

Techniques of Post-Irradiation Examination (PIE) for Water Reactor Fuel and IAEA PIE Facilities/Techniques Database

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for Advanced and Innovative Fuel Technologies"

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IAEA

International Atomic Energy Agency

Post-Irradiation Examination of Water Reactor Fuel (PIE) and IAEA PIE Facilities/Techniques Database

Classification of PIE Techniques (1)

- **Destructive Methods in Hot Cells:**

Microstructural, elemental and isotopic analyses, measurement of physical and mechanical properties

- **Non-Destructive Methods in Hot Cells:**

Visual inspection, detection of failed fuel rods and defect location

Dimensional measurements of fuel rods and assemblies

Gamma scanning, including tomography

Fission gas release determination

Neutron and X-ray radiography



Post-Irradiation Examination of Water Reactor Fuel (PIE) and IAEA PIE Facilities/Techniques Database

Classification of PIE Techniques (2)

- **Pool-side Inspection:**

- FA tightness monitoring (sipping test)

- Visual inspection

- Dimensional measurements

- Gamma-scanning

- Detection of leaky fuel rods in fuel assemblies

- Removal and analysis of deposit probes from the cladding surface of the periphery fuel rods

- Measurement of oxide film thickness from the cladding surface of the periphery fuel rods

- Measurement of elastic parameters of FA spring units

Post-Irradiation Examination of Water Reactor Fuel (PIE) and IAEA PIE Facilities/Techniques Database

Classification of PIE Techniques (3)

- The following is applied to inspect a fuel rod removed from FA:

Visual inspection

Dimensional measurement

Gamma-scanning

Eddy-current testing

Removal and analysis of deposit probes from the cladding surface

measurement of oxide film thickness on the cladding surface

Measurement of the cold gap between fuel and cladding

Post-Irradiation Examination of Water Reactor Fuel (PIE) and IAEA PIE Facilities/Techniques Database

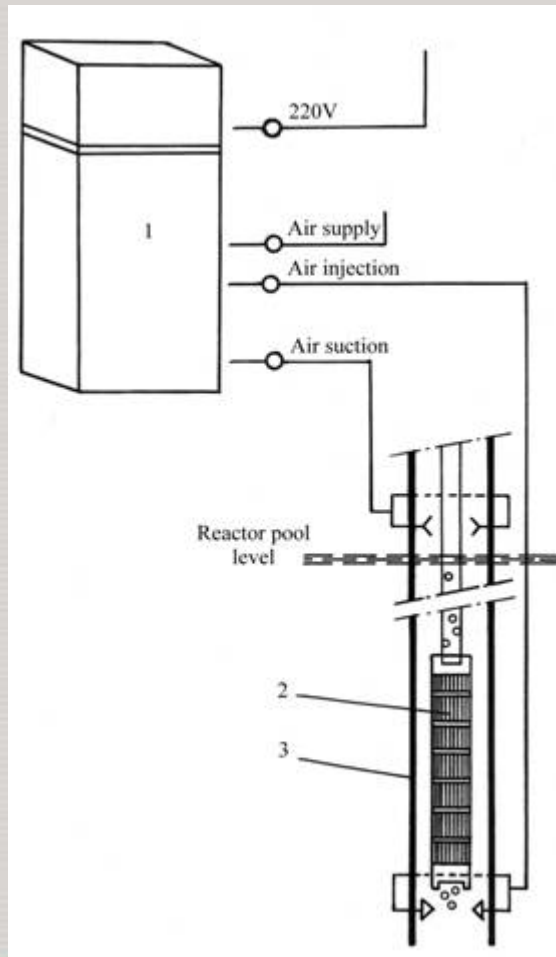
FA Sipping Test (1)

Principle - to identify FA with leaky rod/rods by isolation of FA in a restricted volume, pushing fission gases to be released and radiation-spectrometric analysis of released gases. Sipping test might be done on-line in the fuel discharge machine mast (Qualitative) or in the cask in a spent fuel pool (Qualitative or Quantitative).

System – “Wet” (typical for Nuclear Power Plants-NPPs) or “Dry” (not widely used at NPPs)

Post-Irradiation Examination of Water Reactor Fuel (PIE) and IAEA PIE Facilities/Techniques Database

