

出國報告（出國類別：開會）

參加 2007 年第十九屆美國核管會
管制資訊會議出國報告

服務機關：原子能委員會

姓名職稱：莊長富 科長

派赴國家：美國

出國期間：96 年 3 月 10 日至 3 月 18 日

報告日期：96 年 4 月 30 日

摘 要

本次奉派赴美公差，除參加美國核管會第 19 屆管制資訊會議 (Regulatory Information Conference, RIC) 並應邀在會議中發表「Regulatory Overview of Digital I&C in Taiwan Lungmen Project」外，另於會前拜會美國核管會資深數位儀控專家了解美國核管會正進行標準審查規範(SRP)有關儀控部分之修訂工作現況，冀對核四數位儀控管制有所助益。

今年美國核管會的管制資訊會議於 3 月 13 日至 15 日舉行，為期 3 天，本會議是美國核管會藉以與核能相關單位，包括核電廠業主、核能研究機構及國外核能相關機構等，意見交流與政策宣示之重要會議。今年會議為因應核能在美國已成復興態勢，且在最近將有新機組進行興建申請案之現況，因此今年會議主題是「核能復興時代的管制(Regulating in the Nuclear Renaissance)」，與會人員除美國核能界人士外，尚有來自加拿大、法國、日本、南韓及中華民國等 20 餘國共 2300 多位代表參加，盛況空前。三天的會議除開幕典禮及核管會主席 Dale E. Klein 與四位委員各一個小時的專題演講集中於大會堂外，整個會議分六個主議題於不同會場平行進行，共發表 170 餘篇論文，討論範圍涵括：美國核管會之核能安全管制、管制政策、核能法規、功率提升、執照更新、及新反應器之執照審查等議題，核管會主席在 Keynote Speech 中語重心長提醒美國核能界，在核能復興之際，除要繼續維持安全的核電營運外，更要思量如何取得好品質的建廠設備與建廠所需的各類人才，及加強國際合作；另外，第二天下午還有一項較特殊的議程，即是邀請經濟合作暨發展組織/核能署 (OECD/NEA) 官員介紹他們為促進國際核能合作，正在推動的「多國設計評估專案」(Multinational Design Evaluation Program, 簡稱 MDEP)進展情形。

整體而言，RIC 會議之各項資訊對國內核能安全管制極具參考價值。

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壹、目的

本次奉派赴美公差，主要目的是參加美國核管會為期三天的第 19 屆管制資訊會議（Regulatory Information Conference，RIC），除了解美國核管新資訊外，並應邀在第三天上午的會議中發表「Regulatory Overview of Digital I&C in Taiwan Lungmen Project」，介紹核四數位儀控現況及管制經驗，供美國核能界興建新核電廠的參考，為此台電核技處負責核四儀控業務的李精一課長亦同行出席。

另一目的係於會前拜會美國核管會資深數位儀控專家 Mr. Matthew Chiramal，了解美國核管會正進行標準審查規範（SRP）有關第七章儀控章節修訂工作現況，冀對核四數位儀控管制工作有所助益。

貳、出國行程

本次公差係參加第十九屆美國核管會之管制資訊會議，並於會前拜訪美國核管會數位儀控專家，行程自民國 96 年 3 月 10 日起至 96 年 3 月 18 日止，共計 9 日，行程概要如下表：

出國行程表

日期	地點	工作內容概要
3 月 10 日	台北～紐約	去程
3 月 11 日	紐約～華盛頓特區	去程
3 月 12 日	華盛頓特區	拜訪 NRC 數位儀控專家
3 月 13 日	華盛頓特區	管制資訊會議
3 月 14 日	華盛頓特區	管制資訊會議
3 月 15 日	華盛頓特區	管制資訊會議
3 月 16 日	華盛頓特區～紐約	返程
3 月 17、18 日	紐約～台北	返程

參、過程紀要

第 19 屆 RIC 會議是在 NRC 總部斜對面的 Marriott North Bethesda Conference Center 舉行，自 3 月 13 日至 15 日為期三天，議程示意圖如圖一，重要的議程如開幕典禮、NRC 主席及四位委員的專題演講與「多國設計評估專案」（Multinational Design Evaluation Program，簡稱 MDEP）是在大會堂舉行外，其他議程則分六個場地同步舉行，另外大會也安排有興趣的與會人士參訪 NRC 緊急應變中心，由於保安考量及場地限制，每次僅能容納十餘名，故參訪者需事先登記，我與台電李課長登記參加第一天下午的第一梯次。另外，第二天下午還有一項較特殊的議程，即是邀請經濟合作暨發展組織/核能署（OECD/NEA）官員介紹他們為促進國際核能合作，正在推動的 MDEP 進展情形，該議程場地亦於大會堂舉行，顯示本議題之重要性。整體而言，RIC 會議之各項資訊對國內核能安全管制極具參考價值。以下將以核管會管制資訊會議紀要、NRC 主席及委員的專題演講、MDEP、核四數位儀控管制現況簡報、NRC 緊急應變中心、拜訪美國核管會數位儀控專家等項目說明如后：

一、核管會管制資訊會議紀要

美國核管會舉辦之管制資訊會議（Regulatory Information Conference，RIC），是美國核管會藉以與核能相關單位，包括核電廠業主、核能研究機構及國外核能相關機構等，意見交流與政策宣示之重要會議，今年會議主題是「核能復興時代的管制」（Regulating in the Nuclear Renaissance），主要是因應核能在美國已呈現復興態勢，且最近的將來將會開始有業主進行新機組興建申請案之現況；另自去年度起，又正式將原來在每年下半年以研究成果為主之核能安全研究會議（Nuclear Safety Research Conference，NSRC）合併辦理，因此今年可謂盛況空前，與會人員除美國核能界人士外，尚有來自加拿大、法國、日本、南韓及中華民國等 20 餘國共 2300 多位代表參加。與會者並不需要繳交報名費。

本會議強調是無紙化會議 (Paperless Conference)，從會議籌備階段便將議程、交通與住宿、與會者報名、論文登載等都放在網站上，因此並未印製論文集，而為方便與會者在會場查詢論文內容與印製所需的簡報，大會在會場的一角佈置 Internet and Print Center，有二十餘部電腦供與會者使用，相當方便，會議後又立即將資料更新，把 NRC 主席及委員的專題演講稿與錄影影音、會議提問問題等資料都存放在網站內，網址為 <http://www.nrc.gov/public-involve/conference-symposia/ric/>，實在值得我們學習。

三天的會議除開幕典禮、核管會主席及委員們各一個小時的專題演講及 MDEP 等重要議程集中於大會堂外，整個會議分六個主議題於不同會場平行進行，分別為：

- Track 1 : Operating Reactors、
- Track 2 : New Reactor、
- Track 3 : Stakeholder Communication、
- Track 4 : Reactor Research、
- Track 5 : Risk-Informed Activities、
- Track 6 : Emergency Preparedness

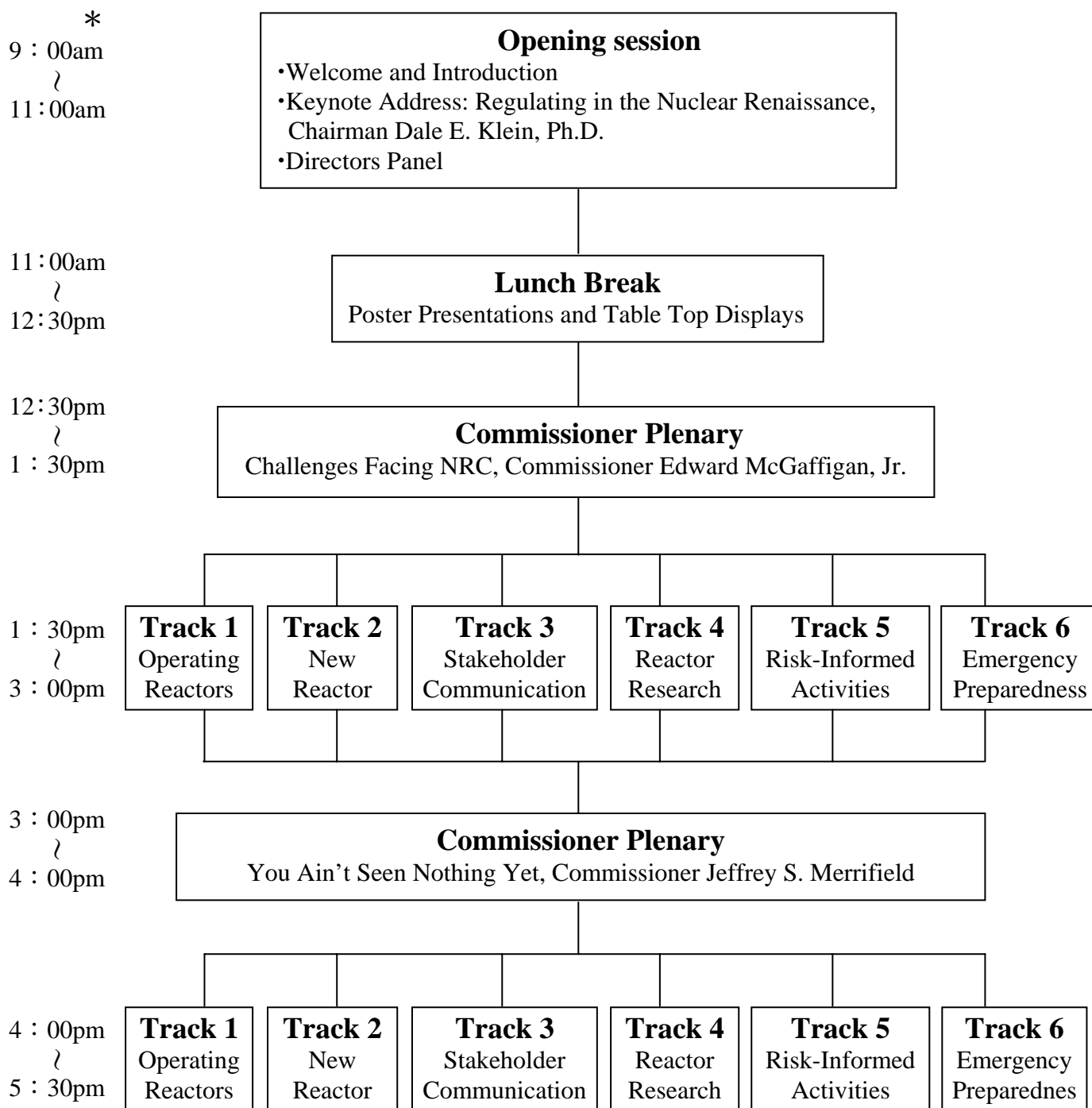
詳細議程如附件一，本次會議共發表 170 餘篇論文，討論範圍涵括：核能管制趨勢、核反應器監管方案之實務及檢討、核能電廠運轉執照更新、新型反應器設計及核照、安全文化、嚴重核子事故研究、核燃料及護套行為研究、核子保防/保安、風險告知作業、運轉經驗回饋、用過燃料及其運輸與處置、緊急應變及防火等多項議題；除了以開會的形式討論相關議題外，會場四周亦佈置了一些展示海報的看板，如表一，這些海報都可從上述 RIC 網址下載，其中幾乎一大半的海報是與新興建核電廠的審照程序有關，如 Combined License Process、Early Site Permit Process、Part 52 Licensing Process、New Reactor Licensing Applications、Verification of ITAAC Completion、Items Within Scope of Environmental Analysis 等，正呼應著會議主題「核能復興時代的管制」。

雖然主辦單位對參加會議者不收費，但主辦單位卻不寒酸，幾乎無限制地供應點心與飲料，因此會場四周除了琳瑯滿目的海報外，在中場休息的時間裡到處都有手拿咖啡與點心互相交談的與會核能從業人士，更使會場四周顯得相當生動活潑，我們也遇到了不少友人，包括本處的鄧文俊、任職佛州電力公司的桂慶寧（早期曾任職於核研所）、MIT 教授 George E. Apostolakis、NRC 的 Kenneth C. Chang（張慶武）、Kirk Foggie、Michael Cullingford、Allen G. Howe、Matthew Chiramal 等人。另外，大會要求每位與會者在會場必須配戴報到時大會所發的識別證，會場內有不少保全人員在注意會場安全。由本次會議內容看來，除了美國核管會持續執行既定的政策，亦即維持核能電廠運轉安全、加強民眾的信心、增進效率與效能、減少持照者不必要的管制負擔等外，令人印象深刻的是美國核能持續發展與復甦的相關進展，在執照更新方面：運轉執照更新是帶動美國核能界的動力，若沒有運轉執照更新，機組在執照到期後將陸續停機，裝置容量將自 2009 年即開始下滑，但近年來在各核能電廠接續提運轉執照更新申請並獲得核准後，此一情形可延後至 2029 年才會發生。美核管會自 2000 年通過第一個運轉執照更新案後，到今年 3 月份為止，全美運轉中的 104 部機組已有 48 部機組完成再運轉 20 年的審查及發照（原先運轉執照期限為 40 年，運轉執照更新後可再運轉 20 年，共計 60 年，NRC 委員 Jeffrey Merrifield 在此次 RIC 演講中提出未來甚至可到 80 年的看法），另有 7 部機組正在審核中，其餘機組預計陸續會提出申請案，目前告知 NRC 有意提出申請之案件預定審核時程已排至 2013 年；在功率提升方面：最早自 1970 年代就已開始此種功率提升的申請案，到 2007 年 3 月為止已有 113 件獲得核准，總共為美國核能機組增添了 4900 MWe 的電力輸出，相當於多出了約 5 部 1000 MWe 級的核能機組；在新反應器興建方面：美國核管會從審照程序著手，頒布了 10 CFR 52，作為審照的法源依據，將早期建廠廠址許可（Early Site Permit，ESP）、聯合建廠及運轉執照（Combined Construction and Operating License，COL）、新型反應器設計認證（Design Certification）等要求納入法規，同時也

進行標準審查導則 NUREG-0800 (SRP) 的更新及其他規範的制定等工作，更配合成立新的部門 (Office of New Reactors) 專司新反應器興建相關業務；在美國核管會官方網站統計顯示核電業主已宣佈將進行 19 個申請 COL 案件，共計 28 座新核能機組的興建，如表二 (惟 NRC 委員 Jeffrey Merrifield 在此次 RIC 演講中則把一些尚未宣佈的案件統計進來，宣稱有 23 廠址將興建 32 部新機組，並把這即將到來的盛況比喻為第二次的大有為時代(Bandwagon)，如同 1967 年“Great Bandwagon Market”)，俱讓人感受到一股強烈核能復興時代的來臨，與國內近年來倡議非核家園的氛圍大相逕庭。

圖一：RIC 會議議程示意圖（1/3）

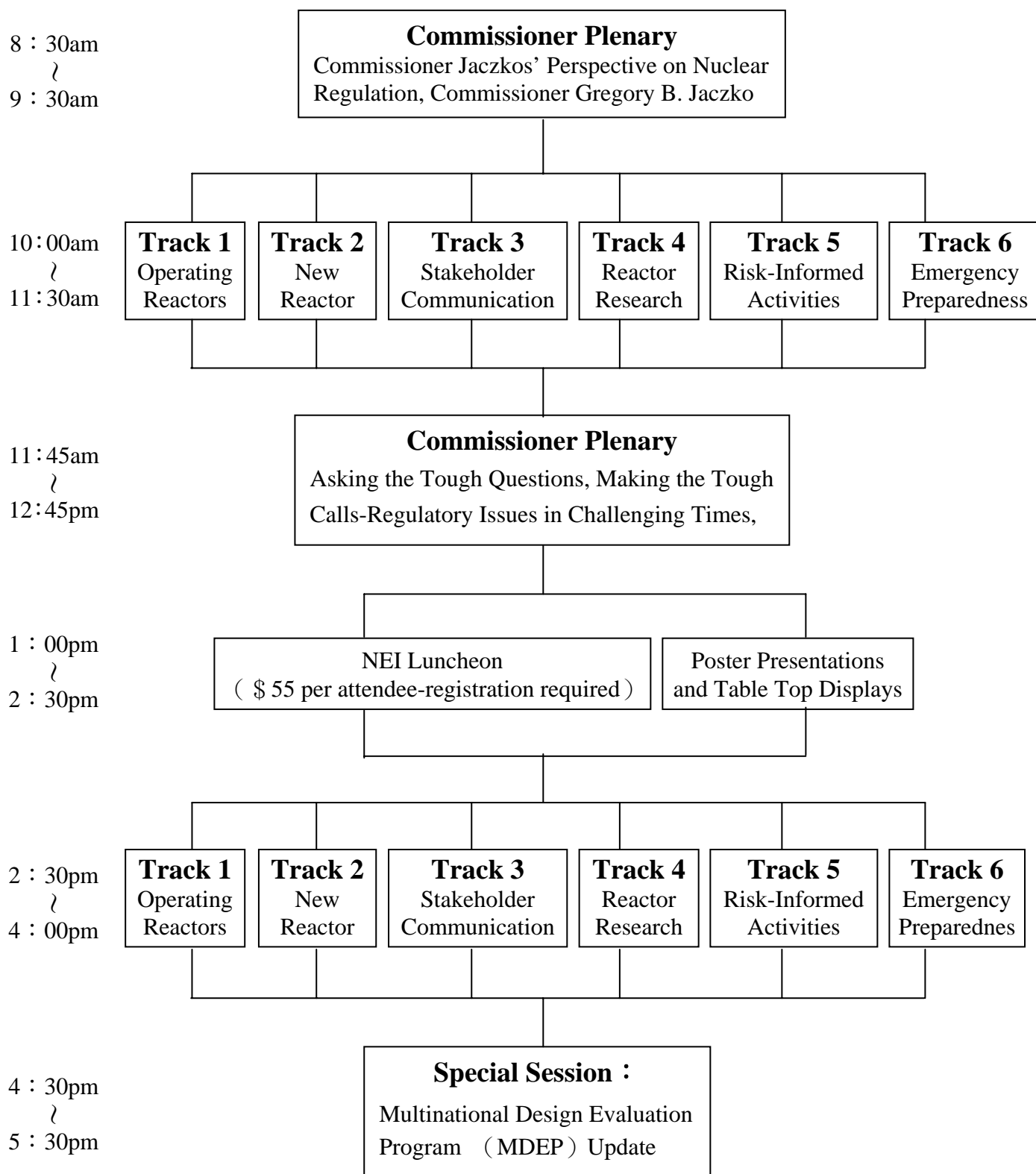
第一天



*NRC Headquarters Operations Center Tours (registration required)

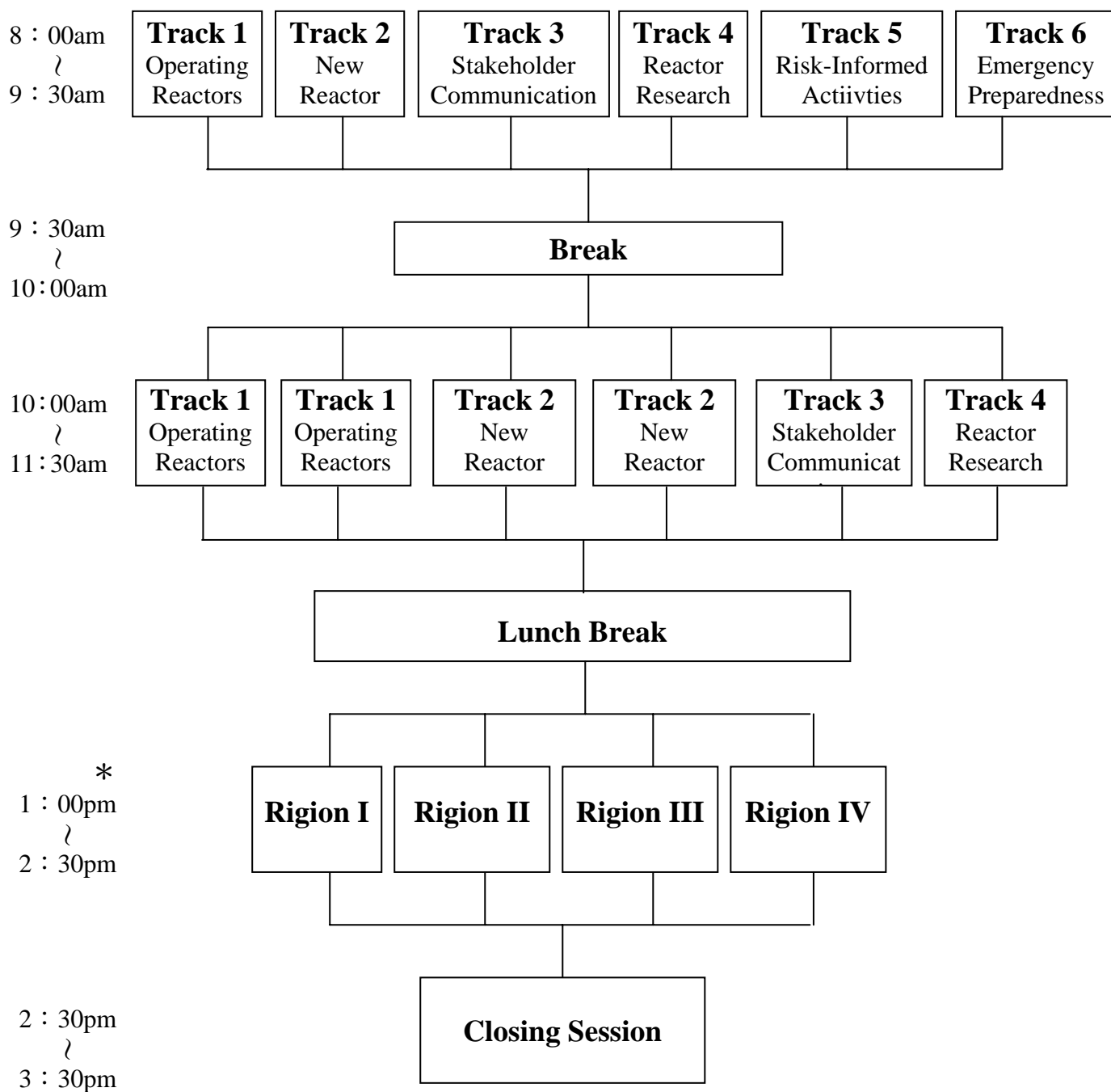
圖一：RIC 會議議程示意圖 (2/3)

第二天



圖一：RIC 會議議程示意圖 (3/3)

第三天



*美國幅員廣大，全國在核能管制上依不同領域分4個區，本時段主要是以區（Region）為單元，進行業界與各區管制官員的對話，冀求達到各區執法一致性的平台。

表一 展示海報標題

1. Preparedness & Response Effective Emergency Preparedness Effective Incident Response
2. Seismic Research Program (Earth Sciences & Seismic Engineering)
3. Accident Sequence Precursor (ASP) Program
4. Combined License Process
5. Early Site Permit Process
6. NRC Construction Oversight Has Multiple Components
7. Verification of ITAAC Completion
8. Items Within Scope of Environmental Analysis
9. New Ractor Licensing Applications
10. Part 52 Licensing Process
11. NRC Review of a License Application for a Repository at Yucca Mountain , Nevada
12. Non-Destructive Examination of Nuclear Components
13. GNEP: Global Nuclear Energy Partnership
14. PRA Quality for Risk-Informed Decision Making
15. The NRC Sensitive Unclassified Non-Safeguards Information Program (SUNSI)
16. Digital Safety Systems Diversity and Defense in Depth
17. Generic Issues Program
18. NRC Sponsored Research at Universities

表二 新反應器申請案官方網站資料

Expected New Nuclear Power Plant Applications				
Updated April 4, 2007				
Company	Design Type	Site Under Consideration	State	Existing Plants
2007 Applications				
Duke	AP1000	William Lee Nuclear Station (2 units)	SC	N
NuStart Energy	AP1000	Bellefonte (2 units)	AL	N
Progress Energy	AP1000	Harris (2 units)	NC	Y
Dominion	ESBWR	North Anna (1 unit)	VA	Y
NuStart Energy	ESBWR	Grand Gulf (1 unit)	MS	Y
South Carolina Electric & Gas	AP1000	Summer (2 units)	SC	Y
NRG Energy	ABWR	South Texas Project (2 units)	TX	Y
2007 TOTAL NUMBER OF APPLICATIONS = 7 TOTAL NUMBER OF UNITS = 12				
2008 Applications				
Progress Energy	AP1000	Levy County (2 units)	FL	N
Southern Nuclear Operating Co.	AP-1000	Vogtle (2 units)	GA	Y
Entergy	ESBWR	River Bend (1 unit)	LA	Y
UNISTAR	EPR	Calvert Cliffs (1 unit)	MD	Y
UNISTAR	EPR	TBD (1 unit)	TBD	UKN
AmerenUE	EPR	Callaway (1 unit)	MO	Y
UNISTAR	EPR	Nine Mile Point (1 unit)	NY	Y
TXU Power	US APWR	Comanche Peak (2 units)	TX	Y
Exelon	TBD	TBD (1 unit)	TBD	UNK
Detroit Edison	TBD	Fermi (1 unit)	OH	Y
Amarillo Power	EPR	Vicinity of Amarillo (2 units)	TX	UKN
2008 TOTAL NUMBER OF APPLICATIONS = 11 TOTAL NUMBER OF UNITS = 15				
2009 Applications				
Florida Power & Light	TBD	TBD (1 unit)	UNK	UNK
2009 TOTAL NUMBER OF APPLICATIONS = 1 TOTAL NUMBER OF UNITS = 1				
2007 – 2009 Total Number of Applications = 19 Total Number of Units = 28				

二、NRC 主席及委員的專題演講

在歷屆會議中，NRC 主席開場演說及其他四位委員的專題演講一向被視為是美國核能管制政策方向的重要談話，對世界核能國家管制政策亦有其影響力，此次會議中 NRC 主席 Dale E. Klein 以「核能復興時代的管制」(Regulating in the Nuclear Renaissance) 為題在開幕時發表演說，強調 NRC 因應核能復興時代來臨的使命，除必須做好管制維持現有核電廠的安全運轉之外，他也提醒必須注意即將新興建核電廠設備供應的來源與品質，及建廠各類人才的培育問題，同時他也強調加強國際合作的重要性。NRC 主席 Klein 的演講約花了 35 分鐘，之後的 25 分鐘開放給現場與會者提問，主席即席回答，這對任何人而言都是一個挑戰，更何況 Dale E. Klein 博士是接任主席職務之後第一次參加 RIC，不過看他回答問題的臨場表現，真欽佩他嫻熟業務，並有自己的理念，也覺得 RIC 這種讓被管制者有機會與管制單位高層直接且公開的對話機制，不僅可拉近 NRC 與業界的距離，也可以促進二者的良性互動。其後另四位委員的演講也循同一方式進行，他們的演講主題如下：

1. *Edward McGaffigan Jr. : “Challenges Facing NRC”
2. Jeffrey S. Merrifield : “You Ain’t Seen Nothin’ Yet”
3. Gregory B. Jaczko : “Commissioner Jaczkos’ Perspective on Nuclear Regulation”
4. Peter B. Lyons : “Asking the Tough Questions , Making the Tough Calls-Regulatory Issues in Challenging Times”

NRC 主席與委員的講稿甚具意義，謹收錄當作本報告附件二~五，並將具代表性的 NRC 主席 Klein 與委員演講重要內容摘要如下。

**Edward McGaffigan , Jr.* 先前因健康因素已提辭呈，不過三月底他認為醫療效果不錯，又提出打消辭職的申請。他原定的任期是在2010年6月30日到期。

NRC 主席 Klein 演說重點摘要

講題：核能復興時代的管制

- 在 NRC 委員及同仁的努力不懈下，美國國會已承諾撥款美金 8 億 2 仟 1 佰萬美元的預算予 NRC 以達成其使命。
- NRC 應是一個強大，可信賴及具一致性的管制者；也就是說，NRC 面對迅速擴大，技術複雜及資金密集的核能業要儘最大可能做好監督及維持核管的穩定性。
- 全球核能需求擴大，目前具技術能力能供應需求的廠家多在美國境外，美國製造業者必須向美國以外，具此技術能力的公司採購系統及組件。但目前世界上許多核能製造廠家的生產線均已滿載，且交貨期長，核能計畫需向全球各地尋找組件及材料，在美國建造的核能廠因有 NRC 嚴謹的檢驗計劃，可確保其組件的正確品質，但我們無法確保全球使用的材料品質，萬一有用到次級品造成嚴重事故，世界核能業必將蒙受其害。另一方面，由於全球核能急速需求擴大，世界各國以及美國國內對組件的需求增加，若善用得宜將可能促成美國恢復核能技術及製造能力，並重新回到原有的領導地位。
- 美國在 2010 年前核能工程師需求將為供給的 1.5 倍（輻射防護專業人員將為 1.6 倍）。年底前將有另一調查報告出來，將會把新核能建造計劃人力需求納入，則人力供應的嚴重不足將更顯現出來，為因應新增機組增加的工作量，NRC 在 2008 前，將以每年淨增 200 人員擴編。核能界已有捐款供社區學校設置訓練基金等，但人力資源必須有完整考量，應從提升小學生、中學生對科學工程的興趣做起。其他國家也將像美國一樣面臨核能人力老化及人力需求的挑戰。

加強國際合作

- 除將繼續維持各種雙邊核能安全交流及參與多邊組織，如 IAEA 及 OECD/NEA 等，美國將強化在新建核電廠及核燃料廠的審照，以及在核能及放射物資管制方面的國際合作。
- 多國設計評估計畫（Multinational Design Evaluation Program，簡稱 MDEP），目前為第一階段，重點為 AREVA EPR 反應器設計審查。下一階段為核管機構間知識經驗交流，以及促進相關法規標準及管制的聚焦。
- 全球核能伙伴計畫（Global Nuclear Energy Partnership Program，簡稱 GNEP），此計畫將可使用過核燃料及高階核廢料更容易處理，但須有明確的立法及管制。

NRC 委員 Lyons 演講重點摘要

講題：提出困難的問題-尋找困難的答案 挑戰時代的核管問題

- 商用核能電廠的核安，係指其設計及運轉特性能提供設計基準嚴重事故時的保護，以及具有緩和設計基準嚴重事故的特性。核安並包括一種無法量化，但非常重要的因素，即安全文化，安全文化超越設備及程序書，包括質疑的態度，問及困難的問題並尋找困難的答案，及因之而來較保守的決定與決策。
- 一方面要保持對所有現有運轉廠的核安及保安的注意，同時另一方面要準備新廠的建照申請案的審查，及監督建廠工程，以確保新一代電廠的安全。
- 評估舊廠老化所可能出現的安全挑戰相關問題。
- 補充我們需要的人力資源。雖然我們已解決核能復興時代的財務問題，但不能確保成功，我們必須繼續晉用有能力的新技術幕僚，訓練他們以

完成我們的任務，並讓他們有穩定的工作環境。

—繼續溝通保安方面的問題。

核安

—經由反應器監督計畫，去年有二部核能機組及其核安有顯著的改善，持照者原本經由核能運轉協會（INPO）評核其績效並不需要 NRC 的額外監督，但 NRC 的作為係在有些電廠安全績效有降低之虞時，適時介入以確保一般大眾安全。

—NRC 在 Browns Ferry 一號機申請再起動時，在執照申請審查及檢驗執行共花了 50000 人時，這些投入代表 NRC 對核安的重視且可做為日後新廠建造的試驗平台。

—在核安方面，再次強調 NRC 及業界要維持核安的最大持續的及共同的挑戰，在於所有層級的人必須避免因自滿而疏忽，第一線的工作人員要常問困難的問題是非常重要的。

保安

—自 2001 年以後，每一個核電廠均已採取適當措施，大大增強電廠保安。

—NRC 正協助美國國土保安部（Department of Homeland Security, DHS）進行每一部核能機組的完整審查（Comprehensive Reviews, CR）。目前已完成 65 CR 中的 47 個。NRC 的設計基準威脅程序與 DHS 的 CR 程序結合將可達成每一座核電廠抵禦暴力攻擊的完整評估。

