SAND2012-8492P

2012 GNEII Steering Committee Meeting

Gulf Nuclear Energy Infrastructure Institute
11 October 2012

Meeting Agenda (1/2)

Morning

- **0900-0915** **Agenda Overview & Introductions**
- **0915-0930** **Review minutes from 2011 SCM**
- **0930-1015** **GNEII Overview**
- ***1015-1045*** ***Break***
- **1045-1230** **GNEII 2013 Course Discussion**
  - 2012 Fundamentals Course Review
  - Lessons Learned and Fellows Feedback
  - 2013 Fundamentals Course Structure

- ***1230-1330*** ***Lunch***

Meeting Agenda (2/2)

Afternoon

- **1330-1500** **GNEII Project Management (I)**
  - Budget & Financial Review
  - GNEII Accreditation
  - Technical Demonstration Area
  - GNEII Website

- ***1500-1530*** ***Break***

- **1530-1700** **GNEII Project Management (II)**
  - Regional Expansion Strategy
  - GNEII Alumni Engagement Efforts
  - 2013 Senior Research Fellow
  - Curriculum & Integration with KU

- **1700-1730** **Concluding Discussion**

- ***1900-2100*** ***GNEII Steering Committee Dinner***

Welcome & Introduction (1/2)

GNEII is a Strategic Partnership

- UAE Partners
  - Sponsorship & implementation
    - **Khalifa University of Science, Technology & Research**
  - Support from
    - Federal Authority for Nuclear Regulation (**FANR**)
    - Emirates Nuclear Energy Corporation (**ENEC**)
    - Critical National Infrastructure Authority (**CNIA**)
- US Partners
  - Sponsorship
    - **DOE/NNSA** – International Nuclear Safeguards and Engagement Program (INSEP)
    - **DOS/CTR** – Partnership for Nuclear Security (PNS)
  - Implementation
    - Sandia National Laboratories (**SNL**)
    - Texas A&M University (**TAMU**)

Mr. Abdelaziz Al Madhloum

Welcome & Introductions (2/2)

GNEII Steering Committee responsibilities

- overall business planning
- setting strategic goals
- policy determination for GNEII

Steering Committee Members

- Chairman: **Dr. Mohammed Ebrahim Al-Mualla**
- UAE Members & Observers
  - Khalifa University: **Mr. Abdelaziz Al Madhloum, Prof. Philip Beeley**
  - FANR: **Mr. Jalal Al Hashemi**
  - ENEC: **Ms. Hanane Zejley**
  - CNIA: **Mr. Farhan Al Murar**
  - Observer - GNEII Senior Research Fellow: **Dr. B.K. Kim**
- US Members & Observers
  - Sandia National Laboratories: **Dr. Amir Mohagheghi**
  - Nuclear Security Science & Policy Institute Texas A&M University: **Dr. David Boyle**
  - Observers
    - Department of Energy: **Mr. Scott Purvis**
    - Department of State: **Ms. Julie Mills**
    - Sandia National Laboratories: **Dr. Robert Finch**
    - Texas A&M University: **Dr. Michael Schuller**

Review 2011 Steering Committee Meeting Minutes

Mr. Abdelaziz Al madhloum

GNEII Review & Update

Dr. Amir Mohagheghi

GNEII History

- Initial Conceptual Discussions

Spring/Summer 2009

Fall 2009

- International Consultations & Gulf/Middle East Regional Scoping Trip

- Letter of Intent Signed

March 2010

2011

- Memorandum of Understanding (February)
- GNEII Pilot Course (Spring)
- 1st Steering Committee Meeting (Fall)
- International Conferences

- GNEII Fundamentals Course (4 Modules)
- International Conferences
- GNEII Symposium

2012

GNEII Review & Update (1/9)

GNEII is …

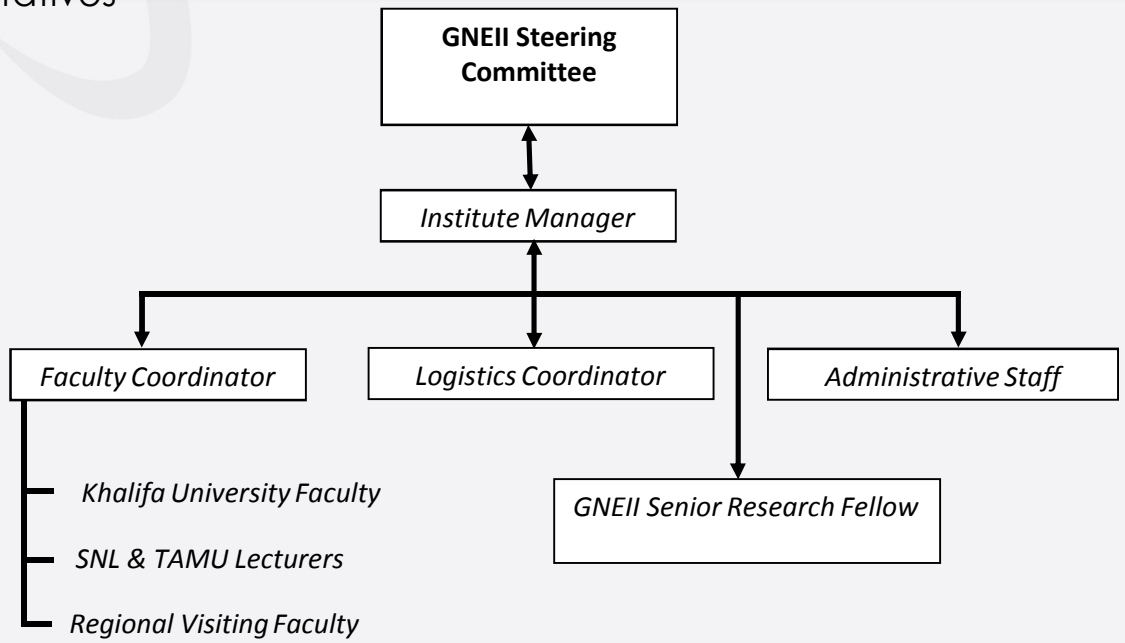
- **Regionally based**
  - Institution to develop human-resource capability
  - Future nuclear program decision makers
- **An Education & Development Institute**
  - Nuclear-energy infrastructure plus integrated safeguards, safety, and security (3S)
  - Regional context
- **A Strategic effort**
  - Integrated 3S culture for a responsible national nuclear-energy program
  - Educate mid-level managers and regulators on the basics of nuclear power

