Kewaunee Power Station License Renewal Work Control Process AMP

Division of License Renewal
Office of Nuclear Reactor Regulation

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- Work Control Process (WCP) AMP
- WCP is a Plant Specific AMP
- WCP used for 1221 AMR Line Items
- LRA Submitted August 14, 2008
  - NRC Letter - Request for supplemental information (March 23, 2009)
  - Dominion Letter - WCP AMP Supplement (April 13, 2009)

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Kewaunee LRA Review Status

- Completed Milestones
  - Scoping and Screening Audit
  - Aging Management Program Consistency Audit
  - AMP Audit RAIs
  - Scoping and Screening RAIs
  - Environmental Audit

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Work Control Process (WCP) – Application in AMRs

- WCP used as the aging management program (AMP) for aging management of over 1200 aging management review (AMR) line items in the LRA

- WCP used as global AMP for aging management of numerous, different material-environment-aging effect (MEA) combinations in the LRA (115)

- Staff noted WCP could be applied in one of the following manners:

  - verification of the effectiveness of a preventative or mitigative AMP that has been credited for aging management (water chemistry, lube oil, fuel oil)
  - for GALL-based AMR line items, either as a replacement for the AMP recommended for aging management in the corresponding AMR line item in the GALL Report or where the GALL AMR is silent on recommending an given AMP for aging management
  - as the AMP credited for aging management in a plant-specific AMR
  - potentially, as the basis for implementing a particular program element aspect or aspects of a GALL-based AMP in the LRA that is credited for aging management

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Staff Review of WCP and AMRs Crediting WCP

- NRC Staff reviewed those AMR items in the LRA crediting WCP against the general aging effect identification criteria and aging management program criteria given in Sections A.1.2.1 and A.1.2.2 of NUREG 1800, Appendix A.1 (SRP-LR Branch Technical Position [BTP] RLSB-1)

- In addition, for GALL-based AMR items, the NRC Staff also reviewed the AMR items against the corresponding AMR items in the GALL Report Volumes 1 and 2 and by performing a review of he program elements for the WCP to the program elements in the GALL recommended AMP

- The staff reviewed the program elements for the WCP program against the staff's generic program element criteria and bases for AMP program elements in Section A.1.2.3 of BTP RLSB-1

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WCP – AMR Application Issues

- When credited for preventative/mitigative AMP effectiveness – AMR basis raises questions on whether this will be done on a periodic or one-time basis and how this can be achieved if the component under review is not one of the ones that will be inspected under the program.

- When credited as a alternative AMP for aging management in a GALL-based AMR – AMR basis raises questions on how the program element for the WCP compare to the program element activities in the GALL Program recommended for aging management in the corresponding AMR item of the GALL report.

- When credited as the AMP for management in a plant-specific AMR item or a GALL-based AMR where the GALL AMR is silent on recommending an AMP for management, ensuring that the program elements of the WCP are conservatively adequate to manage the aging effects associated with the components material and environment.

- When used as the process for implementing a given program element aspect of another GALL-based AMP in the LRA credited for aging management – AMR basis raises the question on how the implementation of the WCP will achieve this and whether it will consistent with program element criteria recommended in the GALL AMP.

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WCP – Current Aging Management Basis

- Defined as an existing, plant-specific condition monitoring AMP for the LRA
- Uses an undefined random sampling basis for inspection
- Uses past preventative maintenance activity or surveillance test histories to draw an inference that there would be sufficient opportunities to inspect the components in the future and thus to conclude that the program is conservative
- Credited for multiple materials, aging effects, and environments
- Credits only undefined visual examination techniques for aging management
- Credits that inspection frequencies will range from once every six (6) months to once every 10 years
- Credits undefined sample expansion criteria and acceptance criteria
- Originally included only a limited operating experience discussion

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WCP Program Element Issues

- Use of a random sampling-based AMP not consistent with the recommendations in BTP RLSB-1. Sampling needs to based on establishing justifying the sample of components that will be inspected on behalf of the population of components for each material-environment-aging effect (MEA) combination being managed by the WCP.