—現有核電廠已能採取適當措施防禦商用飛機的撞擊，但新建核電廠有機會從一開始就設計更多的保護並減少運轉員須處理此類威脅的工作。

—NRC 根據 2005 年能源政策法與司法部諮商後，將依據第 653 節允許核電警衛持有重型武器，及依據 652 節對可取得保防資訊人員執行捺印指紋

及背景調查，及對無人員陪同但可接觸一定數量放射性物質的人捺印指紋。

人力資源

- 美國核能學會（ANS）2006 年的一項報告指出，現有的核能人力在 10 年內將有三分之一達退休年齡，而能源部、國家實驗室、政府其他部門、核能技術公司與大學核工系等目前均極度缺乏符合資格的新雇人員。
- 核能協會（The Nuclear Energy Institute）估計要支持現有業界之運作，需有 90000 新進工作人員，這不包括新建核電廠的供應商及建造人員，此種人力短缺現象，不只存在美國也存在其他國家，許多正計畫擴充核能發電的國家，他們所需的人力可能從美國借重，加深我們的問題。
- NRC 計畫在 2008 年以前，每年新進 300 個技術人員，2006 年新進 371 人，退離 211 人，淨增 160 人。今年到三月初新進 189 人，離去 101 人，淨增 88 人。NRC 人員平均年齡從數年前的 49 歲已降到今天的 48 歲。
- 我們所有的人要加倍努力，讓在學學生知道在科學及技術方面，有很多機會正等待他們。

國際互動

- 目前世界上所使用的核能技術，許多是源自美國，但現在常看到的現象是，大多現代的核能技術卻是國外的，美國有許多地方可從國際社會學習，包括從施工技術、反應器安全試驗到新建電廠的技術。
- 依據能源部最近的一項調查，全球對能源的需求在 2030 年以前可能增加 50%，其中一半以上的成長是來自新興經濟體電力成長，尤其快速預期在 20 年內將增加 75%，許多國家正研議擴大核電廠建造，其數量與美國研議數量相當。

- 隨著全球核能發電的擴展，NRC 必須鼓勵各國須在嚴密注意核安的前提下進行，美國可以經由國際合作，交流管制技術資訊以促進國外核電廠的安全運轉。
- NRC 應承諾運用國際合作來面對核能技術逐漸全球化的現實。
- 目前的多國設計評估計畫（MDEP）係一項特定的國際合作，其目的是要拉近世界各國的核能知識及運轉經驗，以共同努力建立新反應器設計的管制標準並分享資源，以完成必須的核管審查。其第一階段已展開，由芬蘭及法國核管機構協助美國 NRC 進行 AREVA EPR 的設計認證審查，第二階段將包括參加國（加拿大、中國、芬蘭、法國、日本、俄羅斯、南非、南韓、英國及美國）的共同努力，以達成某些安全法規及標準及其他技術問題的聚焦化。

未來挑戰

- 優先設法降低管制的不確定性到最低。
- 美國自從最後一座核能機組訂單，迄今已過 30 年，無疑的對業界與 NRC 而言，新建核電廠要如何因應執照申請的審查將是全新的開始，也是一大考驗。
- 業界要儘可能對執照申請設計及施工予以標準化，則 NRC 審查作業亦可能標準化，如果業界不如此做，時程計畫一定會受到影響。
- 因應新建核能機組的申請，NRC 已增設一個新的部門叫 Office of New Reactors（NRO），並已研訂施工檢驗計畫（Construction Inspection Program）對未來新建電廠執行施工檢驗。
- 數位儀控已被認定是新建核能電廠最困難技術之一，對 NRC 的挑戰是改進管制指引及審查標準，對業界的挑戰是界定它們最後要使用的系統是

怎樣的系統與規格。

NRC 委員 Jaczko 演講重點摘要

講題：一個委員對核能管制的看法

- NRC 應該是，實際上也是，一個顧客導向的機構。NRC 曾探討「六個 Sigma」的商業管理策略，要以顧客的聲音為重心。NRC 的顧客是一般大眾，涵蓋各種利害關係人，包括個人、市民團體、廠家、持照人、申請人及選舉產生的官員。
- NRC 有一群有才幹、受過良好教育的及全心投入的同仁。但他們每日往來接觸的人大多數是持照者，且非常專注在技術問題上。這些問題正是我們這個機構和持照者共同的語言，和共同面對的挑戰。我們和廣義大眾中的其他成員的接觸較不頻繁；時間一久，卻把重點擺在持照者，而較少擺在廣大的顧客的需求上。我認為這個觀念把重點擺錯，NRC 的真正顧客是全體大眾。
- 拿一件我們所做的主要事情-審照及發照來檢視。我相信，即使執照本身，也是為了廣義的大眾。一張執照的確對申請者具有重大的價值；但是應該把它看成是收受者已經符合我們對社會大眾的責任，能夠對大眾合理保證具有足夠的保護。我們的作為就像維護大眾權益的管家，我們提供他們可能因沒有時間或資源去獲得的技術專長和知識。原子能法規清楚的指出我們也有責任確保權益會受到 NRC 的作為影響到的每一個人，讓人人都有權參與決策過程。
- 決定核發一個執照應該是一個公共程序，因為這是一個為了大眾福祉的宣言。
- 一張由聯邦管制者依據具有一致管制要求而發給的執照，理應在這個國家的某個地區及其它地區都有效。但是在東北部的顧客是非常不一樣

的；這裡對我們所核照的作為的有效性有很多挑戰。在這裡的社會合同已經錯的很離譜，以致於政治立場歧異的許多利害關係人要求對幾個核能廠做獨立的安全鑑定。獨立於誰呢，你可能會問？當然他們的主張是獨立於既有的獨立的安全管制機構。在我的發言紀錄裡我曾經這樣說過，我不相信十年前的獨立安全鑑定模式是解決這個問題的最有效的方法。

—有二個非常好的工具可以幫助我們，一個是司法程序，另一個是立法程序。我把它們看成是重要的管制「意見箱」。我們應該利用在聽證過程及立法過程中提出的意見、關切及爭論，去更瞭解我們的顧客對我們核管者工作上的所做所為的感覺是什麼，以及去把新的理念納入。

—有二個很好的例子可說明我們這個機構曾經成功地達到那個目標。一個是對緊急應變準備的管制，另一個是安全文化的改變。我要利用這個機會讚揚相關的同仁在過去二年的努力。這個機構在發展新的緊急應變準備的管制及指引，和找尋更好的方法把安全文化的特性納入反應器監督程序的成果是值得稱讚的。這兩項很複雜、具爭議性及有情緒性的工作，需要收集廣大的利害關係人的意見，並將其納入最後的結果。我也注意到這兩項工作所獲得的解決方案，在開始處理時均未預期到，而是由同仁發起經與大眾雙向互動討論發展而得到的。

—田納西流域管理局正在研究重新起動其 Watts Bar 二號機的建造。這部機停留在局部建造狀況已有幾十年。他們的建照於 1973 年即已取得，並且經 NRC 更新多次。在獲悉田納西流域管理局可能要重新開始施工的消息時，NRC 已經開始考慮提供大眾一個對運轉執照的新的公聽會機會。如果我們決定不提供，其結果是我們會冒了剝奪了我們的顧客的政治權利的風險。畢竟，現今許多住在 Watts Bar 附近的居民在 1976 年時並不在那裡，許多人在那時根本還沒出生。假如我們真正重視我們的顧客，我們要提供一個機會給大眾參與決定是否批准在他們社區運轉核電廠的申

請。假如我們解決依照審查程序發現的所有問題，這個程序所產生的結果不應該受到質疑。

— 審查時程及可預測性是重要的。能夠確保安全而採用的審查方式，其進行的步調完全是 NRC 本身的決定。時程應該是一個保證印記，確保我們要如何使大眾有最大的參與機會、讓公眾知道他們所繳的稅有明智的被使用及讓 NRC 能確保民眾建康及安全。因此我們應該把觸角伸到那些可能根本不知道他們可以參與我們程序的人，並確定他們瞭解這些時程。對時程只有照這樣做我們才能確定能達成批准執照的審查程序也是一個最後能夠真正去建造及運轉一個設施的程序。

— 現在正是時候，在執照申請提出之前，去要求合理的設計變更，包括重置性、安全性系統間的隔離、以及結構的修改，以應付商用飛機的威脅。我呼籲我的同事把這個問題當做一個機會，來證明我們的重心是擺在服務大眾-我們唯一的及真正的顧客。

— 我們時常發現我們和我們的顧客群中的一小部份人在討論事情。我們真正的顧客看起來像是只侷限於持照者和申請人，正如同我們被誤導的觀念說太陽繞著地球轉動。但是我相信，假如我們退一步實實在在的看這個問題，我們將看到我們的真正顧客是更大更廣的大眾。

NRC 委員 Merrifield 演講摘要

講題：還有很多東西要學

— 我決定不再尋求 NRC 委員第 3 個任期。因此之故，今天將是我的第 9 次，也是最後一次以 NRC 委員的身份參加管制資訊會議。

— 當我在 1998 年 10 月到委員會來的時候，我們連一個更新執照都未曾發給我們國家 104 反應器機組中任何一個。今天，我們已經更新了將近 50 個反應器執照，而看起來假如沒有不可預見的狀況，在幾年之內所有 104

部機組不是將被核准可以繼續運轉到 60 年，就是在各種不同的審查階段。

- 今天我們已可能有 32 部新反應器將在 23 個廠址興建。
- 我們是一個具有風險告知的機構。在我到 NRC 一年後我們所展開的反應器監督程序，迄今已有驚人的成效，但我們採取的是更開放，更少爭議及更少負擔的做法。這個機構煩惱了十幾年的防火問題，在展開風險告知的防火計畫-NFPA 805 後，可告結束。
- 在這個全球暴力恐怖已成真實的世界裡，我們對我們所管制的物質及設施的核安與保安的真正風險的瞭解比以前已有非常大的進步。我們所監督的核能電廠是 2001 年 9 月 11 日發生的恐怖攻擊事件前，防禦最好的民用基礎建設，而今天還是如此。
- 再者，我為我們這個機構在溝通能力的成長感到驕傲。不論是與大眾會議、透過網頁歡迎外界、或是與媒體的每日對話，我們已能較不排斥，且更精確說明我們是誰及我們在做什麼。我曾經在幾年以前領導 NRC 溝通專案，而目前這個機構已經成功傳播了有關我們在做什麼以保護人民和環境，我為此引以為榮。

新電廠的訂單

- 在 NRC 有一件清楚的事，是我們不能當核能發電的催促者。身為委員的我一直努力維持這個立場，而我也不會去做任何和今天所作所為有所不同的事情。然而，我們所在的大環境正在改變。全球暖化的問題與核能在面對這個重大環境的挑戰可以扮演的角色，已變得越來越糾纏一起。今天全球暖化已被世界各國看成是首要環境問題。不論你到全球什麼地方去旅行，大家有的共識是我們有這個問題，而且我們需要有所行動。
- 儘管替代能源，例如風力發電及太陽能也有一定角色扮演，不爭的事實是，就大容量基載發電而言，核能是目前技術可行且不產生二氧化碳的

最大能源。我不評估這是好事或壞事，但這是事實。

—我相信我們的政府將無可避免的要採徵收碳稅或排放量配額交易法案來因應全球暖化問題。無論採行那一方式，其一致的結果是，核能發電的價值，無論從經濟角度或環保角度看，將更為誘人。不論採行那一方式，我們將有新的核電廠訂單，將有一大堆事需要先做準備，我要簡略討論其與新廠訂單有關的三點。

第一、在看過我們的計畫，對我似乎已很清楚，我們的機構已經極為努力去符合國家環境政策法（NEPA）。像很多其他的政府機構一樣，與新反應器訂單相關的環境影響宣言，已經膨脹到跟曼哈頓電話簿一樣大小，我們是盡了一切方法實實在在的做出來。相對於環境品質委員會的管制，他們建議大多數的環境影響宣言應少於 150 頁，而我們最近出版的先期場址許可及鈾濃縮設施環境影響宣言都已超過 1000 頁。那並不是要來嘲諷或批評我們的環境工作同仁，我相信他們不眠不休的努力為的是要確定環境可受到保護。雖然如此，我相信因我們產生的國家環境政策法的程序，是過度耗時，過度重視政治的法律面，並且遠遠超出國會的期望及國家環境政策法的要求。在我們專案小組將作出特定建議的同時，我相信委員會需要採取行動，引進更好的排程及效率到我們的環境審查程序。

第二、我相信，我們的強制公聽程序是失敗的。在原子能安全及核照委員會的誠心努力下創造一個強制公聽程序時，我相信，他們的充份審查，其範圍及深度都遠遠超出國會在 1954 年通過這個要求時的期望。在這段期間，就我們程序的開放程度，我相信國會應該廢止強制公聽的要求。如果不做這樣的改變，我們委員會應該直接負責這些審查。用最近 Browns Ferry 一號機再起動會議做範例，我相信要符合強制公聽的要求，可以由委員會召開一次 3 至 4 小時的會議來符合要求。

第三、雖然我們同仁在為聯合運轉執照開創一個詳細的技術審查程序已有顯著的進展，這個聯合運轉執照技術審查程序還是太過冗長，也太過繁重。雖然請照者有義務製作一個高品質申請書，我們要增加對程序的紀律要求，尖銳的和很詳細的問題要以有效率及即時的方式提出。我相信在頒發過幾個聯合運轉執照後，我們應該要以 24-26 個月審查一個申請案為目標-從開始到結束-包括公聽程序。這需要同仁做好訓練管制；有效的環境及安全審查；原子能安全及核照委員會嚴謹的遵循公聽排程;以及最重要的，委員會的強力領導。

執照更新程序

- 除反應器監督程序外，最重要及最成功的就是執照更新程序。第一件執照更新申請案雖然 NRC 同仁用了超過 36 個月時間才完成，最近我們審查案子用的時間平均約 22 個月，這是一個顯著的成就。
- 既然我們已經完成幾乎一半我們現有核能機組 20 年的執照展延，我相信我們需要開始去充分瞭解有關我們要怎樣做，才能允許再一回合的 20 年執照展延的程序。
- 從我們的管制研究處已有的初步資訊，現有核能機組的壓力槽很可能可以安全使用 80 年，我們需要詳細瞭解要做什麼才能做進一步的展延。埋設地下的管道及電纜佈線要更新到什麼程度?儀控設備是否適合做或需做修改?更換柴油發電機是否審慎?對這些問題及早得到答案，對我們的持照者的投資決定有重大的影響。
- 我們的執照更新計畫的一個重要成果是這個計畫已經創造了一個強烈的投資動機，把數十億美元投資在例如新反應爐槽蓋、蒸汽產生器、壓力槽、注水幫浦和其他主要設備改善。長期融資已使電力公司更有能力確立這些機組的主要升級及改善的正當性。進一步再展延執照 20 年也可獲致相同的結果。

- 對現有核能機組所有電廠重新核給執照，在經濟上考量雖然合理可行，我們還需要去更瞭解這個問題的技術特性。依我的看法，絕大多數在美國的核電廠可以做執照展延，最多可運轉到 80 年，而我相信 NRC 必須準備去考慮這個問題。
- 艾森豪（Dwight Eisenhower）總統在 1953 年推動原子能和平計畫，以增進世界各國在原子能和平用途的合作。今天漸漸興起對核能發電的興趣是艾森豪遠大眼光的自然發展。因此之故，我們的國家有道德義務去幫助那些要尋求這個技術的利益的國家管制機構。

結論

在一開始的時候我講過，在過去我擔任委員的 9 年，是一段很美好的時光。在這段時間我們已經創造了一個在核能管制方面追求卓越不落人後的一個機構。我們所監督的核電廠在運轉上獲得前未有的改善，加上我們在執照更新的顯著成果，我們的國家將可享受今後幾十年的不產生二氧化碳的核能發電。今天我們面臨一個對建新核電廠意願特別高的時代，我相信這將可造成美國在今後 20 年核能發電量加倍的結果。為面對這個需求及可能的 80 年執照展延以及解決用過燃料問題往下走漫長道路的下一步，NRC 將有一大堆工作要做。當我六月離開這個委員會時，希望人們將我們這個機構完成很多事情感到滿意，而我相信我和曾經和我共事的委員們將會已經為這個機構及我們國家在原子能的和平用途奠定很堅固的基礎！這個委員會的面貌會改變，我為我能在這個機構服務及有所貢獻感到非常驕傲，也希望這個委員會的面貌將來還會改變，就像過去九年來一樣。非常謝謝！

三、多國設計評估計畫（MDEP）

MDEP 在第二天下午在大會堂舉行，是一項較特殊的議程，從議程場地選在大會堂及由 NRC 主席與法國 ASN 主席共同擔任本議程主席，可看

出本議題深受重視。本議程有二篇報告，分別介紹第一階段與現正進行的第二階段。

1. "MDEP Stage 1 overview" , by André-Claude LACOSTE Chairman of ASN (France)*

* ASN 是法國 nuclear safety authority , 相當於美國 NRC , 其前身為 DGSIN (更前身為 DSIN) 。
Lacoste 亦是 IAEA 核能法規委員會主席。

2. "Multinational Design Evaluation Program Stage 2 " , by Javier REIG, Head , Nuclear Safety Division , OECD/NEA.

如前所述，多國設計評估計畫（MDEP）係一項特定的國際合作，其目的是要拉近世界各國的核能知識及運轉經驗，以共同努力建立新反應器設計的管制標準並分享資源，以完成必須的核管審查。其第一階段已展開，由芬蘭及法國核管機構協助美國 NRC 進行 AREVA EPR 的設計認證審查，第二階段將包括參加國（加拿大、中國、芬蘭、法國、日本、俄羅斯、南非、南韓、英國及美國）的共同努力，以達成某些安全法規與標準及其他技術問題的聚焦化。

由於在臨行前夕經本會駐 OECD/NEA 林耿民博士以電子郵件介紹而與本項工作推動負責人 Javier Reig 相約會後見面，我在第二天下午他結束演講後趨前致意，但因他需馬上離開去參加接待晚宴，所以我們再約隔天（第三天）上午我演講完後見面。隔天我們再見面時，我轉達陳處長邀約他及 MDEP 團隊能在未來對核四進行 peer review 事宜之意，他娓娓表示目前可能存有一些政治與技術問題，他希望政治問題能很快被克服，他建議我們也及早把所需資料備妥，以解決 peer review 時可能碰到的技術問題。

四、Regulatory Overview of Digital I&C in Taiwan Lungmen Project 簡報

簡報「Regulatory Overview of Digital I&C in Taiwan Lungmen Project」是此行最大的任務。在元月經陳處長指派將赴美參加 RIC 會議並作簡報後，便於元月下旬積極邀請台電及核研所參與核四數位儀控工作同仁來會共同研議簡報資料蒐集與製作事宜，並於 2 月上旬另擇期赴核四工地與現場同仁再作進一步討論後定案，簡報資料如附件六。簡報內容除對核四數位儀控系統架構、參與廠家、工期等作概要性介紹之外，更舉出現況存在的一些管制關切問題，包括：

- 軟體安全分析 (Software Safety Analysis, SSA) 是標準審查規範 (SRP) 第七章的重要要求事項，但仍欠缺相關執行細節的法規，核能界宜改善此一現象。
- 參與儀控廠家多設計界面複雜，又在工程進行過程中，各儀控廠家執行系統建置 (Implementation) 與出廠驗收測試 (FAT) 之設計基準 (Design Basis Freeze Date) 不完全一致，造成設計文件不同步，系統整合功能與界面設計之完整性與一致性是管制關切事項。
- 網路設計，基本上區分成緊要多工系統與非緊要多工系統，符合法規，但在性能上部分資料傳輸路徑之時間響應略慢；且緊要多工系統資料更新時間 (Cycle Time) 為 20ms，是否會造成以後事件發生後時間解析度不夠細，以致無法作肇因分析的問題，亦是關切項目。
- 出廠測試 (FAT) 採分三區塊執行，真正的全系統整合測試將在工地安裝驗收後才能測試 (Site Acceptance Test, SAT)，SAT 測試項目的完整性及如何進行測試與如何解決測試發現的問題，是目前最關切事項之一。
- 數位儀控系統的人機界面與以往的傳統核電廠迥異，如何有效進行人因

工程的驗證與確認（HFE V&V）工作是令人關切事項，目前 V&V 已執行完成 V&V-1 與 V&V-2，而 V&V-3 仍未執行，其項目完整性及測試劇本與參與測試人員的選擇都是關切事項。

結論時，我們點出除了相關法規宜更明確外，穩定的建廠環境（避免停工、復工風波）更是不可或缺，對於新興建核電廠在開工之前，若能讓設計完成率達到 60% 以上，不僅將可減少工程進行時各廠家界面與設計不同步的問題，也可使重大設計修改案減少；另外，因應現代科技分工精細，造成參與廠家可能會多的情況，宜在法規面建立要求提送廠家整合計畫（Vendor Integration Plan）的要求；同時從業人員技術能力需對應提升。

本項簡報被安排在會議第三天早上 8:00 開始的第一場次時段，同場次還有韓國 Sam Sung Choi 先生簡報「Introduction to APR 1400 Man-Machine Interface System」及三篇有關 Power Cable 的簡報。當日本來預計提早 7:30am 便到會場，但地鐵在離會場前二站的月台發生因鐵軌有電氣火花的小火警而單線通行的意外情況，當時真讓人著急，幸好車子只停了 10 餘分鐘便又開動了，趕到會場時，因臨時換場地，又多花了幾分鐘，也幸好因有提早，故仍在正式開始前 10 分鐘向本場次主席報到，此為插曲之一。

簡報會場大約坐了 150 人左右，簡報後我們幾位簡報者多紛紛接到書面提問，我也接到近十張左右，因限於時間，主席要我們各回答一題，其餘沒有答的部分他收回去，改寄到我們信箱請我們回答這些問題（如附件七），幾乎都是與 SSA、Diversity、HFE V&V、Network、Cyber Security 有關，顯見這些都是大家關注的議題。結束後 NRC 的 Chiramal、Michael Waterman 趨前致意，OECD/NEA Javier REIG 則已依約等我，之後南德州電力（South Texas Project, STP*）儀控專案經理 Timothy E. Hurst 則續與我及李課長問及龍門人因事宜，我們也盡量答覆，事實上，在出發之前，奇異公司負責龍門計畫的 Kim YU 已告訴我們到時候在會場將有 STP 的人會問我們問題這回事了。順利完成簡報及回答問題後，頓時感到先前放在心

理的壓力消失了，整個人都輕鬆，也覺得這是一次人生難得的經驗，美中不足的是簡報內容是提我們計劃執行的不順利之處，若是我們核四建廠計畫執行很順利，能在這場合讓我們提傲人成就之處，那就更完美，的確「外交是內政的延長」，此為心路歷程之一。

* STP 擬建 ABWR，並以龍門為參考廠

五、NRC 緊急應變中心

會議第一天（13日）下午 2:00，我與台電李課長參加第一梯次的 NRC Operations Center Tours，從會場搭大會安排的小型巴士約 5 分鐘便到了 NRC 總部，經過類似機場規格的安檢後，我們進到 NRC 的緊急應變中心，由 Office of Nuclear Security and Incident Response (NSIR) 副處長 William Dean 出面接待及簡報，他首先說明中心的任務與運作方式，其主要的目的是每天 24 小時、全年無休監控各核子設施的運轉安全，並在事故時動員成立應變組織，進行各種應變措施，包括掌控事件狀況、作等級分類、技術評估並提供建議對策給地方政府、州政府與聯邦政府、提供正確資訊給新聞媒體等。他提到在事件分類上分成 Notification of Unusual Event、Alert、Site Area Emergency、General Emergency 等四類，其定義如表三。他提到 NRC 緊急應變中心將事故時必須用到的設備，訂為 Essential Systems，並維持多套以互為支援。隨後我們一行人進入真正的監控中心參觀，並由其中一位值班人員講解他的任務及電視牆上監控各項資訊的意義，令人印象最深刻的是他所展示仍在建置的 Electronic Library 系統*，他在一面他所謂的 Smart Board（坎在牆壁上，與牆壁幾乎溶為一體）上，以 Beaver Valley 電廠資料為例，說明這套系統的功能，他展示該電廠各類的圖面，包括 Simplified Building Drawing、Simplified System Drawing、Simplified Component Drawing 等（雖然定為 Simplified ”簡易”，但其實並不”簡易”，仍是很詳細），讓人很容易就對現場的廠房佈置、方位、設備位置等清楚了解，彷彿有置身於現場的感覺，隨後他再以汽機廠房發生事故為例，展示汽機系統相關各類

圖面與設備構造圖面等技術資料，令人不得不佩服資料的詳盡，也更相信當電廠發生事故時，NRC 緊急應變中心人員可以在這裡對事故進行獨立且有正確性、有價值的技術評估，的確這是一套很踏實的系統，對電廠發生事故時的應變很有幫助，值得我們學習。另外，我也請教他該系統建置的一些問題及在這裡值班人員的資格，他答說建 Electronic Library 系統是一個大工程，系統有一個很大的資料庫，內已有數個電廠的資料了，且資料由電廠提供並更新；在這裡值班的工作人員大都曾任職核電廠控制室運轉員或當過 NRC 駐廠視察員。因已輪到下一梯次，我們約在 16:00 搭車，離開後門警衛之前，映入眼簾的是大樓旁邊角落（仍在 NRC 大樓範圍內）孩童嬉戲景象，有大人帶著幾位孩童在玩兒童遊樂器材，猜想應是 NRC 員工托兒所的老師帶員工子女正在嬉戲。回會場車上我與李課長討論剛看到的 Electronic Library 系統，都留下深刻印象，也覺得這參觀很值得。

* 2006/9/28 NRC 發行 Regulatory Issue Summary 2006-21: Improving Response Capabilities Through the Use of an Incident Response Electronic Library（文件編號簡稱 RIS-06-021，如附件八）。發行目的係要求各核電廠業主配合提供 NRC 建置在萬一核電廠發生事故時，為處理核電廠緊急應變所需的電子檔資料，並且資料為 Adobe Acrobat 格式。

表三 NRC 緊急應變事件分類

類 別	定 義 與 說 明
Notification of Unusual Event	Under this category , events are in process or have occurred which indicate <i>potential degradation in the level of safety of the plant</i> . No release of radioactive material requiring offsite response or monitoring is expected unless further degradation occurs.
Alert	If an alert is declared , events are in process or have occurred which involve an actual or potential substantial degradation in the level of safety of the plant. Any releases of radioactive material from the plant are expected to be limited to a small fraction of the Environmental Protection Agency (EPA) protective action guides (PAGs)
Site Area Emergency	A site area emergency involves events in process or which have occurred that result in actual or likely major failures of plant functions needed for protection of the public. Any releases of radioactive material are not expected to exceed the EPA PAGs except near the site boundary.
General Emergency	A general emergency involves actual or imminent substantial core damage or melting of reactor fuel with the potential for loss of containment integrity. Radioactive releases during a general emergency can reasonably be expected to exceed the EPA PAGs for more than the immediate site area.

六、拜訪美國核管會數位儀控專家

仿照過去本處與會同仁的慣例，本次公差期間除了參加核管資訊會議之外，順道利用會議前的時間，拜訪美國核管會本部，就數位管制實務問題與美方專家進行討論與經驗交換，美國核管會由台美民用合作國際事務部（OIP）的聯絡人 Kirk Foggie 以及核能管制署 NRR Mr. Matthew Chriamal 接待，討論主題為標準審查導則 NUREG-0800（SRP）第七章更新現況。

標準審查導則 NUREG-0800 於 1975 年 11 月 Rev.0 發行。其後依需要，以章節為單元進行增訂及修改工作，以儀控第七章為例，1997 年 6 月 Rev.4 發行，剛好作為我們民國 86 年底核四初期安全分析報告（PSAR）審查工作時的依據。現 NRC 正為因應美國國內即將新興建核電廠作準備，而進行各章節全面增修，全案於今年 3 月完成改版作業，以便能及時支援依 10CFR52 COL 對新核電廠興建案的審查。從第七章目錄（如附件九）可看出其修改的大致外貌。第七章的每一節都由第四版進版成第五版，附錄的部分則重新安排，並且新增了附錄 7.1-D “Guidance for Evaluation to IEEE Std 7-4.3.2”。Mr Chriamal 也特別印了一份附錄 7.1-D 給我們並當場說明，該附錄前 8 節內容主要是參採 2003 年版的 IEEE Std 7-4.3.2（該年版也已被 R.G. 1.152 Rev.2 參採，又該年版係參考 1998 年版的 IEEE Std 603 而訂），提供審查者對數位安全系統軟體相關作業更仔細的審查規範，在第 9 節則論述資安審查準則（Cyber Security Criteria）。

過去在資安這議題上，只有附錄 7.1-C “Guidance for Evaluation of Conformance to IEEE Std 603” 的第 5.9 節引述 1991 年版的 IEEE Std 603 的一段話（如下）作為審查者的參考，主要是強調，即數位化安全系統要在實體及電子接觸（physical and electronic access）方式中防範非經授權的改變，如不要與網路連結，若需接上維修設備作修改也僅能由被允許的技術人員在真正進行維修的時段內才可為之，全段話係從使用階段利用行政程序的管理來達到對數位化安全系統資安管制的目的。

“The design shall permit the administrative control of access to safety system equipment. These administrative controls shall be supported by provisions within the safety systems, by provision in the generating station design, or by a combination thereof.”

