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Title: Analytical Capability of Plasma Spectrometry Team

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# Analytical Capability of Plasma Spectrometry Team

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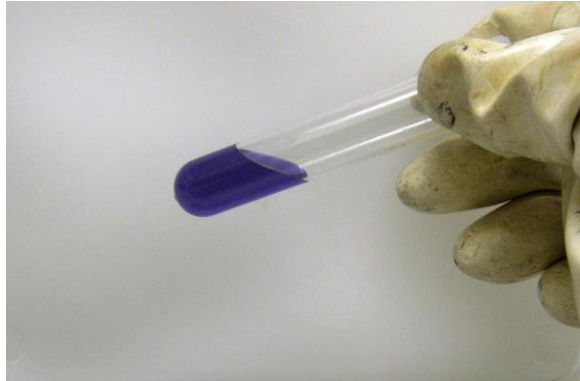
**July 23-24, 2012**

# What Kind of Samples We Analyze?

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- **Pu and U metal**
- **Pu oxide for nuclear fuel**
- **$^{238}\text{Pu}$  oxide for heat source**
- **Nuclear forensic samples: filters, swipes**

# What Kind of Sample Preparation We do?



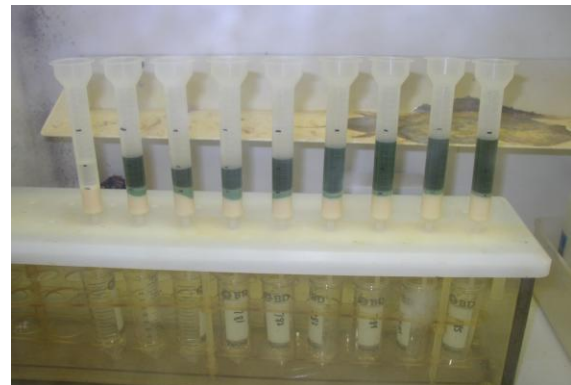
**Metal dissolution**



**Marple filter dissolution**



**Pu oxide closed vessel  
acid digestion**



**Column separation  
to remove Pu**

# What Techniques We Use for Trace Elemental Analysis?



**Glove box interfaced  
ICP-AES (IRIS,  
Thermo Electron)**



**Fume hood contained  
ICP-AES (Ultima 2,  
Horiba Jobin yvon)**



**Glove box interfaced ICP-MS (VG PQ2+)**

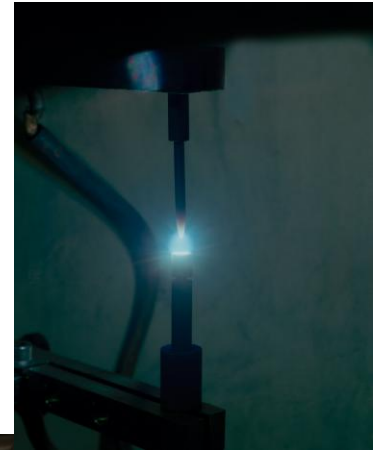
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# Direct $^{238}\text{Pu}$ Oxide Analysis by DC Arc Spectrometry



**New generation DC arc spectrometer (Prodigy, Teledyne Leeman) designed for glove box**

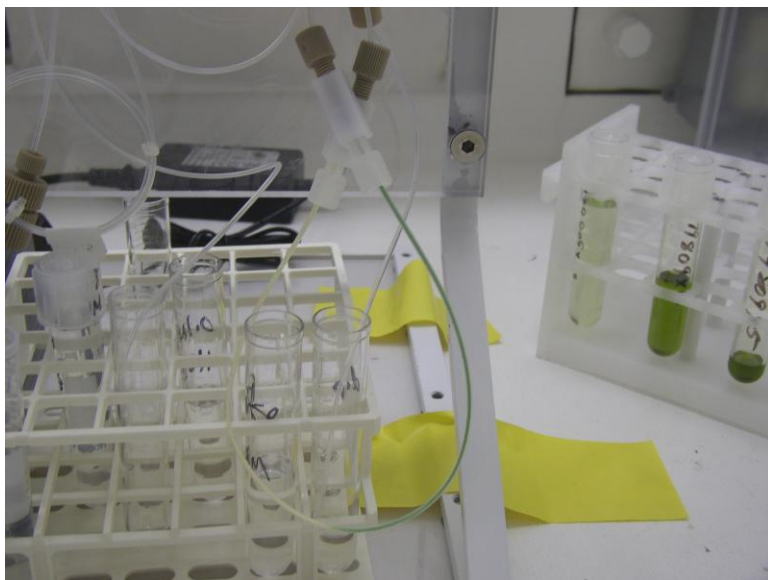
**An arc generated at the sample electrode**



