EPA Rad. Compliance Program

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Radionuclides in NH Wells

- Sand And Gravel Wells - Dug, Point, Springs?
  - Frequency of Occurrence
    - Radon; Approx. upper bound of results 4,000 pCi/L
    - Others <<1%
- Bedrock wells
  - Frequency of Occurrence
    - Radon >4,000 pCi/L 35%
    - Uranium >30 ug/L 8%
    - Radium 226/228 1%
    - Compliance Gross alpha 1%
    - Highest radon 1,100,000 pCi/L

Hierarchy of DES Compliance Recommendations

- 1. Alternative Water Supply
  - Interconnection to another Compliant PWS
    - 25% DES Grant
  - Sand and Gravel Well Development
- 2. Centralized Treatment
- 3. Point of Use – if very, very small

Introduction

- **Approximately 40 systems in violation of Rad. MCLs**
  - 30 systems exceeded uranium
  - 5 systems exceeded radiums
  - 5 systems exceeded Compliance Gross Alpha
- **Solutions to Radionuclides - Approximate**
  - Interconnection with other systems 5
  - New Wells 15
  - Central Treatment with on site disposal 5
  - Central Treatment with off site disposal 5
  - Action Pending 10

Rad Disposal From Centralize Treatment

- **Domestic waste goes to many individual leachfields**
  - Off site disposal
  - Rad treatment tanks in series configuration
  - Lead tank hauled away once saturated
- **Domestic waste goes to a central onsite leachfield**
  - Rad waste can be disposed of into the same central disposal leach field.
- **Domestic Waste to Municipal Sewer**
  - If rad waste to sewer; no sewer would accept a planned long term condition

Case Study:
Country Lane Manor Candia

- 34 MHP units; well yield =
  pump output = 25 gpm
- Single well
- 5,000 gallon hydropneumatic
- Individual septic tank - leach fields
- Unsuccessful sand and gravel well effort
- Possible POU; could not get resident app.

Country Lane Manor, Candia

- Approx. Capital Costs – Rad Treatment
  - New Pump station = $20,000
  - Equipment = 25,000

- Annualize Cost – Rad Treatment
- Approximately once every 5 years lead tank would be disposed of by a rad. broker. Cost for broker services $7,000/ 7 years; approximately $3,000 for new anion resin.
  - Rad disposal cost annualized $ 1,500
  - Chase Environmental, Lexington, KY

    Mr. John O'Neil, tel. 1-865-584-0833. www.chaseenv.com

Case Study: Melody Pines, Conway

- 50 unit condominiums, many seasonal users
- Two bedrock wells
- Storage Tanks –
  - Atmospheric 15,000 gallons
  - Pneumatic 2,250 “
- Problems
  - Fluoride above 4.0 mg/L (Average 4.4 mg/L)
  - Uranium above 30 ug/L (Average 60 ug/L)

Melody Pines, Conway

- Initial sand and gravel well location effort
  - Unsuccessful
- Second round of sand and gravel exploration
  - Difficulty in developing well but eventually successful
- Use
  - New additional well

Melody Pines, Conway

Capital Cost

• 2.5” Test wells	$ 7,500
• Gravel Pack well	10,000
• DES Approval w pump test	7,500
– SDWA Water quality	1,100
• Pump Install/controls	12,500
• Total	$38,600+

Operational Costs

• Savings due to lower pumping cost	$500

Notes

- Definition of Gross Alpha

AGA – U = CGA

AGA = Analytical Gross Alpha ; Lab test results, no MCL
U = Uranium
CGA = Compliance Gross alpha; MCL= 15 pCi/L

Notes

- Flow Mix
  - Mix one compliance test from all active wells
  - Maximize flow from new well
  - Preferred: 90% new well: 10% old well

- Speciation of Gross Alpha MCL

  Obtain separate 3”x10” exchange resin cartridge - 1 for cation, 1 for anion. Collect a “treated” sample after the resin pilot treatment and measure the Gross Alpha in water from each cartridge. Determine if one or both exchange treatments will be need to be installed.