而在此新的附錄章節中，則更具體要求得從數位化安全系統生命週期的各階段（Concepts Phase、Requirement Phase、Design Phase、Implementation Phase、Test Phase、Installation，Checkout，and Acceptance Testing、Operation Phase、Maintenance Phase、Retirement Phase）著手立下規範，來達到資安的目的。對核四而言，此一新法規雖不是 PSAR 承諾遵循的執照基礎，但其相關的條文對提升核能資安具有實質的價值，非常值得研議參採，況且核四的 PSAR 審查是十年前的事了，十年來數位儀控法規對安全演進的部份，我們的核四廠即使在目前建廠階段無法立即參採，未來是應該研議參採的。

肆、心得與建議

- 一、美國核管會每年定期舉辦之管制資訊會議，向來是美國核管會藉以與核能相關單位意見交流與政策宣示之重要會議，值得未來仍持續派員參加此項會議，吸取國際管制新資訊。今年會議為因應核能在美國已成復興態勢，且在最近將會開始有新機組進行興建之現況，因此今年會議主題是「核能復興時代的管制」，討論範圍涵括：美國核管會之核能安全管制、管制政策、核能法規、功率提升、執照更新、及新反應器之執照審查等議題，其內容俱讓人感受到一股強烈核能復興時代的來臨，與國內近年來倡議非核家園的氛圍大相逕庭。
- 二、經濟合作暨發展組織/核能署（OECD/NEA）正在推動的「多國設計評估專案」(MDEP)，其目的是要拉近世界各國的核能知識及運轉經驗，以共同努力建立新反應器設計的管制標準並分享資源，以完成必須的核管審查。我國若能藉助 MDEP 對核四進行 peer review，相信對未來核四的安全營運會有很大的幫助。
- 三、誠如 NRC 委員 Lyons 在演講中所言，數位儀控已被認定是新建核能電廠最困難技術之一。本次奉派在會中簡報我國核四數位儀控管制，從會後的提問可發現 SSA、Diversity、HFE V&V、Network、Cyber Security 是數位儀控引人關注的議題，未來進行核四中期安全分析報告審查時，必須把這些列為審查重點，甚至要求台電針對這些議題提 topic report。
- 四、標準審查導則 NUREG-0800 為因應美國國內即將新興建核電廠作準備而進行全面增修，以便能作為新興建核電廠審查的準則，全案於今年 3 月已完成改版作業，其內容值得我們研議參採。
- 五、NRC 緊急應變中心仍在建置的 Electronic Library 系統，是一套很踏實的系統，其目的是在核電廠發生事故時能提供必要的技術資料，以利進行事故應變的技術評估，值得我們學習。



發表論文



與 NRC Mr. Chiramal 合影



與 OECD/NEA Mr. Javier REIG 合影



台電李精一課長與本處鄧文俊技正會場合影

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附件一

管制資訊會議議程

NRC 19th Annual Regulatory Information Conference (RIC)**2007 Final Program**

March 13 – 15, 2007

Track 1	Operating Reactors	
Track 2	New Reactors	
Track 3	Stakeholder Communications	
Track 4	Reactor Research	
Track 5	Risk-Informed Activities	
Track 6	Security, Emergency Preparedness, Fuel Cycle	
Track 7	Regional	

Tuesday, March 13, 2007

7:00 am – 5:00 pm Grand Ballroom Foyer	Registration
8:00 am – 5:00 pm Lower Level	Internet and Print Center
11:00 am – 5:30 pm Lower Level	NRC Headquarters Operations Center Tours (registration required) <i>*Please note that the tour shuttle will depart on the Lower Level entrance ten (10) minutes prior to your scheduled tour time.</i>
9:00 am – 11:00 am Grand Ballroom	<p style="text-align: center;">Opening Session</p> <p style="text-align: center;">- Welcome and Introductions - Jim Dyer, Director, NRC/NRR and Luis A. Reyes, Executive Director for Operations, EDO/NRC</p> <p style="text-align: center;">Keynote Address: <i>Regulating in the Nuclear Renaissance</i>, Dale E. Klein, Ph.D.</p> <p style="text-align: center;">- Director's Addresses - Director's Remarks – Jim Dyer, Director, NRC/NRR State of the Office of Nuclear Regulatory Research – Brian Sheron, Director, NRC/RES</p>
11:00 am – 12:30 pm Grand Ballroom Foyer	Lunch Break and Poster Presentations and Table Top Displays
12:30 pm – 1:30 pm Grand Ballroom	<p style="text-align: center;">Commissioner Plenary</p> <p style="text-align: center;"><i>Challenges Facing NRC</i>, Edward McGaffigan, Jr.</p>

<p>1:30 pm – 3:00 pm Salon F</p>	<p style="text-align: center;">Sensitive Unclassified Non-Safeguard Information (SUNSI) Program Track 3 – Stakeholder Communications</p> <p>This session will address Sensitive Unclassified Non-Safeguards Information (SUNSI). It will include the definition of SUNSI, the categories of SUNSI, a discussion of current issues with particular emphasis on protecting personally identifiable information (PII), how to mark SUNSI documents for submission to the NRC, and how to ensure your PDF files do not contain unwanted/hidden text.</p> <p>Session Chair: Catherine Holzle, NRC/OIS Panelists: - <i>The Sensitive Unclassified Non-Safeguards Information (SUNSI) Program</i>, Kenny Nguyen, NRC/OIS Session POC: Russ Nichols, NRC/OIS, tel: (301) 415-7169 e-mail: RAN2@nrc.gov</p>
<p>1:30 pm – 3:00 pm White Flint Amphitheater</p>	<p style="text-align: center;">Fire Protection – Successes and Challenges with Improving Industry Performance Track 1 – Operating Reactors</p> <p>This session will be a discussion of the technical issues, challenges and activities associated with the resolution of fire protection issues that are pivotal to the industry in moving forward with improvements. Topics to be addressed during the session include: operator manual actions, circuit analysis, NFPA 805 implementation, and fire barriers.</p> <p>Session Chair: Michael Tschiltz, NRC/NRR Panelists: - <i>Fire Protection Initiatives</i>, Michael Tschiltz, NRC/NRR - <i>Fire Protection: Current Status and Future Plans</i>, Sunil Weerakkody, NRC/NRR - <i>Musings on Fire Protection</i>, Alex Marion, Nuclear Energy Institute (NEI) - <i>Fire Protection: When is an Order not an Order?</i>, Paul Gunter, Nuclear Information and Resource Service - <i>NFPA 805 Transition Experience</i>, James Masterlark, Nuclear Management Company Session POC: Peter Barbadoro, NRC/NRR, tel: (301) 415-3482 e-mail: PJB@nrc.gov</p>
<p>1:30 pm – 3:00 pm Salon B and C</p>	<p style="text-align: center;">New Reactor Organization and Applications: Status and Plans Track 2 – New Reactors</p> <p>The Energy Policy Act of 2005 spurred significant interest in new reactor licensing. The NRC is expecting to receive at least 20 Combined License applications beginning in 2007. In response, the NRC has created the Office of New Reactors and is working with industry to develop a standardized, uniform, design centered approach for new reactor applications. This session updates both NRC's and Industry's activities toward this effort, including progress, challenges, priorities and lessons learned.</p> <p>Session Chair: David Matthews, NRC/NRO Panelists: - <i>AP1000 Design Centered Work Group Status and Plans</i>, Peter Hastings, Duke Energy - <i>U.S. EPR COLA Status</i>, John Price, Constellation - <i>ESBWR Design Centered Working Group Status and Plans</i>, Eugene Grecheck, Dominion - <i>New Nuclear Plants: Industry Needs and Plans</i>, Adrian Heymer, Nuclear Energy Institute (NEI) - <i>NRO Preparation Activities in Support of New Reactor Licensing</i>, Stephanie Coffin, NRC/NRO Session POC: James Steckel, NRC/NRO, tel: (301) 415-1026 e-mail: JAS13@nrc.gov and Mark Kowal, NRC/NRO, tel: (301) 415-1663 e-mail: MXK7@nrc.gov</p>

<p>1:30 pm – 3:00 pm Salon A</p>	<p style="text-align: center;">Thermal Hydraulics Track 4 – Reactor Research</p> <p>The NRC is engaged in a wide range of thermal-hydraulics research and relies on an integrated research approach utilizing experimental results and analytical tools to provide the technical basis for sound regulatory decisions. Recent work done to support the licensing of advanced passive light water reactors is of particular interest. Experiments conducted at integral facilities (e.g., PUMA and ROSA) locally and abroad with international partners have provided key insights into the thermal-hydraulic phenomena of advanced passive plants and will be presented. In addition, computational fluid dynamics (CFD) calculations have provided enhanced understanding of heat transfer mechanisms in plant components such as steam generators and dry storage casks. The need to follow Best Practice Guidelines for CFD for both single-phase and multi-phase applications is essential and required to assess the feasibility and the validity of the CFD method and will also be presented.</p> <p>Session Chair: Christiana Lui, NRC/RES</p> <p>Panelists:</p> <ul style="list-style-type: none"> - ROSA-IV Test Program, Shawn Marshall, NRC/RES - Computational Fluid Dynamics: Best Practices, Ghani Zigh, NRC/RES - PUMA Test Program – Mamoru Ishii, Purdue - PUMA Scaling Distortion Analysis, Marcos Ortiz, ISL <p>Session POC: Kent Welter, NRC/RES, tel: (301) 415-5740 e-mail: KBW@nrc.gov</p>
<p>1:30 pm – 3:00 pm Brookside</p>	<p style="text-align: center;">PRA Models, Methods, & Tools Track 5 – Risk-Informed Activities</p> <p>The use of risk information to assist in decision-making continues to increase and place new demands on PRA Models, Methods, and Tools. In addition to supporting decision-making for operating reactors, appropriate tools will be needed for new reactors. This session will cover the existing state of the art for PRA models, methods, and tools, and discuss ongoing and planned developmental activities.</p> <p>Session Chair: John Monninger, NRC/RES</p> <p>Panelists:</p> <ul style="list-style-type: none"> - Treatment of PRA Uncertainty and Alternative Programs, Mary Drouin, NRC/RES - NRC's Human Reliability Analysis Program, Erasmia Lois, NRC/RES - EPRI's PRA Research and Development, Ken Canavan, Electric Power Research Institute (EPRI) - Insights on PRA, George Apostolakis, Massachusetts Institute of Technology - Industry Views on PRA, Rick Grantom, South Texas Project and ASME Risk Committee - Industry Views on PRA, Greg Krueger, Exelon Nuclear <p>Session POC: Lauren Killian, NRC/RES, tel: (301) 415-0029 e-mail: LAK@nrc.gov</p>

<p>1:30 p m – 3:00 p m Salon G and H</p>	<p style="text-align: center;">Emergency Preparedness Track 6 - Security, Emergency Preparedness, Fuel Cycle</p> <p>This session will address current enhancements in emergency preparedness from different perspectives including the latest Commissioners’ direction related to emergency preparedness regulations and guidance along with new initiatives and lessons learned from recent security event-based drills and exercises.</p> <p>Session Chair: Nader Mamish, NRC/NSIR Panelists: - Enhancements to Emergency Preparedness Regulations, Guidance and Research, Kathryn Brock, NRC/NSIR, - <i>Realistic Exercises</i>, Craig Fugate, State of Florida - <i>Integrated Emergency Planning Zones</i>, Aaron Ertel, St. Charles Homeland Security - <i>Integrated Security/EP Exercises</i>, Scott McCain, Exelon Nuclear Session POC: Robert Moody, NRC/NSIR, tel: (301) 415-1737 e-mail: REM2@nrc.gov</p>
<p>3:00 p m – 4:00 p m Grand Ballroom</p>	<p style="text-align: center;">Commissioner Plenary <i>You Ain't Seen Nothing Yet</i>, Jeffery S. Merrifield</p>
<p>4:00 p m – 5:30 p m Salon G and H</p>	<p style="text-align: center;">Nuclear Sector Challenges Track 3 – Stakeholder Communications</p> <p>As stated in the NRC Strategic Plan, the NRC views nuclear regulation as the public's business and, as such, it should be transacted openly and candidly in order to maintain the public's confidence. Public awareness of NRC's programs is increasing as a result of renewed interest in nuclear power generation and continued interest in ensuring protection of the public and the environment. This session is intended to encourage exchange of stakeholder views on the primary challenges currently facing the nuclear sector and how we should address these challenges.</p> <p>Session Chair: Michael Johnson, NRC/EDO Panelists: - Informing External Stakeholders About Events, David Lochbaum, Union of Concerned Scientists (UCS) - Public Communications in the Internet Age, Eliot Brenner, NRC/OPA - NRC's Human Capital Challenges, Sarah J. Lynch, U.S. Government Accountability Office (GAO) - New Plant Construction Labor Challenges, Dale Lloyd, Southern Nuclear - Making Sense out of Science, Steven Kerekes, Nuclear Energy Institute (NEI) Session POC: Tilda Liu, NRC/NRR, tel: (301) 415-1315 e-mail: TYL1@nrc.gov</p>

<p>4:00 p m – 5:30 p m Salon F</p>	<p style="text-align: center;">Generic Safety Issue (GSI) 191 Track 1 – Operating Reactors</p> <p>GSI 191, applicable to pressurized water reactors, concerns the potential for inadequate core cooling during sump recirculation following a loss-of-coolant accident. Licensees and the NRC have placed major emphasis on resolution of this issue, and the NRC expects licensees to show resolution of sump clogging issues by the end of 2007. This session provides an update on the NRC's regulatory activities regarding GSI-191 and industry perspectives on progress in addressing the issue.</p> <p>Session Chair: Thomas Martin, NRC/NRR</p> <p>Panelists:</p> <ul style="list-style-type: none"> - Generic Safety Issue 191: Status and Path Forward, Michael Scott, NRC/NRR - Generic Safety Issue 191: NRC-Sponsored Research, Ervin Geiger, NRC/RES - Generic Safety Issue 191: Chemical Effects Update, Paul Klein, NRC/NRR - Resolution of GSI-191: Industry Actions and Schedule, John Butler, Nuclear Energy Institute (NEI) - Fort Calhoun Station Water Management Initiative, Joseph Gasper, Omaha Public Power District <p>Session POC: Michael Scott, NRC/NRR, tel: (301) 415-0565 e-mail: MLS3@nrc.gov</p>
<p>4:00 p m – 5:30 p m Salon B and C</p>	<p style="text-align: center;">New Reactor Rulemaking Track 2 – New Reactors</p> <p>The NRC is pursuing several rulemakings that are intended to improve regulatory programs including the review of combined license applications, and the regulation of construction activities for new plants. Rulemakings to be discussed include changes to Part 52 that modify the licensing process; limited work authorizations; fitness for duty requirements for construction; access authorization; and security issues for new reactors. This session will focus on implementation issues for rules that have been finalized, and will provide a forum for discussion of viewpoints for rules under consideration.</p> <p>Session Chair: Gary Holahan, NRC/NRO</p> <p>Panelists:</p> <ul style="list-style-type: none"> - Doug Huyck, NRC/NSIR - Eileen McKenna, NRC/NRO - Tony Pietrangelo, Nuclear Energy Institute (NEI) - Brian Dolan, Duke Energy <p>Session POC: Donna Williams, NRC/NRO, tel: (301) 415-1322 e-mail: DMS6@nrc.gov</p>

<p>4:00 p m – 5:30 p m Salon A</p>	<p style="text-align: center;">Fire Research – Integrating Research into Practical Applications Track 4 – Reactor Research</p> <p>Fire Research is a dynamic and growing area within the NRC's Office of Nuclear Regulatory Research (RES). This session will focus on two state-of-the-art research programs that were recently completed, specifically, <u>Cable Response to Live FIRE (CAROLFIRE)</u> and Fire Modeling Verification and Validation (NUREG-1824). These RES products are designed to support the current Nuclear Power Plants Fire Protection licensing basis as well as those voluntarily adopting the new 10CFR 50.48c (NFPA 805).</p> <p>Session Chair: Mark Salley, NRC/RES</p> <p>Panelists:</p> <ul style="list-style-type: none"> - Duke Armored Cable Spurious Actuation Fire Testing Program, Harold Barrett, Duke Energy - Fire Model Verification and Validation for Nuclear Power Plant Applications, Francisco Joglar, Electric Power Research Institute/SAIC - Development of a Cable Response Model and Fire Model Verification and Validation, Kevin McGrattan, National Institute of Standards and Technology (NIST) - Cable Response to Live Fire (CAROLFIRE) Testing Program, Steve Nowlen, Sandia National Laboratory - Current and Future Use of Fire Research in Inspections, John Rogge, NRC/R-I <p>Session POC: Kendra Hill, NRC/RES, tel: (301) 415-5456 e-mail: KLH@nrc.gov</p>
<p>4:00 p m – 5:30 p m White Flint Amphitheater</p>	<p style="text-align: center;">Risk-Informed Regulatory Activities Track 5 – Risk-Informed Activities</p> <p>Risk-informed activities continue to play an important role in nuclear power regulation. As a result, the NRC and industry have a large number of risk-informed initiatives underway or planned. This session will cover perspectives from both the NRC and industry on current risk-informed activities, risk-informed standards, and challenges associated with implementing risk-informed initiatives.</p> <p>Session Chair: Cornelius Holden, NRC/NRR</p> <p>Panelists:</p> <ul style="list-style-type: none"> - Regulatory Guide 1.200 Implementation, Michael Tschiltz, NRC/NRR - Limerick Generating Station: Risk Informed Initiative 5b - Surveillance Frequency Control Program, Greg Krueger, Exelon Nuclear - The Value Proposition for PRA, Biff Bradley, Nuclear Energy Institute (NEI) - Risk Management Standard's Activities for Today and Tomorrow's Nuclear Power Plants, C.R. (Rick) Grantom, American Society of Mechanical Engineers (ASME) Committee on Nuclear Risk Management <p>Session POC: Carolyn Lauron, NRC/NRR, tel: (301) 415-2736 e-mail: CLL@nrc.gov</p>

<p>4:00 p m - 5:30 p m Brookside</p>	<p style="text-align: center;">Nuclear Security Track 6 - Security, Emergency Preparedness, Fuel Cycle</p> <p>The NRC's licensees have undergone a significant transformation concerning security since the events of September 11, 2001. This transformation started with the issuance of Orders from the NRC requiring increased levels of protection for licensees. With the establishment of the Department of Homeland Security, the NRC has worked closely with DHS to ensure the Federal response to security events is an integral part of the planning process. The NRC is proceeding with rulemaking to ensure the new levels of security at NRC licensees and the lessons-learned over the last five years are integrated into regulations. During this presentation, the panelists will discuss; the Department of Homeland Security's interactions with the NRC; the protection of risk-significant radioactive sources in the U.S.; nuclear power plant security; and the nuclear power industry perspective on nuclear security today.</p> <p>Session Chair: Dan Dorman, NRC/NSIR and Patricia Holahan, NRC/NSIR Panelists:</p> <ul style="list-style-type: none"> - Radioactive Source Security, Mark Shaffer, NRC/NSIR - Nuclear Security, Rich Correia, NRC/NSIR - Nuclear Sector Partnership, Craig Conklin, Department of Homeland Security (DHS) - Nuclear Security Industry Perspective, Nelson Martin, Dominion <p>Session POC: Sheldon Stuchell, NRC/NSIR, tel: (301) 415-1847 e-mail: SXS10@nrc.gov</p>
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Wednesday, March 14, 2007

7:00 a m – 5:00 p m Grand Ballroom Foyer	Registration
8:00 a m – 5:00 p m Lower Level	Internet and Print Center
9:45 a m – 4:15 p m Lower Level	NRC Headquarters Operations Center Tours (registration required) <i>*Please note that the tour shuttle will depart on the Lower Level entrance ten (10) minutes prior to your scheduled tour time.</i>
8:30 a m – 9:30 a m Grand Ballroom	Commissioner Plenary <i>Commissioner Jaczko's Perspective on Nuclear Regulation, Gregory B. Jaczko</i>
9:30 a m – 10:00 a m Grand Ballroom Foyer	Break
10:00 a m – 11:30 a m Salon G and H	<p align="center">New Reactor Guidance for Applications and Reviews Track 2 – New Reactors</p> <p>Standardization is the key to effective and efficient preparation of combined license applications and the subsequent NRC review of those applications. The development and use of guidance documents by the applicants and by the NRC staff are important to our efforts to take full advantage of standardization. This session will provide updates on the status of key regulatory guidance documents such as the standard review plan and regulatory guides as well as insights from those using the guidance to prepare combined license applications.</p> <p>Session Chair: Tom Bergman, NRC/NRO Panelists:</p> <ul style="list-style-type: none"> - <i>Perspective of a Design Certification Applicant on New Reactor Application and Review Guidance</i>, Sandra Sloan, Areva NP, Inc. - <i>COL Applicant Perspectives on New Reactor Application and Review Guidance</i>, George A. Zinke, Entergy Nuclear/NuStart Energy Development - <i>Industry Perspective on COL Application and Review Guidance</i>, Russell J. Bell, Nuclear Energy Institute (NEI) - <i>Relevant Experience from Recent Licensing Reviews of Major Fuel Cycle Facilities</i>, Joseph G. Giitter, NRC/NMSS - <i>Guidance Documents for NRC Staff and Applicants</i>, Stephen S. Koenick, NRC/NRO <p>Session POC: Bill Reckley, NRC/NRO, tel: (301) 415-1323 e-mail: WDR@nrc.gov</p>

<p>10:00 am – 11:30 am Salon B and C</p>	<p style="text-align: center;">Lessons Learned from International Operating Experience Track 1 – Operating Reactors</p> <p>The sharing of operating experience and lessons learned amongst regulators and utilities is essential for the continued safe operation of the world's nuclear power plants. This session will provide recent operating experience and lessons learned from several of the NRC's international regulatory counterparts. This exchange of operating experience will allow the NRC, other regulators, and the nuclear industry to benefit from issues that have occurred in other countries.</p> <p>Session Chair: Mary Jane Ross-Lee, NRC/NRR and Janice Dunn Lee, NRC/OIP Panelists:</p> <ul style="list-style-type: none"> - Andre-Claude Lacosté, Nuclear Safety Authority (ASN) - Wolfgang Renneberg, Federal Ministry for the Environment – Germany - Petteri Tippiana, Radiation and Nuclear Safety Authority (STUK) - Finland - Linda Keen, Canadian Nuclear Security Commission - Konstatin Pulikovskiy, Federal Service for Ecological, Technological and Nuclear Oversight - Russia <p>Session POC: Brett Rini, NRC/NRR, tel: (301) 415-3931 e-mail: BAR3@nrc.gov and Kirk Foggie, tel: (301) 415-2238, e-mail: KXF@nrc.gov</p>
<p>10:00 am – 11:30 am Brookside</p>	<p style="text-align: center;">NRC TRACE Code Activities Track 4 – Reactor Research</p> <p>For the past several years, development of the NRC's thermal-hydraulic code known as the TRAC/RELAP Advanced Computational Engine (TRACE) has focused on consolidation of the capabilities and functions of its predecessor codes: TRAC-P, TRAC-B, RELAP5, and RAMONA. There have also been significant efforts to develop TRACE capabilities to assist in the review and evaluation of new reactors. The result of these efforts is a code that has considerable capability and versatility. The NRC staff is concluding its comprehensive assessment of the code and will share with the nuclear community the TRACE development process and results of recent code assessments. In addition, the staff has developed and will demonstrate the Symbolic Nuclear Analysis Package (SNAP), a graphical user interface system designed to support several NRC nuclear analysis codes, including TRACE. SNAP allows code users to more effectively and efficiently develop input models for plant safety analyses, and provides improved data visualization and animated playback of simulations.</p> <p>Session Chair: William "Butch" Burton, NRC/RES Panelists:</p> <ul style="list-style-type: none"> - Overview of TRACE v5.0, Christopher Murray, NRC/RES - SNAP: Symbolic Nuclear Analysis Package, Chester Gingrich, NRC/RES and Ken Jones, NRC/RES - Evaluation of TRACE for Advances BWR LOCAs, Kent Welter, NRC/RES <p>Session POC: Andrew Ireland, NRC/RES, tel: (301) 415-6061 e-mail: AJI1@nrc.gov</p>

<p>10:00 am – 11:30 am Salon A</p>	<p style="text-align: center;">Proposed Geological Repository at Yucca Mountain, NV Track 6 - Security, Emergency Preparedness, Fuel Cycle</p> <p>The proposed geologic repository at Yucca Mountain, Nevada, has been beset by complex political, legal, budgetary and technical issues since its inception, causing numerous delays. Nuclear utilities want the Federal government to fulfill its obligation to take the spent nuclear fuel rather than continuing to rely on interim storage; the State of Nevada is opposed to the proposed site. The Department of Energy, responsible for the construction and operation of the proposed repository, faces many challenges to submitting a high-quality license application by its publicized date of June 30, 2008. Concurrently, NRC, the responsible regulatory agency, is preparing to review and adjudicate the application. This session will summarize the current state of affairs regarding the proposed repository.</p> <p>Session Chair: Lawrence Kokajko, NRC/NMSS Panelists:</p> <ul style="list-style-type: none"> - <i>Used Nuclear Fuel – Integrated Management</i>, Steve Kraft, Nuclear Energy Institute (NEI) - <i>Last Gasp at Yucca: Nevada's Perspective on Current Yucca Mountain Developments</i>, Martin Malsch, State of Nevada - <i>Licensing the Proposed DOE Repository at Yucca Mountain</i>, Jack Davis, NRC/NMSS - <i>Yucca Mountain Project Update</i>, Ward Sproat, Department of Energy (DOE) <p>Session POC: David W. Pstrak, NRC/NMSS, tel: (301) 415-7260 e-mail: DWP1@nrc.gov</p>
<p>10:00 am – 11:30 am Salon F</p>	<p style="text-align: center;">Contaminated Groundwater/Lessons Learned Task Force Track 3 – Stakeholder Communications</p> <p>In response to inadvertent unmonitored releases of radioactive effluents from nuclear power plants, the NRC and the industry have taken several actions. Some of these actions include the establishment of the NRC Liquid Radioactive Release Lessons Learned Task Force; revisions to the NRC public radiation cornerstone inspection procedure; and the Industry Groundwater Protection Initiative. This session will discuss the circumstances that contributed to unplanned liquid effluent releases; the industry and NRC actions in response; and the reactions of the public and other external stakeholders. Additionally the session will provide an overview of NRC and industry future plans.</p> <p>Session Chair: Stuart Richards, NRC/NRR Panelists:</p> <ul style="list-style-type: none"> - <i>NRC Actions and Plans for Unplanned Liquid Effluent Releases</i>, Steven Garry, NRC/NRR - <i>NRC Region I Experiences</i>, Randolph Blough, NRC/R-I - <i>Nuclear Industry Initiative on Groundwater Protection</i>, Ralph Andersen, Nuclear Energy Institute (NEI) - <i>Contaminated Groundwater/Lesson Learned Task Force</i>, Tom O'Neill, Exelon Nuclear <p>Session POC: Katherine Streit, NRC/NRR, tel: (301) 415-3299 e-mail: KNS1@nrc.gov</p>

<p>10 :00 am – 11:30 am White Flint Amphitheater</p>	<p style="text-align: center;">10 CFR 50.46 and Acceptance Criteria Track 5 – Risk-Informed Activities</p> <p>The NRC is considering changes to 10CFR50.46 and its acceptance criteria to make the rule risk-informed. The draft rule for a proposed 50.46a option includes a LOCA break spectrum that is divided into two regions. A "transition break size" (TBS) has been defined, based on frequency and other considerations. Breaks smaller than the TBS would be analyzed using current 50.46 methods and acceptance criteria. Breaks larger than the TBS would be subject to less stringent analysis criteria and assumptions, but mitigation capability up to a full double-ended guillotine break would have to be demonstrated. The NRC is also considering a revision to the 50.46 acceptance criteria. To accomplish this, the NRC and industry have performed research on conventional and advanced cladding materials to establish a basis for this change. Invited speakers will discuss the status of proposed 50.46 rule change and possible changes to the acceptance criteria.</p> <p>Session Chair: Stephen Bajorek, NRC/RES</p> <p>Panelists:</p> <ul style="list-style-type: none"> - <i>Status of the Proposed 10CFR50.46a Risk-Informed ECCS Rulemaking</i>, Richard Dudley, NRC/NRR - <i>ACRS Position on the Proposed 10CFR50.46 Rule</i>, Thomas Kress, Advisory Committee on Reactor Safeguards - <i>Industry Perspective on 10CFR50.46 Rulemaking</i>, Jeffrey Gasser, Southern Nuclear Operating Company - <i>Fuel Research and 50.46 Acceptance Criteria</i>, Ralph Meyer, NRC/RES - <i>Industry's Perspective on Acceptance Criteria</i>, Odelli Ozer, Electric Power Research Institute (EPRI) <p>Session POC: Peter Cochran, NRC/RES, tel: (301) 415-5887 e-mail: PAC2@nrc.gov</p>
<p>11:30 am – 11:45 am</p>	<p style="text-align: center;">Break</p>
<p>11:45 pm – 12:45 pm Grand Ballroom</p>	<p style="text-align: center;">Commissioner Plenary <i>Asking the Tough Questions, Making the Tough Calls – Regulatory Issues in Challenging Times</i>, Peter B. Lyons</p>
<p>12:45 pm – 1:00 pm</p>	<p style="text-align: center;">Break</p>
<p>1:00 pm – 2:30 pm Salon B and C</p>	<p style="text-align: center;">NEI Luncheon – (\$55.00 per attendee – registration required) and Poster Presentations and Table Top Displays <i>*To register for the Luncheon, visit the NEI table located in the Grand Ballroom Foyer</i></p>

<p>2:30 pm – 4:00 pm White Flint Amphitheater</p>	<p style="text-align: center;">Construction Inspection Program Track 2 – New Reactors</p> <p>NRC desires an inspection program that ensures construction of a safe facility, and one that is efficient, effective and provides meaningful information for all stakeholders. Providing a crisp background on the agency's activities to date, this panel will focus on key aspects of the inspection program including: oversight program resources and focus, the general construct of the construction inspection program, the performance assessment and enforcement processes, reporting methods and public interactions, utility and vendor perspectives and needs, and public concerns and perspectives.</p> <p>Session Chair: Glenn Tracy, NRC/NRO and Loren Plisco, NRC/R-II</p> <p>Panelists:</p> <ul style="list-style-type: none"> - NRC Perspective on Construction Inspection, Glenn Tracy, NRC/NRO - Field Office Perspective on Construction Inspection, Loren Plisco, NRC/R-II - Industry Perspective on Construction Inspection, Marilyn Kray, Exelon Nuclear - Industry Perspective on Construction Inspection, Russ Bell, Nuclear Energy Institute (NEI) - Reactor Prenatal Care, David Lochbaum, Union of Concerned Scientists (UCS) <p>Session POC: Rick Rasmussen, NRC/NRO, tel: (301) 415-1340 e-mail: RAR@nrc.gov</p>
<p>2:30 pm – 4:00 pm Salon F</p>	<p style="text-align: center;">Environmental Models for Dose Assessment Track 4 – Reactor Research</p> <p>The NRC assesses radiation doses to humans from routine and non-routine radiological releases at nuclear facilities. Modeling the features, events, and processes associated with both the release of radiological materials and exposure to humans enables the NRC to develop exposure scenarios, calculate radiation doses to individuals and populations, and verify regulatory compliance. Modeling these parameters and pathways is complex, especially as uncertainties are associated with the movement of radiological materials and possible human exposure pathways. This session's presentations and panel discussion will provide insights into the overall modeling process, including the estimation of parameters, identification of uncertainties, and the use of monitoring information to evaluate results and understand dose estimates.</p> <p>Session Chair: Sher Bahadur, NRC/RES</p> <p>Panelists:</p> <ul style="list-style-type: none"> - <i>Overview of NRC Environmental-Exposure Assessment</i>, Ralph Cady, NRC/RES - <i>Uncertainty and Parameter Estimation Associated with Multimedia Environmental Models</i>, Thomas Nicholson, NRC/RES - <i>Dose Assessment</i>, Terry Brock, NRC/RES - <i>Assessing Food Chain Pathways in Biosphere Models</i>, Bruce Napier, Pacific Northwest National Laboratory (PNNL) - <i>Multimedia Environmental Models for Assessing Contaminant Migration and Dose</i>, Gene Whelan, Pacific Northwest National Laboratory (PNNL) <p>Session POC: Adam Schwartzman, NRC/RES, tel: (301) 415-8172 e-mail: ALS2@nrc.gov</p>

