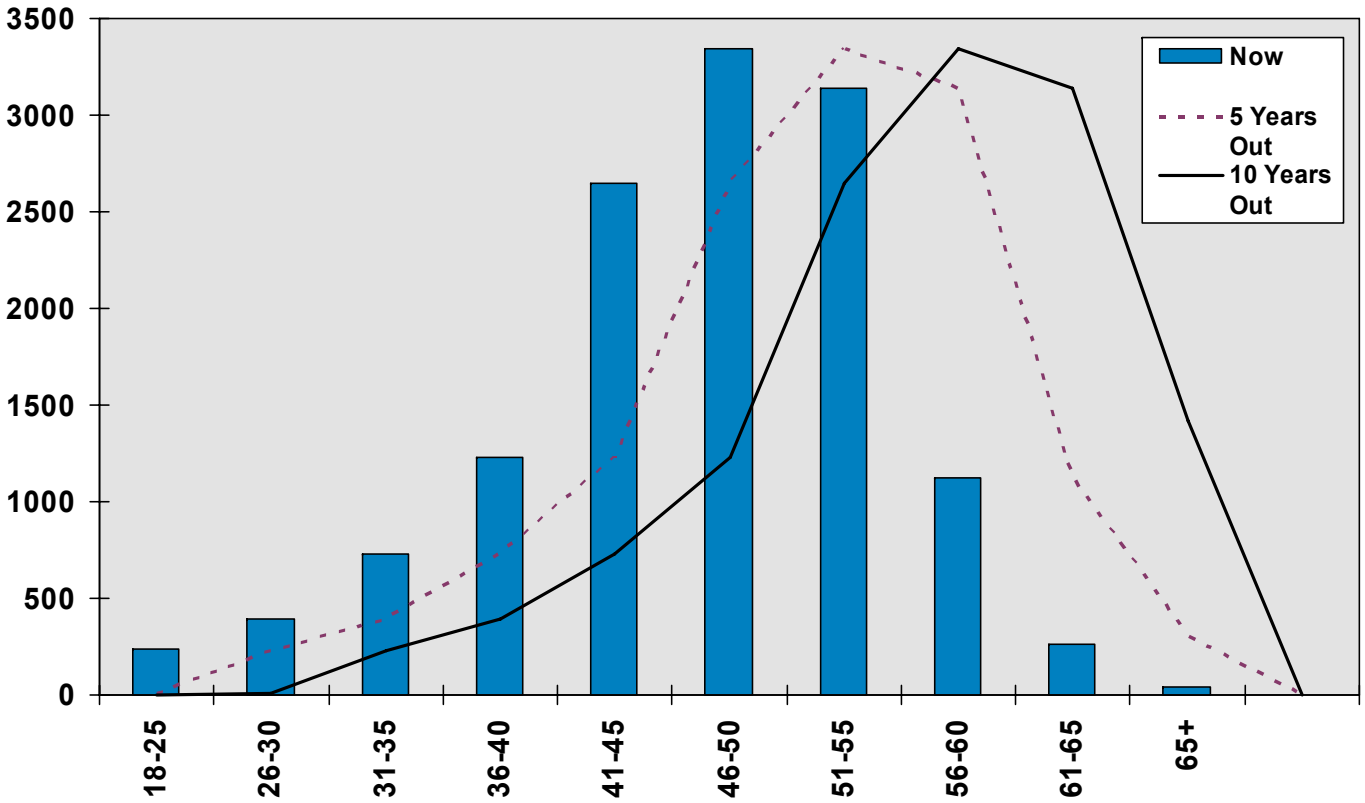
TVA's Attrition Challenge



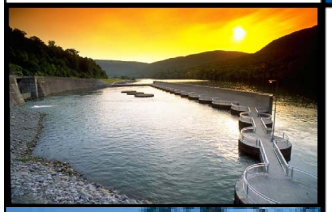


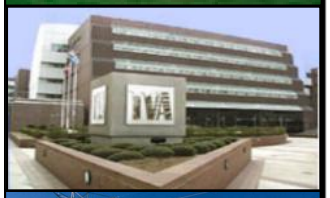



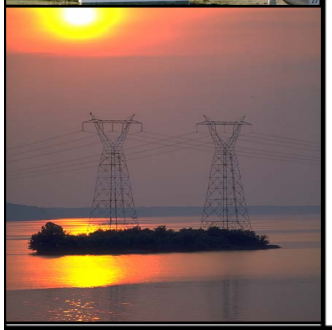
An Aging Work Force Nearing Retirement



The Attrition Challenge







National Issue: Graying of America

- "Baby Boomers" reaching retirement age
- Median age of the US worker is 41
- Number of workers over 55 is growing 4 times faster than the workforce as a whole
- Retiring Earlier and Working Longer
- "Echo Boom" significantly smaller
- Widening Skills Gap
- What do NASA, Nuclear Weapons, and the EPA have in common?