FA Sipping test (2) – In-mast On-line



1-Control cabinet

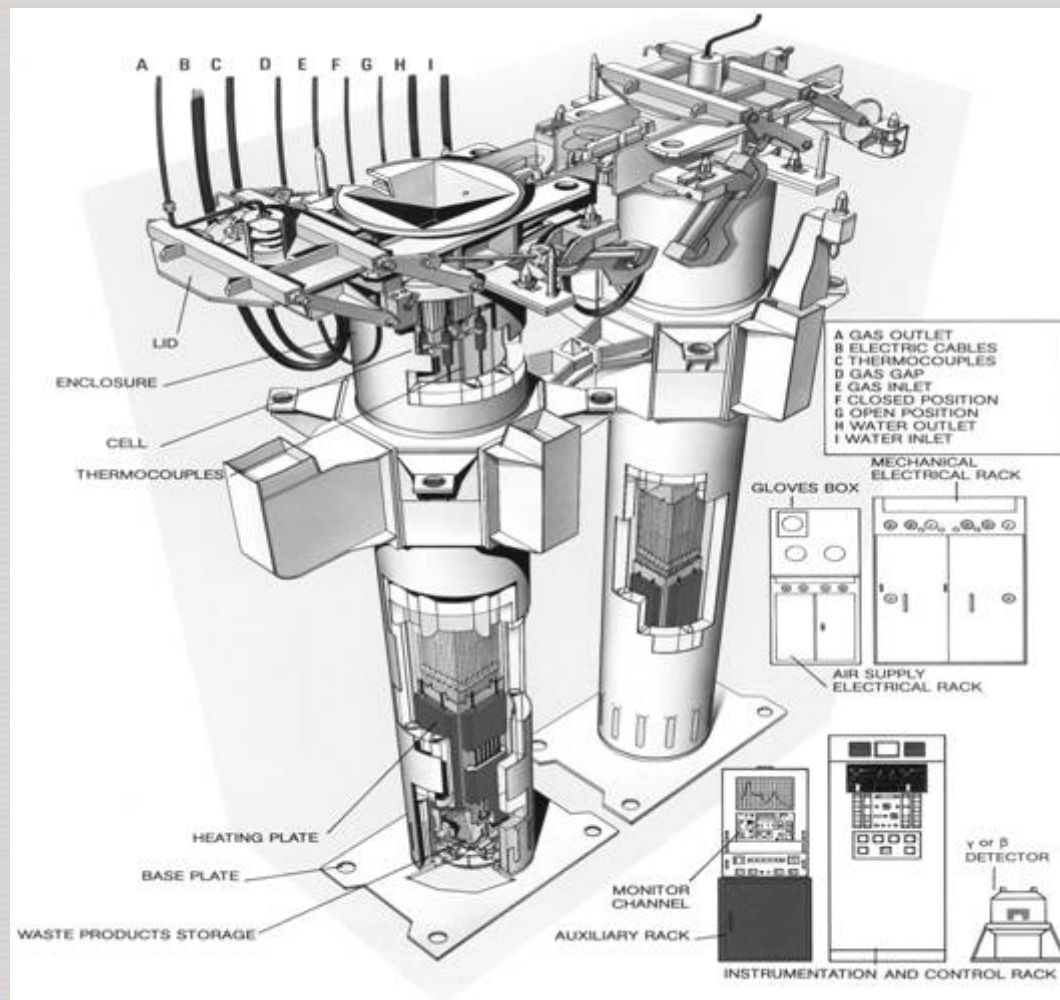
2-FA

3-Manipulator crane mast

FA is lifted into the mast. Due to hydrostatic pressure change, fission products are released from leaky rod into water. FPs soluble in water are captured by injected air and transferred for Xe-133 gamma analyzer and compared with value averaged for 10 FAs.

Post-Irradiation Examination of Water Reactor Fuel (PIE) and IAEA PIE Facilities/Techniques Database