- Aging effects and parameters monitored as providing indication of these aging effects need to be better defined.

- Inspection methods for detecting the parameters that will be indicative of a given aging effect need to be better defined, and may need to include the crediting of either augmented visual techniques, surface examination techniques, or volumetric examination techniques, as based on pertinent relevant operating experience.

- Inspection frequencies and expansion criteria for each MEA managed under the program need to be defined.

- Acceptance criteria for each parameter monitored clearly need to be established

- Relevant operating experience needs to be factored into the establishment of the program element criteria for the AMP.

NRC Contact Information

Samuel Hernandez
Project Manager
301-415-4049
samuel.hernandez@nrc.gov

Vanice Perin
Project Manager
301-415-8143
vanice.perin@nrc.gov

http://www.nrc.gov/reactors/operating/licensing/renewal/applications/kewaunee.html

Kewaunee Power Station

Work Control Process

Work Control Process (WCP)

- Address the use of WCP in lieu of GALL AMPs in the LRA
- Discuss the application of WCP in the LRA
- Break down the AERM managed by WCP
- Describe the alignment of the WCP with GALL (XI.M32 & M38)
- Schedule for supplemental information to facilitate on-going NRC reviews

NUREG-1801

- **NUREG-1801 typically specifies that chemistry control programs are to be augmented to verify effectiveness**
- **NUREG-1801 recommends using a plant-specific program or a program similar to OTI (XI.M32) for the verification**
- **NUREG-1801 specifies that an alternative acceptable program may include *routine maintenance* or *a review of repair or inspection records to confirm absence of aging***

WCP History

- *Routine maintenance* is the essence of the Dominion WCP
- Based on a historical review, Dominion chose the WCP because more inspection opportunities exist compared to the OTI AMP
- Dominion provided the NRC staff (NRR, Regions I & II) extensive program information during the reviews of the North Anna, Surry and Millstone license renewal applications

WCP History

- The North Anna, Surry and Millstone SERs concluded that the WCP will provide "reasonable assurance" that aging will be managed in the PEO
- The KPS LRA was developed based on this past precedence

WCP Usage

- **Use with Chemistry Programs:**
  - **GALL typically requires verification of chemistry effectiveness**
  - **However, there are several GALL items where verification of chemistry is not required by a OTI**
  - **In these situations, Dominion conservatively applied WCP in addition to the specified chemistry AMP (except ASME Class 1)**
  - **As a result, over 250 additional Table 2 line items in the KPS LRA utilize WCP**

WCP Usage

- "Dominion Defined" AERM:
  - GALL contains several MEAPs for the various SSCs typically found at a plant
  - However, KPS created unique M/E/A groups for systems and structure AMRs that created an additional (~500) LRA Table 2 line items
  - In many situations, WCP was credited for managing the AERM
- WCP was also used to verify the effectiveness of the CCCW Chemistry AMP, although no effectiveness verification is recommended in GALL