Getting to Tomorrow's Workforce

Critical Undocumented Knowledge !

Early experiments in transportation

Lessons Learned

Knowledge Retention

Process Focus

- Focusing on the critical positions where knowledge loss is the greatest threat
- Identifying and prioritizing the specific knowledge and skills at risk
- Developing concrete, actionable responses to mitigate this loss.

Knowledge Retention

Three major phases:

Step 1. Conduct a ***Knowledge Loss Risk Assessment***

Step 2. ***Determine Approach*** to Capture Critical Knowledge

Step 3. ***Monitor*** and ***Evaluate***

Knowledge Retention

Step 1 Step 2 Step 3

"Knowledge Loss Risk Assessment"

- Designed to identify positions/people where the potential knowledge loss is greatest and most imminent.
- Includes Ratings based on two factors:
  - Time until Retirement
  - Position Criticality
- Provides focus - Identifies positions where steps to mitigate knowledge loss may be needed.

Knowledge Retention

Step 1 | Step 2 | Step 3

Estimating Attrition

- Focus on Predicting Retirement
- Historical Projections
- Employee Self-identification
  - "High Tech" TVA-wide campaign
  - "High Touch" follow-up with critical positions
- Identified critical functional areas of greatest risk

Knowledge Retention

Step 1 | Step 2 | Step 3

"Knowledge Loss Risk Assessment"

Retirement Factor	X	Position Risk Factor	=	Total Attrition Factor

Retirement Factor -- The projected retirement dates in the work force planning system (whether based upon employee estimates or calculated based on age and tenure data) will be assigned a retirement factor as follows:

5 - Projected retirement date within current or next fiscal year

4 - Projected retirement date within 3rd fiscal year

3 - Projected retirement date within 4th fiscal year

2 - Projected retirement date within 5th fiscal year

1 - Projected retirement date within or greater than 6th fiscal year

Knowledge Retention

Step 1 | Step 2 | Step 3

"Knowledge Loss Risk Assessment"

Retirement Factor X Position Risk Factor = Total Attrition Factor

Position Risk Factor -- An estimate of the difficulty or level of effort required to replace the position incumbent. Managers/supervisors are responsible for making these ratings based upon the following criteria:

5 - Critical and unique knowledge and skills. Mission-critical knowledge/skills with the potential for significant reliability or safety impacts. TVA- or site-specific knowledge. Knowledge undocumented. Requires 3-5 years of training and experience. No ready replacements available.

4 - Critical knowledge and skills. Mission-critical knowledge/skills. Some limited duplication exists at other plans/sites and/or some documentation exists. Requires 2-4 years of focused training and experience.

3 - Important, systematized knowledge and skills. Documentation exists and/or other personnel on-site possess the knowledge/skills. Recruits generally available and can be trained in 1 to 2 years.

2 - Proceduralized or non-mission critical knowledge and skills. Clear, up-to-date procedures exist. Training programs are current and effective and can be completed in less than one year.

1 - Common knowledge and skills. External hires possessing the knowledge/skill are readily available and require little additional training.

Knowledge Retention

Step 1 | Step 2 | Step 3

"Knowledge Loss Risk Assessment"

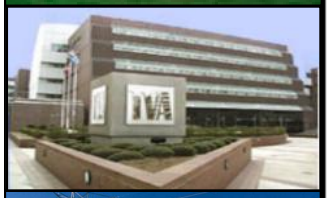
Retirement Factor X Position Risk Factor = Total Attrition Factor

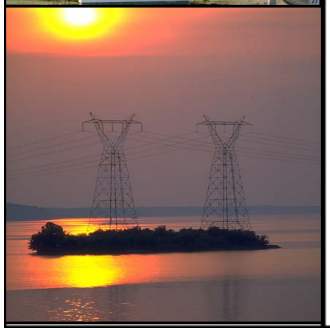
Total Attrition Factor -- An estimate of the effort and urgency necessary to effectively manage the attrition.