GNEII is not intended to train nuclear engineers or operators

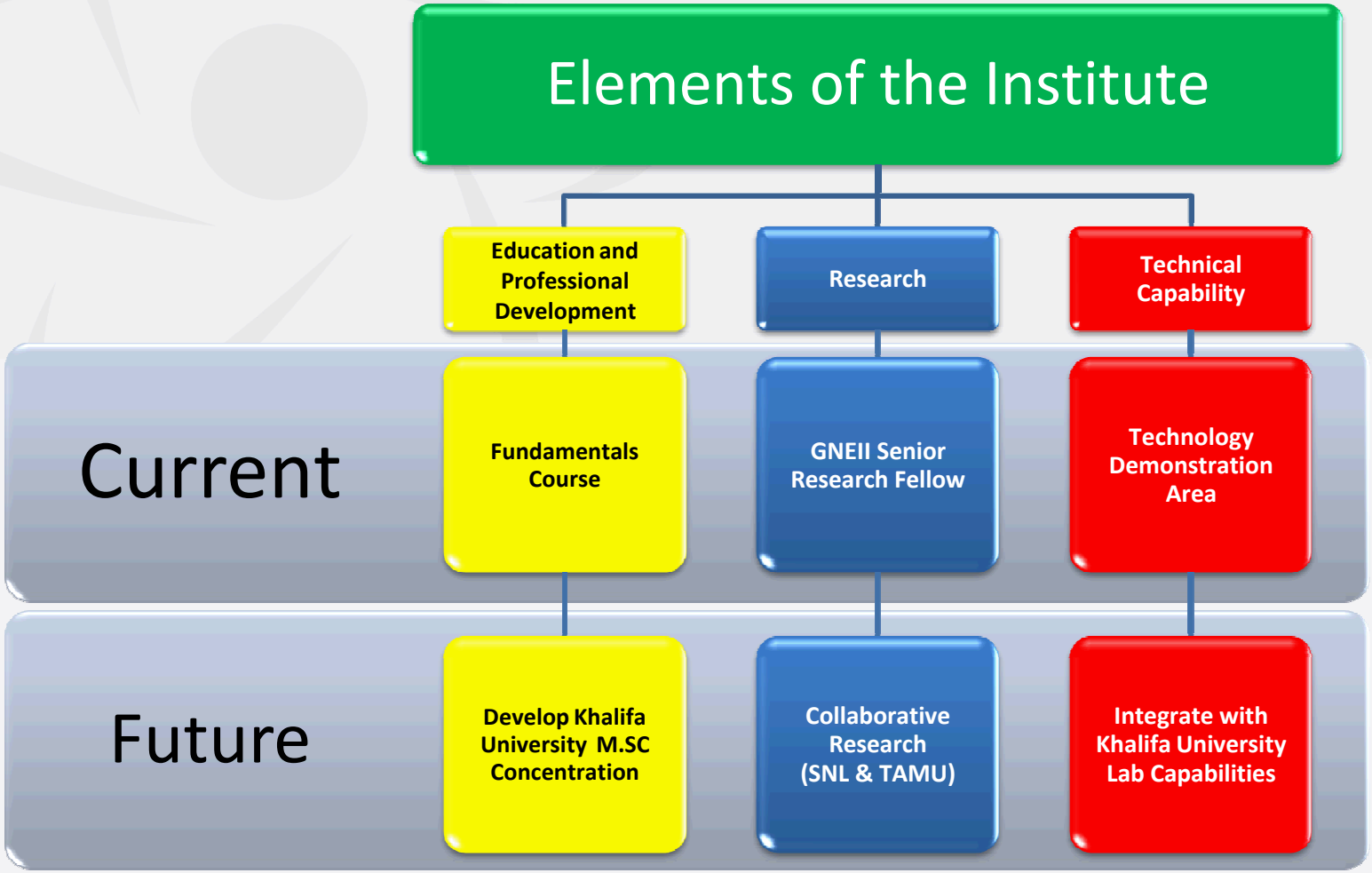
GNEII Review & Update (2/9)

Management & Operation

- Institute Staff
  - Daily operation & management
  - Manager & local staff from Khalifa University
- Steering Committee
  - Set goals & policies
  - Khalifa University, ENEC, FANR, CNIA, SNL, & TAMU
  - Regional Representatives



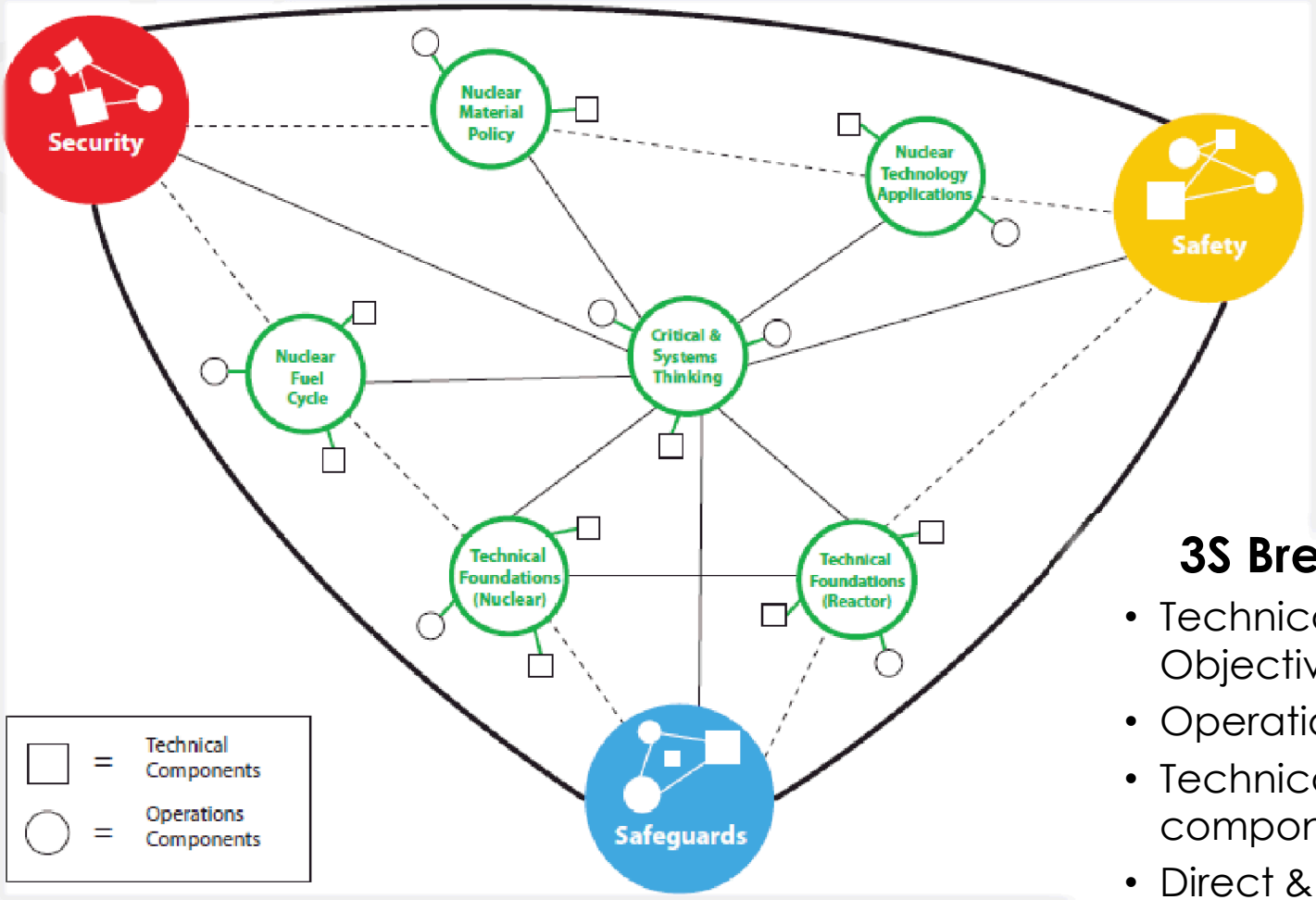
GNEII Review & Update (3/9)



GNEII Review & Update (4/9)

- Institutional Development & Capacity Building
  - Business Operations Plan
    - Framework for multinational, multi-organizational leadership team
    - Repository of institutional memory
  - Management & Operations
    - Financial & operational sustainability planning
    - Primary Point of Contact for GNEII
  - Regional Expansion
    - Increase from 2011 Pilot Course to 2012 Fundamentals Course
      - **11(9)** → **26(22)** Fellows (~double)
      - **1**→ **5** Regional States (UAE, Kuwait, Saudi Arabia, Qatar, Jordan)
- Bolstering Institute Elements
  - Education
  - Research
  - Technical Capability

Integrated Curriculum Design



3S Breakdown

- Technical & Design Objectives
- Operational Objectives
- Technical & operational components
- Direct & indirect connections

Education and Professional Development

2012 GNEII Fundamentals Course

- Week #1 – Critical & Systems Thinking, The Scientific Method
- Week #2 – Technical Foundations I
- Week #3 – Technical Foundations II
- Week #4 – The Nuclear Fuel Cycle

Module I: Nuclear Energy Technical Foundations

- Week #5 – Nuclear Technology Applications
- Week #6 – Nuclear Materials Control, History & Policy
- Week #7 – Nuclear Safeguards: Technical Design & Objectives
- Week #8 – Nuclear Safeguards: Operations Objectives