<p>2:30 pm – 4:00 pm Brookside</p>	<p style="text-align: center;">Spent Fuel Storage & Transportation Track 6 - Security, Emergency Preparedness, Fuel Cycle</p> <p>This session will include a discussion of recent developments and practices for storage and transportation of spent fuel. The discussions will include recent developments, regulatory review experience and rules of engagement, pressing technical and licensing issues, openness and stakeholder outreach. Invited speakers will represent a broad spectrum of industry, DOE and stakeholder views and comments.</p> <p>Session Chair: William Brach, NRC/NMSS</p> <p>Panelists:</p> <ul style="list-style-type: none"> - Advancing Dry Storage and Transportation Licensing, Steven P. Kraft - Nuclear Energy Institute (NEI) - State of Nevada Perspective on Spent Nuclear Fuel Storage and Transportation, Robert Halstead - Consultant to the State of Nevada - Transportation, Aging, and Disposal (TAD) Canister System Status, Chris Kouts, DOE Office of Civilian Radioactive Waste Management - Perspectives on Spent Fuel Storage and Transportation, Maureen Conley - Freelance writer with Platts/McGraw-Hill - Results of Security Survey Conducted by the Midwestern Radioactive Materials Transportation Committee and State Issues Related to Security for Spent Nuclear Fuel Shipments, Tim Runyon, Illinois Emergency Management Agency <p>Session POC: Bernard White, NRC/NMSS, tel: (301) 415-8515 e-mail: BHW@nrc.gov</p>
<p>2:30 pm – 4:00 pm Salon A</p>	<p style="text-align: center;">Rulemaking Track 3 – Stakeholder Communications</p> <p>The NRC uses the rulemaking process as one of the regulatory tools to develop new, or enhance existing, regulations as part of its responsibility for licensing and regulating nuclear facilities and materials. Compliance with NRC rules are demonstrated by meeting the requirements set forth in rule implementation guidance documents. This session will focus on a number of challenges involving the development of strategic-level rule requirements and their effective implementation at the user-level through guidance documents, interaction with various stakeholders affected by the rule, and verification of compliance with rule.</p> <p>Session Chair: Michael Case, NRC/NRR</p> <p>Panelists:</p> <ul style="list-style-type: none"> - Implementation and Inspection Challenges, Russell Gibbs, NRC/NRR - Implementation Process Challenges, Tim Reed, NRC/NRR - Rule Implementation Guidance, Jack Roe, Nuclear Energy Institute (NEI) - NRC Proposed Rule 10 CFR 26 Subpart I: Managing Fatigue, Joe Bauer, Exelon Nuclear <p>Session POC: David Diec, NRC/NRR, tel: (301) 415-2834 e-mail: DTD@nrc.gov</p>

<p>2:30 pm – 4:00 pm Salon H</p>	<p style="text-align: center;">Reactor Inspection and Assessment Track 1 – Operating Reactors</p> <p>Safety Culture is that assembly of characteristics and attitudes in organizations and individuals which establishes that, as an overriding priority, nuclear plant safety issues receive the attention warranted by their significance. This session will focus on the recent Reactor Oversight Process (ROP) inspection and assessment program changes related to the safety culture initiative. The panelists will provide insights into the implementation of these changes, as well as some other ongoing initiatives to enhance the ROP.</p> <p>Session Chair: Elmo Collins, NRC/NRR Panelists: - Safety Culture Enhancements: An Ongoing Process, Marc Dapas, NRC/R-I - Safety Culture Enhancements: An Ongoing Process, James Andersen, NRC/NRR - NEI Reactor Oversight Process Task Force, Julie Keys, Nuclear Energy Institute (NEI) - Safety Culture - Application and Insights, Darin Benyak, Exelon Nuclear Session POC: Thomas Hedigan, NRC/NRR, tel: (301) 415-1596 e-mail: TEH1@nrc.gov</p>
<p>2:30 pm – 4:00 pm Salon G</p>	<p style="text-align: center;">Safety Margin Work Track 5 – Risk-Informed Activities</p> <p>The safety margin concept is fundamental to reactor safety. This session places safety margin in historical context, and discusses its role in licensing analyses both in the U.S. and internationally. The session will also cover how safety margins can be considered in evaluating risk. A methodology devised by the Office of Nuclear Regulatory Research to integrate risk and safety margins will be presented, and potential applications of this methodology will be explored. Four presentations are planned; they will be given by NRC and ACRS staff, as well as an international expert.</p> <p>Session Chair: Farouk Eltawila, NRC/RES Panelists: - Historical Perspectives on Safety Margins, Michael Réocreux, Institut de Radioprotection et de Sûreté Nucléaire Cadarache, France - The Role of Safety Margins in Licensing Calculations, Ralph Landry, NRC/NRR - Frequency-Consequence Type Risk Guidelines, Tom Kress, Advisory Committee on Reactor Safeguards - Integrating Risk and Safety Margins, Mirela Gravilas, NRC/RES Session POC: Ilka Berrios, NRC/RES, tel: (301) 415-4055 e-mail: IXB3@nrc.gov</p>
<p>4:00 pm – 4:30 pm</p>	<p style="text-align: center;">Break</p>
<p>4:30 pm – 5:30 pm Grand Ballroom</p>	<p style="text-align: center;">Special Session: Multinational Design Evaluation Program (MDEP) Update</p> <p>Session Chair: Dale E. Klein, Ph.D., Chairman, NRC and Andre-Claude Lacosté, Chairman, Nuclear Safety Authority (ASN) Invited Speaker: Javier Reig, Nuclear Energy Agency (NEA) - France Session POC: Michael Cullingford, NRC/RES, tel: (301) 415-1276 e-mail: MCC@nrc.gov and Jeffrey Jacobson, NRC/OIP, tel: (301) 415-2977 e-mail: JBJ@nrc.gov</p>

Thursday, March 15, 2007

7:00 am – 12:00 pm Grand Ballroom Foyer	Registration
8:00 am – 5:00 pm Lower Level	Internet and Print Center
7:30 am – 5:00 pm Lower Level	NRC Headquarters Operations Center Tours (registration required) <i>*Please note that the tour shuttle will depart on the Lower Level entrance ten (10) minutes prior to your scheduled tour time.</i>
8:00 am – 9:30 am Salon A	<p style="text-align: center;">Severe Accident Research and Regulatory Applications Track 4 – Reactor Research</p> <p>Research studies of severe accidents assess the detailed behavior of reactor and containment systems, including the means by which these accidents may be prevented or mitigated. Severe accident analysis addresses fuel damage, progression of accident scenarios, ability to maintain damaged fuel within the reactor pressure vessel and the ability to confine radiation release within the containment building. Severe accident methodologies can also be applied to spent fuel storage and non-reactor facilities. Severe accident analysis is a key component of level 2 and level 3 PRA and is increasingly used to risk inform regulatory criteria. This session includes application of severe accident research to spent fuel issues, critical benchmarking of severe accident methods and use of severe accident analysis to guide future regulatory source term criteria for reactors.</p> <p>Session Chair: Charles Tinkler, NRC/RES Panelists:</p> <ul style="list-style-type: none"> - <i>More Realistic Analysis of Spent Fuel Pool Accident Progression</i>, Jason Schaperow, NRC/RES - <i>Flow and Heat Transfer Experiments for BWR Spent Fuel Assemblies Under Loss-of-Coolant Conditions</i>, Ghani Zigh, NRC/RES - <i>The Need to Identify Cornerstone Benchmarks</i>, Robert E. Henry, Fauske & Associates, LLC - <i>MELCOR Severe Accident Code Application to Regulatory Source Term Assessment, Design Certification Activities, and PRA</i>, Randall O. Gauntt, Sandia National Laboratories <p>Session POC: Daniel Forsyth, NRC/RES, tel: (301) 415-5674 e-mail: DCF1@nrc.gov</p>
8:00 am – 9:30 am Salon B and C	<p style="text-align: center;">International Lessons Identified from Construction & Inspection for New Reactors Track 2 – New Reactors</p> <p>Around the globe, there has been a resurgence of interest in nuclear power. While in the U.S., utilities are still evaluating the timing and magnitude of new nuclear power plant construction, elsewhere, nuclear power plants are being constructed, and regulators are fulfilling their role to help ensure the quality and integrity of the completed facility. During this session, we will hear from several regulators that have recent experience in inspecting new plant construction. By sharing such information, we hope to create an environment where regulators can learn from each other, and where lessons learned can be incorporated into developing programs.</p> <p>Session Chair: Janice Dunn-Lee, NRC/OIP and Gene Imbro, NRC/NRO Panelists:</p> <ul style="list-style-type: none"> - Petteri Tiippana, Radiation and Nuclear Safety Authority (STUK) - Finland - Yong Ho Ryu, Korea Institute of Nuclear Safety (KINS) – South Korea - Wang Jun, State Environmental Protection Administration (SEPA) - China - Yuriinori Maekawa, Nuclear Industrial Safety Agency (NISA) - Japan <p>Session POC: Kirk Foggie, NRC/OIP, tel: (301) 415-2238 e-mail: KXF@nrc.gov</p>

<p>8:00 a m – 9:30 a m Brookside</p>	<p style="text-align: center;">GNEP and Fuel Cycle Track 6 - Security, Emergency Preparedness, Fuel Cycle</p> <p>This session will discuss DOE's Global Nuclear Energy Partnership and its role in closing the nuclear fuel cycle. DOE will summarize the GNEP Strategic Plan, the proposed technologies, and the overall goals for GNEP. NRC will discuss potential regulatory approaches to licensing commercial facilities that may be built to accomplish GNEP goals. NEI will discuss the nuclear industry's views on the need for and timing of GNEP.</p> <p>Session Chair: Robert Pierson, NRC/NMSS Panelists:</p> <ul style="list-style-type: none"> - GNEP and Fuel Cycle Introductory Remarks, Robert Pierson, NRC/NMSS - The DOE Global Nuclear Energy Partnership Strategic Plan, Buzz Savage, Office of Nuclear Energy, DOE - Regulatory Options for Licensing Commercial GNEP Facilities, Joseph Gütter, Special Projects and Technical Support Directorate - GNEP Transmutation Fuel Development, Frank Goldner, Idaho National Laboratories - The Global Nuclear Energy Partnership in the Nuclear Energy Commercial Sector, Felix Killar, Nuclear Energy Institute (NEI) - Proposed Path to Deploy GNEP's CFTC, Earl Saito, GE Nuclear, Wilmington, North Carolina <p>Session POC: Priya Yadav, NRC/NMSS, tel: (301) 415-6667 e-mail: PPY@nrc.gov</p>
<p>8:00 a m – 9:30 a m Salon G and H</p>	<p style="text-align: center;">PRA Techniques for the Evaluation of Reactor Operating Experience Track 5 – Risk-Informed Activities</p> <p>This session will provide an introduction on how risk analyses are used within the NRC and by industry to evaluate the risk significance of events and conditions identified by licensees and/or NRC inspections. The discussions will include regulatory risk analysis tools and methods, important technical issues that can cause significant differences between NRC and licensee risk analyses, including the risk significance of inspection findings, and industry perspectives on use of licensee PRAs.</p> <p>Session Chair: Patrick Baranowsky, NRC/RES Panelists:</p> <ul style="list-style-type: none"> - <i>Overview on the Different Risk Analyses (SDP, ASP, MD 8.3) Performed by the NRC and How the Results are Used</i>, Patrick Baranowsky, NRC/RES - <i>Introduction into SPAR Models</i>, Robert Buell, Idaho National Laboratory (INL) - <i>NRR Perspectives on Use of SPAR Models as a Tool to Support Regulatory Decision Making</i>, Michael Franovich, NRC/NRR - <i>Unresolved Technical Issues: The Cause Differences Between NRC and Licensee Analysis Results</i>, Robert Buell, INL and Pete Appignani, NRC/RES - <i>Industry Perspective on Use of Licensee PRAs to Assess Risk Significance of Inspection Findings</i>, Gerald Sowers, APS <p>Session POC: Chris Hunter, NRC/RES, tel: (301) 415-4127 e-mail: CSH3@nrc.gov</p>

<p>8:00 am – 9:30 am White Flint Amphitheater</p>	<p style="text-align: center;">Emerging Issues: Electrical Track 1 – Operating Reactors</p> <p>A panel session will be held by the Office of Nuclear Reactor Regulation's (NRR) Division of Engineering on "Emerging Issues: Electrical," that will be chaired by Patrick L. Hiland, Director of the Division of Engineering/NRR. The session will be divided into two panels. The first panel will be a general discussion on the design and reliability of digital instrumentation and control systems with a focus on associated NRC activities and international experience. The second panel will discuss power cable management programs with a focus on medium voltage inaccessible and underground power cables.</p> <p>Session Chair: Patrick Hiland, NRC/NRR</p> <p>Panelists:</p> <ul style="list-style-type: none"> - Allen G. Howe, NRC/NRR - Alex Marion, Nuclear Energy Institute (NEI) - Regulatory Overview of Digital I&C in Taiwan Lungmen Project, Chang-Fu Chuang, Taiwan Atomic Energy Council - Introduction to APR1400 Man-Machine Interface System, Sam Sung Choi, Korea Hydro and Nuclear Power - Overview of NRC Activities Related to Power Cable Management, George A. Wilson, NRC/NRR - Underground Medium Voltage Cable Failures and Status of Testing, Alex Marion, Nuclear Energy Institute (NEI) - Underground Medium Voltage Cable Testing, Kent Brown, Tennessee Valley Authority <p>Session POC: Matthew McConnell, NRC/NRR, tel: (301) 415-1597 e-mail: MXM4@nrc.gov</p>
<p>8:00 am – 9:30 am Salon F</p>	<p style="text-align: center;">Preparedness for Pandemic Avian Influenza Track 3 – Stakeholder Communications</p> <p>The NRC is working with other federal agencies and industry to assess the effects of a pandemic on the operation of nuclear power plants. The panel will address the challenges associated with maximizing the availability of critical infrastructure while simultaneously maintaining an acceptable level of safety in light of long-term reduced staffing.</p> <p>Session Chair: Melvyn Leach, NRC/NSIR</p> <p>Panelists:</p> <ul style="list-style-type: none"> - Nuclear Sector Pandemic Preparedness - Plans, Initiatives and Posture, Vijay Nilekani, Nuclear Energy Institute (NEI) - Preparedness for Pandemic Influenza, Frederick Kass, Department of Health and Human Services - Office of the Assistant Secretary for Preparedness and Response - NRC and the Pandemic, Christopher Jackson, NRC/NRR <p>Session POC: Janelle Jessie, NRC/NSIR, tel: (301) 415-6775 e-mail: JRB6@nrc.gov</p>
<p>9:30 am – 10:00 am</p>	<p style="text-align: center;">Break</p>

<p>10:00 am – 11:30 am Salon A</p>	<p style="text-align: center;">Operating Reactor Licensing Track 1 – Operating Reactors</p> <p>This session will discuss the impact on Operating Reactor Licensing of generic issues, including regulatory changes, budgets, and industry needs. The panel will discuss how these issues impact NRC, individual licensees, and the nuclear industry as a whole. The panel will address the impact of these generic issues and possible improvements to address the issues proactively.</p> <p>Session Chair: Catherine Haney, NRC/NRR</p> <p>Panelists:</p> <ul style="list-style-type: none"> - <i>Changes in NRC Processes and Their Impact on Operating Reactor Licensing</i>, John Lubinski, NRC/NRR - <i>The Changing Regulatory Environment and Its Growing Impact on Licensing and Site Personnel</i>, Brian McCabe, Progress Energy - <i>Resource Impacts from Regulatory Change - A Utility's Perspective</i>, Keith Jury, Exelon Generation Company, LLC - <i>The Role of NEI LATF and Managing the Imposition of Preliminary Generic Positions During Plant-Specific Licensing Actions and Inspections</i>, Donald Woodlan, TXU Power <p>Session POC: Robert Kuntz, NRC/NRR, tel: (301) 415-3733 e-mail: RFK@nrc.gov</p>
<p>10:00 am – 11:30 am Salon B and C</p>	<p style="text-align: center;">Environmental Reviews for New Reactors Track 2 – New Reactors</p> <p>This session will address the roles of characteristic organizations expected to participate with prospective applicants at various stages in the development of a nuclear power project to identify the requisite information needs to conduct activities before, during, and after the development of the applicant's environmental report (ER). The ER is submitted to the NRC as part of its Early Site Permit (ESP) or Combined License (COL) application and is the starting point for NRC's independent evaluation. Early contact with resource and authorizing agencies is essential to ensure that all of the necessary permits are in process as the NRC fulfills its National Environmental Policy Act responsibilities before it can issue an ESP or COL.</p> <p>Session Chair: James Lyons, NRC/NRO</p> <p>Panelists:</p> <ul style="list-style-type: none"> - <i>PE Environmental Assessment and Innovation</i>, Kevin Magerr, United States Environmental Protection Agency (EPA) - <i>Environmental Reviews: The Role of the SHPO</i>, Ethel Eaton, Virginia Department of Historic Resources - <i>Environmental Permits for New Reactors</i>, Theodore J. Bowling, Duke Energy - <i>Environmental Reviews for New Reactors</i>, Tamar Cerafici, CH2M HILL <p>Session POC: Michael Willingham, NRC/NRO, tel: (301) 415-3924 e-mail: MHW1@nrc.gov</p>

<p>10:00 am – 11:30 am Brookside</p>	<p style="text-align: center;">Consequence Analysis Track 4 – Reactor Research</p> <p>The NRC is conducting a three-year State-of-the-Art Reactor Consequence Analysis (SOAR-CA) project to estimate the possible consequences in the unlikely event of a nuclear power plant accident. Accident assessment tools have been used since their creation in the 1970s to help focus attention on reactor design and operational features that are most important to safety. SOAR-CA will take maximum advantage of national and international reactor safety research, as well as improved NRC regulatory requirements and nuclear industry initiatives over the past 25 years.</p> <p>Session Chair: Farouk Eltawila, NRC/RES</p> <p>Panelists:</p> <ul style="list-style-type: none"> - <i>Objectives and Plans for the State-of-the-Art Reactor Consequence Analysis Program</i>, Charles Tinkler, NRC/RES - <i>Fundamental Issues for Consequence Analyses</i>, Robert Henry, Fauske and Associates, LLC - <i>Current Activities on Accident Consequences Analysis at IRSN</i>, Emmanuel Raimond, IRSN-France - <i>Progress in Predictive Technology for Severe Accident Progression and Consequence Assessment Since 1982 Study</i>, Randall Gauntt, Sandia National Laboratory <p>Session POC: Paulette Torres, NRC/RES, tel: (301) 415-5656 e-mail: PAT3@nrc.gov</p>
<p>10:00 am – 11:30 am Salon F</p>	<p style="text-align: center;">Communications During Incidents Track 3 – Stakeholder Communications</p> <p>In response to an event at a nuclear facility, interoperability not only allows various groups to work closer, but it also facilitates a faster and more efficient means of communication. The panel will address current trends in communication and collaborative tools which can benefit all stakeholders while specifically reducing the burden on licensees.</p> <p>Session Chair: Melvyn Leach, NRC/NSIR</p> <p>Panelists:</p> <ul style="list-style-type: none"> - <i>Incident Response-Stakeholder Communications</i>, Holly Harrington, NRC/OPA - <i>Licensee Communications</i>, Walter Lee, Southern Company - <i>Welcome to Tomorrow: Recreating the Joint Information Center in a Virtual World</i>, Donald Maurer, State Emergency Management Office – New York <p>Session POC: Janelle Jessie, NRC/NSIR, tel: (301) 415-6775 e-mail: JRB6@nrc.gov</p>
<p>10:00 am – 11:30 am Salon G and H</p>	<p style="text-align: center;">Advanced Reactor Designs Track 2 – New Reactors</p> <p>This session will provide an overview of reactor technologies that are significantly different from current light water reactors and that are being considered for NRC review. This session will focus on the challenges for licensing these designs.</p> <p>Session Chair: Charles Ader, NRC/NRO</p> <p>Panelists:</p> <ul style="list-style-type: none"> - <i>PBMR Nuclear Power Beyond Electricity</i>, Edward Wallace, Pebble Bed Modular Reactor - <i>Research for the Next Generation</i>, Thomas O'Connor, DOE Next Generation Nuclear Plant (NGNP) Program - <i>Advanced Reactors: NUREG-1368 Applicability to Global Nuclear Energy Partnership</i>, Eric Loewen, GE Nuclear - <i>Global Nuclear Energy Partnership: Potential Regulatory Approaches for the Advanced Burned Reactor</i>, Robert Pierson, NRC/NMSS - <i>Getting Ready to License Next Generation Non-LWRs: What NRC is Doing Now</i>, Stuart Rubin, NRC/RES <p>Session POC: Charles Ader, NRC/NRO, tel: (301) 415-3256 e-mail: CEA@nrc.gov</p>

<p>10:00 am – 11:30 am White Flint Amphitheater</p>	<p style="text-align: center;">Emerging Issues: Materials/Mechanical Track 1 – Operating Reactors</p> <p>A panel session will be held by the Division of Component Integrity on "Emerging Issues (Materials and Mechanical Issues)," that will be chaired by Michele Evans, Director of DCI. The potential topics to be presented include: dissimilar metal butt welds, steam generator issues, OM Code comprehensive pump test issues and Research initiatives. The actual topics for this session will be finalized a few weeks prior to the RIC to ensure focus on issues of most current interest.</p> <p>Session Chair: Michele Evans, NRC/NRR Panelists: - <i>Introduction to Emerging Issues (Materials and Mechanical Issues)</i>, Michele Evans, NRC/NRR - <i>Dissimilar Metal Butt Welds</i>, Edmund Sullivan, NRC/NRR - <i>Steam Generator Issues</i>, Kenneth Karwoski, NRC/NRR - <i>OM Code Comprehensive Pump Test Issues</i>, Jack McHale, NRC/NRR - <i>Research Initiatives</i>, Bill Cullen, NRC/RES and Amy Hull, NRC/RES Session POC: Meena Khanna, NRC/NRR, tel: (301) 415-2150 e-mail: MKK@nrc.gov</p>
<p>11:30 am – 1:00 pm Grand Ballroom Foyer</p>	<p style="text-align: center;">Lunch Break and Poster Presentations and Table Top Displays</p>
<p>1:00 pm – 2:30 pm Salon B</p>	<p style="text-align: center;">Region I Track 7 - Regional</p> <p>Session Chair: Samuel Collins, NRC/R-I Panelists: - <i>NRC Perspective</i>, Bruce Boger, NRC/NRR - <i>Industry Perspective</i>, Dave Christian, Dominion Resources Session POC: Richard Barkley, NRC/R-I, tel: (610) 337-5065 e-mail: RSB1@nrc.gov</p>
<p>1:00 pm – 2:30 pm Salon C</p>	<p style="text-align: center;">Region II Track 7 - Regional</p> <p>Session Chair: William Travers, NRC/R-II Panelists: - <i>NRC Perspective</i>, Michael Weber, NRC/NRR - <i>NRC Perspective</i>, Loren Plisco, NRC/R-II - <i>Industry Perspective</i>, Jeffrey T. Gasser, Southern Nuclear Operating Company Session POC: George Hopper, NRC/R-II, tel: (404)562-4645 e-mail: GTH1@nrc.gov</p>
<p>1:00 pm – 2:30 pm Salon G</p>	<p style="text-align: center;">Region III Track 7 - Regional</p> <p>Session Chair: James Caldwell, NRC/R-III Panelists: - <i>NRC Perspective</i>, Elmo Collins, NRC/NRR - <i>NRC Perspective</i>, J.A. Stall, FPL Group Session POC: Roger Lanksbury, NRC/R-III, tel: (630) 829-9631 e-mail: JLC1@nrc.gov</p>

1:00 pm – 2:30 pm Salon H	<p style="text-align: center;">Region IV Track 7 - Regional</p> <p>Session Chair: Bruce Mallet, NRC/R-IV</p> <p>Panelists:</p> <ul style="list-style-type: none"> - NRC Perspective, Jack Grobe, NRC/NRR - Industry Perspective, William Campbell, Entergy Nuclear South <p>Session POC: Jeffrey Clark, NRC/R-IV, tel: (817) 860-8185 e-mail: JAC@nrc.gov</p>
2:30 pm – 3:30 pm Salon D	<p style="text-align: center;">Closing Session and Regional Wrap-up</p> <p style="text-align: center;">Jim Dyer, Director, NRC/NRR, and Regional Administrators</p>

附件二

NRC 主席 Dale E. Klein RIC 專題演講講稿



NRC NEWS

U.S. NUCLEAR REGULATORY COMMISSION

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March 13, 2007

**Statement of Dr. Dale E. Klein
Chairman, U.S. Nuclear Regulatory Commission
Keynote Address
19th Annual Regulatory Information Conference
Rockville, Maryland
March 13, 2007**

Thank you, Luis [Reyes]; and thank you for all you do to help the Commission and to maintain the excellence of the NRC staff and its work.

As I have noted on many occasions, I was very pleased to find, upon coming to the NRC, that the agency has a superb and hard-working staff.

I am pleased to participate in this, my first, Regulatory Information Conference.

Before I get to the substantive portion of my remarks, let me take this opportunity to thank my fellow Commissioners for their diligence and hard work in overcoming the latest challenge we've faced at the NRC.

Until a few weeks ago, the Commission was operating under a Continuing Resolution; that is, without a real budget authorization from Congress. Had this situation not been resolved, it would have had a crippling effect on our ability to carry out our core functions. But thanks to the unflagging efforts of the staff and my fellow Commissioners, Congress has promised us \$821 million to accomplish our mission. That is in line with the request sent to the Hill a year ago.

This was not an easy task. The senior leadership of the agency worked hard on this for well over two months. We talked to members of both the House and Senate, the Congressional leadership, and staff members on the relevant committees in nearly 80 meetings to explain what would happen if we did not receive full funding.

As I noted in a recent memo, all good things come to those who wait, providing you work like heck in the meantime. That was certainly the case here.

We are now able to move forward and work with all of you to meet the anticipated expansion of the nuclear power sector in a safe, secure and predictable way.

I've been on board about nine months now, and aside from quite a few trips to Capitol Hill, I have spent a fair bit of time going out and talking to various stakeholders to explain my priorities and vision for the Commission. I would like to recap these points briefly, and then I want to address one very significant matter that I think we should get out in the open here at the beginning of the conference.

One of the most important themes I have been stressing is the need for the NRC to be a strong, credible, and consistent regulator. No less a figure than James Madison addressed this subject in the *Federalist Papers* — that famous series of essays which serve as a kind of “user’s manual” for the Constitution. Madison explained that stability and predictability in the law would, quote, “inspire a general prudence and industry, and give a regular course to the business of society.”

As a regulatory body, the NRC does not serve as an advocate for or against commercial nuclear power generation. Rather, I think that the industry and the general public should have a reasonable expectation of timely regulatory decisions based on good science and high quality engineering practices.

We will hold our licensees accountable. We will articulate our requirements clearly. We will be demanding and we will be responsive to their legitimate needs and concerns. All stakeholders in the nuclear industry — the financial community, and especially the public — must be made aware of the status and progress of issues of interest to them.

In short, my goal is for the NRC to provide, to the maximum extent possible, the regulatory oversight and stability needed for this rapidly expanding, technologically complex and capital-intensive industrial sector. In this way we can help give “a regular course” — to use Madison’s phrase — to the coming nuclear renaissance.

This recognition that the nuclear power sector is on the cusp of significant growth leads me to two other topics I’ve been addressing. They concern what I see as significant pinch-points for future growth.

The first involves the manufacturing sector. As we confront the prospect of a global nuclear expansion, the companies that will make those multi-billion-dollar orders must make critically important decisions as to where to buy their systems and components. Clearly, much of the technological capability to supply their needs now rests outside the United States. And many of the world’s nuclear manufacturers are now operating at capacity; right now, the lead time for delivery of reactor vessels is upwards of four years, and other key components have equally long backlogs.

In the face of those long lead times, nuclear projects will need to get in line and scour the globe for available components and materials.

The NRC has in place the rigorous inspection programs needed to ensure the quality and authenticity of the components that go into plants built in the United States. However, we cannot ensure the quality of the materials used globally, and if use of substandard materials should lead to a high-profile event anywhere in the world, the nuclear industry worldwide would suffer.

Whatever this country does, it is clear that nuclear power is growing elsewhere in the world. This world-wide demand for components, along with the consideration of nuclear power to meet our own energy needs, may serve as a springboard to rebuild U.S. technology and manufacturing capabilities. A revival of domestic production could help return the United States to something approaching the leadership it once enjoyed, while also facilitating the NRC's inspection process.

But this kind of growth won't be possible over the long haul unless we address the second pinch-point, which is the need to prepare the next generation of construction workers, engineers, technical workers, and managers.

A 2001 nuclear industry survey estimated that demand for nuclear engineers through the end of the decade would be about 150 percent of supply, and the need for radiation protection professionals would be about 160 percent of the supply. That survey predated the recent movement toward new reactor planning, and I'm told the next industry survey, due out later this year, will show an even more acute shortage of candidates to fill the waiting jobs.

I ask this audience the same questions I have asked others: Where are we going to get the educated and skilled workers to safely run the current fleet over extended lifetimes and the potential nuclear plants of the future? Where are they being educated? Where are they being trained?

The NRC alone will increase staff by a net of 200 professionals each year through 2008 to handle the increased workload of new plant applications and other business. The U.S. Department of Energy, the national laboratories, NASA and other government agencies will also have personnel needs.

None of our interests — not to mention the national interest — is going to be well served if we spend our time and money chasing after a limited number of candidates. Instead of bidding against each other, all of us — industry and government alike — must focus on an intensive nationwide effort to expand the base of qualified people.

The nuclear industry is working on many fronts to address this critical need. It has launched major programs to provide scholarships, training programs, and recruitment drives. For instance, you may have read last week about the announcement by General Electric that they are donating \$175,000 to kick off a new program in nuclear training at Cape Fear Community College in North Carolina. On a similar note, First Energy in Akron, Ohio, is providing funds to two local colleges to create an educational "pipeline" for future employees at its plants near Cleveland and Toledo.

These contributions to workforce development are invaluable; but this is still an enormous challenge that will require even more concerted effort by people at the highest levels.

You may know that I spent some time working at DOD. While I was there I was impressed by the process through which the military develops its senior officer corps. I believe that there would be of great benefit for the safe and effective operation of nuclear power plants if the industry had something like a Command School for a nuclear energy equivalent of Flag Officers — a structure that brings up-and-coming managers together in an organized way and gives them the big picture. Such a program for developing a cadre of well-trained executives might look for inspiration to a place like the National Defense University, which — to quote from their mission statement — addresses "national and international security challenges through multi-disciplinary educational programs, research,

professional exchanges, and outreach.” Substitute “nuclear energy” for “national security” and you have some notion of what I am suggesting.

That is, of course, just one idea — which builds on the good work already being done by INPO, the Institute for Nuclear Power Operations. What we really need, however, is a comprehensive approach through every level of education in the country, starting with a commitment to get elementary and middle school children interested in science and engineering.

In fact, I believe this is a challenge that not only cuts across the whole spectrum of education, but also extends beyond the United States’ borders. The same need to address future workforce issues is likely confronting other countries with mature nuclear industries whose workforce, like that of the United States, may be aging.

And there are other issues that we can extrapolate worldwide. The U.S. nuclear industry has restored itself by sharing knowledge to improve performance. Lessons learned from that experience can and should be applied internationally. Open cooperation in standardizing design and applying best practices will help to set new and higher standards of safety and operating efficiency for nuclear facilities worldwide.

That is, of course, the intent of the Multinational Design Evaluation Program. I am going to be on a panel tomorrow with my French counterpart, ASN Chairman André-Claude Lacoste and Javier Reig, of the OECD Nuclear Energy Agency, where we will discuss this subject in greater detail. But let me say a word this morning about why this is such a significant topic.

The reality is that the NRC and other regulators are already becoming in many respects *de facto* international regulators. The nuclear power industry is now an international one, from the upstream mining of the uranium ore, through nearly all the downstream steps of the fuel cycle. So when I talk about international cooperative efforts like MDEP, it isn’t just nice-sounding rhetoric, it is a substantial and important element in our portfolio of responsibilities right now. Our focus must be on making international cooperation a more systematic and explicit part of what we do.

So in addition to maintaining various bilateral nuclear safety exchanges and participation in multilateral organizations such as the IAEA and the Nuclear Energy Agency, I foresee intensified international efforts related to the licensing of new nuclear power plants and fuel cycle facilities, as well as with enhanced controls of nuclear and radioactive materials. I believe that these new challenges will require strategic rethinking of how the NRC approaches its international activities, including the development of mutually beneficial and innovative programs to leverage the knowledge and experience of our regulatory peers throughout the world.

Unlike this previous generation of reactors, the majority of plants to be built around the world in the next five to 15 years will likely be limited to a small number of relatively standardized designs, purchased from a limited number of multinational corporations.