20-25	High Priority - Immediate action needed. Specific replacement action plans with due dates will be developed to include: method of replacement, knowledge management assessment, specific training required, on-the-job training/shadowing with incumbent.
16-19	Priority - Staffing plans should be established to address method and timing of replacement, recruitment efforts, training, shadowing with current incumbent.
10-15	High Importance- Look ahead on how the position will be filled/ work be accomplished. College recruiting, training programs, process improvements, reinvestment
1-9	Important - Recognize the functions of the position and determine the replacement need.

Knowledge Retention







Step 1 | Step 2 | Step 3

"Knowledge Loss Risk Assessment"

Position Risk Factor

Retirement Factor	1	2	3	4	5
5	5	10	15	**20**	**25**
4	4	8	12	16	**20**
3	3	6	9	12	15
2	2	4	6	8	10
1	1	2	3	4	5

Knowledge Retention

Step 1 | Step 2 | Step 3

"Determine Approach to Capture Critical Knowledge"

- Conduct Interview to ID potential knowledge loss areas
- Assess consequences of loss using interview results and organization specific critical skills inventories
- Prioritize and ID options to retain or mitigate
- Develop and implement action plans

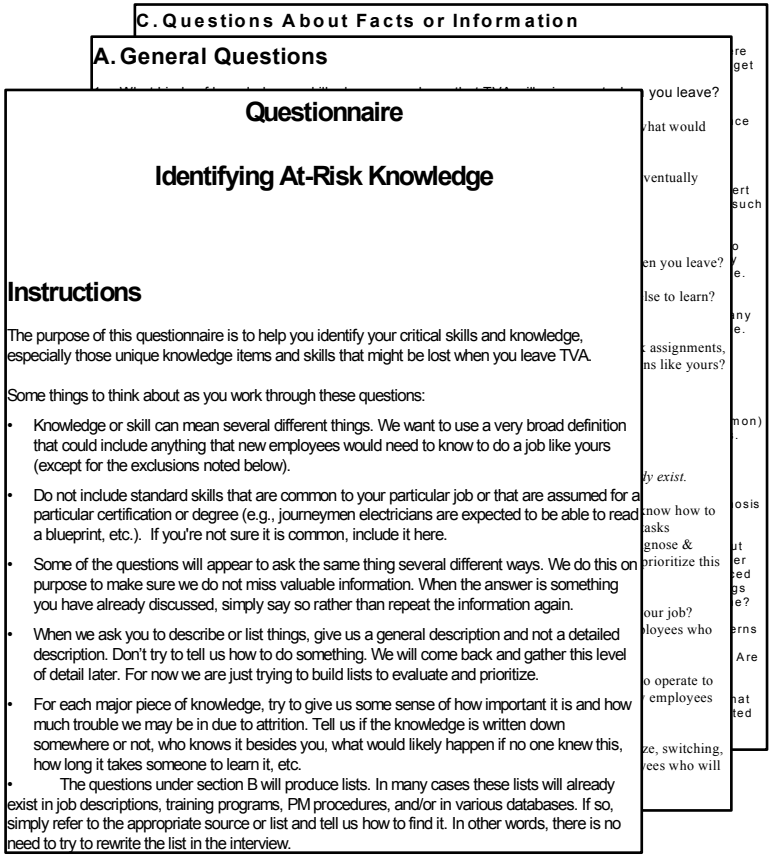
Knowledge Retention

Step 1 | Step 2 | Step 3

Conduct Interview to ID potential Knowledge Loss Areas

Interview Questionnaire

- General questions
- Task questions (how….)
- Fact or information questions (what…who…)
- Pattern recognition / lessons-learned questions



C. Questions About Facts or Information

A. General Questions

Questionnaire

Identifying At-Risk Knowledge

Instructions

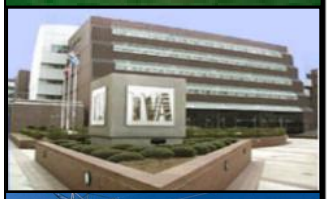
The purpose of this questionnaire is to help you identify your critical skills and knowledge, especially those unique knowledge items and skills that might be lost when you leave TVA.