Module II: Nuclear Energy Nonproliferation & Safeguards

- Week #9 – Nuclear Security: Technical Design & Objectives
- Week #10 – Nuclear Security: Operations Objectives
- Week #11 – Nuclear Safety: Technical Design & Objectives
- Week #12 – Nuclear Safety: Operations Objectives

Module III: Nuclear Energy Security & Safety

- Week #13 – Capstone Introduction
- Week #14 – Capstone Research
- Week #15 – Capstone Research
- Week #16 – Capstone Presentation

Module IV: Capstone

– ***New Topics Added***
- *Economics of nuclear power*
- *Nuclear technical applications*
- *Cyber security*

– ***Topics Reordered***
- *Technical Foundations*
- *More time for Capstone*

– ***GNEII Lecturer Series***
- *Former IAEA Rep*
- *WINS Rep*
- *MESIS Rep*

GNEII Review & Update (8/9)

Research

– *Inaugural GNEII Senior Research Fellow*

• ***Dr. BK Kim***

– *Korean Atomic Energy Research Institute (30 years)*
– *Establish national safeguards system (SSAC)*
– *International Atomic Energy Agency, Dept of Technical Cooperation (7 years)*
▪ *Member of Standing Advisory Group of Safeguards Implementation (SAGSI)*

Developing GNEII's Research Framework

Research papers in progress

1. *"3S Integration"*
2. *"Gulf Cooling"*

GNEII Review & Update (9/9)

Technical Capability

Technology Demonstration Area

- *Create a "GNEII Display Board"*
- *Procure 3S related equipment*
- *Establish a "3S Laboratory" at Khalifa University*

Environmental Radiation Lab

Reactor Analysis, Design and Instrumentation Controls Lab

Radiation Sciences Lab

BREAK

2012 Fundamentals Course Review

Dr. Michael Schuller

Fundamentals Course Review (1/3)

- **2012**
  - 26 Fellows Enrolled
    - 20 males, 6 females
    - FANR, ENEC, CNIA
    - Kuwait, Saudi Arabia, Qatar, Jordan
- **2011**
  - 11 UAE Fellows Enrolled
    - 9 males, 2 females
    - FANR, ENEC, CNIA

Fundamentals Course Review (2/3)

- Participation
  - 14 Fellows attended all four modules
  - 5 Fellows attended three of four modules
  - 1 Fellow attended two of four modules
  - 6 Fellows attended one of four modules
- Capstone
  - 11 separate projects
    - Several Fellows who were unable to attend Module IV are still working with their project teams remotely
    - All 11 projects are strongly tied to the Fellows regular job duties
  - Feedback indicates desire for more early emphasis on capstone work

Fundamentals Course Review (3/3)

- Periodic exams
  - important to focus students' efforts
- Problem solving
  - Students tend to work as groups (promotes team work)
  - Need to place greater emphasis on individual work
- Connecting material to UAE work was helpful
  - Keeps course relevant, but …
  - Including GCC Fellows creates challenges

Lessons Learned and Fellows Feedback

Dr. Michael Schuller

Lessons Learned and Fellows Feedback (1/3)

- Content
  - Fellows generally comfortable with content
    - Some complaints about duplication of material
    - Repetition can be helpful, though
  - Sequence of topics worked well
  - Weekly projects well received
  - Fellows recommend …
    - More discussions & case studies
    - Less lecturing

Lessons Learned and Fellows Feedback (2/3)

- MODULAR 2012 Fundamentals Course
  - Travel is burdensome
    - Logistical difficulties
    - Visa issues
    - Work difficulties
      - little accomplished during 3-week breaks
      - outside travel interfered with attendance, especially during Capstone
    - Travel Funding
      - Non-UAE Fellows
  - Course length makes it difficult to integrate Khalifa faculty
    - Overlaps two academic semesters (Year-long commitment)
  - Students largely recommended return to 2011 format
    - Noted that supervisors viewed them as "available" even during class time
    - Breaks too short to accomplish much at work
  - Partial completion of 8 Fellows
- SEMESTER 2011 Pilot Course
  - 13 straight weeks of curriculum
    - long & draining
  - Integrated the capstone into a semester format
    - Beneficial, but not well planned for Pilot Course

Lessons Learned and Fellows Feedback (3/3)

- Lessons Learned Analysis & Fellows Feedback
  - ➢ *2012 Modular Format is Problematic*
    - Course structure affects GNEII's sustainability
  - – Fewer breaks & less travel
  - – Modify schedule
  - – Increase 3S integration
  - – Modify some topics
  - – Integrate Capstone

➢ Discuss structure for 2013 Course …

2013 Fundamentals Course Structure

Dr. Michael Schuller

2013 Fundamentals Course Structure (1/8)

- Course Objective
  - Comprehensive education on *nuclear energy program infrastructure*
    - Responsible National Nuclear Energy Program
  - Emphasize a *Systems Approach* to nuclear safeguards, security, and safety ("3S")
- Course Attributes
  - Introduce *Systems Thinking*, *Critical Thinking*, and basic *Atomic & Reactor Physics*
  - *Capstone* project
  - *Technical* & *Operational* aspects of 3S
- Desired Course Characteristics
  - Single academic semester
  - Minimize travel
    - Accommodate UAE visa requirements for non-UAE Fellows
  - Integrate capstone throughout course
  - Consistency among all 3S topics

➢ What course structure can best capture the above?

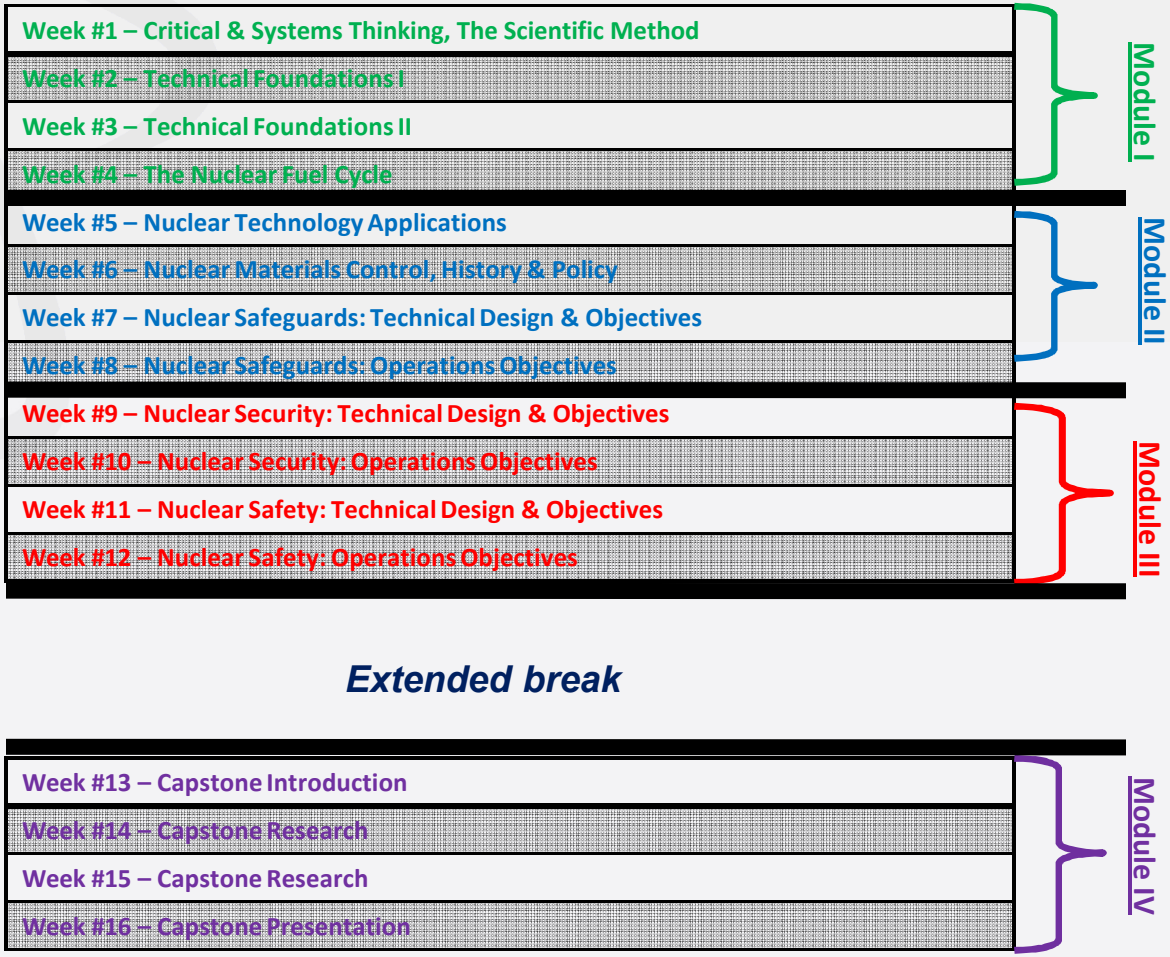
2013 Fundamentals Course Structure (2/8)