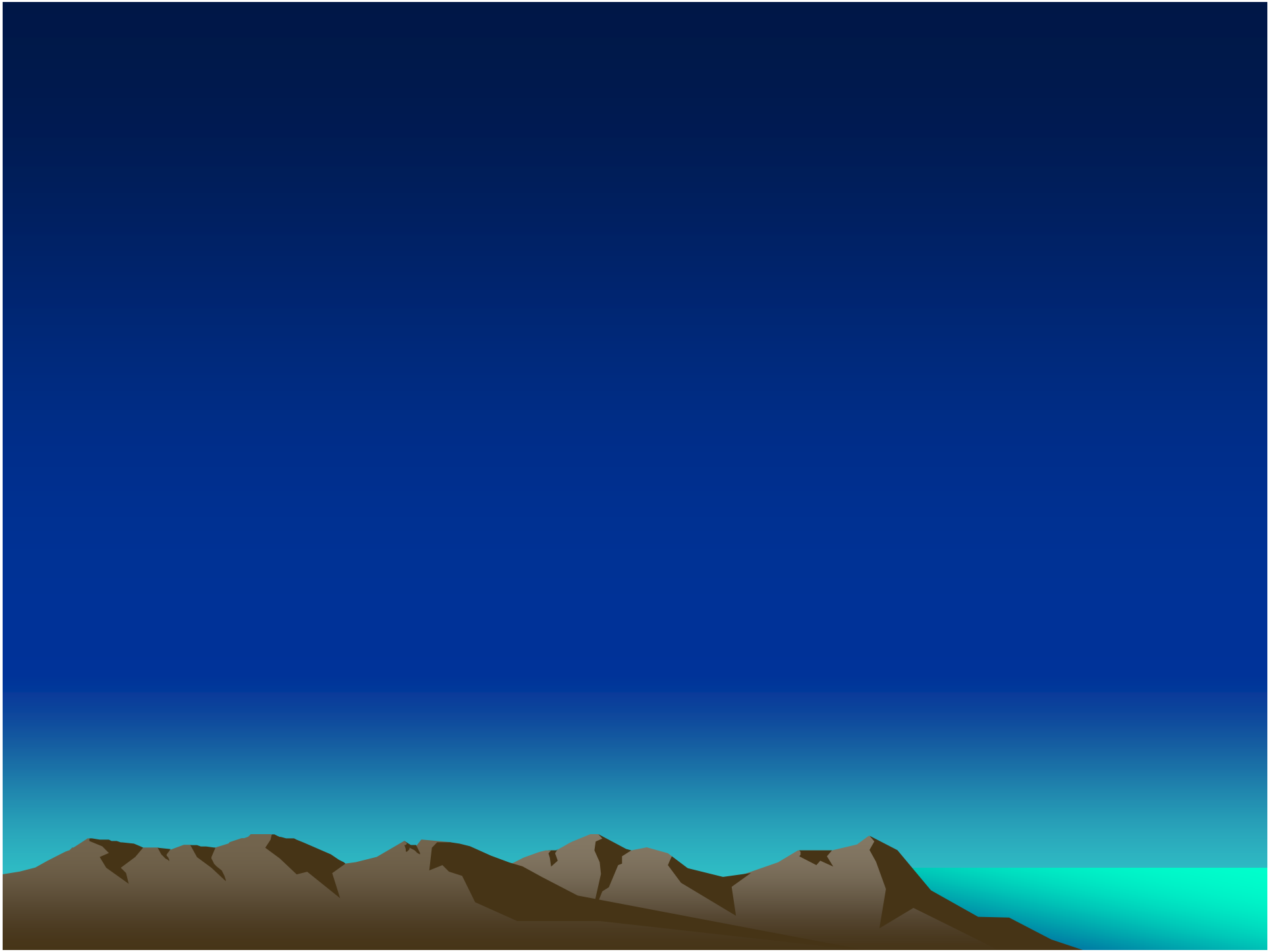
Notes

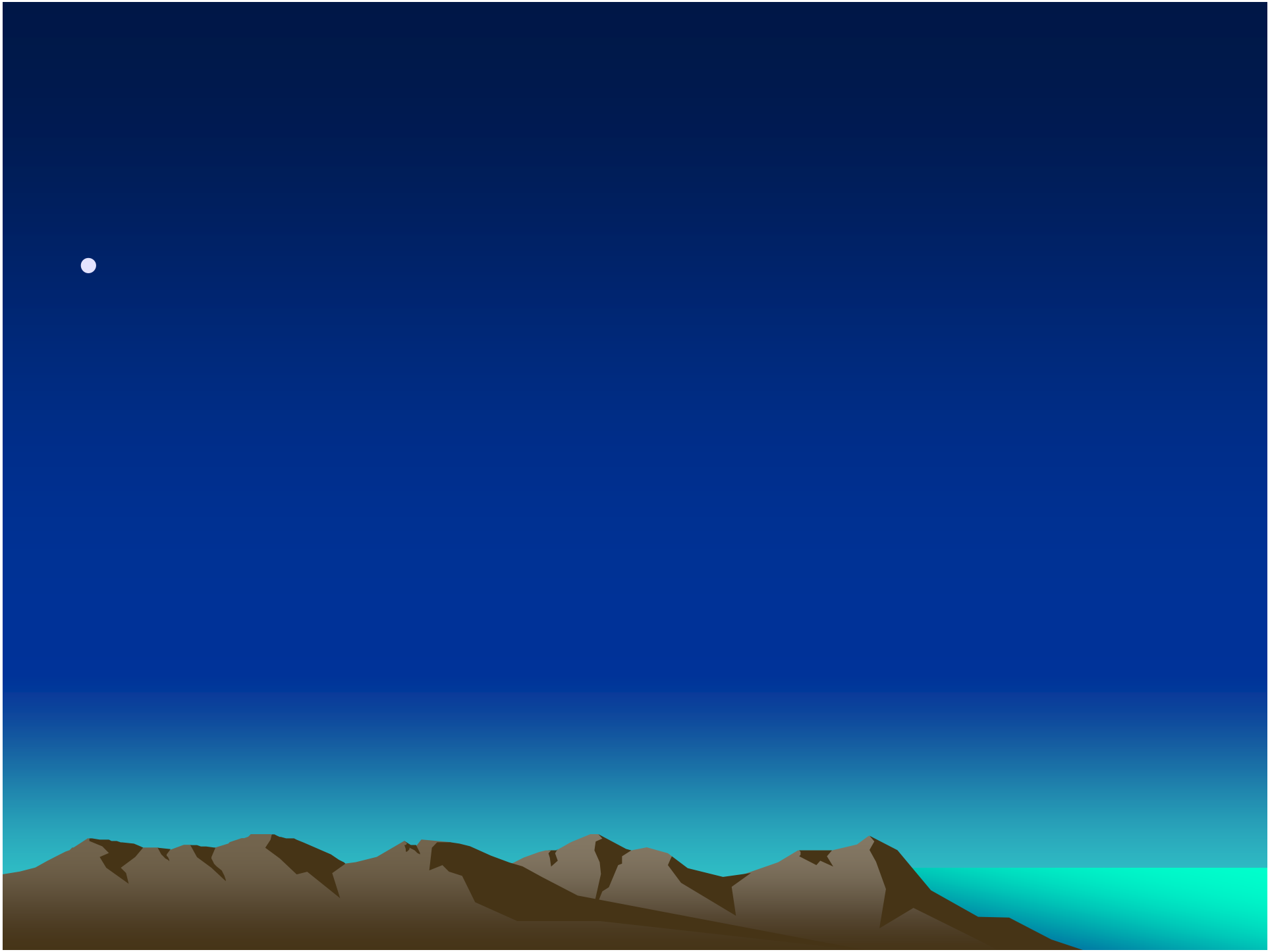
- Worker Safety
  - Baseline radionuclide measurements needed from pump house area. Taken at treatment startup
- Coordination of Rad Disposal Brokers
  - DES will coordinate the approximately 5 systems that will accumulate uranium in treatment tanks to assure proper disposal and reduce costs.

Notes

- DES is considering a policy to require developers to explore all water supply options before a development water system is approved even if additional wells need to be drilled in other areas of the development.

- i.e. Future owners will not inherit a complex expensive treatment process that could have been avoided.





Melody Pines, Conway

- Approx Capital Cost – Rad response
  - Test well I = $10,000
  - Test well II = x,000
  - Well installation = 7,000
  - Sustained pump test & services = 20,000
  - Pump installation / connection = 8,000
- Approx. Annual Cost – Rad response
  - No additional Cost =

List of Existing Rad Systems

- Pelham Kirlin Place
  - Sump
- Candia Country lane Manor
  - – Haul off 10 year life
- Freedom Freedom Village Condos
  - Shoreline well; lower risk; not snactioned