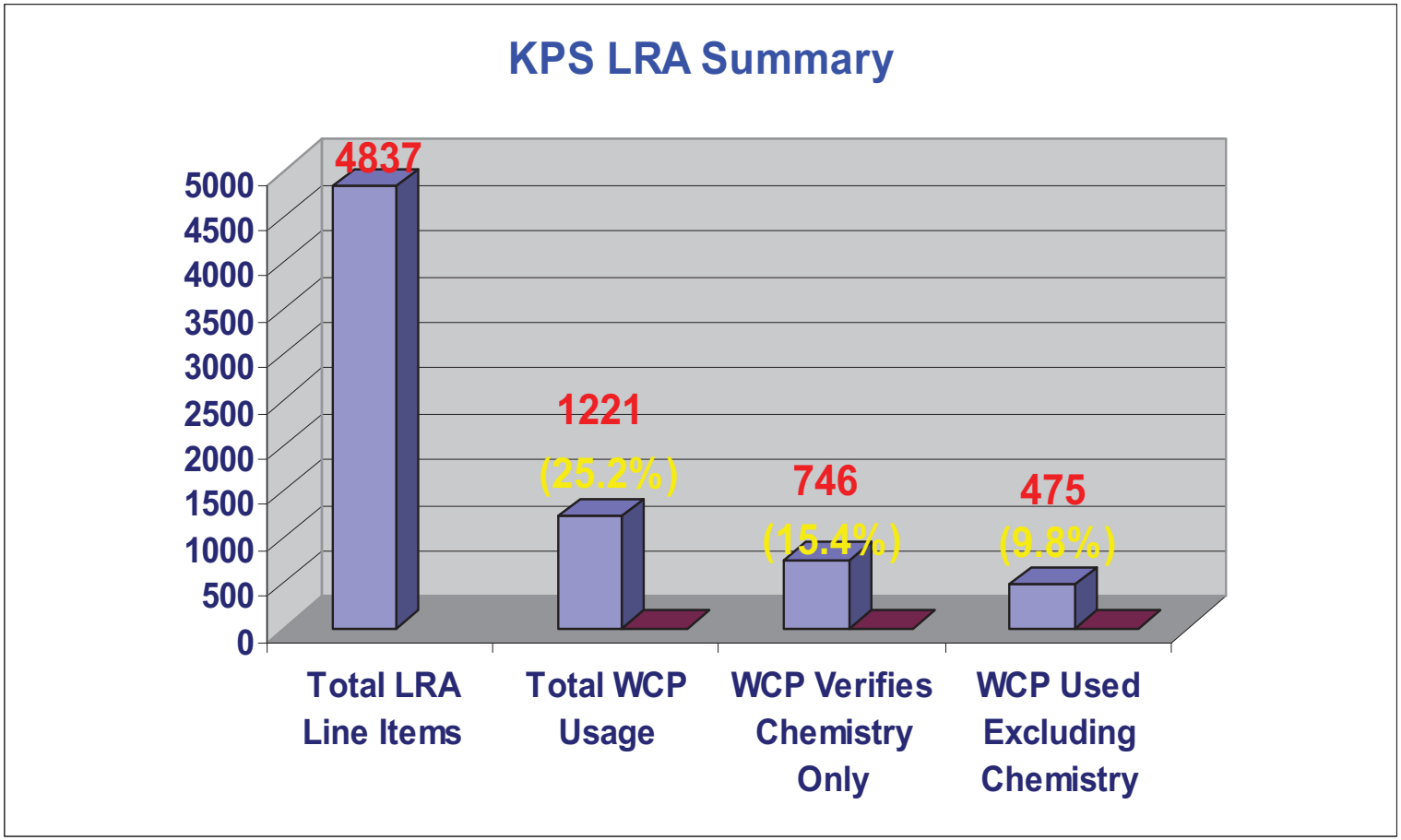
WCP Usage Summary

- Industry and Plant OE demonstrates that chemistry programs are effective in mitigating aging
- However, Dominion conservatively used WCP to verify the effectiveness of all chemistry control programs (incl. CCCW)
- Loss of material is the predominant aging effect that is managed by the WCP
- Many “Dominion Defined” AERM items are also managed by the WCP