- **Similar to 2012Course**

- **Pros**
  - More "soak time"
  - Dedicated Capstone module
  - More material (extensive)
  - Return to work @ breaks
    - apply course material at job

- **Cons**
  - Year-long commitment
    - 2 semesters
  - Difficult to integrate KU faculty
  - Potential knowledge loss during breaks
  - Mixed attendance
  - Visa problems

Module Option



2013 Fundamentals Course Structure (3/8)

Similar to 2011Pilot Course

- **Pros**
  - Single semester
  - Can use existing KU faculty
  - No Breaks
    - no knowledge loss
  - Topical depth & detail
  - Extended time with instructors & other Fellows
    - networking & relationship building

- **Cons**
  - Long absence from jobs & family
  - A lot of information quickly
    - no "soak time"
  - Risk of "burn-out"
  - Risk of reduced enrollment
    - Extended work absence

New Semester Option

Week #1 – Critical & Systems Thinking, The Scientific Method	
Week #2 – Technical Foundations I	
Week #3 – Technical Foundations II	
Week #4 – The Nuclear Fuel Cycle	
Week #5 – Capstone Preparation (3 days)	Break (2 days)
Week #6 – Nuclear Technology Applications	
Week #7 – Nuclear Materials Control, History & Policy	
Week #8 – Nuclear Safeguards: Technical Design & Objectives	
Week #9 – Nuclear Safeguards: Operations Objectives	
Week #10– Capstone Preparation (3 days)	Break (2 days)
Week #10 – Nuclear Security: Technical Design & Objectives	
Week #11 – Nuclear Security: Operations Objectives	
Week #12 – Nuclear Safety: Technical Design & Objectives	
Week #13 – Nuclear Safety: Operations Objectives	
Week #14– Break (2 days)	Capstone Preparation (3 days)
Week #15 – Capstone Preparation/Presentation	

2013 Fundamentals Course Structure (4/8)

Modified Modular Format (MMF)

	Day 1	Day 2	Day 3	Day 4	Day 5
Week 1	**Introduction to 3S, Critical Thinking, and Systems Thinking**				
Week 2	**Technical Foundations**: Introdution to Nuclear Physics, Radiation, & Nuclear Power				
Week 3	Capstone Intro / 3S Interactions	**Technical Foundations**: Nuclear Power Plant Operations & Management			
Week 4	CAPSTONE / 3S Interactions	**Technical Foundations**: Nuclear Fuel Cycle			CAPSTONE
Week 5	CAPSTONE / 3S Interactions	**Technical Foundations**: Nuclear Materials Control, History & Policy			CAPSTONE
(Weeks 6 - 10)	---------- 5 WEEK BREAK ----------				
Week 11 (6)	**SAFEGUARDS** (Tools, Systems Design, Applications, Assessments, Case Studies, Excercises)				Model NFC Exercise
Week 12 (7)	**SAFEGUARDS** (Tools, Systems Design, Applications, Assessments, Case Studies, Excercises)				Model NFC Exercise
Week 13 (8)	**SECURITY** (Tools, Systems Design, Applications, Assessments, Case Studies, Excercises)				Model NFC Exercise
Week 14 (9)	**SECURITY** (Tools, Systems Design, Applications, Assessments, Case Studies, Excercises)				CAPSTONE
Week 15 (10)	**SAFETY** (Tools, Systems Design, Applications, Assessments, Case Studies, Excercises)				CAPSTONE
Week 16 (11)	**SAFETY** (Tools, Systems Design, Applications, Assessments, Case Studies, Excercises)				CAPSTONE
Week 17 (12)	CAPSTONE	CAPSTONE	CAPSTONE	CAPSTONE Presentations & Certificates	CAPSTONE Presentations & Certificates

Pros

- Single semester
- Can use existing KU faculty
- Break between Fundamentals & 3S
- Limit "burn out"
- Moderate "soak time"
- Apply at work during break
- Minimal knowledge loss
- Consistent depth across all topics
- Integrated Capstone
- Resolves visa issue & mitigates attendance risks

Cons

- A lot of information in a short time
- Less material (condensed)
- Extra time & preparation if a Primer is added

2013 Fundamentals Course Structure (5/8)

Module Option

Pros

- More "soak time"
- Dedicated Capstone module
- More material (extensive)
- Return to work @ breaks
  - Apply course material at job

Cons

- Year-long commitment
  - 2 semesters
- Difficult to integrate KU faculty
- Some knowledge loss during breaks
- Risks attendance lapses
- Visa problems

New Semester Option

Pros

- Single semester
- Can use existing KU faculty
- No Breaks
- No knowledge loss
- Topical depth & detail
- Extended time with instructors & other Fellows
  - networking & relationship building

Cons

- Long absence from jobs & family
- A lot of information quickly
  - no "soak time"
- Risk of "burn-out"
- Risk of reduced enrollment
  - Extended work absence

MMF Option

Pros

- Single semester
- Can use existing KU faculty
- Break between Fundamentals & 3S
- Limit "burn out"
- Moderate "soak time"
- Apply at work during break
- Minimal knowledge loss
- Consistent depth across all topics
- Integrated *Capstone*
- Resolves visa issue & mitigates attendance risks

Cons

- A lot of information in a short time
- Less material (condensed)
- Extra time & preparation if a *Primer* is added

2013 Fundamentals Course Structure (6/8)

- Discussion
  - What format for the 2013 Fundamentals Course?
- Options
  - Semester
  - Module
  - MMF Option
- Recommendation
  - Keep Fundamentals Course within a single semester
    - Semester Option
    - MMF Option

2013 Fundamentals Course Structure (7/8)

- Discussion
  - When to begin 2013 Fundamentals Course?
- Options
  - Align GNEII schedule with Khalifa's academic calendar
    - MMF & Semester Format Options => single semester
    - Greatly simplifies task of integrating Khalifa faculty into program
  - Modular schedule would extend throughout school year
- Recommendation
  - MMF Option for 2013 Spring Semester
    - Begins 3 February 2013
      - 17 weeks (calendar time)
      - 11 weeks instruction
      - 1 week Symposium
      - Ends 30 May

2013 Fundamentals Course Structure (8/8)

- Discussion
  - If MMF Option is chosen – Do we need a Primer?
    - Permits fellows to enroll for second half only – 3S and capstone
- Options
  - Primer during week preceding second half of MMF
    - Web based, format as for 2012 Primer
    - Primer for 2013 MMF would require additional material
- Recommendation
  - Develop Primer for MMF option
    - Week before beginning of second half
      - April 7 - 11

LUNCH BREAK

GNEII Project Management (I)

Dr. Abdelaziz Al Madhloum

Budget & Financial Review

Mr. Abdelaziz Al Madhloum

Budget & Financial Review (1/5)