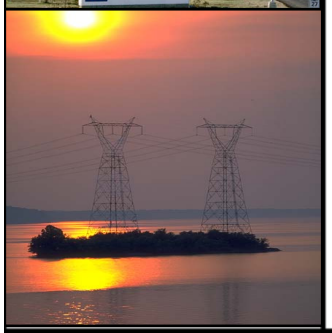
Some things to think about as you work through these questions:

- Knowledge or skill can mean several different things. We want to use a very broad definition that could include anything that new employees would need to know to do a job like yours (except for the exclusions noted below).
- Do not include standard skills that are common to your particular job or that are assumed for a particular certification or degree (e.g., journeymen electricians are expected to be able to read a blueprint, etc.). If you're not sure it is common, include it here.
- Some of the questions will appear to ask the same thing several different ways. We do this on purpose to make sure we do not miss valuable information. When the answer is something you have already discussed, simply say so rather than repeat the information again.
- When we ask you to describe or list things, give us a general description and not a detailed description. Don't try to tell us how to do something. We will come back and gather this level of detail later. For now we are just trying to build lists to evaluate and prioritize.
- For each major piece of knowledge, try to give us some sense of how important it is and how much trouble we may be in due to attrition. Tell us if the knowledge is written down somewhere or not, who knows it besides you, what would likely happen if no one knew this, how long it takes someone to learn it, etc.
- The questions under section B will produce lists. In many cases these lists will already exist in job descriptions, training programs, PM procedures, and/or in various databases. If so, simply refer to the appropriate source or list and tell us how to find it. In other words, there is no need to try to rewrite the list in the interview.

Assessing Knowledge Criticality





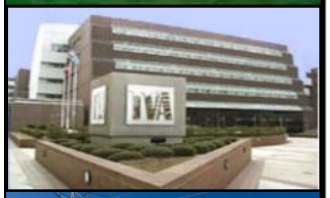


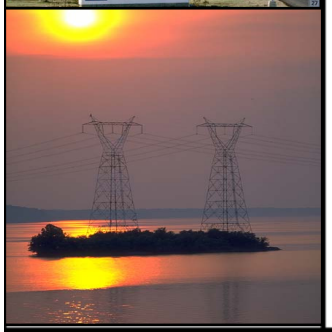
- **Importance**
  - Impact on safe, reliable, and efficient operations
  - Localized vs. system-wide impact
  - Existence of alternative methods
  - Frequency and timing of need
- **Rarity of Knowledge**
  - Redundancy of knowledge internally and externally
  - Company-specific knowledge
  - Existence & cost of outside resources
  - New hires with this knowledge available
  - Loss gradual or abrupt
- **Difficulty of Recovery**
  - Recovery possible
  - Documentation or records exist
  - Lead time needed to document or transfer

Some knowledge deserves to be lost.

Knowledge Retention







Step 1 | Step 2 | Step 3

ID Options to Retain or Mitigate Knowledge Loss

Codification

- Documentation & Procedures
- Checklists, Inventories, etc.
- Performance Support Systems
- Concept Mapping

Alternative Resources

- Agency/site/department expert
- Rotational or “Visiting” Staff
- Multi-skilling or Cross-training
- Contractors, part-timers, retirees

Engineer It Out

- Process Improvement
- Update Equipment
- “Smart” tools and technology
- Eliminate task, product or service

Education & Training

- Classroom and Simulator Training
- CBT, Video-based, and alternative delivery
- Coaching and Mentoring
- OJT and Targeted Work Assignments
- Coaching, Shadowing & Mentoring
- Apprenticeship Programs

Sample KR Plan – SQN Engineer




KNOWLEDGE RETENTION PLAN

Employee:	**Position: Engr. Mech. General (NUC)**	**Position Risk Factor: 4** **Retirement Factor: 5**	**Total Attrition Factor: 20**

Summary and Situation Assessment:

The incumbent has in depth knowledge of and expertise in piping analysis with emphasis on use of the T Pipe software. This software is unique to SQN and little duplication of knowledge exists. Though a replacement person with an engineering degree could become proficient in the use of this software in about six months, at least two years on-the-job training is needed to respond quickly to urgent questions related to piping analysis. In addition to the T Pipe system, there must be extensive knowledge of the Class II computer system, SDP – NEDP9, and SQN LDC 13.1 and 24.2. Though a person with a two year degree may be knowledgeable, it is preferable to have someone with a four year degree in either Civil or Mechanical Engineering.