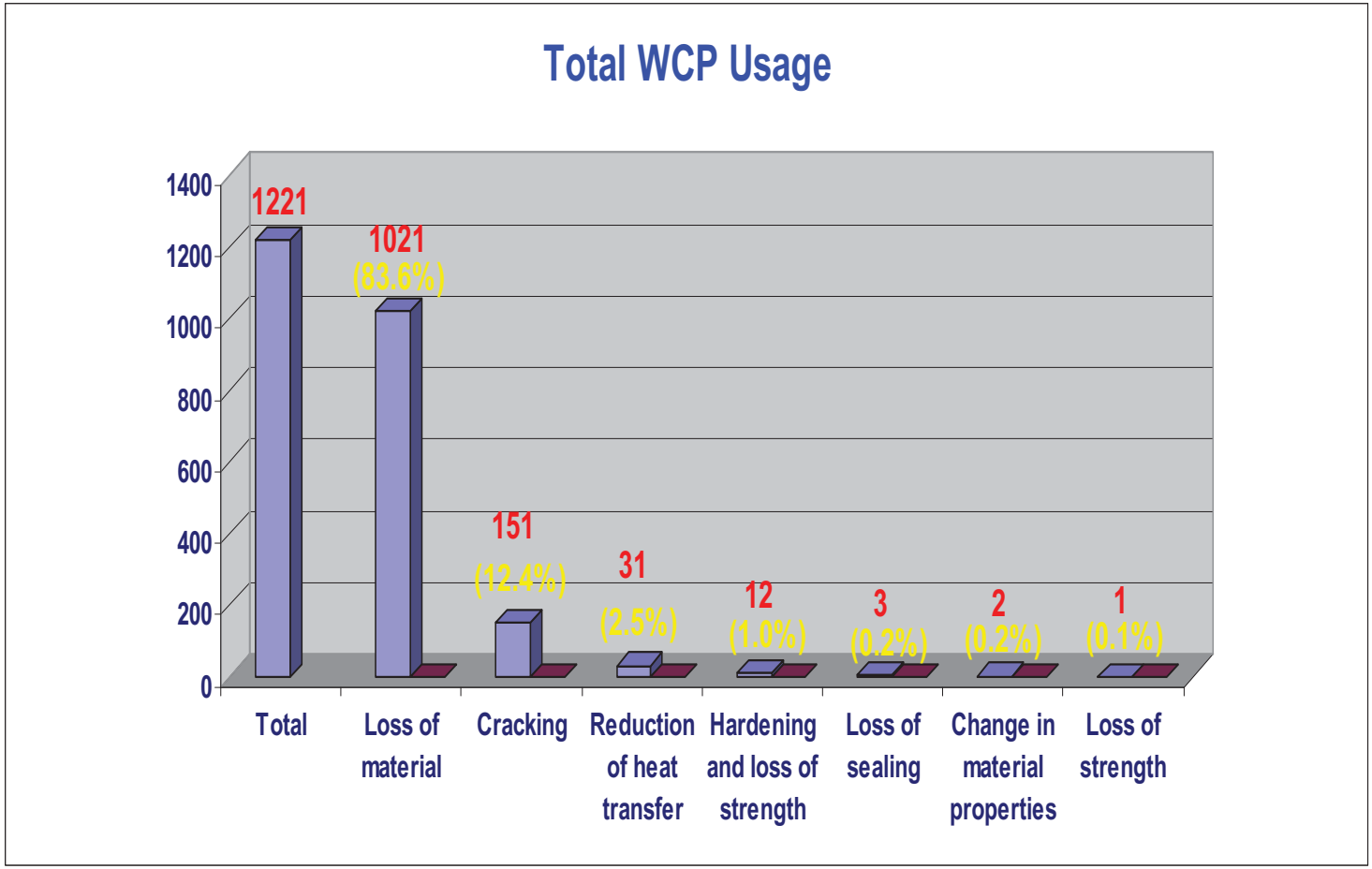
WCP -AERM Breakdown

- AERM that credit the WCP include:
  - Loss of Material
  - Cracking
  - Reduction of heat transfer
  - Hardening and Loss of strength
  - Change in Material Properties
  - Loss of strength
  - Loss of sealing
- The overwhelming AERM was the loss of material as shown in the following charts