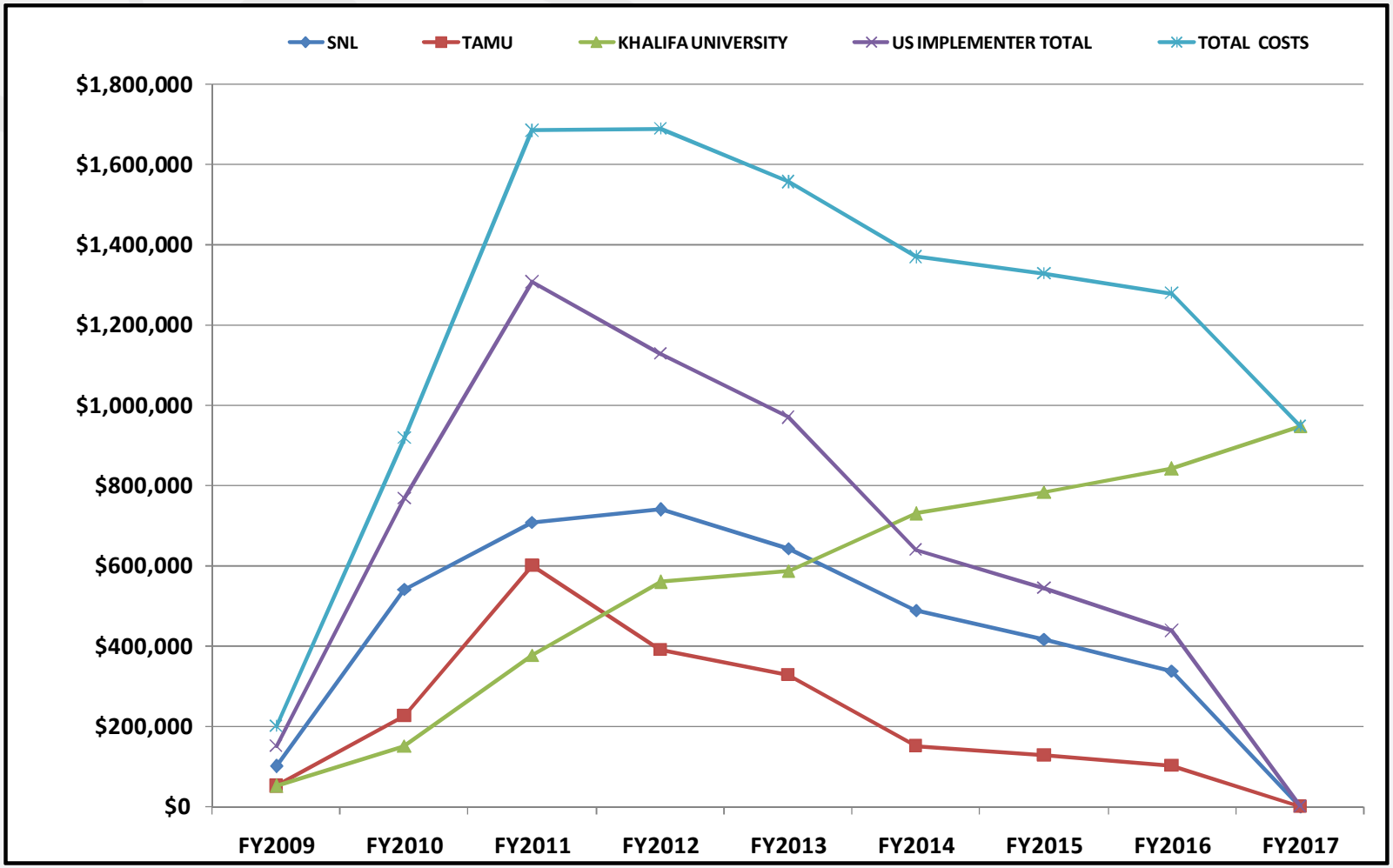
- Responsibility for GNEII operations & finances transition to UAE
  - GNEII will be autonomous within the MOU period (2011–2016)
  - Regionally funded and staffed with personnel capable of teaching all courses
    - Faculty Coordinator position transfers to KU after 2013
- Short Term
  - MOU Period Performance
    - Includes development and start-up costs *plus* operational costs
      - Clarify GNEII operational costs 2013-2016
- Long Term
  - Costs of out-year financial sustainability are primarily operational

Budget & Financial Review (2/5)

- Review budget plan for MOU period of performance
- Refine budget based on
  - Lessons learned from 2011 Pilot & 2012 Fundamentals Courses
    - Actual costs vs. estimated costs
  - Revisit budget annually during MOU period of performance
    - 2011 – 2016
  - Implementers provide analysis & cost projections
- Financial Sustainability
  - Financing GNEII *after* MOU period of performance
    - Long-term sustainability

Budget & Financial Review (3/5)

Past & Projected Operational Costs



Budget & Financial Review (4/5)

- Financial Sustainability
- Long-Term options
  - Leverage existing KU resources
    - Senior Research Fellow from Faculty
    - Faculty Coordinator
  - Additional funding support
    - Course fees
    - Institute-related event fees
    - Endowment
    - IAEA/TC - Regional Technical Cooperation project support
    - GCC support
    - Other?

Budget & Financial Review (5/5)

- Options for course fees (if considered)
  - Vary Fee structure with program format
    - Entire program vs. individual module vs. individual week
  - Scalable
    - "in-state" vs. "out-of-state"
  - Individual fellow sponsorships
    - Alternative to direct donations to GNEII

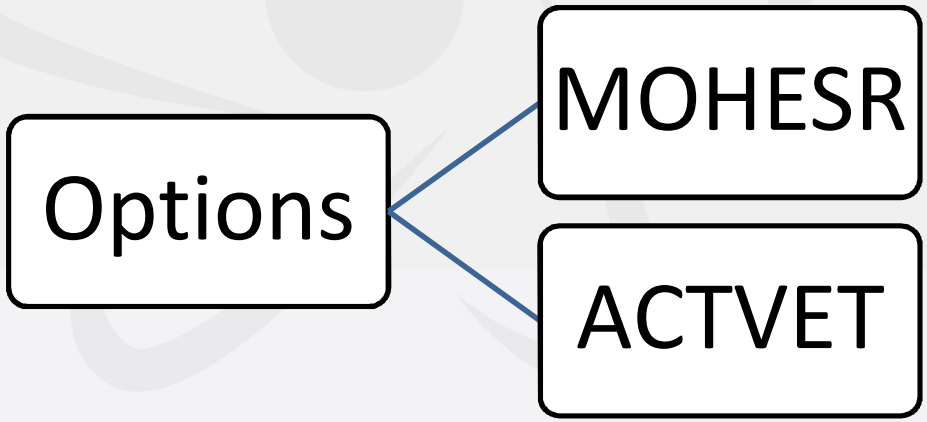
GNEII Accreditation

Mr. Abdelaziz Al Madhloum

GNEII Accreditation (1/8)

- Current credentials
  - 2012 fellows:
    - 21.6 CEU's from TAMU
    - "Certificate of Completion" from KU, SNL, TAMU
  - 2013 fellows:
    - 21.6 CEU's from TAMU
    - "Professional Nuclear Energy Safeguards, Security, & Safety Certificate"
- Intent is for GNEII certificate to be stand alone credential
  - Does GNEII credential have credibility in UAE?
  - If no, how can it gain credibility?
  - If yes, how can we spread or improve the credibility?