Through MDEP, we are undertaking an international effort to define the terms of how we plan, design, build and regulate nuclear power plants. Different nations may have different ideas of “adequate protection”; but I believe it would be an understatement to say that we should all agree on a standard set of metrics, in the sense of consistent definitions of terms. For lack of a better metaphor, I

would say that it doesn't matter what color we paint the concrete, as long as we agree on the same standards of concrete's strength, consistency, etc.

While the first step of MDEP focuses on the planned design reviews associated with the AREVA EPR reactor, the next phases can move us toward leveraging the knowledge and experience of regulators around the world and providing a catalyst for convergence of associated codes, standards, and regulations.

My hope is that we can eventually extend these efforts on standardized licensing and design of reactors to other stages of the fuel cycle, including even a global regulatory framework for waste disposition.

I also believe programs such as the Global Nuclear Energy Partnership could make the disposal of spent fuel and high-level waste easier to resolve. At some point, this country will likely need to reconsider recycling spent fuel. And if the GNEP vision is realized — which will require, I should add, clear codification into laws and regulations — it would modify the material ultimately designated as high-level waste. That waste will still require disposal, and I believe that the safest long-term option remains a stable geologic repository.

As you know, there are some who question the development of new nuclear power plants in the United States without resolving the repository issue. I would point out that there are already some 70,000 metric tons of spent fuel in the United States. That material will not go away just because no new plants are built. This is an issue that must be addressed worldwide, regardless of the course the nuclear renaissance may take in the United States.

And whatever the outcome, the NRC will continue to rigorously regulate the onsite storage and management of spent fuel. And as I see it, the current lack of a permanent repository or recycling option is not a barrier to the licensing of new reactors.

Another area in which I believe everyone can benefit from greater standardization is with respect to establishing common threat parameters. Unless the international community addresses the terrorist threat in a consistent way, we will continue to send mixed signals to each other, to the manufacturing sector, and to our partners in the national security and law enforcement communities.

So the time to discuss this topic is now. It is a next step in the process of ensuring the safety and security of nuclear energy.

Whatever the outcome of this debate, however, I want industry and, above all, the public to know one thing for certain: The NRC will provide clear and consistent guidance that establishes high standards of safety and security.

These complementary and critical goals of safety and security require unflagging commitment from all of us. For our part, the NRC will be a strong and independent Commission, and we will continue with the hard work of creating the needed framework of regulatory stability. In turn, we expect that the manufacturers, builders, and operators of current and future plants will meet their obligations to the public as well. In this way, with all of us doing our jobs, nuclear energy will continue to play a valuable role in our nation's energy future.

Thank you for your attention. I will be happy to take some questions.

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附件三

NRC 委員 Jeffrey S. Merrifield RIC 專題演講講稿



NRC NEWS

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No. S-07-008

“You Ain’t Seen Nothin’ Yet”

**The Honorable Jeffrey S. Merrifield
Commissioner
U.S. Nuclear Regulatory Commission**

at the

**2007 Regulatory Information Conference
Rockville, Maryland**

March 13, 2007

As many of you already know, I made a decision last October that I would not seek a third term as a Commissioner of the Nuclear Regulatory Commission. As a result, this will be my ninth and final Regulatory Information Conference as a Commissioner of the NRC.

And what a time it has been. I believe that I have given the NRC staff many challenges and they have more than met my expectations. When I came to the Commission in October of 1998, we had not issued a single license renewal for any one of our nation’s 104 reactor fleet. Today, we have renewed the licenses of close to 50 reactors, and absent some unforeseen circumstance, it appears that within a handful of years all 104 will either be allowed to continue to operate for 60 years or be in various stages of review.

Despite the fact that we had issued three design certifications by 1999, I was still very much on a limb at the 2001 RIC when I postulated that “new nuclear plant orders may become a reality in the near future.” During the late 1960s, the nation’s utilities rapidly increased their orders for nuclear power stations, participating in what Philip Sporn, past president of American Electric Power Service Corporation, described in 1967 as the “great bandwagon market.” Today, we have the potential for 32 new reactors at 23 sites. If that is not a second bandwagon, I don’t know what is.

I asked the staff to consider new ways to approach decommissioning and they have made great strides. Consequently, we have a much better handle on our legacy waste issues than we did nine years ago. The lessons that we and our licensees have learned in this process will be of tremendous

assistance when the as-yet-unbuilt reactors prepare for decommissioning late in the 21st century.

Our legal process, which was under some stress when I first got here, is far more disciplined under our new Part 2 procedures. Possessing a cadre of new, well trained judges, we are far more prepared to handle new license applications than we were just a few short years ago. And with the new alternative dispute resolution process that I championed, I believe that the NRC will have better outcomes and less litigation in our enforcement process.

We are a more risk-informed agency. The reactor oversight process that we deployed just a year after my arrival has had a striking success in enhancing our oversight of the nation's reactors, yet in a manner that is more open, less contentious and less burdensome. The issue of fire protection, which has been a nettlesome issue for this agency for decades, will be put to bed through the deployment of the risk-informed fire protection program – NFPA 805.

Our international partnerships are as strong as they have ever been. Whether it is the relationships with our neighbors to the north and south, or our allies across the Atlantic and Pacific, the multinational efforts that we have enhanced during my time on this Commission make us a better and more informed regulator. Through our partnership with the International Atomic Energy Agency, the world's nuclear fleet is stronger and safer than it was just a mere decade ago.

In a world where global terrorism is a reality, we have made tremendous strides in understanding better than ever before the real safety and security risks associated with the materials and facilities we regulate. The nuclear fleet we oversee was the most well-defended element of the civilian infrastructure prior to the terrible events of September 11, 2001, and it remains so today.

Finally, I am proud of how this agency has grown in its ability to communicate. Whether it is meeting with the public, welcoming the world through our Web site, or engaging in our daily dialog with the media, we are less reluctant and more articulate in our ability to communicate about who we are and what we do. Having led the NRC Communications Task Force some years ago, I am proud of the work that this agency has accomplished in spreading the word about what we do to protect people and the environment.

These have been real measurable achievements that have transformed this agency and its reputation. It was the work of a highly talented and motivated staff, and a series of Commissioners who have dedicated themselves, one and all, to doing what they thought best for public health and safety. While there is much left to be done – Part 26 being one that I would like to finish before I leave – I would like to turn my attention today to what I believe are some of the more significant challenges that lie ahead for my successors on this Commission.

New Plant Orders

One of the clear mantras that we have here at the NRC is that we are not supposed to be promoters of nuclear power. I have worked hard to maintain this position as a Commissioner, and I don't intend to do anything different today. However, the environment in which we find ourselves is changing. The issues of global warming and the role that nuclear power can play in addressing this significant environmental challenge are becoming increasingly intertwined. Today, global warming is viewed as the number one environmental issue around the world. Yet, while well-reasoned scientists

may debate its origins and causes, no matter where you travel around the globe, there is general consensus that we have a problem and we need to do something about it.

Clearly, conservation must play a major role in limiting human carbon output. While alternative energy sources such as wind power and solar power also have a role to play, the fact remains that as far as large base load generating capacity is concerned, nuclear power is the largest carbon-friendly source that is technologically deployable at the current time. I will not comment on whether that is a good or bad thing, but it is a fact.

Many of my Republican brethren may not like to hear me say this, but *I believe that it is inevitable that our government will act to address global warming by enacting either a carbon tax or a cap-and-trade emissions program.* Either way, the concurrent result is that nuclear generating assets will become more attractive from both an economic and environmental point of view. One way or another, we will have new nuclear plant orders in this country.

I believe that in the next 20 years, assuming continued safe operation, we could at least double the number of nuclear power plants we have in this country. If I am correct, there is a lot this agency will need to do to prepare.

Over the course of the last four months, I have led an NRC task force comprised of 10 senior managers and staff in this agency who have been looking at how we can be more efficient in our combined operating license review process. While I do not intend to go into detail regarding the results of this task force, there are three areas I would like to touch on as it relates to new plant orders.

First, having reviewed our programs, it seems clear to me that our agency has been extremely diligent in meeting the requirements of the National Environmental Policy Act (NEPA). Like many other agencies, the environmental impact statements associated with new reactor orders have grown to the size of a Manhattan phone book and leave literally no stone unturned. In contrast to Council of Environmental Quality regulations, which recommend that most environmental impact statements be fewer than 150 pages, our recently published environmental impact statements for early site permits and uranium enrichment facilities have been over 1,000 pages. That is not to ridicule or criticize our environmental staff, who I believe have worked tirelessly to ensure that the environment is protected in what we do. However, *I believe the NEPA process we have engendered is far too time intensive, too focused on potential litigation, and goes far beyond what Congress expected or required under NEPA.* While our task force will make specific recommendations, I believe the Commission will need to act to bring greater timeliness and efficiency into our environmental review process.

Second, *I believe that our mandatory hearing process is broken.* While the Atomic Safety and Licensing Board (ASLB) has made a good faith effort to create a mandatory hearing process, I believe that the scope and depth of their sufficiency review goes far, far beyond what Congress expected when this requirement was first adopted in 1954. Given the openness of our process in this day and age, *I believe Congress should repeal the requirement for a mandatory hearing.* Absent this change, the Commission should take direct responsibility for these reviews. Using the recent Browns Ferry 1 restart meeting as a model, *I believe the requirements for a mandatory hearing could be fulfilled by a single three-to-four hour meeting of the Commission.*

Third, while our staff has made significant progress in creating a detailed technical review

process for combined operating license applications, *the COL technical review process remains too long and too cumbersome*. While it is the obligation of our licensees to craft high quality applications, we need to add discipline to the process to ask penetrating and detailed questions in an efficient and timely way. *I believe that after the first handful of COLs are issued, we should have a target of a 24- to 26-month review for an application - beginning to end - including the hearing process*. This will require discipline by our staff, efficient environmental and safety reviews, rigorous adherence to hearing timelines by the ASLB, and most importantly, strong Commission leadership.

License Renewal Process

The next topic I will address this afternoon is license renewal. Beyond our reactor oversight process, this is the most important and successful program that the Commission has overseen during my time here on the Commission. While the first license renewal applications took the NRC staff over 36 months to complete, more recently we have been averaging these reviews in about 22 months, if there is no hearing. I believe this is a notable achievement, and a testament to the discipline and efficiency that our staff and senior managers have invested in this program.

Now that we have completed the 20-year license extension of almost half of our current fleet, I believe we need to begin the process of fully understanding what it would take to allow a further round of 20-year license extensions.

While we already have preliminary information from our Office of Regulatory Research that the pressure vessels of the existing fleet can likely be safely utilized for 80 years, we need to have a more detailed understanding of what it would take to conduct a further extension. To what extent would buried piping or cabling need to be replaced? Would changes in instrumentation and control equipment be justified or needed? Would replacement of emergency diesel generators be prudent? Early answers to these questions could have a significant impact on the investment decisions made by our licensees.

One of the major outcomes of our license renewal program is that it has created a strong incentive for many billions of dollars in investments for items such as new vessel heads, steam generators, pressurizers, injection pumps and other major capitol improvements. Long-term financing has made it much more viable for utilities to justify major upgrades and improvements in these units. A further 20-year license extension would provoke the same result.

While it may make economic sense to relicense all of the plants in our existing fleet, we need to have a better understanding of the technical merits of this issue. *In my view, the vast majority of nuclear power plants in the United States could be serious candidates for license extension for up to 80 years of operation, and I believe the NRC must prepare itself to consider that question.*

High-Level Waste

The next topic I want to talk about is the issue of high-level waste.

It is most unfortunate the amount of time and money this nation has invested in finding a final repository for used fuel. I have to say I am somewhat tired of hearing people say that we haven't found a "solution" to this problem. Clearly, we know how to reprocess spent fuel, as we invented that process here in the United States as part of the Manhattan Project. Clearly, we know how to dispose of the used

fuel in a repository. Indeed, given the time and money we have spent studying Yucca Mountain, I think this country has a pretty darn good idea how used fuel will react over a very long period of time.

The fact is that we have a political issue. Fair or not, in 1987 Congress voted to hand the hot potato to Nevada, and the state has been fighting tooth and nail against a fuel repository ever since. As a Commissioner, *I have not been given one fact that would lead me to the conclusion that Yucca Mountain could not be licensed as a repository for spent fuel.* But, since I will be long gone from here when the final decision is made, my views are academic at this point.

One area we need to change course is management. DOE does an outstanding job overseeing the stewardship of our nation's nuclear stockpile, and our national labs take a backseat to no one in their pursuit of science and technical breakthroughs. However, *it was a terrible mistake to saddle the Department of Energy with the Yucca Mountain Project.* What this effort needed was sound project management focused on meeting specific timetables and deliverables in an atmosphere more insulated from shifting political winds. This is something that DOE simply is not good at. I agree with a point that Commissioner Ed McGaffigan made recently: We need to follow the course of our counterparts in Sweden and Finland and create a private/public partnership to bring this issue to a final resolution.

What is important to remember about this used fuel is the matter of time. The spent fuel storage cask technology we have deployed at 28 of our 65 nuclear sites around the country is sufficient to hold this spent fuel safely in excess of 100 years. To those who say new plants can't be built without "solving" the spent fuel storage problem, I say "hogwash." *Whether it is new plants or old, we can safely store the fuel at existing or new sites throughout the lifetime of both current and future nuclear units.* This will give our nation sufficient time to resolve whether we will store spent fuel in Yucca Mountain, reprocess the fuel and dispose of the remaining high level waste, or identify some new repository in the future. Time is indeed on our side.

International Partnerships

I have been fortunate to visit 36 countries as a Commissioner of the NRC, including 30 of the 31 countries that operate nuclear plants. I have seen first hand the impact that our agency and our partners at IAEA have had in improving the state of nuclear regulation worldwide. I was pleased to have represented our country at the last Convention on Nuclear Safety, and it was with great pride that I was able to explain the steps that the NRC has taken to protect the use of the atom in our country.

A few things have become quite evident to me given the interactions I have had over the last nine years. First, there is a great desire for our international partners to learn from what we have done here at the NRC, and increasingly, our more experienced partners have more to offer us in return. Second, nuclear regulators around the world, particularly in Eastern Europe, have made great strides in improving their capabilities over the last 10 years. Third, there is a burgeoning number of countries that have announced that they are interested in exploring the use of nuclear power.

Thailand, Vietnam, Malaysia, Indonesia, Burma, Venezuela, Chile, Poland, Estonia, Italy, Belarus, Turkey, Egypt, Israel, Namibia, Nigeria, Jordan, Qatar, and Morocco are among the countries that have announced that they may want to join the nuclear power family. IAEA has taken steps to reach out to many of these countries to help provide credible regulatory bodies, and I applaud the leadership of Mohammed ElBaradei for this effort. However, in my personal opinion our country needs

to do more. *The NRC must take an increased role in promoting strengthened nuclear regulators worldwide.*

President Dwight Eisenhower launched the Atoms for Peace program in 1953 to foster increased cooperation among countries around the world through the peaceful use of the atom. The burgeoning interest in nuclear power today is a direct outgrowth of Eisenhower's vision. As such, our country has a moral obligation to lend a helping hand to regulators in those countries that seek the benefits of this technology. In my view, *Congress should provide the NRC with additional funding off the fee base to allow this agency to take a more proactive role in assisting our regulatory counterparts worldwide.* Nuclear safety should not take short shrift in the foreign aid our country provides, and I hope future Commissioners and our counterparts in the State Department will see the wisdom of this view.

Conclusion

As I stated in the beginning, it has been an exciting time to be an NRC Commissioner over the last nine years. As a result of the effort that my fellow Commissioners and I have made over this period of time, we have created an institution that is second to none in its pursuit of excellence in the field of nuclear regulation. We have enjoyed unprecedented improvement in the operation of the plants we oversee, and with the significant achievement we have made in license renewal, our nation will enjoy the use of this carbon-friendly power generation for decades to come. Today, we are confronted with an extraordinary level of interest in building new plants, which I believe could result in a doubling of nuclear power generation in the United States over the next 20 years. Combined with this effort, the agency will have its work cut out for it to prepare to deal with the potential for an 80-year license term, as well as the next steps on the long road toward resolving the spent fuel issue. When I leave the Commission in June, it will be with the satisfaction that we have accomplished much as an agency, and I believe that I and the Commissioners I have served with will have laid a very solid foundation for the future of this agency and for the safe and peaceful use of the atom in our country. While the face of the Commission will change, I am very proud of my service and contribution to this agency, and hope that it will do as well in the future as it has done over the last nine years. Thank you very much.

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NRC 委員 Peter B. Lyons 專題演講講稿



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Asking the Tough Questions – Making the Tough Calls: Regulatory Issues in Challenging Times

**Dr. Peter B. Lyons, Commissioner
U.S. Nuclear Regulatory Commission
at the**

**19TH Annual NRC Regulatory Information Conference
March 14, 2007**

It is a pleasure to be participating with all of you - Chairman Klein, fellow Commissioners, NRC staff, industry and public stakeholders, and international visitors at this Regulatory Information Conference (RIC).

This is the third time I have participated in and addressed the RIC. Just as in the last two times, I'm tremendously impressed with the breadth and diversity of topics addressed here, as well as with the depth in which subjects are analyzed. All of the participants in this Conference have my compliments and thanks for your outstanding contributions. I especially want to recognize the efforts of the NRC staff in the planning and execution of an excellent Conference.

Today, plant safety performance is good; the Continuing Resolution was resolved to provide new financial resources to the NRC; plant security challenges have been met; many challenging licensing issues were resolved with appropriate attention to safety in a timely way; and a strong NRC recruitment program is demonstrating success. But in spite of these positive realities, these are very challenging times for the NRC and the industries relying on nuclear technologies. Some of these challenging areas that have required us to ask the tough questions and make the tough calls include:

- Retaining an unrelenting focus on the safety and security of all operating plants, while preparing to concurrently review any license applications for new plants and overseeing new construction activities to assure the safety of any future generations of plants.
- Evaluating issues associated with plant aging that may present potential challenges to safety.

- Continuing to remain as transparent as possible in our actions and operations. Public and Congressional stakeholders remain very interested in the NRC's discharge of its responsibilities, interest that can certainly be positive but also challenging.
- Fulfilling our human capital needs. We have the fiscal resources to succeed in a possible nuclear renaissance, but adequate funding alone does not guarantee success. We must continue to hire capable, new technical staff; train them to accomplish the Agency's missions; provide them with a professional work environment; challenge them with interesting assignments; and retain them.
- Continuing national discourse on security issues.

I'll focus my remarks today on safety, security, and human capital, areas of emphasis that I've used in past RIC speeches. These areas continue to represent the greatest challenges for the Agency and will remain my focus. In addition, I'd like to discuss the role of international interactions and some new insights I have developed.

Safety

Safety of the existing NRC-regulated reactor and materials licenses, along with about 17,500 materials licenses regulated by the Agreement States, continues to be my top priority. Today, in the United States, reactor safety performance continues to be sound, with a low number and generally low severity of plant events. Safety performance measures, including performance indicators and inspection findings, are strong for most plants.

Of course, these measures of performance are only manifestations of something much deeper: commitment. It is essential that both the entities we regulate and the NRC itself remain continuously committed to safety and maintaining the technical competence to achieve it. Commitment to safety requires a "top down" focus. It must be reflected in the vision and expectations for success by licensee's management and modeled to their staff through actions to place safety ahead of profit. Commitment to safety means that everyone in the nuclear field must understand the safety implications of his or her job and be personally dedicated to maintaining that safety.

When we discuss commercial nuclear power plants the phrase "reactor safety," refers to plant design and operational characteristics that provide protection against design-basis accidents and features to mitigate beyond-design-basis severe accidents and to the training and capability of the operators at the controls. Thus, reactor safety embraces systems, structures, and components; programs, practices, and procedures; and knowledge, skills, and abilities. It also includes a factor not always measurable in numbers, but, nevertheless, crucially important: safety culture. Safety culture is what drives an organization's commitment to safety. Safety culture extends well beyond equipment and procedures; it includes questioning attitudes and resulting conservative decisions, asking the tough questions and making the tough calls.

I've been pleased to note excellent progress on initiatives addressing safety culture at the operating nuclear power plants in this past year. Through the staff's extensive involvement of stakeholders, the Agency has enhanced the reactor oversight program to include evaluation of safety culture. This new feature is being implemented at our nuclear power plants to assess any indications of a weakening safety culture. Feedback from the initial use of these evaluations should be invaluable as we "fine-tune" this vital initiative.

As an Agency, we need to encourage more attention to safety culture beyond just reactors. All too often, I read of accidents or incidents involving medical and industrial users of risk-significant sources. Focus on a strong safety culture is just as important for these non-reactor licensees. Between the NRC and the Agreement States, we need to find better ways to encourage the materials licensees to maintain a strong safety culture.

In addition to our progress on the safety culture program, I want to highlight the Agency's progress on the operating experience program and on implementation of a strong lessons-learned program. As I've visited plants over the last year and talked with licensees, I've been pleased with the respect in which they hold our operating experience program and the benefits they cite from the insights the program provides. Just as we expect licensees to institutionalize lessons learned, the NRC must do the same. To that end, this past year has seen the initiation of an important new NRC program to do just that.

Next, I want to provide special mention of the very informative and detailed report our staff prepared comparing the safety-related activities conducted as part of the Independent Safety Assessment of the Maine Yankee plant and the activities now conducted as part of our Reactor Oversight Program or ROP. This report clearly demonstrates to me that we are accomplishing the necessary safety oversight activities through the ROP. This is an excellent testimonial to the evolution in our ROP and the Agency's focus on continuous improvement.

Improved safety was also noted this last year as two plants exited from Column 4 of the ROP, although unfortunately one plant moved into Column 4. Through the Institute of Nuclear Power Operators and their own internal programs, licensees must strive to demonstrate strong performance that does not require the additional oversight that the Agency provides for plants with indications of degraded safety performance. But the public should be reassured that where the performance of a plant warrants further intervention, the NRC is ready to provide that additional effort.

Our staff's focus on safety was also highlighted this year by the effort invested in activities associated with the restart of Browns Ferry 1. This strong effort should further reassure the public that this Agency will not compromise safety. At the Commission briefing on this subject, we heard that 13,000 hours were invested in review of the license amendment with another 8,000 hours expended on review of generic letters, bulletins, and applicable special program requirements. In all, 50,000 staff hours were invested in both the licensing reviews and the inspection program. This substantial effort exemplifies the Agency's focus on safety and serves as a test bed for new plant construction. While

construction of new plants is anticipated to follow paths quite different from Browns Ferry 1, these activities are now providing an opportunity to strengthen our construction inspection capabilities.

And as you well know, there are continuing challenges with the operating plants. For example:

- Questions still remain on the potential extent of chemical effects on sump performance and on fuel pin cooling. Plans for larger sump areas are now in place with increases in sump area typically well over a factor of 10. While plants are now in the process of making these improvements, we must continue to ask the tough questions regarding potential chemical effects.
- The recently discovered circumferential weld faults at Wolf Creek were not expected by the Agency or by industry. I'm pleased that industry has stepped up its surveillance and refurbishment activities to ensure that no such weld faults compromise safety at any of our plants.
- Grid stability remains a challenge as our nation's electrical grid continues to experience seasonal stresses due to transmission bottlenecks and the need for additional new generating capacity. Increased interactions between the Federal Energy Regulatory Commission (FERC) and the NRC are helping to assure that grid issues are foreseen and minimized.
- Also, emergency planning communications and coordination remain a challenge. Coordination of on-site and off-site responses through interactions involving the local, state, and federal response capabilities is a complex multi-dimensional program. As one excellent example, in the last year I visited the Waterford plant for discussions about its emergency planning and its relevance during Hurricane Katrina. The activities at Waterford, in coordination with the emergency planning team of St. Charles Parish, and their careful response to the challenges associated with Hurricane Katrina demonstrate the benefits that can accrue to an entire community through careful planning of responses to potential safety challenges.

In closing my comments on safety, I want to reiterate that the NRC's and industry's greatest continuing, shared challenge related to maintaining safety is to avoid complacency at any level. It's fine to congratulate ourselves on another year of excellent safety performance for nuclear power plants, but we should occasionally remind ourselves of the severe degradation of the Davis Besse pressure vessel and its root causes of complacency and inattention.

In addition, I want to again commend the NRC's licensing and inspection staff and to specifically acknowledge the resident inspectors for their "front line" vital role in asking the tough questions regarding the safety of our nuclear power plants and fuel facilities. With each of my visits to sites, I've spent time with the resident inspectors. They have immense responsibility, and I've been most impressed with the skill and dedication they bring to their jobs. Their daily contributions and those of all the NRC staff are essential to the Commission's ability to assure the American public of adequate protection of public health and safety.

Security

Turning now to the topic of security, I continue to focus attention on the security programs at every nuclear power plant and other sites that I visit. While implementation of security enhancements differs from site to site, I am convinced that appropriate actions have been taken at every site since 2001 to greatly enhance security.

Our cooperation and coordination with other federal agencies increased significantly this year. As an Agency, we've worked with the Department of Homeland Security (DHS) on each of its Comprehensive Reviews, or CRs, of nuclear power plants. To date, 47 out of 65 CR site visits have been completed. Of course, DHS is conducting CRs at many other critical infrastructure sites around the country. In my view, the nation will derive the full benefit of the CR process as the Department completes its work across all sectors of critical infrastructure such that appropriate evaluations of risk and required response can be determined for the full spectrum of sites.

In the course of each CR, the plant's defenses in coordination with off-site response capabilities are evaluated for a wide range of possible terrorist scenarios. The combination of the CR process of the DHS and the Design Basis Threat process of the NRC should be viewed as an integrated national evaluation of the ability of each plant to withstand terrorist attack.

Security at any element of our nation's critical infrastructure should be evaluated as part of our integrated capabilities to defend this nation. No one element of our critical infrastructure can or should be expected to defend itself in isolation. Our intelligence, military, state and local capabilities work together to provide integrated, multi-dimensional, barriers to any individuals or groups working to harm our nation. With this view as a background, I regard the stronger coordination between the NRC and the DHS to be a very positive enhancement in the security of our citizens.

Plant security continues to be regularly tested at every nuclear power plant through drills conducted by the licensee. In addition, we exercise the NRC DBT through the force-on-force exercises, and I'm very pleased that the 21 plants that were subjected to this exercise in Calendar Year 2006 performed very well against very capable and creative mock adversaries. Specifically, in no case last year did the mock adversaries succeed in accessing a critical target set.

The Commission moved in the last year toward codification in regulations of some of the Orders issued in the post 9/11 days. These actions, including the most recent change to Part 73 on the Design Basis Threat, are positive steps that enhance the security requirements for all commercial power reactor licensees in a very deliberative manner, contributing to stability.

The Commission has also wrestled with the issue of the extent to which new plants should incorporate features against the impact of a commercial airliner. For the existing fleet, the Agency has carefully evaluated potential vulnerabilities and required many actions from our licensees to mitigate this possible threat. While the existing plants are adequately prepared, we have an opportunity with new plants to design more of the protective features into the plants from the start and to require fewer mitigative actions from the operators in response to such threats. In my view, it is appropriate and

consistent with our approach to beyond design basis severe accidents to ensure new plants provide this protection with reduced reliance on operator actions.

Security issues are not solely focused on reactor licensees. Both the NRC and the Agreement States continue to issue enhanced security requirements for licensees authorized to possess certain types and quantities of radioactive materials. The NRC and the Agreement States inspect and enforce the requirements for their licensees. The Agency should continue to coordinate with the States to assure consistent implementation of security requirements.

In addition, many of the requirements from the Energy Policy Act of 2005 have a security nexus, and the Agency has made progress toward implementation of its provisions. We've implemented, after consultation with the Justice Department, Section 653 that enabled use of heavier weapons by the plants' guards. We've implemented Section 652 related to fingerprinting and background checks for those with access to Safeguards Information, and we are implementing Section 652 related to fingerprinting requirements for individuals with unescorted access to radioactive material quantities of concern.

Human Capital

Human capital issues were one of my primary concerns as I joined the NRC, and they remain so today. Nuclear technologies continue to benefit us in many ways and, therefore, will continue to be a critical focal point of many national security, foreign, energy, and environmental policies for the foreseeable future. With this assumption, it follows that we require an educated, well-trained work force. Although we are making some progress in this vital area since I last addressed the RIC, far more work is needed.

Focusing specifically on the nuclear energy needs, the employment outlook has certainly gyrated during my professional career. I remember the enthusiastic, optimistic days of the 1960s and 1970s. By 1974, the government had approved operating licenses for 52 nuclear reactors with plans for dozens more to be built. However, several events in the 1970s, including Three Mile Island, contributed to cancellation of the application process for 93 reactors. In 1997 when I joined Senate staff, I was appalled to watch the nuclear R&D program receive zero budget authority in the 1998 fiscal year.

How times have changed! With a forecast for 50 percent growth in electricity consumption by 2030 and increased recognition of the potential impacts of global warming, the industry projects strong growth. But in a December 2006 report, the American Nuclear Society (ANS) estimated that almost one-third of the current nuclear workforce will reach retirement in the next 10 years. The report notes that the Department of Energy (DOE), the national laboratories, other federal and state agencies, nuclear technology companies, and university nuclear engineering departments are currently experiencing a significant shortage of qualified people for new hires. The report further recommends that the U.S. government, specifically the DOE, serve as steward for national nuclear research and educational enterprise. I could not agree more strongly with the view of the ANS that the DOE must

provide this support.

The human capital needs of many federal, state, and local government agencies, as well as medical, manufacturing, research and development, and energy industries, for an educated and well-trained workforce are widely recognized. The Nuclear Energy Institute (NEI) estimates that 26 percent of engineers working in U.S. nuclear utilities will be eligible for retirement in the next 5 years.

The NEI also estimates that 90,000 entry-level workers will be needed to support existing industry operations through 2011. That figure doesn't include the workers needed to supply the materials for any new plants and then to build the plants themselves. After construction, additional workers will be needed to staff those new units. Furthermore, this is not just a phenomenon in the United States; many countries are planning major expansions of nuclear power, and some of the workers they need may be attracted to relocate from our nation.

The National Organization of Test, Research, and Training Reactors has noted the decline in the number of research reactors for more than 20 years. The number of university and non-academic-based research reactors has fallen from 63 facilities to the current number of 27. I strongly support the ANS report, which emphasizes that the DOE must continue to monitor these facilities and provide support to assure long-term strength of the national educational infrastructure for nuclear science and engineering and related fields, like health physics.

I can highlight this last point by my experience in Australia a few months ago. I had the opportunity to tour its new OPAL reactor, built by INVAP of Argentina. That reactor is far more modern than any research reactor that I've seen in this country. The OPAL reactor is the type of facility that we should have in this country to encourage new students to explore nuclear engineering and related specialities. Most of the research reactors I've seen in this country do not have the modern instrumentation and high technology that will interest new students in this profession. There is no federal agency other than the DOE that can rectify this situation.

In preparation for our expanding workload, the NRC plans to hire about 300 new technical staff a year through 2008. Through outstanding staff efforts, the NRC was highly successful in recruitment during this past year. We added 371 new staff last fiscal year, offset by attrition of 211, for a net gain of 160. As of early-March, we had brought 189 new staff on board and lost 101 for a net gain of 88 in the current fiscal year. Both the new recruiting tools provided by Congress and the staff's use of those tools have helped with this success. It is encouraging that the average age of our staff has dropped from somewhat over 49 a few years ago to closer to 48 today, and, most important, that the average age has not increased by one year per year!

The Agency's management and its staff also deserve compliments for creating the work environment that has led to the Agency's superb placement in the recent survey done by the Office of Personnel Management. In that survey, the NRC placed first in Talent Management and Leadership and Knowledge Management, two of the four major categories of the survey. The NRC was second in

the Job Satisfaction Index, and fourth in the Results-Oriented Performance Culture Index. This performance speaks very well for the caliber of our staff and management.