Currently Employee A is being cross-trained on the T Pipe system. Employee B also works with this system and has significant knowledge. Employee C and Employee D work in the Chattanooga TVAN Corporate office and also have knowledge of the system.

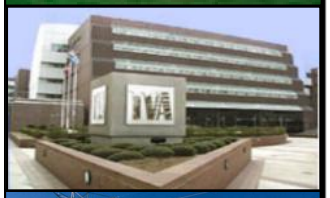
Because the T Pipe system is unique to SQN there is no external training on its use. However ASME does provide training on piping analysis and code requirements.

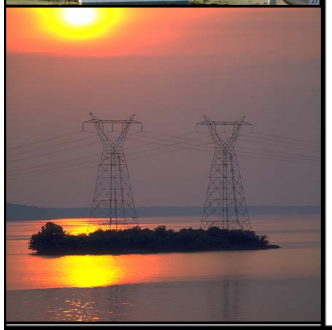
Knowledge or Skill	**Criticality (1-5)**	**Actions** ***(Required of Criticality 4-5)*** List steps which can and will be taken to retain this critical knowledge/skill and/or minimize the impact of its loss)	**Target Date(s) for Completion**	**Status and Issues**
Rigorous and alternate piping analysis, component qualification of code components and pipe rupture analysis skills	5	• Identify a replacement person for the critical skills • Replacement person complete ASME courses in piping analysis and code requirements • Replacement person develop a working knowledge of T-Pipe Code, ASME Code, procedures and criteria through reading and mentoring of _____ and _____.	Dec 2004 Sept 2005 Sept 2005	Employee A and Employee B are being crossed trained in T-Pipe. Will send both to ASME Course when offered by TVA Training. Both being Mentored
Development Plans	5	• Supervisor assign replacement person "trail tasks" under the direction of _____ and/or ____ • Replacement complete qualification card under mentor sponsorship • Include mentoring in _____ and ___ PR&D and developmental goals in replacement individual • Recruit/hire person to replace replacement person	March 2005 Dec 2005 Sept 2004 Oct 2005	On going replacements are
Documentation	5	Incumbent to develop a piping analysis, component qualification and pipe rupture reference library of handbooks, procedures, criteria and process in conjunction with replacement person.	Sept 2004	On going will be completed by Sept.

Knowledge Retention Plan Prepared by: _OE Consultant_____ Date: November 6, 2003
Last Update: _7/22/04; Manager__

Examples of KR Options Used



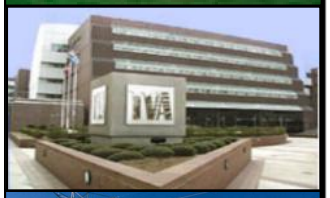


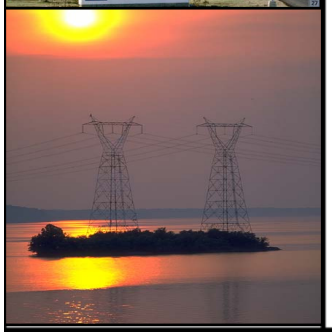


- Identify Co-worker to Cross-train
- Provide Formal Education & Training
- Structured Self-Study and Mentoring
- Update/Develop Documentation and Procedures

Knowledge Retention







Step 1 | Step 2 | Step 3

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- Apprenticeship Programs

Knowledge Retention

Step 1 Step 2 Step 3

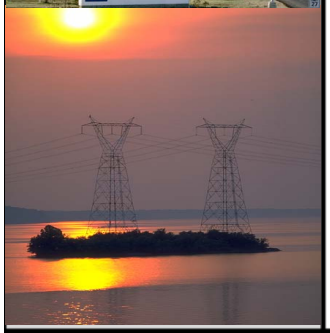
Monitor and evaluate knowledge retention plans

- Review updated Work Force Planning Attrition Data
- Monitor previous Knowledge Retention Plans
- ID areas that need to be reassessed
- Coordinate and replicate