GNEII Accreditation (2/8)



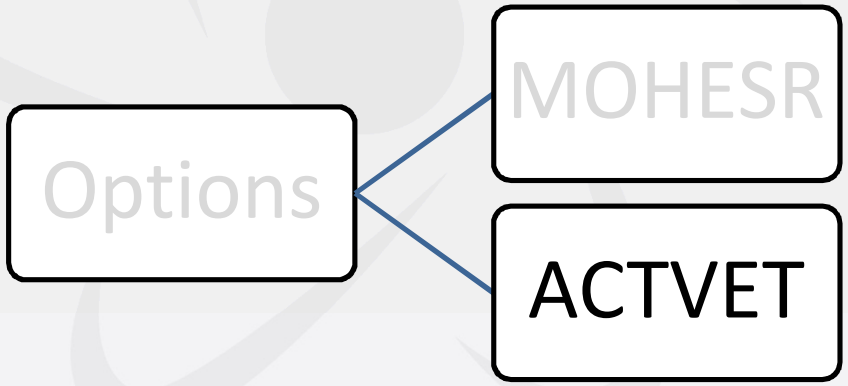
MOHESR

- Not possible for less than 1 year program.
- if Nuclear Theme added it will be accredited by default

ACTVET

- Possible for GNEII structure and business plan

GNEII Accreditation (3/8)



ACTVET

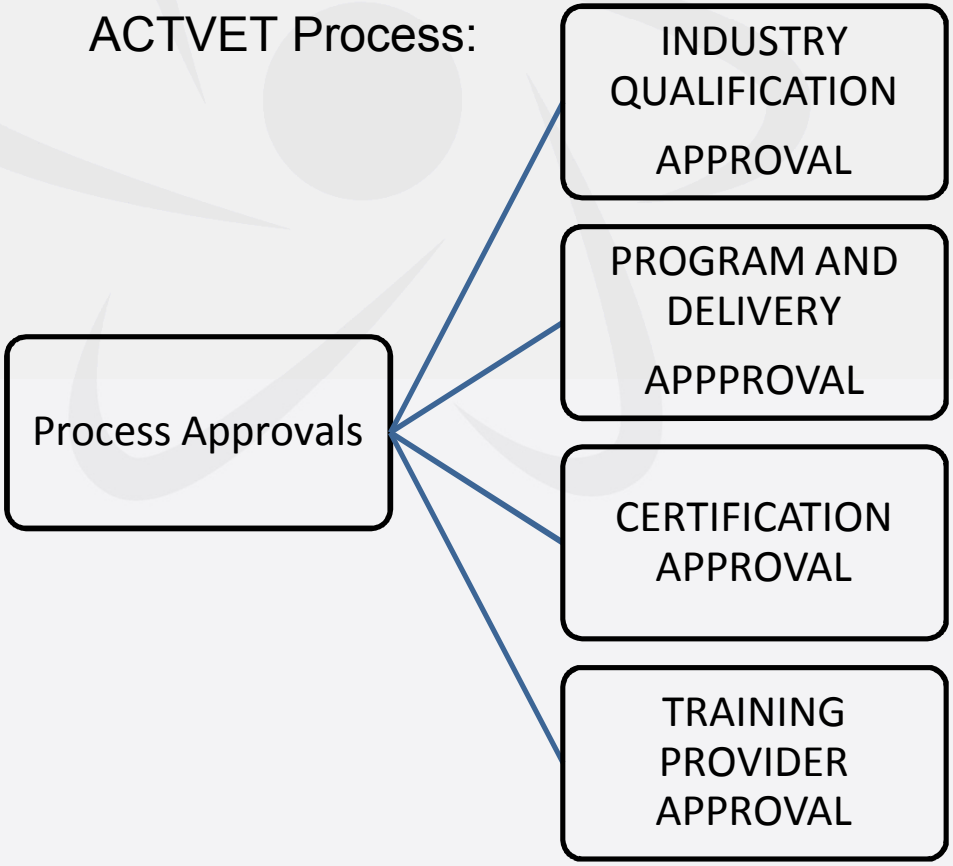
- Abu Dhabi Centre for Technical and Vocational Education and Training
  - Awarding body
  - Created by the Abu Dhabi Executive Council (2010)
  - Presides over technical and vocational training in Abu Dhabi
  - Qualifications Department of ACTVET is the administering office of the IAE and its committees
- ACTVET Goals
  - Increase the number of skilled young Emiratis employed in rewarding positions
  - Provide them opportunities for life-long learning and personal development

NQA

- National Qualifications Authority (Federal Entity)
  - ACTVET Accreditations will be endorsed.

GNEII Accreditation (4/8)

ACTVET Process:



Need to create Industry Advisory Executives

No need to do this, we are NPO and can use KU.

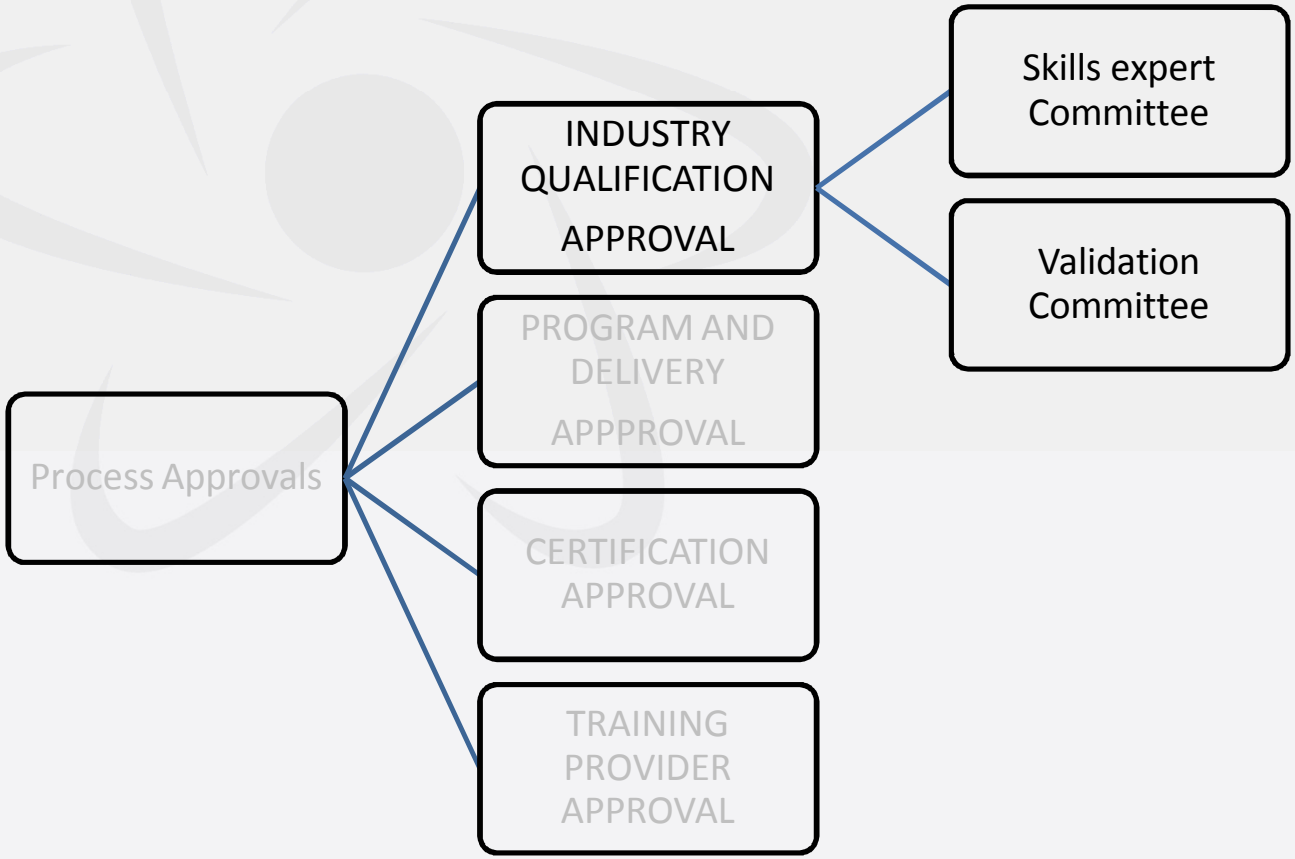
GNEII Accreditation (5/8)

- **Functions of the Industry Advisory Executive – Nuclear Industry**

- The functions of the Industry Advisory Executive are to:
  - Respond to Labour Market Information and Intelligence for qualifications designed specifically to meet industrial needs
  - Validate and verify qualifications are 'fit for purpose' and meet industries needs
  - Written qualifications meet the occupational standards required by industry

- To achieve its aims the Industry Advisory Executive will have an operational duty and will oversee the functioning of two sub-committees: the Skill Expert Committee and the Validation Committee.

GNEII Accreditation (6/8)



GNEII Accreditation (7/8)

- **3.1 Skill Expert Committee – Nuclear Industry**
- The functions of the Skill Expert Committee are to:

  Write and quality assure unit standards/qualifications for industry to match skill needs.