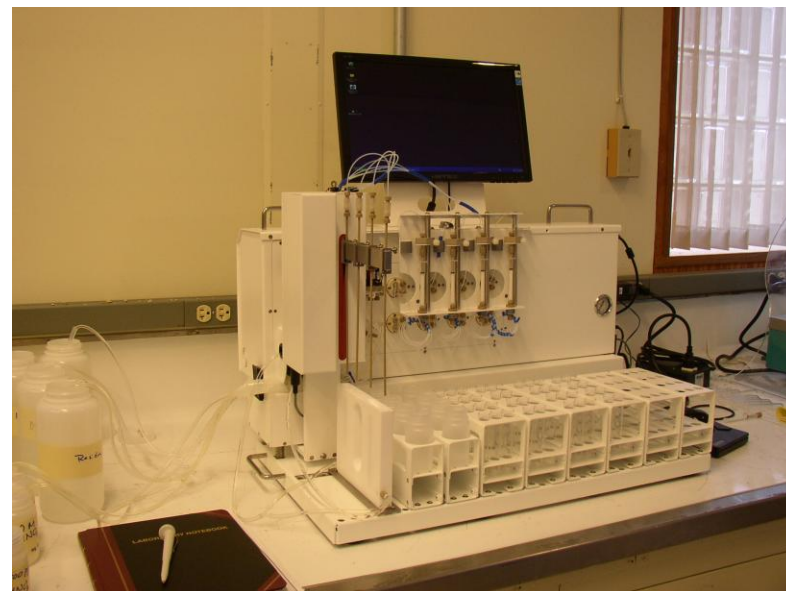
**Glove box contained DC arc stand**



# New Micro Column System Actinide Separation



**Manual micro column separation for Pu- gas pressured extraction column to reduce raw material consumption and waste generation**



**Automated multi column actinide separation system designed by Staff in PS team and fabricated by J2 Scientific**

# What Is New?-RLUOB

## New Trace Element labs



**ICP-AES (iCAP 6000, Thermo)**



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**ICP-MS (X Series 2, Thermo)**

Slide 7



## What Is New?-RLUOB (cont.)



**ICP-AES (Prodigy, Teledyne  
Leeman) interfaced with glove  
box**

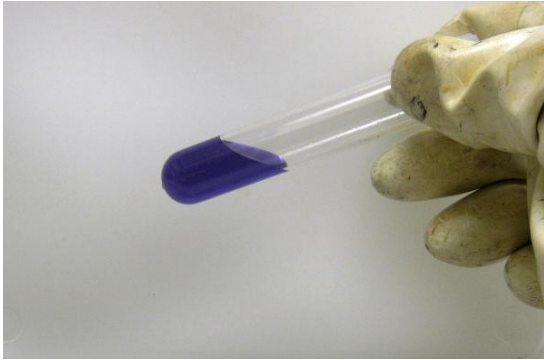


**High resolution ICP-MS (Element  
XR, Thermo)**

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# Sample Preparation



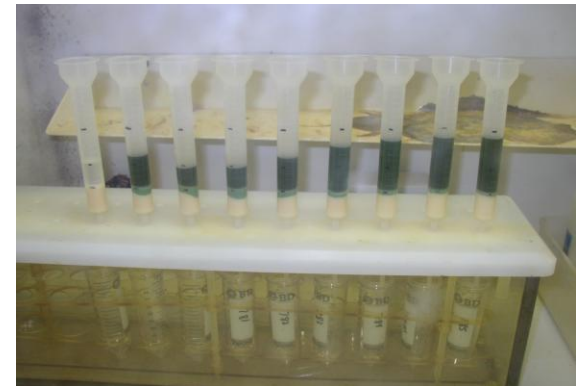
**Metal dissolution – Pu and U**



**Marple filter dissolution -  
nuclear forensic**



**Pu oxide closed vessel acid  
digestion – nuclear fuel**



**Column separation to remove Pu**