The challenge of long-term workforce development is faced by every industry and every organization represented in this room. For that reason, every one of your organizations should be actively helping students to develop an interest in nuclear science and technology careers, as early in their education as possible. I challenge each licensee to strongly support basic science and technical educational programs at all levels. I recognize that many of you already have programs in place to foster these goals; however, all of us need to personally redouble our efforts in conveying to students the excitement and opportunities that await them in science and technology.

International interactions

Over the last year, I had several opportunities to represent the Agency and our nation at international conferences and meetings. Such visits impress upon me the extent to which nuclear energy is a global enterprise, with countless contributions from a very wide range of countries. At the same time, such visits are a sobering reminder that while the United States originated much of the nuclear technology in use around the world, there are many situations where the most modern applications of these technologies are now abroad.

Answers to, or expertise in, all our technical challenge areas no longer reside totally within our country. We have a great deal to learn from the international community in areas ranging from construction techniques, to reactor safety experiments, to technologies applicable to new domestic plants. I don't mean to imply that we in the United States do not have much to contribute to the global community in these areas, but the inescapable truth is that we have much to gain from interactions with the international community in terms of improving the safety and security of our nation's power reactors and nuclear materials.

This global interest is hardly surprising given that the DOE recently estimated that the global demand for energy may increase by 50 percent by 2030, with more than half of that growth coming from the world's emerging economies. For electricity, the growth is projected to be particularly steep, increasing more than 75 percent over the next two decades. Several countries are discussing expansion of nuclear power with construction of numbers of plants comparable to those being discussed in the United States.

As nuclear power expands around the globe, the NRC must constantly encourage that this expansion be accomplished with strict attention to safety. Through our global interactions, we can and do exchange regulatory practices and technical information that enable safer operations in other countries; and it is equally true that we obtain information and data in these exchanges that enhance the safety of plants in this country as well. No one involved with this industry, whether as a regulator, a utility, a vendor, or another stakeholder wants to see an incident anywhere in the world that compromises the reputation for safety that nuclear energy has developed over the past two decades.

I fully support a strong commitment from the NRC to utilize international collaboration to deal with the realities of the increasing “globalization” of nuclear technology. We must recognize that changes in the marketplace, technology, and regulation have taken place around the world, and international partnerships of industry and international partnerships of independent regulators are the optimum path toward success.

One specific aspect of international collaboration involves the “Multinational Design Evaluation Program” (MDEP). As you know, this is a multinational program to leverage worldwide nuclear knowledge and operating experience in a cooperative effort to establish common regulatory standards for new reactor designs and to share resources in completing the necessary regulatory reviews. The first stage of the MDEP has already begun. It involves cooperation with the regulatory authorities in Finland and France to assist the NRC’s design certification review of the Areva EPR. Stage 2 consists of the efforts of participating nations (Canada, China, Finland, France, Japan, Russia, South Africa, South Korea, United Kingdom, and United States) to achieve convergence on certain safety codes and standards and other technical matters. A key concept is that, while seeking to improve regulatory effectiveness and efficiency, national regulators retain sovereign authority for all licensing and regulatory decisions.

To the extent that other nations explore licensing of any of the designs that the NRC has certified or is in the process of design certification, I support creation of additional collaborations to share our knowledge. In the same way that our work with Finland and France may provide additional insights to them, it would be my goal that any interactions we have with other nations also lead to mutual sharing of technical knowledge relevant to safe performance.

Additional Challenges

In addition to the challenges I have already discussed, priority should be given to minimizing regulatory uncertainty. This is an issue faced by any new regulated industry and, despite the operating history of U.S. nuclear power spanning more than 40 years, the NRC review of new license applications will be new, by virtue of the fact that 30 years have passed since the last nuclear orders were placed. There is no doubt that the NRC is going to be challenged to respond to the number of applications that have been advertised by industry. On the one hand, the NRC is doing all it can do to build the human capital resources and the infrastructure to accommodate this number. But there are many actions that industry should be taking if its expectation is that the NRC can evaluate this number of license applications in a timely manner.

Industry must maximize standardization of license applications, designs, and construction activities so that the NRC can leverage, to the extent practicable, similar standardization in its review process. This “design-centered” approach will directly contribute to the success of the NRC as we strive to operate with a “one issue-one review-one position” approach. Timelines will be impacted if industry does not follow this model. The NRC must docket only applications meeting very high quality standards, and we will not compromise our standards to expedite approvals. The burden is on industry to provide that level of quality.

The challenges in the NRC are far greater than just acting on license applications for new plants. On the one hand, we must assure safety of operating plants. Creation of the Office of New Reactors (NRO) was a vital step to enable NRO and NRR to focus exclusively on challenges associated with new and operating reactors, respectively. In addition, both the NRC and the nuclear industry have a lot of work ahead of us in gearing up for the new construction in the United States. In this area, the NRC will be implementing its new Construction Inspection Program that we recently centered in the Atlanta Regional Office. Here too, our response will partly depend on industry. We will do a better job if industry establishes reliable schedules for its construction activities.

Digital instrumentation and control have been identified as one of the “longest poles” in the tent covering new plant activities. The NRC is challenged to improve regulatory guidance and review standards in this area and industry is challenged to specify with finality the systems it will use. I support stronger regulatory research in this area to address the Agency’s needs. This may also stimulate research outside of the NRC that may lead to even safer designs.

Both high- and low-level waste initiatives may challenge the Agency. We face a monumental task to review a license application for a potential Yucca Mountain waste repository. Nevertheless, we stand ready to initiate this review when DOE submits its license application. Low-level waste issues may also present special challenges, especially if the Barnwell site closes to out-of-compact wastes as planned in 2008. The nation could then be without storage for Classes B and C wastes, a far from ideal situation. The NRC would be faced, in all probability, with assuring that the absence of disposal capacity for such wastes doesn’t translate into unsafe storage of such wastes by organizations generating it.

New approaches to management of the fuel cycle are being proposed and may significantly challenge the NRC. The Global Nuclear Energy Partnership (GNEP) proposed by the DOE is intended to develop the systems, technologies, and policy regimes to allow recycling of used light water reactor fuel and, to a large extent, eliminate the actinides in fast-spectrum reactors in a way that enhances proliferation resistance. The resulting waste streams are envisioned to have characteristics that would lessen the volume and thermal challenges for a geologic repository. If this program progresses, the NRC will need to be heavily involved. However, as the DOE is formulating this program, it is not yet clear at what stage in its evolution the Agency will be participating.

Finally, in closing, I want to recognize that the Commission faces the departure of Commissioners Edward McGaffigan and Jeffrey Merrifield later this year. Commissioner Merrifield began his service at the NRC on October 23, 1998. I appreciated his guidance as I began my service here. He has always been available to provide solid advice to me on the myriad responsibilities that a new Commissioner faces.

I’ve known Commissioner McGaffigan for at least 20 years and probably quite a bit longer. We first began interacting when he worked for Senator Bingaman, when my visits with him were divided between Los Alamos National Laboratory and Los Alamos Schools issues. From our earliest interactions, Ed has been a role model to which I aspire. His dedication to decades of public service is inspirational. His photographic memory and keen mind have helped me better understand countless

issues we face on the Commission.

When these two great Commissioners leave the Commission, they will be sorely missed. It is a very sobering challenge that the three remaining, and eventually two new, Commissioners will confront.

In spite of, and perhaps because of, these challenges, this is an exciting time to be at the NRC, and I welcome the opportunity to serve here. This is a time of change, and it is during unsettled times that we must take particular care to ensure the future. There is a lot of hard work to do; and I will do everything in my power to assure that the NRC is ready to meet these changing times and future challenges.

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“A Commissioner’s Perspective on Nuclear Regulation”

Prepared Remarks for

**The Honorable Gregory B. Jaczko
Commissioner
U.S. Nuclear Regulatory Commission**

**at the
Regulatory Information Conference
Rockville, MD**

March 14, 2007

This is my third Regulatory Information Conference Speech. I look at these speeches as an opportunity to take a step back and reflect on broad themes. In my first RIC speech, I spoke about my philosophy of government focused on openness, transparency, and communication with stakeholders. Last year, I discussed the importance of earning public confidence in the U.S. Nuclear Regulatory Commission (NRC).

After I gave that speech, I spoke with my colleagues about how challenging that goal is. After all, we can not control how others feel about the work of the agency. But I do believe there is a way we can work toward that goal and it involves a focus on our true customer. It is that topic I intend to expand on this year but before I do, I would like to take a few minutes to discuss a couple of my colleagues who will be leaving the Commission this year - Commissioners McGaffigan and Merrifield.

I met Commissioner Jeff Merrifield just before I started at the agency back at the beginning of 2005. He gave me a warm welcome and offered me sound and practical advice, including on how to organize my office, which helped cement our relationship from the very beginning. He brings a unique and important perspective to the Commission as its sole attorney.

Jeff and I have different backgrounds and have not agreed on every policy issue. But I have personally appreciated his dedication to the principle that the decision-making process we follow

should be disciplined and differing views should be respected. Together we have sought consensus where it could be found, and ensured that the process provided us with the opportunity to professionally explain our differences, where necessary. I know he has truly enjoyed his government service, I will miss working with him, and I wish him well in his next career.

I would also like to share a few thoughts about Commissioner McGaffigan. We share a bond of having fathers who immigrated to this country and his life is the quintessential American success story. He represents something I have a tremendous amount of respect for - public servants who dedicate their lives to government service. Throughout his three decade long career in the executive and legislative branches, he has responded honorably to the call to service and shown the moral courage that are legacies of President Kennedy's Administration.

He also has such a nimble mind and a keen attention to detail that he challenges each of us to be better Commissioners – to be certain we can clearly explain the logic of our beliefs and positions in our discussions with him. Some of my most challenging and enjoyable times at the NRC have been when Commissioner McGaffigan and I have disagreed on policy issues and then engaged in lively and productive discussions.

Commissioner McGaffigan and Commissioner Merrifield have been tremendous assets to this nation and the Commission, and I will miss them. These types of departures are always difficult transitions, but as you clearly heard yesterday, neither of these gentleman has left just yet. They still have a lot to say about how the agency functions and important issues to weigh in on, so with that in mind I better turn to my views on what the Commission should be focusing on next.

I will begin with an anecdotal story about the renowned 20th century Austrian philosopher Ludwig Wittgenstein. As the story goes, he asked a friend: "Tell me. Why do people always say it was natural for man to assume that the Sun went around the Earth rather than that the Earth was rotating?" His friend replied, "Well obviously because it just *looks* as though the Sun is going around the Earth!" Wittgenstein reportedly replied, "Well, what would it have looked like if it had looked as though the Earth was rotating?"

I bring up this story because it makes vividly clear how something that everyone accepts as truth may sometimes not be the true reflection of reality. Since the earth does indeed rotate, our initial perception of reality was misguided. So I ask you to keep this idea in mind as I continue my remarks today.

The NRC should be, and is, a customer oriented agency. The NRC has been exploring the business process management strategy known as "six sigma." Its focus is on the "voice of the customer." This strategy requires that an organization analyze what it does, who it serves, and then survey those customers to see if it is meeting their needs. Organizations use this strategy to gather data and then redesign their processes in a fact-based way to meet the customer's requirements.

I believe that an NRC analysis such as this clearly shows that our customer is the public at large. We sometimes have a tendency to narrow our focus to those members of the public who we interact with on a daily basis. As I mentioned in last year's speech, however, the public includes a wide variety of stakeholders including individuals, citizen groups, vendors, licensees, applicants, and

elected officials. The public - our customer - includes those who do and even those who do not actively participate in our formal processes.

The NRC has a talented, well educated, and dedicated staff. But most of the contact they have on a daily basis is with licensees and is focused on highly technical issues. It is on these issues that our agency and licensees speak a common language and face similar challenges. Contact with other members of the broader public is much less frequent. Over time, I believe this has naturally led to a focus more on what licensees need from the NRC and less on what the broader customer needs.

I think that view is incorrectly focused, just as it was wrong to believe the sun revolved around the earth because that was 'the way it looked.' The NRC's true customers are the public as a whole.

This has the ring of a self evident truth - our government is of, by, and for the people after all. Examine it in light of one of the main things we do which is to review and issue licenses. I believe even licenses themselves are for the broadly defined public. A license certainly has substantial intrinsic value for an applicant, but it should be thought of as a recognition that the recipient has met *our* responsibilities to the public to provide a reasonable assurance of adequate protection. We act as the stewards of the public interest to provide them with the technical expertise and knowledge they may not have the time or resources to acquire. And as the Atomic Energy Act makes clear, we also have a responsibility to ensure that everyone whose interests may be affected by an NRC action has the right to participate in the decision making process.

There is, therefore, a social contract: The public grants applicants the right to possess and manage potentially harmful substances when they *earn* it from us by demonstrating they can and will meet the rules and requirements we establish. We must keep our regulatory focus on ensuring we are meeting the needs of our true customers.

The agency has made tremendous strides in meeting this goal, but I believe we can do better. For instance, we organize signing ceremonies for license approvals at the end of what are detailed, technical, and sometimes emotional license review processes. Representatives of the agency and licensees attend, and sometimes even local officials are present. We should aim for a level of such true customer service that these events would be attended not only by those members of the public, but also by every intervenor in the proceedings. They may not be in perfect agreement with every decision made during the process, just as the applicant probably is not, but they would believe their concerns have been heard and really addressed, and have faith in us as their trustees that public health and safety will be protected. This should be our goal, and is a good way to look at whether our focus is on the right process.

So, we have more work to do in this area. The decision to issue a license is, and should be, a public process precisely because it is a statement for the public's benefit.

Let me give you a couple of examples of what I mean. In 1997 a consortium formed by eight large electric utility companies called Private Fuel Storage (PFS) submitted a license application to the Commission with the hope of operating an away-from-reactor spent nuclear fuel storage facility in Utah. Nine years later, the Commission approved a license. One would think that after almost nine years of exhaustive work to get a license, the applicant would waste no time beginning construction

leading to eventual operations.

It is over a year later, however, and the applicant is no closer to building the facility today than it was back in 1997. Instead, members of the public whom the Commission's license is supposed to benefit, largely rejected our decision to issue the PFS license for a host of reasons. Somehow our process failed because the license we issued did not provide adequate assurance of public health and safety in the view of the members of the public most affected by the action - those who live near the site and those elected to represent them, including the government of the State of Utah.

I am not saying the NRC necessarily erred in issuing the licence, but because the process was flawed, the end result of years of regulatory work is the same as if the license had been rejected. A license granted should be a license implemented, and if it is not, there is obviously a problem. Now, I am not arguing for a longer review time, or that it is necessary to appease every party involved. But a license review that does a better job of addressing our customer's needs would ultimately be more efficient and effective, and probably even faster.

Let us take a look at another region of the country. A license issued by a federal regulator under a consistent regulatory regime should be just as valid in one part of our country as in another. But in the Northeast, the customer is very different and there are other challenges to the validity of our licensing actions. Here the social contract has gone so wrong that a wide variety of stakeholders across the political spectrum have called for independent safety assessments at several nuclear power plants.

Independent of whom, you might ask? Independent of the *independent* safety regulator. And it is important to note that these concerned customers include not only members of public interest groups but also elected officials from all levels of government.

I am on record as saying I do not believe that the independent safety assessment model from ten years ago is the most effective way to address this issue. But the continued requests for this action, again by a wide group of stakeholders from different states, demonstrate to me that we are not doing a good job of serving our customer.

Again, I am not saying that every idea any member of the public has should be adopted by the NRC. We should have a stable regulatory regime and our decisions must be based on sound scientific, technical, and regulatory policy. But they must also be based on sound public policy. This requires a subtle shift that will have profound ramifications. It requires clear public communication and education. It requires that the Commission lead, and provide the staff with the resources to accomplish the additional customer service work. And it requires that the Commission clearly convey that we see this effort as being a high staff priority.

Two excellent tools we have to help us are the adjudicatory and rulemaking processes, which I consider great big regulatory 'suggestion boxes.' We should take advantage of comments, concerns, and contentions raised in the context of hearings and rulemakings to learn more about how our customer feels about the job we are doing as regulators and to incorporate new ideas.

People want and deserve answers to their questions about the use of radioactive materials in their communities, and we should not only seek to answer these concerns but to truly resolve them. If

we do that, our customers will know we are listening and incorporating their concerns into our regulatory structure and licensing actions.

Two good examples of where the agency has successfully accomplished that goal are in changes to emergency preparedness regulations and safety culture. I want to take this opportunity to commend the preparedness and response and office of enforcement staff on their outreach efforts over the last two years. The agency's successes in both developing new emergency preparedness regulations and guidance, and in finding a way to better incorporate attributes of safety culture into the reactor oversight process, are laudable. Both dealt with complex, controversial, and emotional issues and both required that extensive stakeholder input be gathered and incorporated into the final product. I would note that both also resulted in solutions that were not foreseen at the beginning of the process but were developed through the dynamic two-way conversation the staff initiated with the public.

Some opportunities to take advantage of these regulatory suggestion boxes and therefore help ensure the legitimacy of our licensing actions are pretty straightforward.

The Tennessee Valley Authority is studying whether to re-start construction of Watts Bar Unit 2, which has existed in a state of partial construction for decades. They have a construction permit issued back in 1973 that the NRC has renewed multiple times. In 1976 they applied for an operating license and this agency noticed a public hearing opportunity that is now closed.

On the news that TVA may want to restart construction, the NRC has begun to consider whether the public should be provided a new opportunity for a hearing on the operating license. If we decide not to, we run the risk that we could end up disenfranchising our customer.

After all, many of the people living near Watts Bar today were not there in 1976. Many were not even born. If we truly focus on our customer, we will provide an opportunity for the public to participate in the decision about whether or not to approve an application to operate a nuclear power plant in their community. If we can resolve all of the questions about the review process we follow, there should not be any questions about the outcome of that process.

Another slight shift in focus that could have profound effects involves our approach to schedules. Some stakeholders have encouraged the NRC to focus on streamlining our review process as much as possible and to secure the resources necessary to review every application they are considering submitting.

I wholeheartedly agree that review schedules and predictability are important. The NRC alone ultimately controls the pace at which reviews can be done in a manner that ensures safety. Schedules should be the hallmarks of how we maximize the opportunities for public participation, for the public to know their tax dollars are being spent wisely, and to allow the NRC to ensure public health and safety. We should therefore reach out to people who may not even know they can participate in our processes and make sure they have an understanding of these schedules. It is only by following this approach to schedules that we can be sure a review process that results in a license approval will also be one that leads to the actual construction and operation of a facility.

I would like to close with a discussion of one controversial decision the Commission has before

it. I have proposed that the Commission complete an expedited rulemaking which would require any new nuclear power plants built in the U.S. be designed to withstand a large commercial aircraft impact. If we look at this issue from a customer service perspective, we should reach out and make sure we know what our customer's expectations are. I believe I have a sense of those expectations, but I also believe we should discuss this issue publicly to make sure we fully understand the broader public's views.

It was not easy to address new security threats for the fleet of existing reactors, but the Commission thought it was vital to do so following September 11, 2001. The agency, therefore, issued orders requiring licensees to identify and implement strategies to maintain or restore cooling for the reactor core, containment building, and spent fuel pool. The NRC directed licensees to identify mitigative strategies - or measures they could take to reduce the potential consequences of a large fire or explosion - that could be implemented with resources already existing or readily available. This was what we could realistically do with billions of dollars of built infrastructure and it was sufficient to provide a reasonable assurance of adequate protection. It is not, however, sufficient, to miss an opportunity to design away the requirement for these strategies in new plants. We should act today, as the regulator of one critical infrastructure sector, to require improvements that will limit the damage that may occur from such an impact.

Now is the time, before any applications have even been submitted, to require reasonable design changes including redundancy, separation of safety systems, and structural modifications to address the commercial aircraft threat. I urge my colleagues to use this issue as an opportunity to demonstrate that our focus is on serving the public as our one and only true customer.

So to close, I believe we often find ourselves in a discussion with a narrower subset of our customer base. Just as our perception that the sun revolved around the earth was misguided, it may look like our true customer is limited to licensees and applicants. But I believe that if we step back and really look at this issue, we will see that our true customer is the much larger and broader public.

If we put a stronger focus on serving our customer we will be successful. It will lead to more realistic and effective regulatory approaches to all of the important public policy issues we face.

Thank you for your attention and I would welcome any questions you may have.

附件六

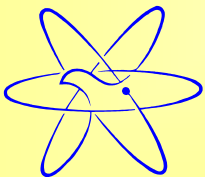
核四數位儀控管制簡報資料

Regulatory Overview of Digital I&C in Taiwan Lungmen Project

Chang-Fu Chuang &
Yi-Bin Chen, Ph.D.

Atomic Energy Council
Taiwan

March 15, 2007



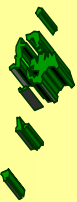
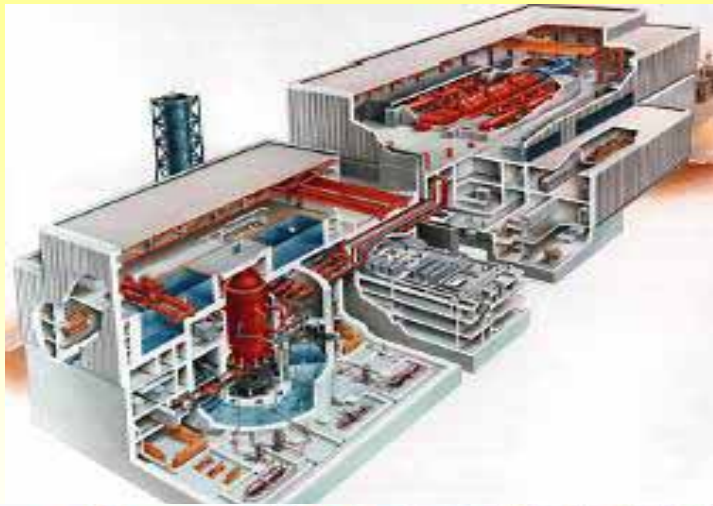
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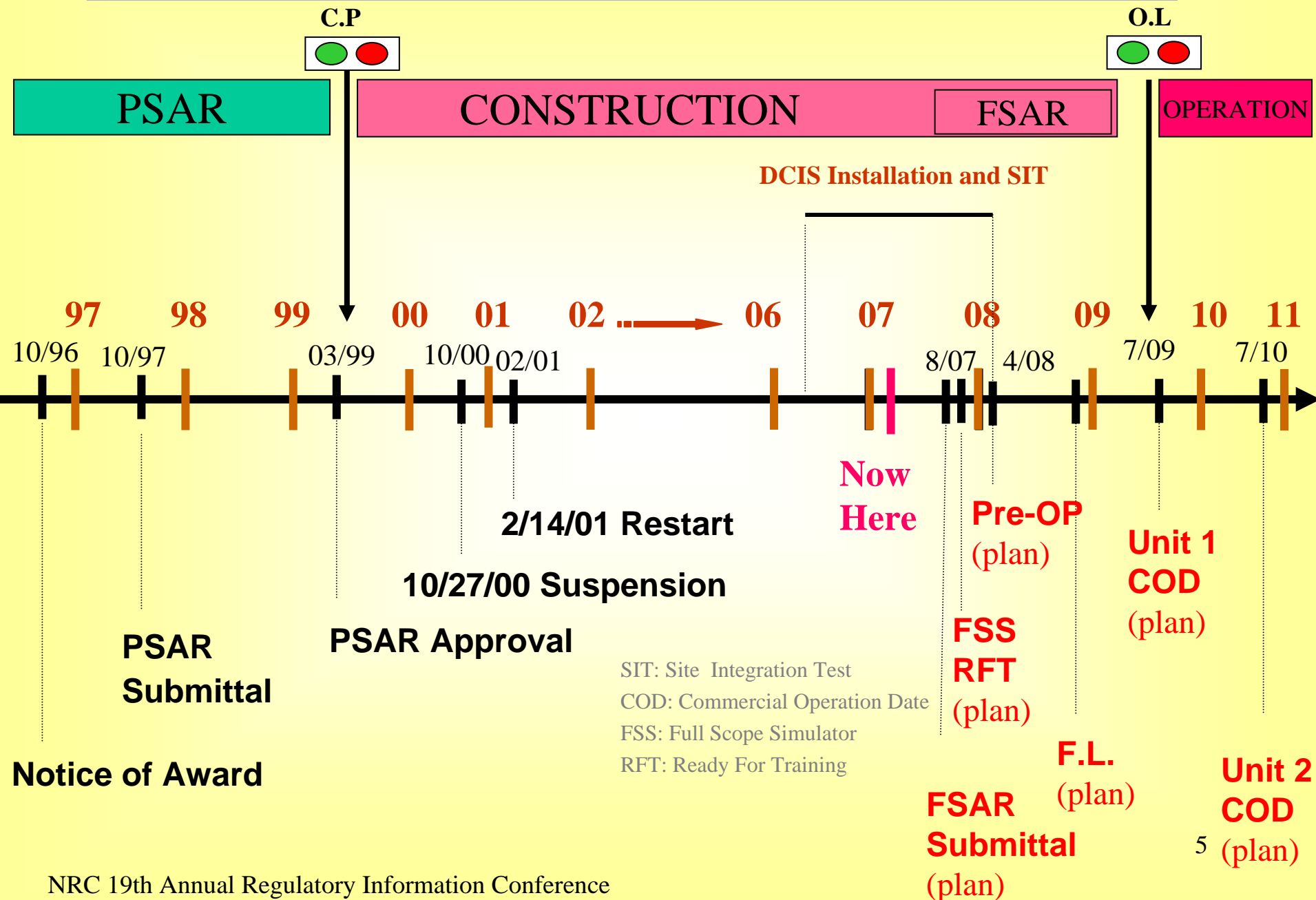
Topics

- Introduction
- Overview of Lungmen Digital I/C Systems
- Bases of Regulation
- Major Regulatory Issues/Concerns
- Conclusion and Recommendations

Introduction

- Lungmen Project consists of two ABWR units. It started in March 1999, and was suspended in Oct. 2000 for 110 days due to political issue. Now the construction is on-going again.[P.5]
- Lungmen Project adopts modern fully-integrated digital design. Digital systems come with inherent differences from analog systems in the design and architecture.
- The challenges - limited technical guidance and regulatory precedence.

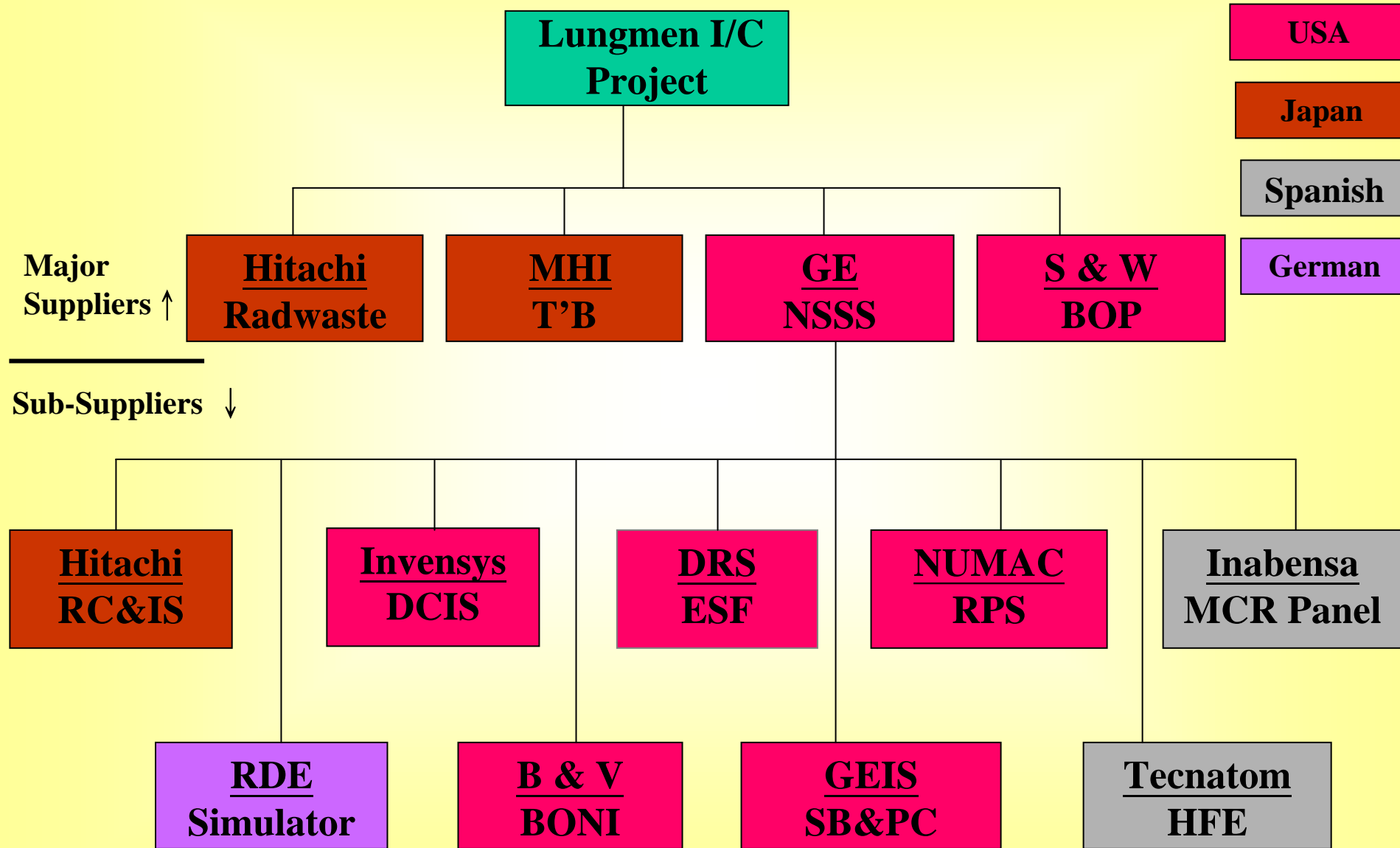
Key Milestones



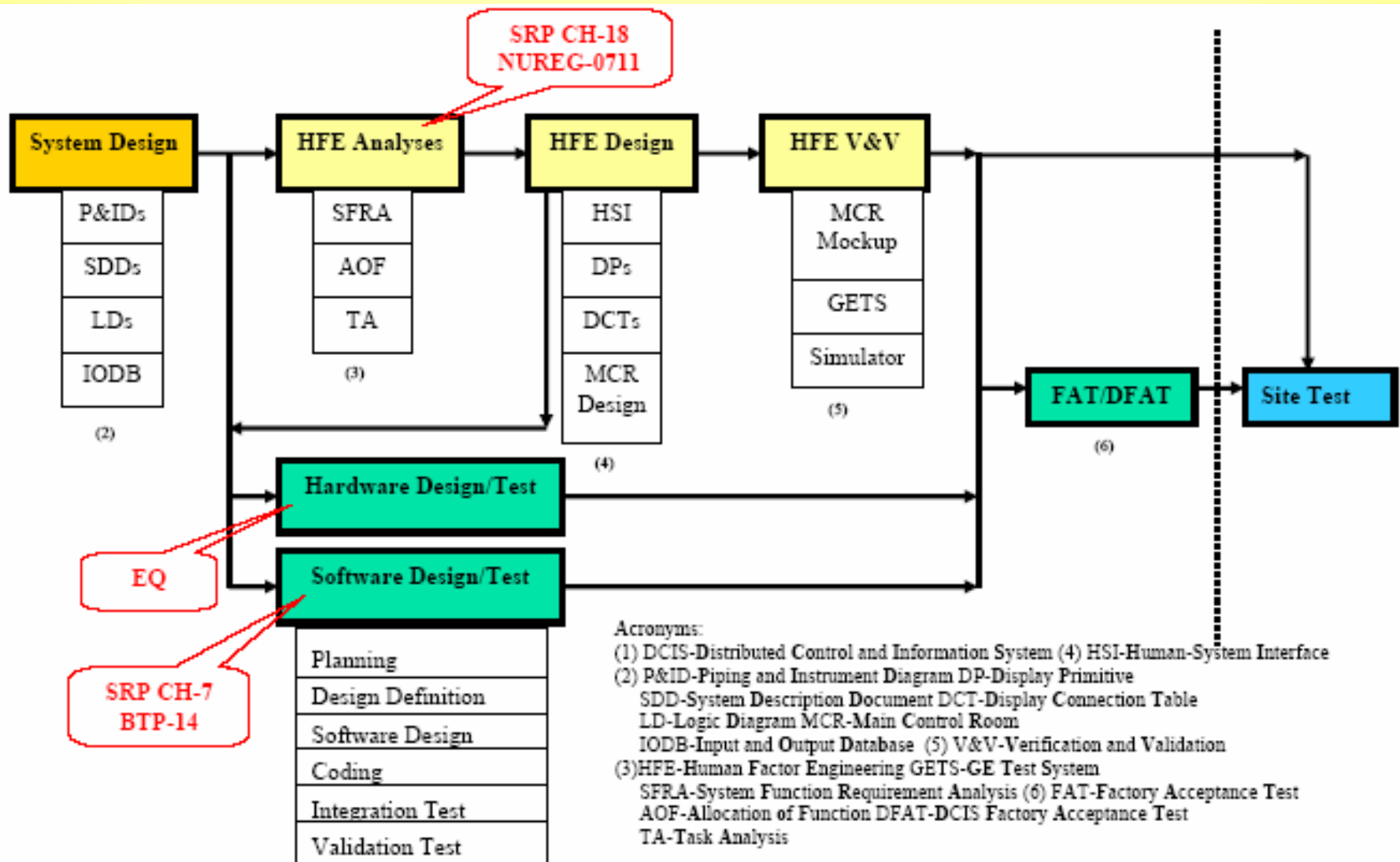
Overview of Lungmen Digital I/C Systems (1/2)

