

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	<u>12,500</u>
• Total	\$38,600+

Operational Costs

• Savings due to lower pumping cost	\$500
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Notes

- Definition of Gross Alpha

$$\text{AGA} - \text{U} = \text{CGA}$$

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