- **3.2 Validation Committee – Nuclear Industry**
- The functions of the Validation Committee are to:

  Validate technical writing accuracy of qualifications/unit standards as being able 'fit for purpose', appropriate for the UAE market, use valid assessment, equivalence knowledge, skill and performance demands across different occupational skill standard in industry.

GNEII Accreditation (8/8)

Current status of accreditation application

- Recommendations to move forward on the committee formation from existing partners personnel.

GNEII's relation to Khalifa University

1. Nuclear Engineering Department
   - Expanded MSc (further discussion to follow break)
     - TAMU support
2. Institute for International and Civil Security
   - Form specialization within M.A. program
     - "Nuclear safeguards, security and safety" track
   - Most likely path for graduate credit
   - Collaborative research projects
   - Other?

Technical Demonstration Area & Website Development

Mr. Abdelaziz Al Madhloum

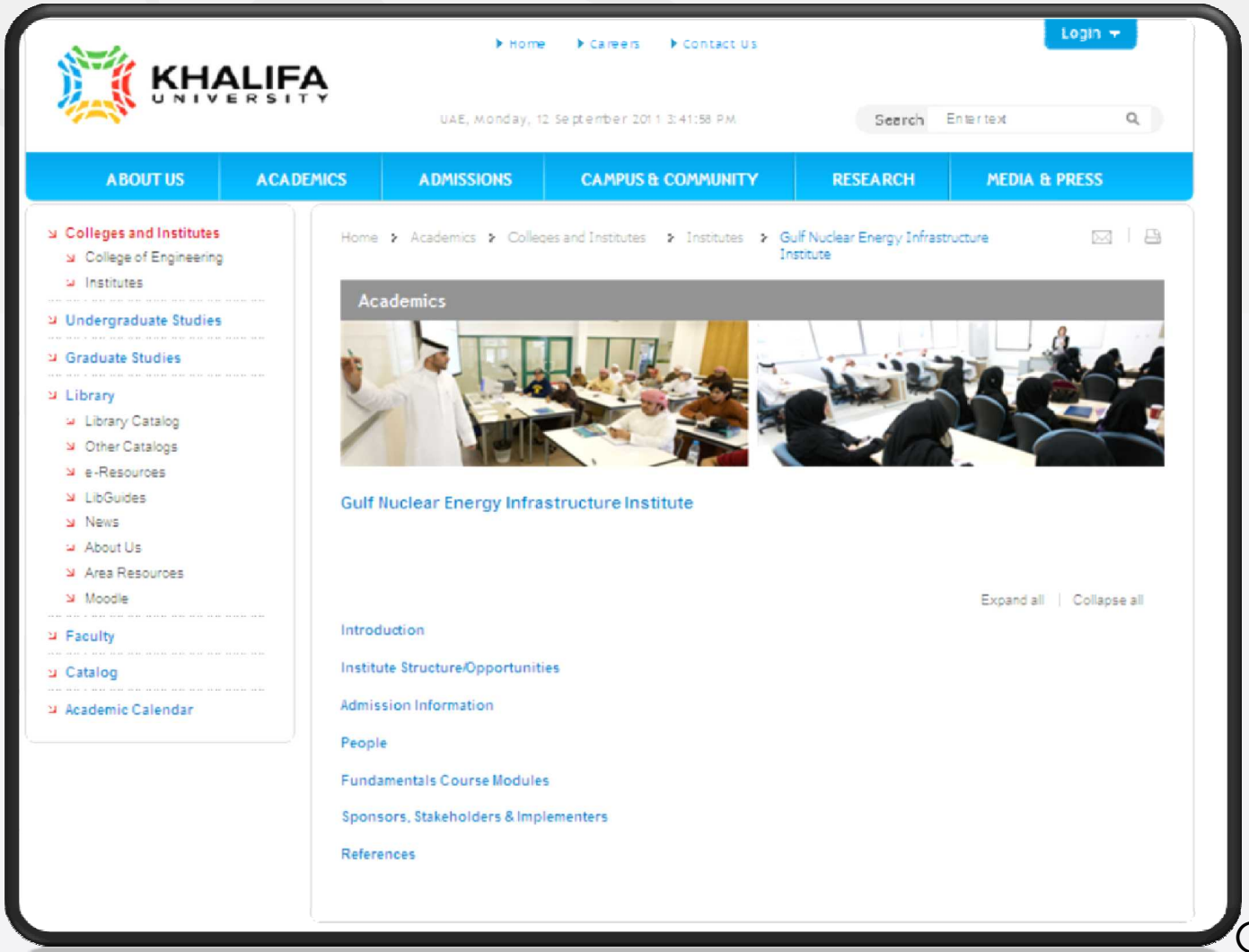
Technical Demonstration Area (1/1)

- Vision
  - Develop a technology demonstration space where nuclear safety, safeguards, and security technologies are displayed & demonstrated
- Implementation
  - Space has been identified
  - Sandia donating equipment
    - In process
      - Export-Control & Property Transfer requirements
  - Procure additional equipment as needed

Sandia/CMC Technical Demonstration Area (New Mexico)

GNEII Website Development (1/1)

- **Khalifa University domain**
  - Website structure parallel to KU's *Institute of International & Civil Security*
  - http://www.kustar.ac.ae/academics/collegesandinstitutes/institutes/gneii/gneii.aspx
- **Future stand-alone (but linked) website**



BREAK

GNEII Project Management (II)

Mr. Abdelaziz Al Madhloum

Regional Expansion Strategy

Mr. Abdelaziz Al Madhloum

Regional Expansion Strategy (1/3)

Rationale (MOU*)

- Khalifa University, SNL, and TAMU/NSSPI cooperate toward …
  - Operating GNEII as a regional educational, training, and research hub
  - Establishing and maintaining relevancy among participating Middle East states
    - *Regular participation of Fellows from regional states*
- GNEII to engage other regional states
  - Prepare for additional logistics
  - Methodology for handling costs
- Roles of the Institute
  - GNEII Manager
  - Senior Research Fellow
  - UAE Stakeholders
  - US Stakeholders
  - GNEII Steering Committee

*** Memorandum of Understanding among GNEII partners, signed February 2011**

Regional Expansion Strategy (2/3)

- 2013 Course
  - Course Capacity: ~20 Fellows
  - Expect all fellows to complete entire course
  - Deadline for identifying fellows = **6 weeks** before start
    - 20 December 2012
- Emirati Fellows
  - 2011 & 2012: FANR, ENEC, CNIA
  - Include other UAE organizations?
    - NCEMA
    - Customs Authority
- GCC and Regional Fellows
  - 2011 & 2012: Kuwait, Saudi Arabia, Qatar, Jordan
  - Invite others?
    - Other GCC
      - Oman & Bahrain
    - Regional
      - Morocco
  - Interest from outside of MENA

Regional Expansion Strategy (3/3)

- Discussion
  - Does GNEII continue to expand national and regional participation?

- Potential Options:
  - Additional UAE organizations?
    - NCEMA
    - Customs Authority
    - Others?
  - Invite all GCC countries?
    - Oman
    - Bahrain
  - Other regional countries?
    - Jordan
    - Morocco
    - Others?