- Multiple vendors - Concerns on coordination and interface among designers and manufacturers. [P.7]
- Fully digital systems for control, communications, and human-system interfaces (HSIs). An overview of the design process for the LMNPP digital I&C system is shown on [p.8].
- Overall architecture consists of five levels: sensor/actuator level, local level, system level, plant-wide level and utility-wide level. [P.9]

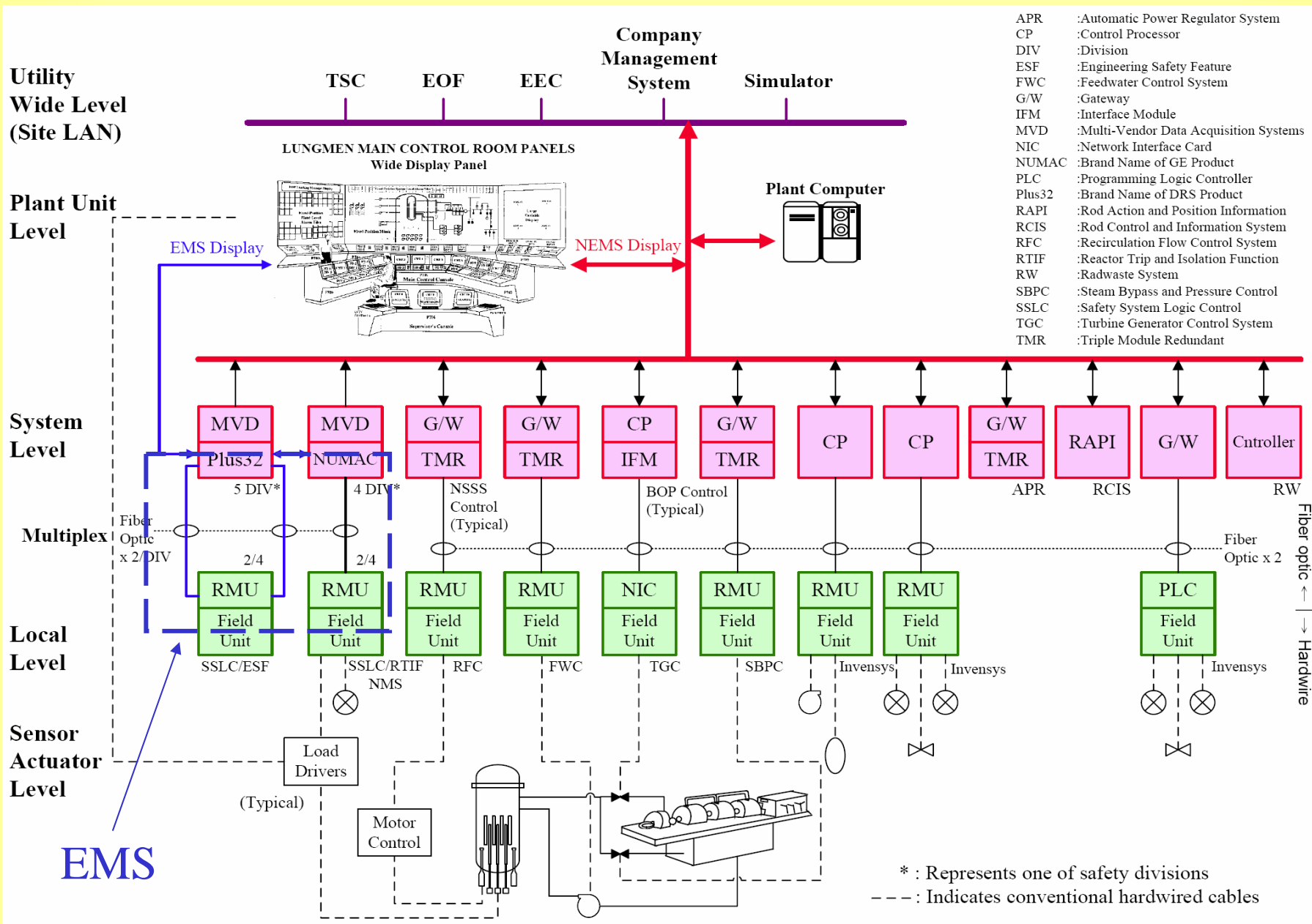
Major Digital I&C Systems and Various Vendors



Design Implementation Flowchart



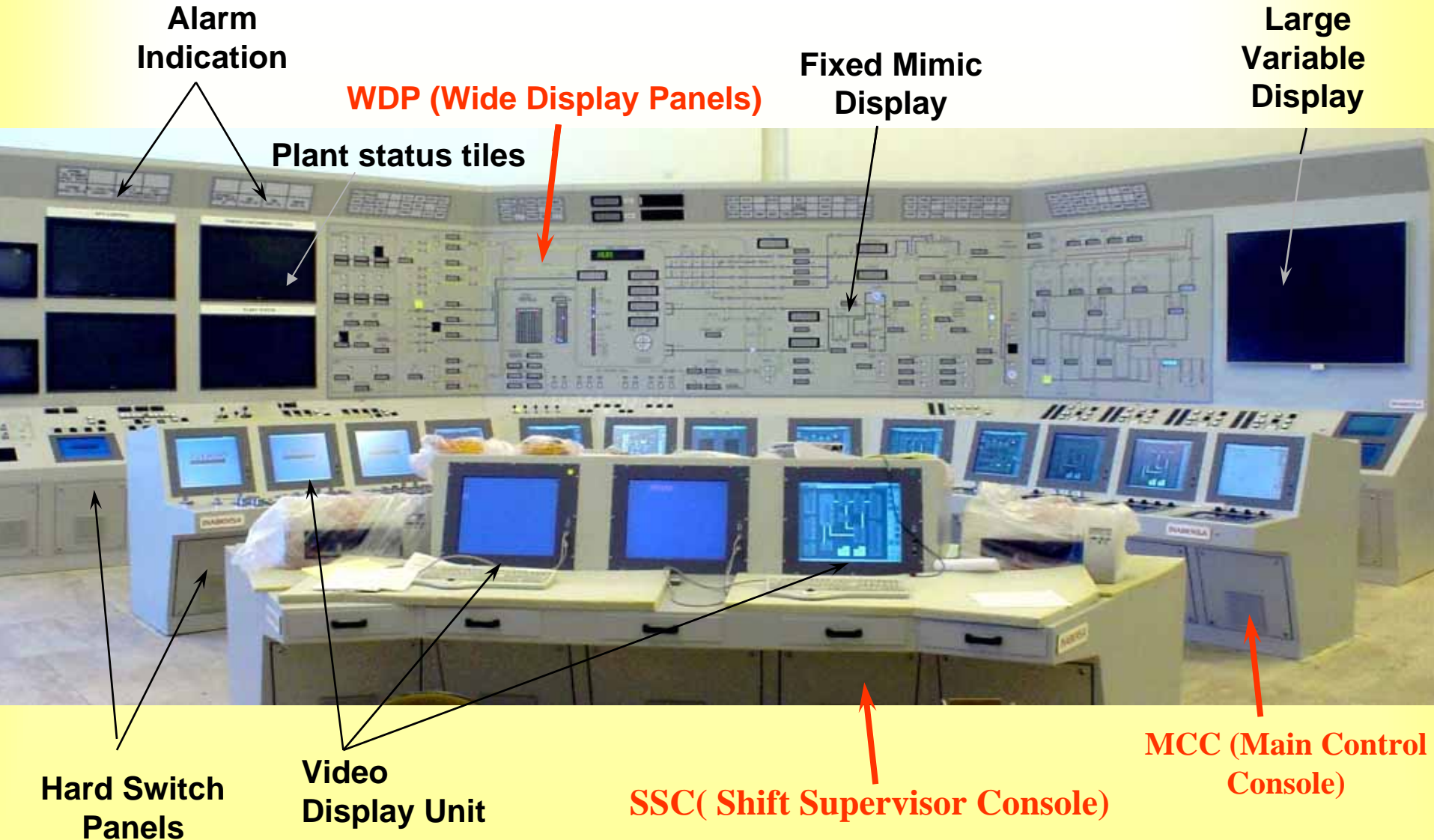
Overall architecture of Lungmen I&C systems



Overview of Lungmen Digital I/C Systems (2/2)

- The manner for operation information display & operator control are much different from traditional control room. [P.11]
- Important information are highly integrated and used by operators via video display units (VDUs). Navigation among 45 VDUs and ~1,000 operation screens, with 3 hierarchy levels, should not negatively impact operator performance. A VDU operational configuration strategy is being evaluated. [P.12]
- A top-down Human Factors Engineering Program Review Model (HFE PRM) specified in NUREG-0711 is adopted to assist the evaluation of LMNPP advanced control room design by three V&V steps. [P.13]

Main Control Room



Front Page of Operation Menu on VDU

FoxView TSWS70:TSWS70 - 1C91GD000_001 Mon 09/30/2002 10:57:43

File View Config Disp MPL SitMnt Help PRV

SIM 1C91GD000_001 OPERATOR MENU Page 1 of 1

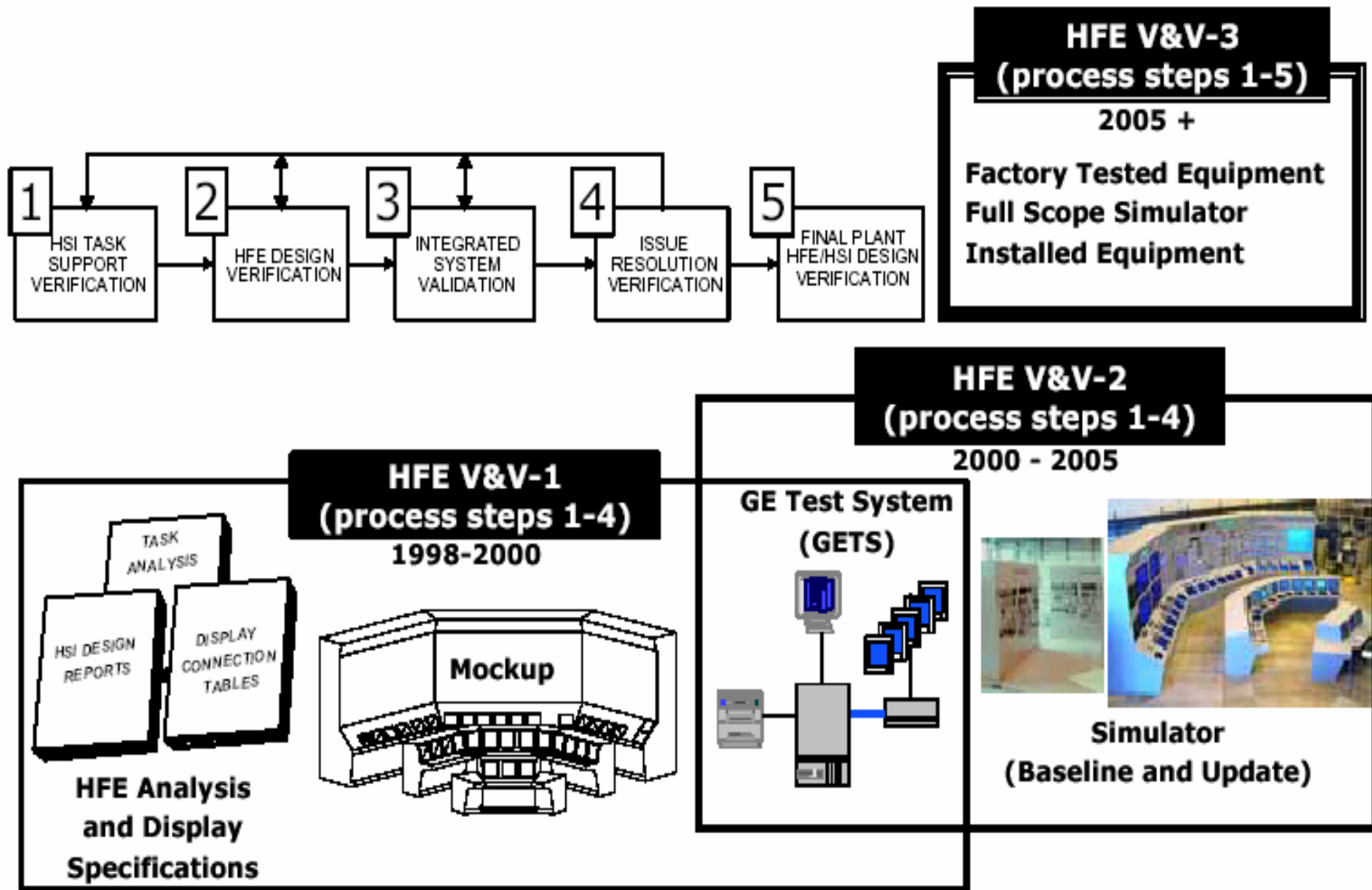
The interface displays the following components:

- PLANT AUTOMATION:**
 - C82 APR
 - C91 PGCS
- SAFETY & PROTECTION:**
 - C71 RPS
 - C73/C74 LDI/SSLC
- CONTAINMENT:**
 - T22 SGT
 - T31 ACS
 - T40 DWC
 - T49 FCS
 - T62 CMS
- WATER SYSTEMS:**
 - G41 FPCU
 - G42 AFPC
 - G51 SPCU
 - P11 MW
 - P13 CSTF
 - P16 FP
 - P21 RBCW
 - P22 TBCW
 - P24 NCW
 - P25 ECW
 - P26 RBSW
 - P27 TBSW
 - P29 BPCW
 - P30 TBC
- VESEL & AUXILIARY:**
 - B31/C81 RCIR/RFC
 - C11 RCIS
 - C12 CRD
 - C41 SLC
 - C51 NMS
 - C85 SBPC
 - G31 RWCU
- MAIN STEAM & REHEAT:**
 - B21/N15 MS/TBP
 - B22/N14 RS/MSR
- EXTRACTION & HDS:**
 - N11 HPED
 - N12 LPED
- TURBINE & CONDENSER:**
 - K68 OG
 - N23 FWD
 - N31 TURB
 - N32 EHC
 - N33 TGS
 - N34/N35 TLO/TLOS
 - N42 GGC
 - N43 GSC
 - N44 HSO
 - N61 CDSR
 - P28 CCW
- CONDENSATE & FEEDWATER:**
 - C31 FWC
 - G61 CPS
 - N21 COND
 - N22 FW
 - N37 MFTE
 - N38 MFLO
- ELECTRICAL DISTRIBUTION:**
 - N41/N51 GEM/EXCT
 - R10 EPD
 - R11 MVD
 - R12 LVD
 - R13 VAC
 - R14 ICP
 - R15 LSP
 - R16 DC
 - R21 DG
- AUXILIARY SYSTEMS:**
 - G62 TBS
 - G63 RBS
 - P51 SAIR
 - P52 IAIR
 - P54 N2
 - P61/P62 AUXB/ASS
 - W12 ISS
 - W13 ISHS
 - Y54 ES
- HVAC & VENTILATION:**
 - P56 BAIR
 - T41 RBHV
 - T42 TBHV
 - T43 CBHV
 - T51 SGHV
 - T52 HMHV
 - T54 AFHV
 - T55 RBPV
 - T57 EBV
 - T58 CWPV
- ECCS:**
 - E11 RHR
 - E22 HPCF
 - E51 RCIC
- ENVIRONMENTAL:**
 - T61 ARM
 - T63 PRM
 - Y47 MET
- RAD WASTE BUILDING:**
 - K11 SUMP
 - K15 FDRT
 - P31 NRD
 - T53 RTHV

Navigation buttons on the right side include: SYS ALARM, OPER MENU, OLPS, PLANT ALARM, CORE MONTR, CHANGE ENV, OPER AIDS, ENGR MENU, SPDS, PREV DISPLAY, REPORT, GROUP POINTS, PRINT, LVD, PAGE, and PAGE.

Windows at the bottom: Start, FoxView TSWS70:TS..., Exceed, MS AFM Alarm Manager TSWS70:..., Microsoft PowerPoint - [Pr..., 10:57 AM

The Implementation of HFE V&V Plan



Bases of Regulation

- Taiwan Requirements

"Atomic Energy Law of Taiwan" ; "Detailed Regulations for Implementation of the Atomic Energy Law" and applicable domestic industrial codes and standards.

- Country-of-Origin Codes and Standards

Compliance with country-of-origin codes and standards is pre-requisite. Particularly, Chapters 7 and 18 of USNRC Standard Review Plan (SRP) are major bases.

[P.15]

Chapter 7 Instrumentation and Controls

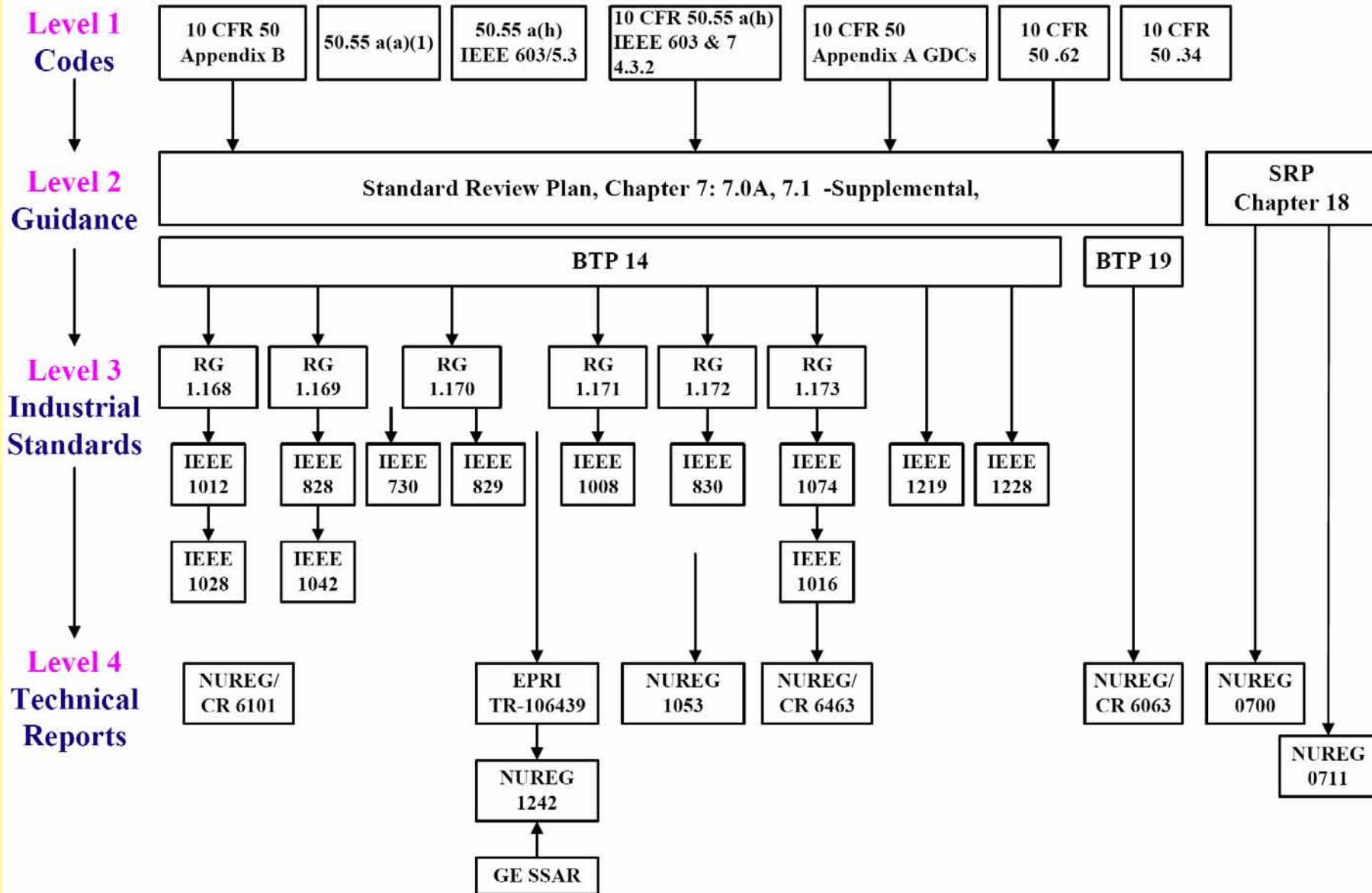
7.8 Diverse Instrumentation and Control Systems

7.9 Data Communications Systems

Appendix 7.0-A Review Process for Digital I&C Systems

Chapter 18 Human Factors Engineering

Structure of Country-of-Origin Codes and Standards



Current Major Regulatory Issues/Concerns (1/13)

- Issues from PSAR Review
- Data Communications Network
- Cyber Security
- Software Safety Analysis Process and Results
- MCR Human Factor Engineering (HFE) V&V
- Integration Tests
- Design inputs Final Synchronization
- Others
 - Full-Scope Simulator Implementation Activities
 - Software V&V and CM
 - EMI, RFI, Grounding Issues
 - Fiber Optical Performance

Current Major Regulatory Issues/Concerns (2/13)

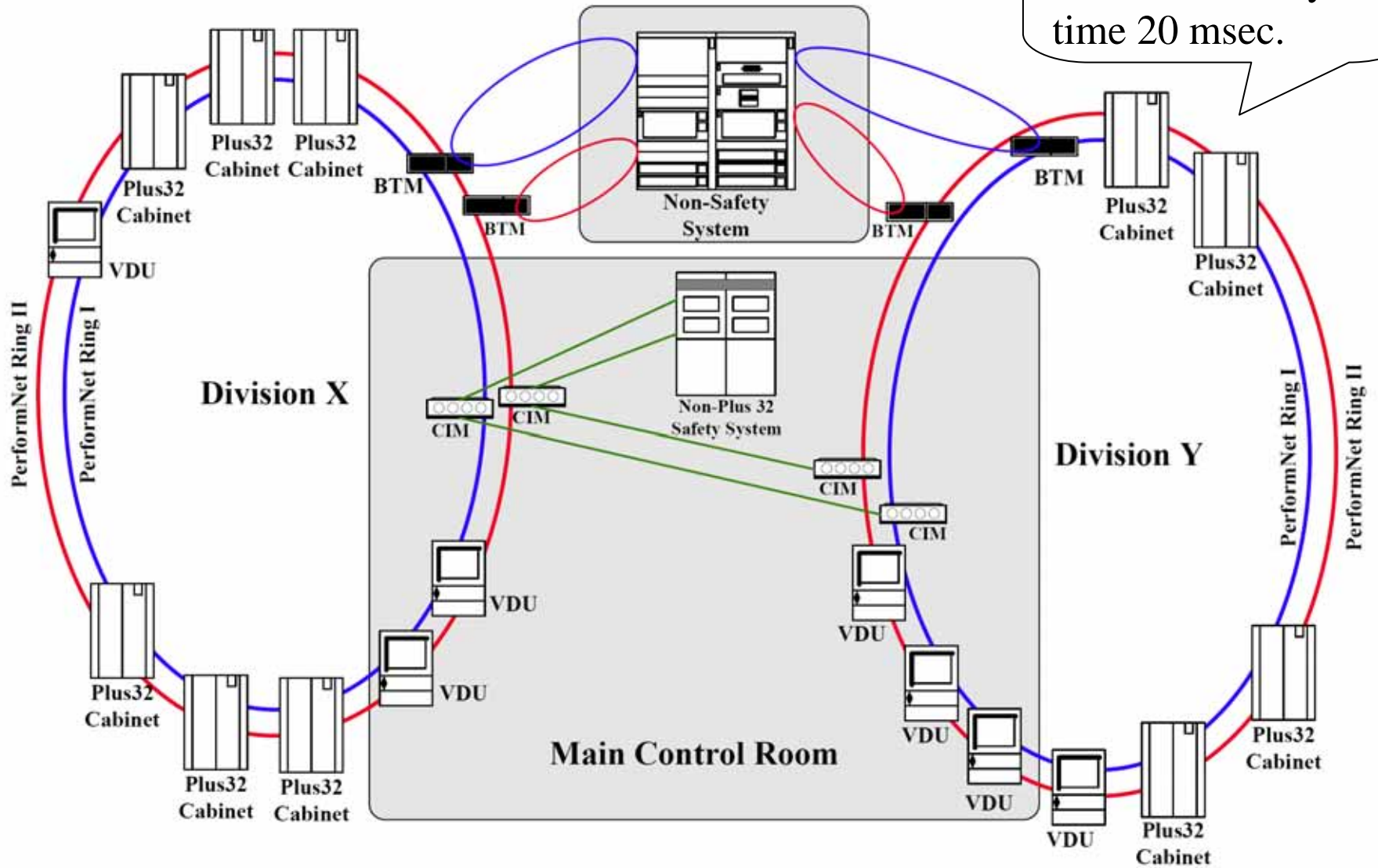
- Issues from PSAR Review
 - PSAR Review Period: Oct. 1997~March 1999
 - Major Findings:
 - Incomplete software development plans
 - Need to follow newer standards
 - Insufficient degree of independence of V&V
 - “Important Issues” are being followed up until satisfactory resolution.

Current Major Regulatory Issues/Concerns (3/13)

- Data Communications Network

- Network and multiplex systems are classified as safety class (EMS) and non-safety class (NEMS).
- EMS must be Class 1E-qualified system with deterministic communications protocol design. [P.19]
 1. EMS Platform Certification.
 2. Dedication issue of DRS VDU Touch Screen Controller.
 3. Concern that deterministic protocol design with 20 ms may affect the time resolution of Sequence of Events (SOE) in root cause analysis while plant in operation in the future.

EMS Network Architecture



Current Major Regulatory Issues/Concerns (4/13)

- Data Communications Network

- NEMS Network real-time performance, including time response and data loading in normal operation, transient, emergency conditions, etc., is our concern.

1. Failure of Both Ethernet Root Switches. [P.21]

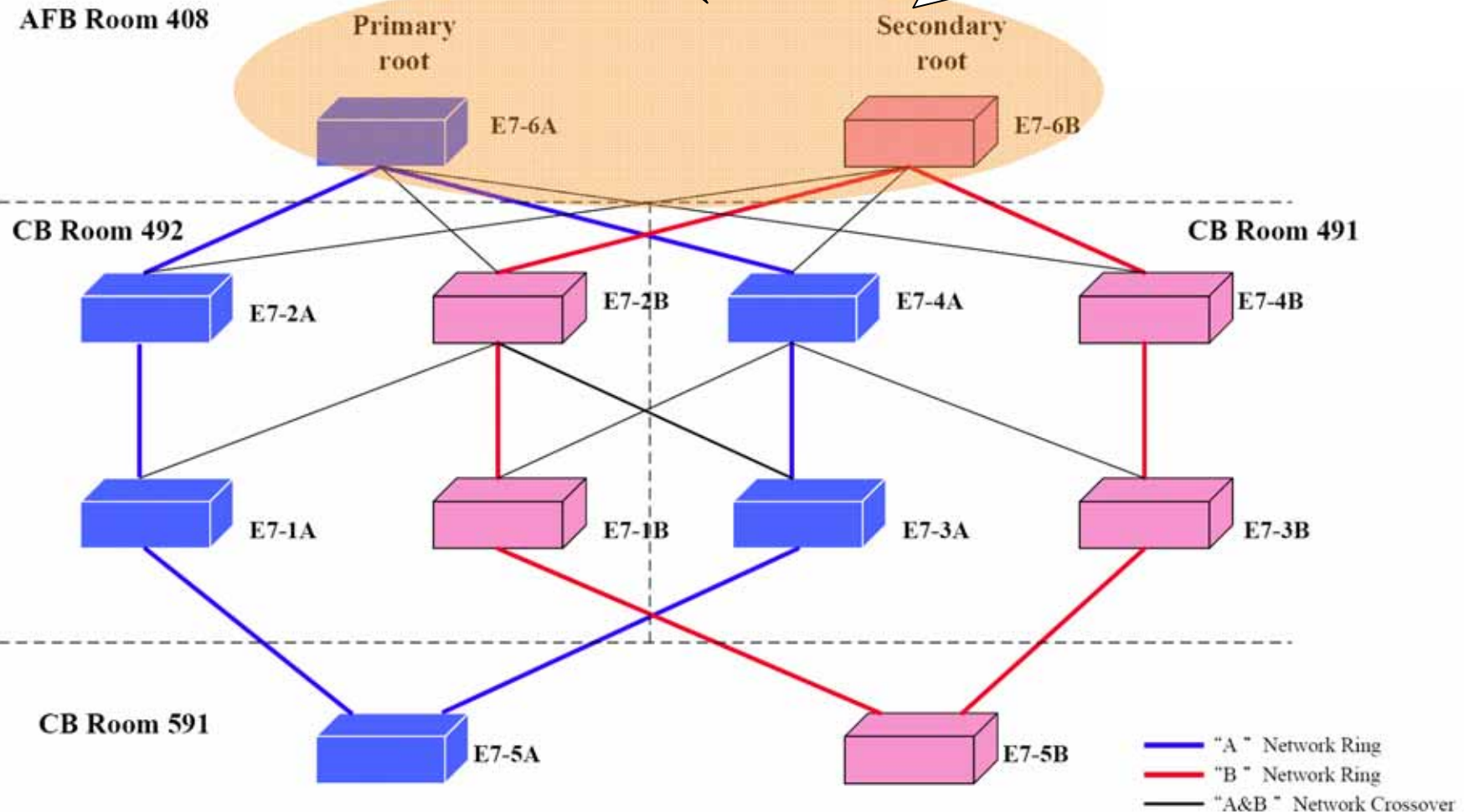
Originally in the event that pair root switches are lost simultaneously, the resulting network reconfiguration would be completed in ~20 seconds. After corrective action, E7-2B and E7-4A will become root switches within several ms once the pair root switches are lost simultaneously.