Use of Work Control Process at KPS



Use of Work Control Process at KPS



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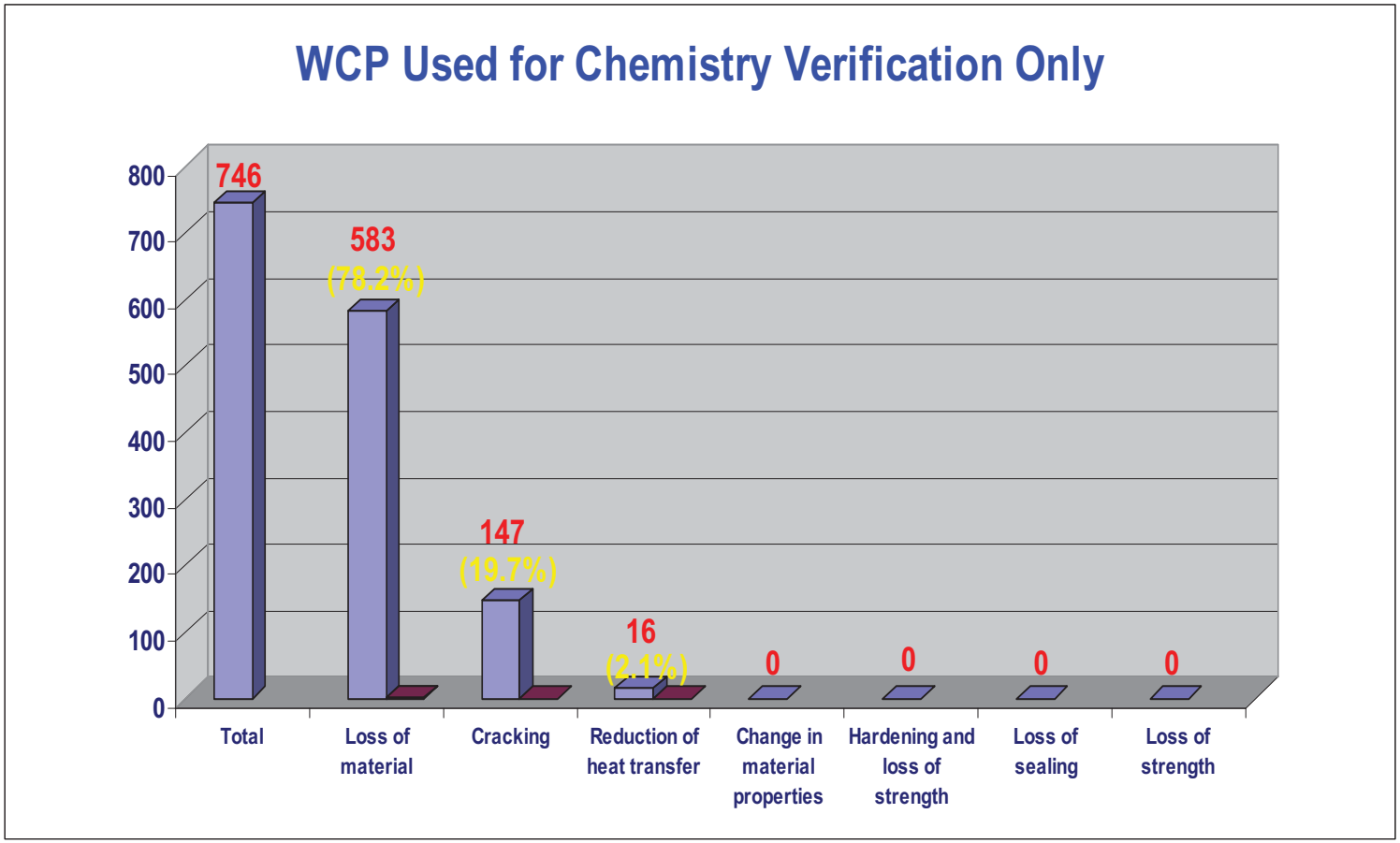
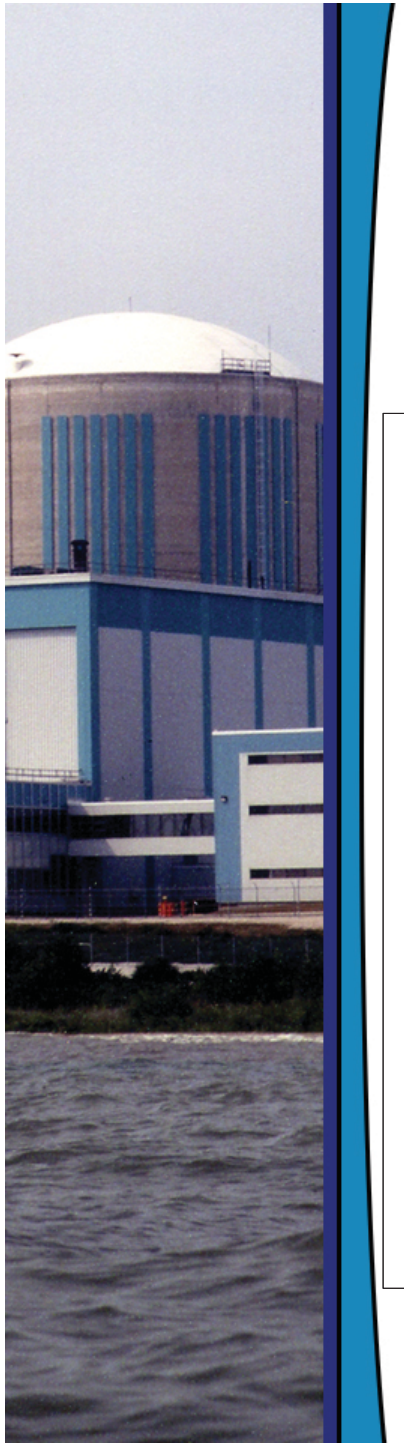
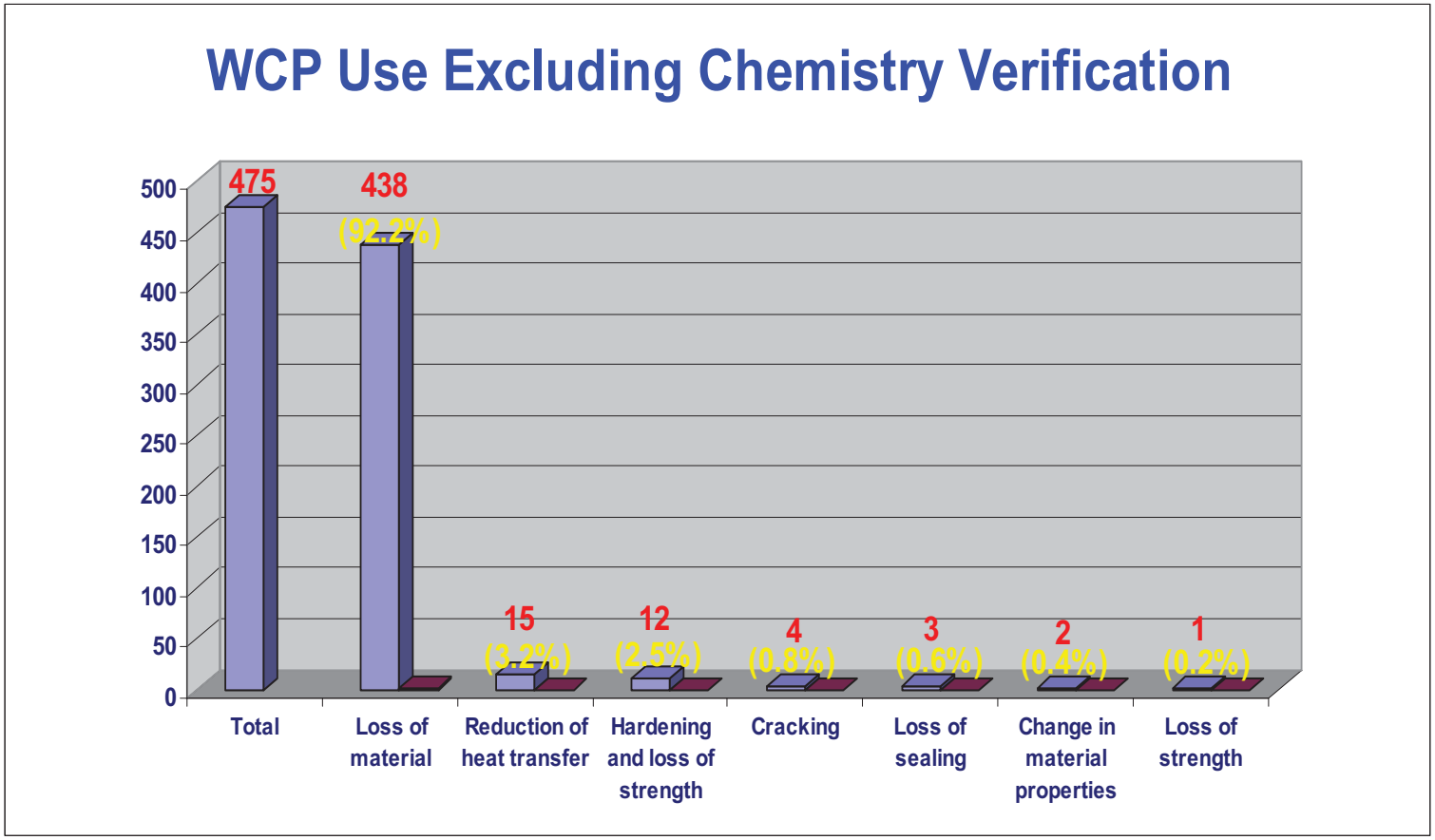