- Recommendation
  - All GCC + Jordan + Morocco
    - Gradual, measured expansion

Alumni Engagement Efforts

Mr. Abdelaziz Al Madhloum

Alumni Engagement Efforts (1/1)

- Purpose
  - Create a strong alumni network & enhance stakeholder support
- Potential Engagement Efforts
  - On-line forum for collaboration
  - Invited speakers at annual GNEII Symposium
  - Invite as guest lecturers for Fundamentals Course
  - Present capstone papers at annual conferences
    - INMM, ANS, etc.
  - Former fellows as mentors to current fellows
  - Alumni newsletters

2013 GNEII Senior Research Fellow

Mr. Abdelaziz Al Madhloum

GNEII Senior Research Fellow (1/2)

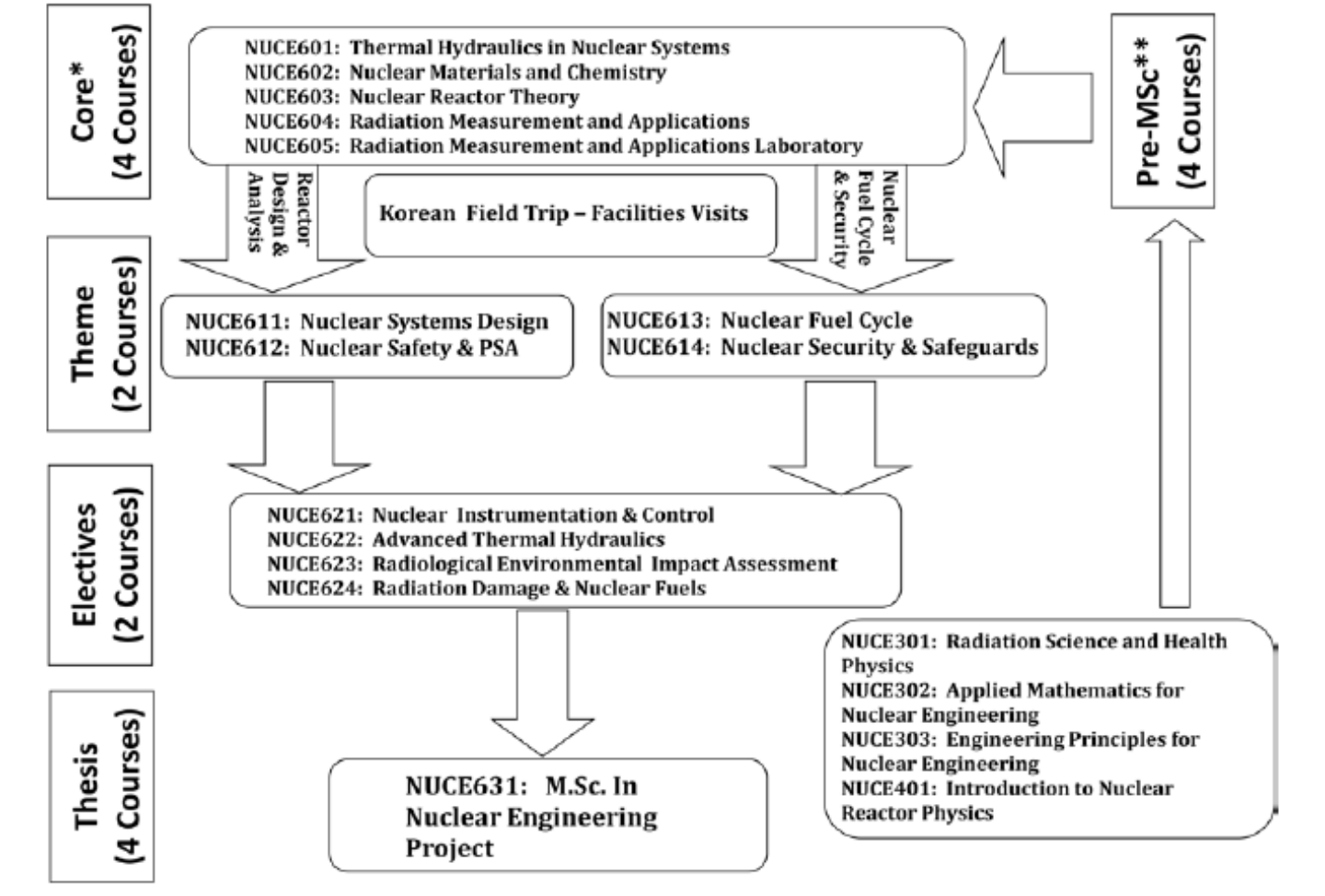
- Senior Fellow Responsibilities
  - Conduct high-quality research
    - Technical & socio-technical aspects of nuclear energy safety, safeguards, security, and nonproliferation
    - Regular peer-reviewed publications
  - Coordinate research projects
    - GNEII & Khalifa University's Nuclear Engineering MSc program
  - Support teaching and related duties for GNEII courses
  - Regional & International GNEII Representative
    - Academic & research conferences
- Nominated by the *Institute Manager*
  - in consultation with the Steering Committee
- Plans for 2013 Senior Research Fellow position
  - Part-time KU Nuclear Engineering Faculty

Curriculum & Integration with KU

Mr. Abdelaziz Al Madhloum

Curriculum & Integration with KU (1/4)

Current NucEng MSc Program



Curriculum & Integration with KU (2/4)

FUTURE CONSTRUCT AND INTEGRATION

- Revise GNEII Fundamentals Course
  - Gain from the lessons learned in 2011 and 2012
- Integrate GNEII more with the KU's Nuclear Engineering Department
  - Proposed integrated schedule developed with Dr. Mike Schuller at TAMU, endorsed by KU

➢ Develop a ***3rd theme*** in KU's NucEng MSc curriculum

- Current *Fuel Cycle and Security* theme changes to *Fuel Cycle and Materials* theme
- New *Safeguards and Security* theme is introduced

- Possible courses for new *Safeguards and Security* theme*
  - NUCE 614 (already exists)
  - TAMU Nuclear Engineering Department Courses (subject to approval from Dr Bill Charlton)
    - NuEn 650 – Non Proliferation
    - NuEn 605 – Nuclear Materials Management
    - NuEn 685 – Critical Analysis of Security Detection (Capstone)
    - Chem 685 – Radiochemistry
    - NuEn 489 – Nuclear Security and Systems Design

**Note:* Some elements of the above might be combined into a *Nuclear Forensics* course

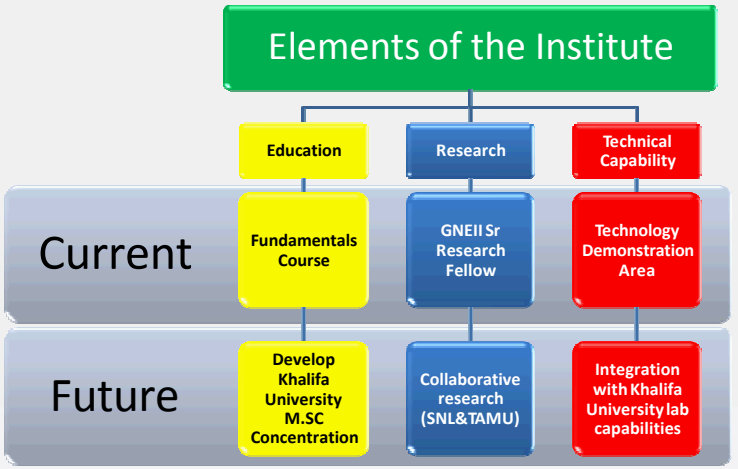
Curriculum & Integration with KU (3/4)

Proposed MSc Program changes …

1. Further integrates GNEII into KU's Nuclear Engineering Department
   - Graduate-level courses add depth to the GNEII Fundamentals Course
   - Provides GNEII Fellows the opportunity to earn an MSc with a specialty in *Nuclear Safeguards & Security*
2. Increases collaboration among KU, TAMU/NSSPI, and Sandia
   - Consistent with goals outlined in the GNEII MOU

Curriculum & Integration with KU (4/4)

1. Education Pillar
   - Goal to develop MSc concentration
   - New *Safeguards and Security* theme (and electives) help achieve this
   - Consistent with MOU signed in 2011
   - GNEII calendar same as academic semester
2. Research Pillar
   - Need more development & innovation
   - The Capstone projects may contribute basic ideas
     - Not yet fully developed research initiatives
   - Research initiatives should focus on security and safeguards or 3S integration
     - Safety is part of main-stream Nuclear Engineering.
3. Technical-capability Pillar
   - Needs development
   - KU NE Labs provide some support for GNEII
   - Surplus equipment from SNL is in progress



- Semester or MMF represent a new curriculum format for GNEII Fundamentals Course
  - Check individual syllabi
  - Re-submit to ACTVET for accreditation at the right time

Questions?
Final thoughts?

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Thank you