2. Some data flow paths exceed the predefined response time 1.5s in FAT; further review on them is needed. [P.22]

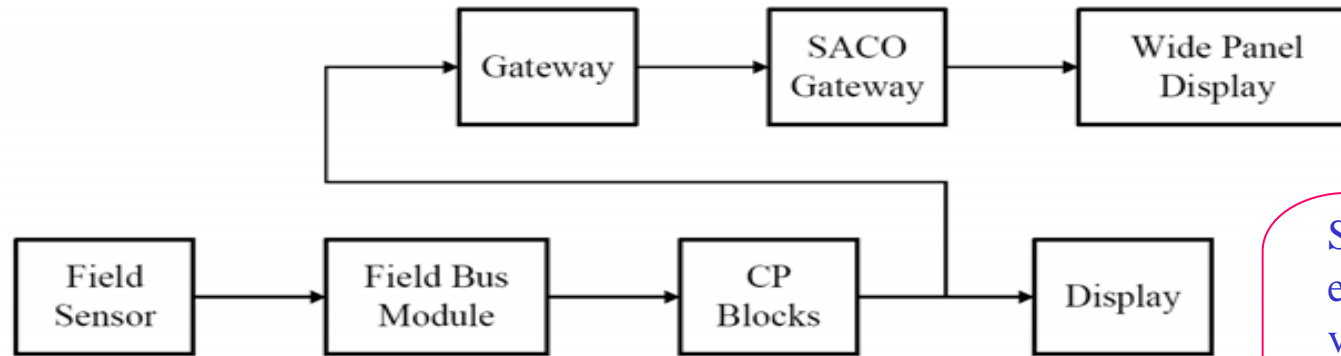
NEMS Ethernet Switch Redundant Ring Network

Originally in the event that pair root switches are lost simultaneously, the resulting network reconfiguration will take ~20 seconds.

After corrective action, E7-2B and E7-4A will become root switches within several ms once the 6A/6B pair root switches are lost simultaneously.

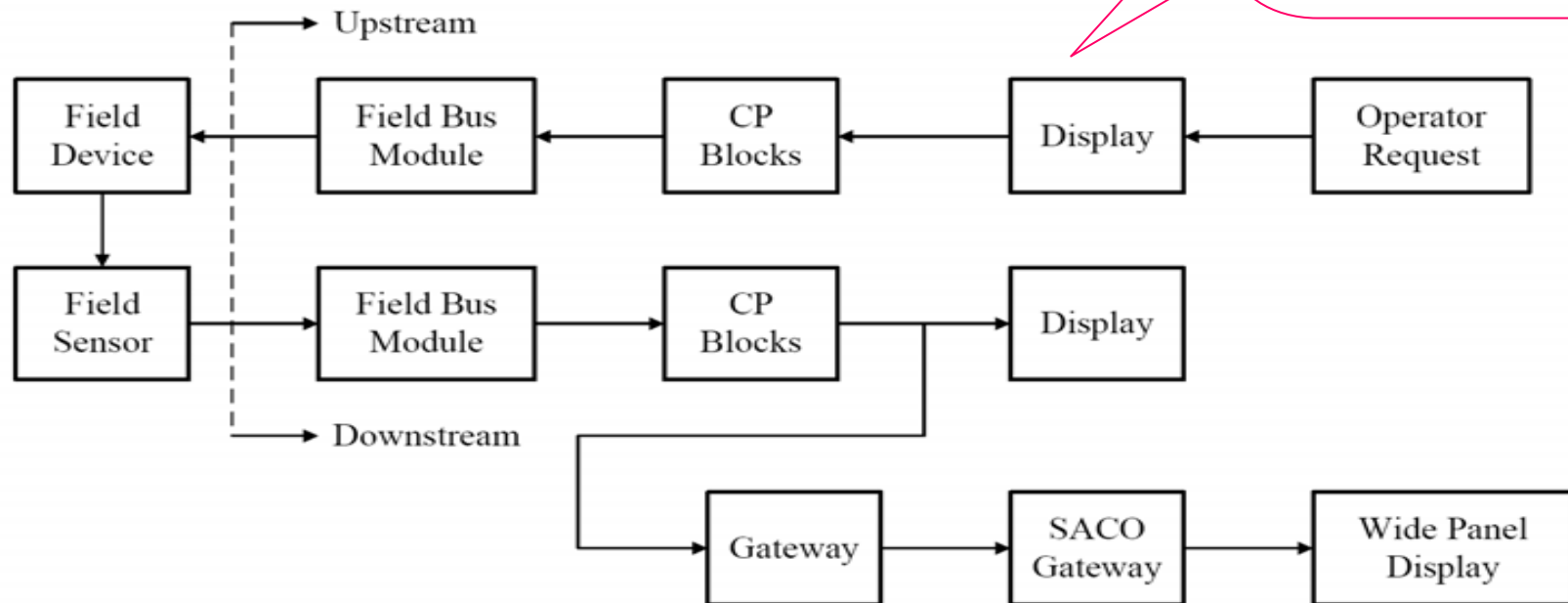


Typical Communications Paths



a. Type (1) Communication Path

Some data flow paths exceed the predefined value of 1.5 s response time. Further review on them is needed.



b. Type (2) Communication Path

Current Major Regulatory Issues/Concerns (5/13)

- Cyber Security

- There is no specific cyber security requirement in TPC Lungmen Spec. However, the security requirements is part of the overall system requirements. User access capabilities, especially via networks, are restricted for protection against potential cyber security threats. Remote access to the control network is prohibited.
- A Security Policy shall be developed by power plant to delineate control over
 - (1) access to the software functions,
 - (2) use of safety system services,
 - (3) data communications with other systems,
 - (4) the list of personnel who may access / use the system.

Current Major Regulatory Issues/Concerns (6/13)

- Cyber Security

- USNRC is working hard on this topic. Related studies on Cyber Security and Vulnerabilities had been conducted.
- We expect new regulations and guidance issued for this topic in near future.
- Will study them thoroughly when ready, & figure out a measure to retrofit existing implementation if necessary.

Current Major Regulatory Issues/Concerns (7/13)

- Software Safety Analysis Process and Results
 - SSA is to identify potential system safety threats originated from the unintended software features that were created during software development process.
 - No specific guidance was endorsed by USNRC for performing SSA. So, it was difficult to reach consensus on how to perform SSA activities and how to prepare/review SSA reports among regulators, utility and vendors. It has taken extra time and effort to agree on the SSA process.

Current Major Regulatory Issues/Concerns (8/13)

- Software Safety Analysis Process and Results
 - Lots of discussion were held among regulator, utility and vendors, and the final resolutions are:
 1. To apply FMEA method used in Hazard Analysis & Defense in Depth for SSA for all safety systems.
 2. To apply FMEA method used in Abnormal Condition Event Analysis, based on IEEE-7-4.3.2-1993, for new software of safety systems, such as RTIF, and Class 1E Video Display Units (VDUs).
 3. TPC has hired a third party to perform the project “Parallel Validation of Software Safety Analysis” to validate the vendor’s SSA activities and results.

Current Major Regulatory Issues/Concerns (9/13)

- MCR Human Factor Engineering (HFE) V&V
 - V&V is to assure that the design of the HSI conforms to HFE principles. The V&V activities for the Lungmen project have been separated into three phases; V&V-1, V&V-2, and V&V-3, depending on the design progress and the tools available for use.
 - The MCR design still needs to go through the HFE V&V-3 for final integrated system validation and as-built design verification.
 - LMNPP is working to develop a VDU operational configuration strategy for management and operation of the large number of VDUs in the MCR under different operating modes, to guide and limit on the freedom of VDU usage. It deserves further V&V for use in the LMNPP.

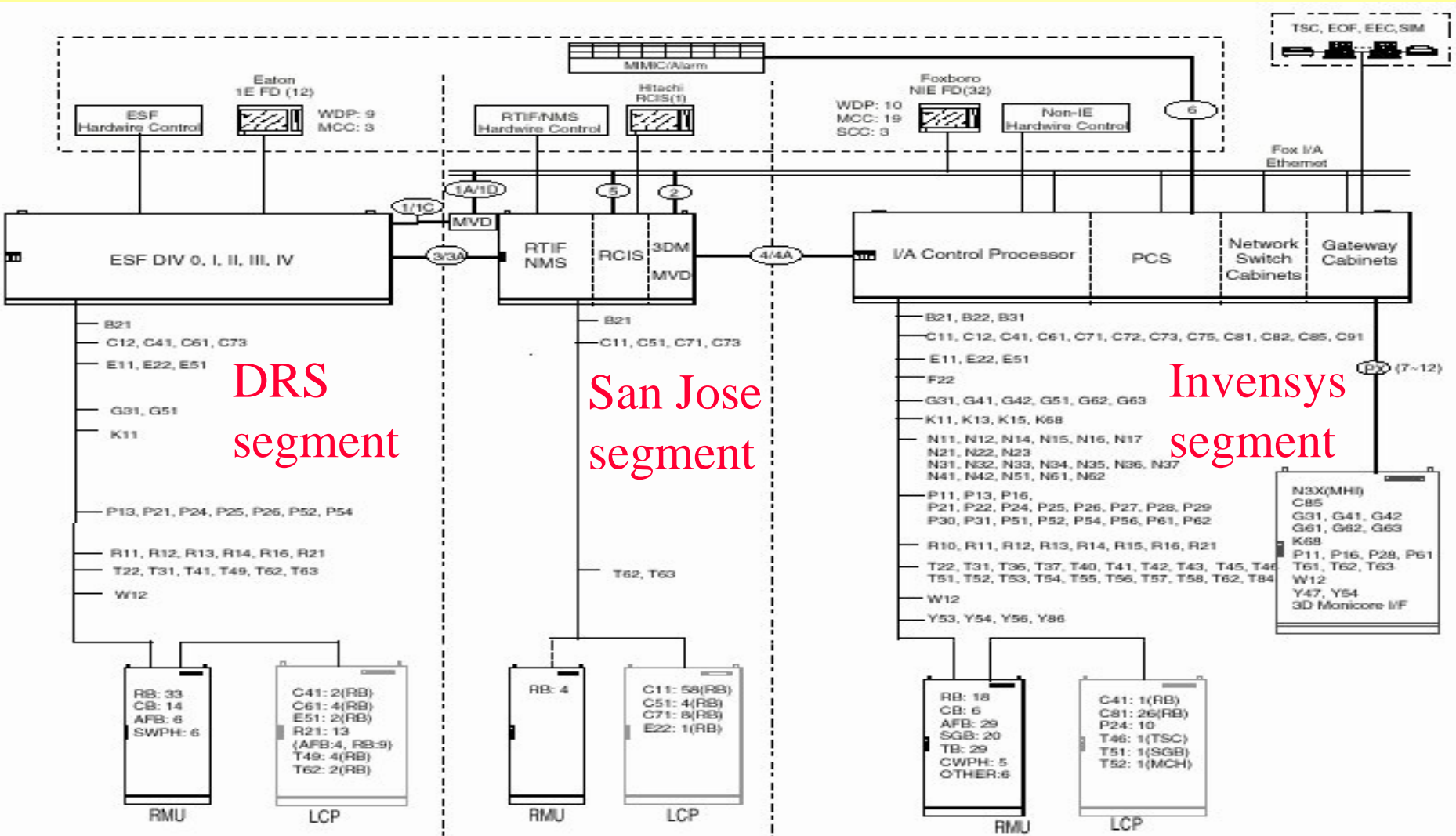
Current Major Regulatory Issues/Concerns (10/13)

- MCR Human Factor Engineering (HFE) V&V
 - NUREG-0700 Rev. 1 (1996) and NUREG-0711 Rev. 0 (1994) were committed in the LMNPP's Preliminary Safety Analysis Report (PSAR, 1997). The current version of NUREG-0700 is Rev. 2 (2002), and of NUREG-0711 Rev. 2 (2004).
 - New NUREG-0700 guidelines in maintainability of digital I&C equipment are adopted in the Lungmen Project. Investigation of the way to implement New NUREG-0711 program elements is on-going.

Current Major Regulatory Issues/Concerns (11/13)

- Integration Tests (FAT & SAT)
 - FAT serves as the last validation at the vendor site and has been performed using a segment testing approach at major supplier locations. Potential interface and integration problems due to multiple vendors could occur. [P.30]
 - SAT is the first time the DCIS is actually integrated, so it will play more important role than that in the traditional project to confirm the total integration of the DCIS. The leading designer being not responsible for conducting the SAT is of a potential regulatory concern. Of concern also is the short time span allocated for the site tests.
 - Concerns over the SAT testing process, including test execution and discrepancy resolution.

Segmented FAT Overview



Current Major Regulatory Issues/Concerns (12/13)

- Design Inputs Final Synchronization
 - Based on the progress of the Lungmen project, two design freeze dates have been established/implemented for Invensys and DRS, this created difficulties in keeping their progress on the same design data base, and necessitate a final synchronization of the data base at site in the near future.
 - For the new project, it is advisable to have a high design completion rate, say more than 60%, ahead of the project commencement to mitigate design freeze issue and avoid the big design changes during design implementation.

Current Major Regulatory Issues/Concerns (13/13)

- Other Regulatory Issues/Concerns

- Full-Scope Simulator Implementation Plan

- Electromagnetic Compliance (EMC) Plan

It was not issued in the project beginning phase until 10/15/03, when certain DCIS equipment had been delivered to the site. An evaluation is performing to assess and identify the needs for corrections for those as-shipped equipment.

- Fiber Optical Performance

High-quality fusion splice with low splice loss, low reflection, high mechanical strength, and long-term stability are all important items for regulation.

Conclusion and Recommendations (1/2)

- Digital I&C licensing is a critical task among regulator, utility and vendors. All are faced with great challenges because there is limited regulatory precedence. Close coordination between all parties is necessary to avoid the potential issues.
- SSA Plan, CM Plan, EMC Plan and Vendor Integration Plan are suggested to be ready practically ahead of the project commencement.
- An early review of the overall I&C system test plans (FAT & SAT) and strategy would provide a better understanding of the coverage and overlaps of the various tests and would help in identifying any gaps or deficiencies in the test coverage.

Conclusion and Recommendations (2/2)

- Necessary to evaluate whether to adopt new requirements based on the importance to plant safety, protection of personnel safety, and the feasibility of implementation at the project stage.
- For the new project, it is advisable to have a high design completion rate, say more than 60%, ahead of the project commencement to mitigate design freeze issue and avoid the big design changes during design implementation.

報告完畢 謝謝大家

Thanks for your attention !

chuang@aec.gov.tw

附件七

RIC 簡報後與會者提問問題

Hi Chief Chuang,

Please see below the message from NRC (Kirk). Have a nice day.

Regards,
Taun-ran Yeh

----- Original Message -----

From: Kirk Foggie <KXF@nrc.gov>

To: djshieh@tecrosd.org, tryeh@tecrosd.org

Sent: Mon, 23 Apr 2007 20:37:56 -0400

Subject: RIC followup questions

> Dr Yeh,

> Can you please pass these questions to Mr Chuang, who spoke at this
> past RIC, they were lost in my inbox from the travel I have been on and
> are past due. Please have Mr. Chuang send his responses to me as soon
> as possible. Thank you.. Kirk Foggie

>

> 1) Please address environmental qualification program

> of your digital I&C system. Also address, the maintenance activities to
> prevent dust, heat, humidity of your installed I&C equipment.

> 2) How have you handled diversity in your I&C systems?

> 3) Do you model digital I&C systems in your probabilistic risk

> assessments (PRAs)? If so, how (that is, fault tree or dynamic

> modeling)? Do you use risk insights in your design? If so, how?

> 4) Do your designs include diverse digital or analog back-up

> systems? If so, what functions are backed-up by these systems?

> What regulatory guidance is there in your country regarding the need for

> diverse actuation systems?

Q1) Please address environmental qualification program of your digital I&C system.

Ans:

The environmental qualification of our digital I&C system is based on IEEE 323 and R.G 1.89. Control of the electromagnetic environment follows the guidance contained in IEEE Std. 518 and EPRI TR-102323.

Q1) Also address, the maintenance activities to prevent dust, heat, humidity of your installed I&C equipment.

Ans:

I&C equipment has panel enclosure to prevent dust, heat and humidity during the shipment and storage, and is installed in HVAC environment.

Generally speaking, there is the aluminum-type protection cover and wood panel enclosure to protect the I&C Cabinets and equipment from the humidity intrusion during the shipment. They are stored in the Class A Warehouse (keep temp 18~23 degree centigrade, humidity below 50%) after shipment to Taiwan. We move out the wood panel enclosure and cut aluminum-type protection cover while performing the receiving inspection and the maintenance activities in the warehouse. After the inspection and the maintenance, we reseal the aluminum-type protection cover to prevent dust and moisture into the I&C Cabinets and equipment.

We move the I&C Cabinets and equipment from the warehouse to the field for installation while the field environment is in good condition. At this time there is HVAC to control the temperature and humidity.

Q2) How have you handled diversity in your I&C systems?

Ans: See answer for Q4).

Q3) Do you model digital I&C systems in your probabilistic risk assessments (PRAs)? If so, how (that is, fault tree or dynamic modeling)? Do you use risk insights in your design? If so, how?

Ans: Yes. By fault tree. No, we don't use risk insights in our design.

Q4) Do your designs include diverse digital or analog back-up systems? If so, what functions are backed-up by these systems?

Ans:

Yes, The diverse I&C features are provided for protection against common mode failures of the protection systems. These features mitigate anticipated transient without scram (ATWS) events and ensure compliance with defense-in-depth requirements. Mitigation of common mode failures is provided by the following diverse features:

- (1) Manual scram and MSIV isolation by the operator in the MCR in response to diverse parameter indications.
- (2) Core makeup water capability from the diverse feedwater, CRD, and condensate systems.
- (3) Availability of manual high pressure injection capability.
- (4) Long term shutdown capability provided in a conventionally hardwired remote

shutdown system (RSD) with 2 divisional panels containing analog or simple, dedicated and diverse software based digital equipment. Local displays of process variables in RSD system are continuously powered and so are available for monitoring at any time.

The Anticipated Transient Without Scram (ATWS) mitigation functions use diverse control logics from the primary protection system but are not necessarily hardwired:

- (1) Alternate Rod Insertion, in association with the Rod Control and Information System (RCIS).
- (2) Fine Motion Control Rod Drive (FMCRD) run-in
- (3) Automatic Depressurization System (ADS) inhibit
- (4) Automatic Standby Liquid Control System (SLC) initiation
- (5) Feedwater Control System (FWC) runback

Q4) What regulatory guidance is there in your country regarding the need for diverse actuation systems?

Ans:

NRC document SECY-93-087 and Standard Review Plan Section 7.8.

附件八

RIS-06-021 資料

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
WASHINGTON, DC 20555-0001

September 28, 2006

**NRC REGULATORY ISSUE SUMMARY 2006-21:
IMPROVING RESPONSE CAPABILITIES THROUGH THE USE OF AN
INCIDENT RESPONSE ELECTRONIC LIBRARY**

ADDRESSEES

All holders of operating licenses for nuclear power reactors, except those who have permanently ceased operations and have certified that fuel has been permanently removed from the reactor vessel.

INTENT

The U.S. Nuclear Regulatory Commission (NRC) is issuing this regulatory issue summary (RIS) to request licensee cooperation in obtaining documents that would improve the agency's ability to respond to an emergency at a nuclear power plant. This RIS requests licensees provide the documents that are listed in the enclosures in electronic, Adobe Acrobat (Adobe) format.

BACKGROUND INFORMATION

During an emergency, NRC must independently evaluate the situation and the licensee's protective action recommendations to State and local officials. NRC provides assistance and advice to State and local officials to help ensure that the protective actions taken are in the best interest of public health and safety. In addition, during an emergency that activates the National Response Plan, NRC is the coordinating Federal agency for its licensees and is responsible for facilitating all communications between the licensees and the Federal Government. In such a situation, NRC is the primary source of information for other Federal agencies, the source of information the Federal Government provides to the public, and the conduit for assistance from the Federal Government to the licensees.

To perform these functions effectively, NRC needs to provide its emergency responders with information that would allow them to quickly and efficiently evaluate a licensee's situation. Thus, NRC has developed an electronic repository of critical plant information to provide to NRC emergency responders: Incident Response Electronic Library. This electronic repository, or "e-Library," will be located on an NRC server and will contain plant information that is readily accessible, easily shared, highly reliable, and up-to-date. The e-Library will allow NRC and the licensee to access the same information during an event.

To test the effectiveness of the e-Library, NRC conducted a four-plant pilot with the Beaver Valley, Monticello, Seabrook, and Wolf Creek nuclear plants. During this pilot, NRC tested (1) the feasibility of gathering the needed information and (2) the ease of converting the licensees' documents into a usable and shareable format (i.e., Adobe). After the NRC staff refined the agency's processes, the licensees at the four plants produced the documents quickly and easily. The average collection time during the pilot was 15 hours per plant.

ML062010152

The NRC staff found that most documents were available in Adobe format or were able to be easily converted into Adobe format.

SUMMARY OF ISSUE

The purpose of this RIS is to request licensees' cooperation and assistance in providing the documents listed in Enclosures 1 or 2. With these documents, NRC will be a more efficient and effective response partner and will increase situational and informational awareness during a licensee's emergency.

The NRC staff will insert the documents listed in Enclosures 1 or 2 into the easy-to-use framework of the e-Library. The e-Library then will be NRC's primary method of storing, organizing, and displaying incident response documents. NRC then will eliminate the current method of storing cumbersome and outdated hard-copy versions of response documents. The new method will improve the effectiveness and efficiency of incident response, thereby reducing the potential for human error and dramatically reducing the licensee's communications burden during an event.

Submission of this information is voluntary and not required by regulation. However, NRC believes that providing the information will be advantageous to both the industry and NRC. The value of the e-Library was demonstrated during the biennial exercises with the Braidwood, Monticello, Seabrook, and Wolf Creek nuclear plants. The NRC staff installed the information gathered through the pilot in the e-Library and effectively used the e-Library during these plants' biennial exercises. The e-Library significantly reduced the need for the licensees to send plant information to NRC during the exercise, reducing the number of questions and requests for information from NRC to the licensee by more than 50 percent.

The e-Library initiative has been discussed at several industry emergency preparedness forums. The reaction has been positive. Industry representatives consider the e-Library to be beneficial to both licensees and the NRC staff. NRC has briefed the Nuclear Energy Institute's Emergency Preparedness Working Group on this initiative.

NRC would appreciate receiving the documents listed in the applicable enclosure within approximately 90 days of the issuance of this RIS. The requested documents should be formatted as Adobe files, copied to a CD-ROM, and mailed to the Deputy Director for Incident Response, Mail Stop: T-4L7, 11545 Rockville Pike, Rockville, MD 20852-2738. To ensure that NRC has current information, a streamlined process for updating the e-Library is being developed and will be shared with licensees at a future date.

NRC will use the provided documents for incident response purposes and will label them as controlled documents. These documents will not be made available routinely to the public but could be subject to a Freedom of Information Act (FOIA) request. Documents that contain sensitive information should be labeled according to the guidance set forth in RIS 2005-26.

VOLUNTARY RESPONSE

This RIS requests licensee assistance in obtaining documents relevant to responding to an emergency at the licensee's facility. Addressees that choose to participate may do so by submitting the documents listed in the applicable enclosure in accordance with the guidance

contained in this RIS. Submission of this information is voluntary and is not a backfit under Title 10 of the *Code of Federal Regulations* Section 50.109, "Backfitting" (10 CFR 50.109). However, NRC believes that providing the information will be advantageous to both the industry and NRC.

BACKFIT DISCUSSION

This RIS requires no action or written response. Any action on the part of addressees to provide the documents listed in the applicable enclosure in accordance with the guidance contained in this RIS is strictly voluntary and, therefore, is not a backfit under 10 CFR 50.109. Consequently, the NRC staff did not perform a backfit analysis.

FEDERAL REGISTER NOTIFICATION

NRC did not publish a notice of opportunity for public comment on this RIS in the *Federal Register* because it pertains to an administrative aspect of the regulatory process that involves the voluntary submission of information on the part of addressees.

CONGRESSIONAL REVIEW ACT

This RIS is not a rule as designated by the Congressional Review Act (5 U.S.C. §§ 801-888) and, therefore, is not subject to the Act.

PAPERWORK REDUCTION ACT STATEMENT

This RIS contains information collection requests that are subject to the Paperwork Reduction Act of 1995 (44 U.S.C. § 3501 et seq.). These information collections were approved by Office of Management and Budget (OMB), Approval No. 3150-0011, which expires February 28, 2007. The burden to the public for these voluntary information collections is estimated to average 15 hours per response for respondents who already have the documents requested in Adobe electronic format and 20 hours per response for respondents who must convert their existing documents into Adobe electronic format. The burden hours per response include the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the information collection.

Send comments regarding this burden estimate or any other aspect of these information collections, including suggestions for reducing the burden, to the Records and FOIA/Privacy Services Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001, or by Internet electronic mail to Infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0011), Office of Management and Budget, Washington, DC 20503. (Note that NRC may not conduct or sponsor, and a person is not required to respond to, a request for information or an information collection requirement unless the requesting document displays a currently valid OMB control number.)

CONTACT

Please direct any questions about this matter to the technical contact listed below.

/RA by John W. Lubinski for/

Ho K. Nieh, Acting Director
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Technical Contact: Michael I. Dudek, NSIR/DPR
301-415-6500
E-mail: mid@nrc.gov

Enclosures:

1. Pressurized Water Reactor Documents for the Incident Response Electronic Library
2. Boiling Water Reactor Documents for the Incident Response Electronic Library

Note: NRC generic communications may be found on NRC public Web site, <http://www.nrc.gov>, under Electronic Reading Room/Document Collections.

Pressurized Water Reactor Documents for the Incident Response Electronic Library

The documents that NRC is requesting from you in electronic Adobe Acrobat format are listed below:

- Current Site Photographs & Layout Drawings
 - Aerial Photographs (3-4 in Numerous Directions)
 - Side-View Photographs (2-3 in Numerous Directions)
 - Site Layout Drawings (Simplified and Detailed Drawings with Labeled Buildings and Major Structures)

- Simplified Plant Drawings
 - Building Layout Drawings (Floor Layouts of Major Buildings, Labeled Major Pieces of Machinery) (e.g., Pre-Fire Strategy Notebooks)
 - Simplified One-Line Diagrams of Plant Systems (Generally Used in Operator Training Materials) or P&IDs
 - Reactor Vessel Water Level Drawings
 - Release Pathway Drawings

- Operating Procedures
 - Emergency Operating Procedures (EOPs)
 - Abnormal Operating Procedures (AOPs)
 - Functional Restoration Procedures (FRPs)
 - Contingency Action Procedures (CAPs)
 - Critical Safety Function Status Trees

- Severe Accident Management Guidelines (SAMGs)
 - Severe Accident Control Room Response Guides (SACRGs)
 - Severe Challenge Status Trees (SCSTs)
 - Severe Accident Guides (SAGs)
 - Severe Challenge Guides (SCGs)
 - Computational Aids (CAs)

- Emergency Plans (EPs)
 - Radiological Emergency Plan (REP)
 - Emergency Plan Implementing Procedures (EPIPs)
 - Emergency Action Level (EAL) Flowcharts
 - Protective Action Recommendation (PAR) Flowcharts
 - EPZ Maps (10- and 50-mile EPZ Maps)
 - Siren Location Maps

- Organization Charts and Contact Information
 - Utility Org. Chart and Contact Information
 - Plant Org. Chart and Contact Information
 - Emergency Response Facility Directory

Boiling Water Reactor Documents for the Incident Response Electronic Library

The documents that NRC is requesting from you in electronic Adobe Acrobat format are listed below:

- Current Site Photographs & Layout Drawings
 - Aerial Photographs (3-4 in Numerous Directions)
 - Side-View Photographs (2-3 in Numerous Directions)
 - Site Layout Drawings (Simplified and Detailed Drawings with Labeled Buildings and Major Structures)

- Simplified Plant Drawings
 - Building Layout Drawings (Floor Layouts of Major Buildings, Labeled Major Pieces of Machinery) (e.g., Pre-Fire Strategy Notebooks)
 - Simplified One-Line Diagrams of Plant Systems (Generally Used in Operator Training Materials) or P&IDs
 - Reactor Vessel Water Level Drawings
 - Release Pathway Drawings

- Operating Procedures
 - Emergency Operating Procedures (EOPs)
 - EOP Flowcharts

- Severe Accident Management Guidelines (SAMGs)

- Emergency Plans (EPs)
 - Radiological Emergency Plan (REP)
 - Emergency Plan Implementing Procedures (EPIPs)
 - Emergency Action Level (EAL) Flowcharts
 - Protective Action Recommendation (PAR) Flowcharts
 - EPZ Maps (10- and 50-mile EPZ Maps)
 - Siren Location Maps

- Organization Charts & Contact Information
 - Utility Org. Chart and Contact Information
 - Plant Org. Chart and Contact Information
 - Emergency Response Facility Directory

附件九

SRP 第七章第五版目錄

NUREG-0800
STANDARD REVIEW PLAN (SRP) FOR THE REVIEW OF
SAFETY ANALYSIS REPORTS FOR NUCLEAR POWER PLANTS

This web-page will be updated on March 30, 2007, to reflect the March 2007 revision to the SRP. The March 2007 revision is based on the anticipated Part 52 Rulemaking with the exception of Chapter 19. Following Commission affirmation on the Rulemaking, a schedule will be provided for the issuance of Chapter 19 and any other sections that may be impacted by the Rulemaking. [NUREG-0800](#) web-site will be updated in the near future. NOTE: The Branch Technical Positions (BTPs) are now individual sections in the appropriate chapter, e.g., BTP 7-1 is located in Chapter 7, BTP 8-1 is located in Chapter 8.

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7.1, Rev. 5	Instrumentation and Controls - Introduction	03/2007
7.1-T, Second Rev. 5	Table 7-1 Regulatory Requirements, Acceptance Criteria, and Guidelines for Instrumentation and Control Systems Important to Safety	03/2007
Appendix 7.1-A, Second Rev. 5	Acceptance Criteria and Guidelines for Instrumentation and Control Systems Important to Safety	03/2007

Section/Revision	Title	Date
Appendix 7.1-B, Rev. 5	Guidance for Evaluation of Conformance to IEEE Std. 279	03/2007
Appendix 7.1-C, Rev 5	Guidance for Evaluation of Conformance to IEEE Std. 603	03/2007
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Appendix 7-A, Rev. 5	Branch Technical Positions	Appendix 7-A, Rev. 5, Branch Technical Positions (BTP) (02/20/2007), has been separated into individual sections.
Appendix 7-B, Rev. 5 Appendix 7-A, Rev. 5	General Agenda, Station Site Visits	03/2007
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Branch Technical Position 7-3, Rev. 5	Guidance on Protection System Trip Point Changes for Operation With Reactor Coolant Pumps Out of Service	03/2007
Branch Technical Position 7-4, Second Rev. 5	Guidance on Design Criteria for Auxiliary Feedwater Systems	03/2007
Branch Technical Position 7-5, Rev. 5	Guidance on Spurious Withdrawals of Single Control Rods in Pressurized Water Reactors	03/2007
Branch Technical Position 7-6, Rev. 5	Guidance on Design of Instrumentation and Controls Provided to Accomplish Changeover from Injection to Recirculation Mode	03/2007
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Branch Technical Position 7-19, Rev. 5	Guidance for Evaluation of Diversity and Defense-in-Depth in Digital Computer-Based Instrumentation and Control Systems	03/2007
Branch Technical Position 7-21, Rev. 5	Guidance on Digital Computer Real-Time Performance	03/2007