Use of Work Control Process at KPS



WCP – Going Forward

- In response to NRC feedback, WCP was re-evaluated for consistency with GALL AMPs
- WCP will be modified to encompass both:
  - Inspection of Internal Surfaces (XI.M38)
  - One-Time Inspection (XI.M32)
- Both GALL programs will be fully evaluated in the WCP AMP
- WCP will eliminate the “opportunistic” approach and perform OTI
- The WCP program will be “Consistent with GALL” and will no longer be considered as plant-specific

WCP – XI.M32 Overview

- Consistent with GALL, OTI will be performed to verify the effectiveness of existing station chemistry programs:
  - Fuel Oil Chemistry
  - Lubricating Oil Analysis
  - Primary Water Chemistry
  - Secondary Water Chemistry
- AERM will include loss of material, cracking, loss of strength and the reduction of heat transfer

WCP – XI.M32 Overview

- Separate sample groups will be established based on:
  - Material
  - Environment
  - Aging Effect(s)
  - Component types
  - Plant OE
- Each sample group will focus on areas that are most susceptible to aging (e.g. stagnant locations) as a leading indicator
- Inspections will also be considered for less susceptible locations as a validation

WCP – XI.M32 Overview

- Other specific OTI will be performed as determined through the alignment to XI.M32
- The program will rely on established NDE techniques, including visual, volumetric, and surface examinations that are performed by qualified personnel following procedures consistent with the ASME Code and 10 CFR Part 50, Appendix B

WCP – XI.M32 Overview

- Unacceptable inspection findings will be evaluated in accordance with the site corrective action process to determine the need for subsequent (including periodic) inspections and for monitoring and trending the results

WCP – XI.M38 Overview

- Consistent with XI.M38, the WCP will perform visual inspections of piping, piping components, and other components that are not covered by other KPS AMPs
- Internal inspections will be performed during the periodic system and component surveillances or during the performance of maintenance activities when the surfaces are made accessible for visual inspection through the work management process

WCP – XI.M38 Overview

- WCP will visually inspect for the following:
  - Loss of material
  - Reduction of heat transfer
- For elastomers, the WCP will manage:
  - Change of material properties (elastomers)
  - Cracking (elastomers)
  - Loss of sealing (elastomers)

Dominion Actions

- Realign WCP to encompass GALL XI.M32 and XI.M38 AMPs
- Define OTI to verify the effectiveness of the chemistry control programs where delineated by the GALL
- Identify additional OTI inspections for unique M/E/A
- Incorporate remaining inspections into WCP-XI.M32

Summary

- WCP will be considered Consistent with GALL and no longer plant-specific
- The supplemental information will amend information in KPS LRA - Appendix A and B
- Dominion will provide supplemental information related to the WCP no later than September 25, 2009