Knowledge Retention Process







Step 1
Conduct
Risk Assessment

- Prepare Management
- Assess Risk Factor
- Prioritize Positions

Step 2
Determine &
Implement Plan

- Inventory Knowledge/Skill "Clusters"
- Assess Criticality
- Develop Knowledge Retention Plans
- Coordinate and Review KR Plans
- Implement KR Plans

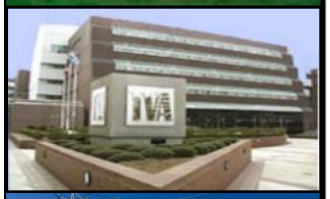
Step 3

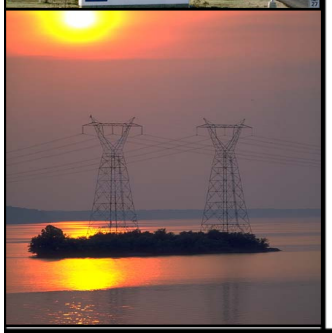
Monitor & Evaluate

- Monitor & Evaluate KR Plan Progress

Lessons Learned



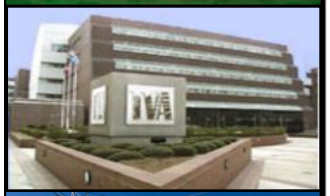




- Line Management cares. Need process and tools.
- Risk greatest in specialized technical positions and in problem solving strategies.
- Wider range of options to mitigate knowledge loss than is typically consider.
- Process and procedures often weak – An over-reliance on “tribal knowledge” and individual expertise.
- Specific Pockets, or “Functional Areas,” of risk.
- Line Managers must own the solutions.
- Need to promote a culture of knowledge sharing

A Culture of Knowledge Sharing
The Role of Managers

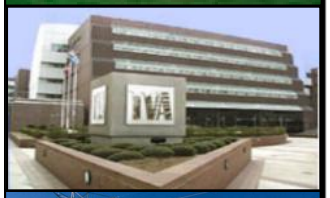




- Recognize observation and “tagging along” can be an investment.
- Facilitate development plans with specific learning objectives.
- Make knowledge transfer an expectation -- not just an option. Evaluate learning, teaching, and sharing.
- Provide an infrastructure (procedures, processes, documentation, lessons learned databases, shared folders) for employees to capture and share knowledge.
- Encourage formal cross-training and rotational assignments. Go beyond a single heir apparent.
- Fund job aids, signage, and “smart tools.”
- Encourage “Brown bag” lunches and story telling.
- Develop a pipeline of experts and leaders.

A Culture of Knowledge Sharing
The Role of the Experienced Worker



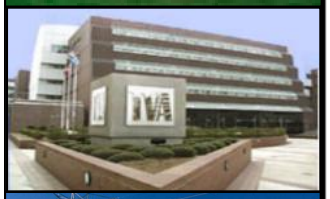


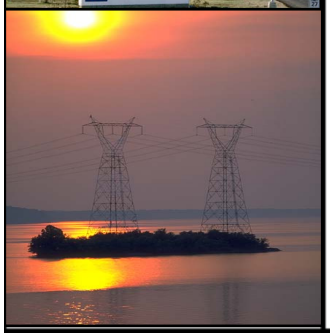

- Look for opportunities to teach & coach tomorrow's workforce
- Involve tomorrow's workforce in infrequent, specialized projects
- Tell some stories. Explain "the why" -- or history -- of the way things are done.
- Introduce tomorrow's workforce to customers, suppliers, consultants, user groups, other regions, etc.
- Update your records, processes and procedures.
- Develop job aids, signs, checklists, etc.
- Develop and deliver training.
- Consolidate and organize your files (including electronic records).
- Don't focus on a single "heir apparent" -- seek to develop a cluster of skilled employees

A Culture of Knowledge Sharing
The Role of Tomorrow's Workforce

- Ask questions. Ask to go along. Ask for more details. Ask.
- Seek out rotational and temporary assignments and cross-training opportunities.
- Volunteer to write-up the procedure or develop the website. Have seasoned employees review.
- Have a written development plan. List specific things to learn, experiences to have, people to meet, etc.
- Visit new locations and expand your network.
- Recognize that understanding and honoring the past doesn't limit your future.





Questions?

For more information …

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