FA Sipping Test (3) – In-pool Canister

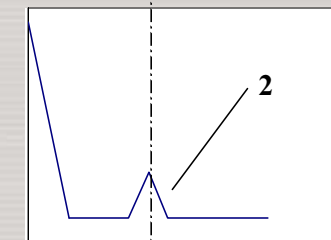
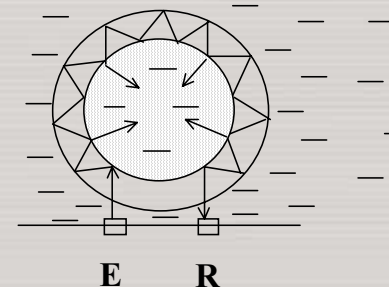
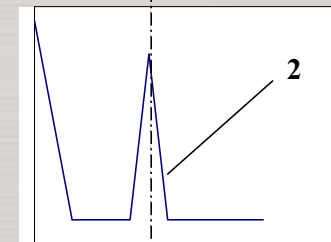
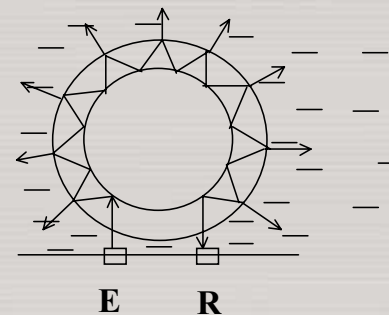
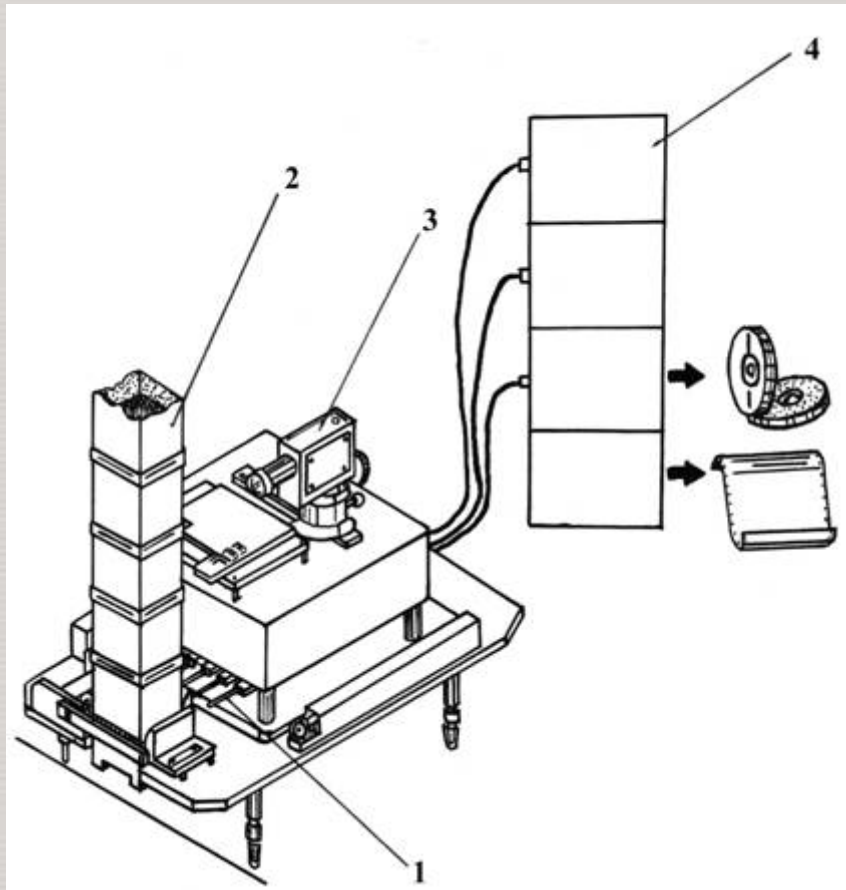


Post-Irradiation Examination of Water Reactor Fuel (PIE) and IAEA PIE Facilities/Techniques Database

Single FR Leak Detection in a FA (1)

UT, circular wave propagation (BBR-B & W)

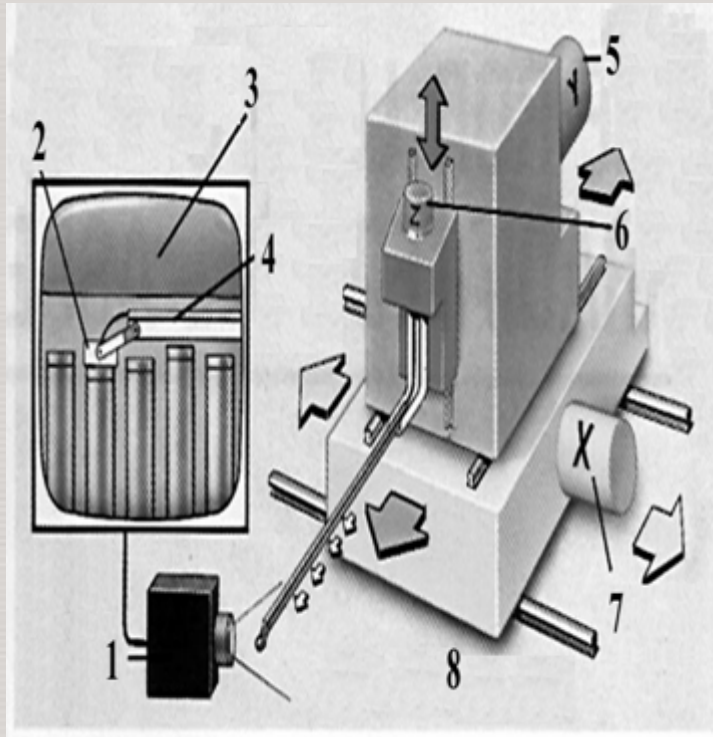
1-set of ultrasonic probes; 2-FA; 3-video camera; 4-cabinet



Post-Irradiation Examination of Water Reactor Fuel (PIE) and IAEA PIE Facilities/Techniques Database

Single FR Leak Detection in a FA (2)

UT, vertical wave propagation (FRAGEMA)
1-video camera; 2-UT probe; 3- top nozzle; 4- manipulator; 5-7-motors; 8 X & Y-motion table



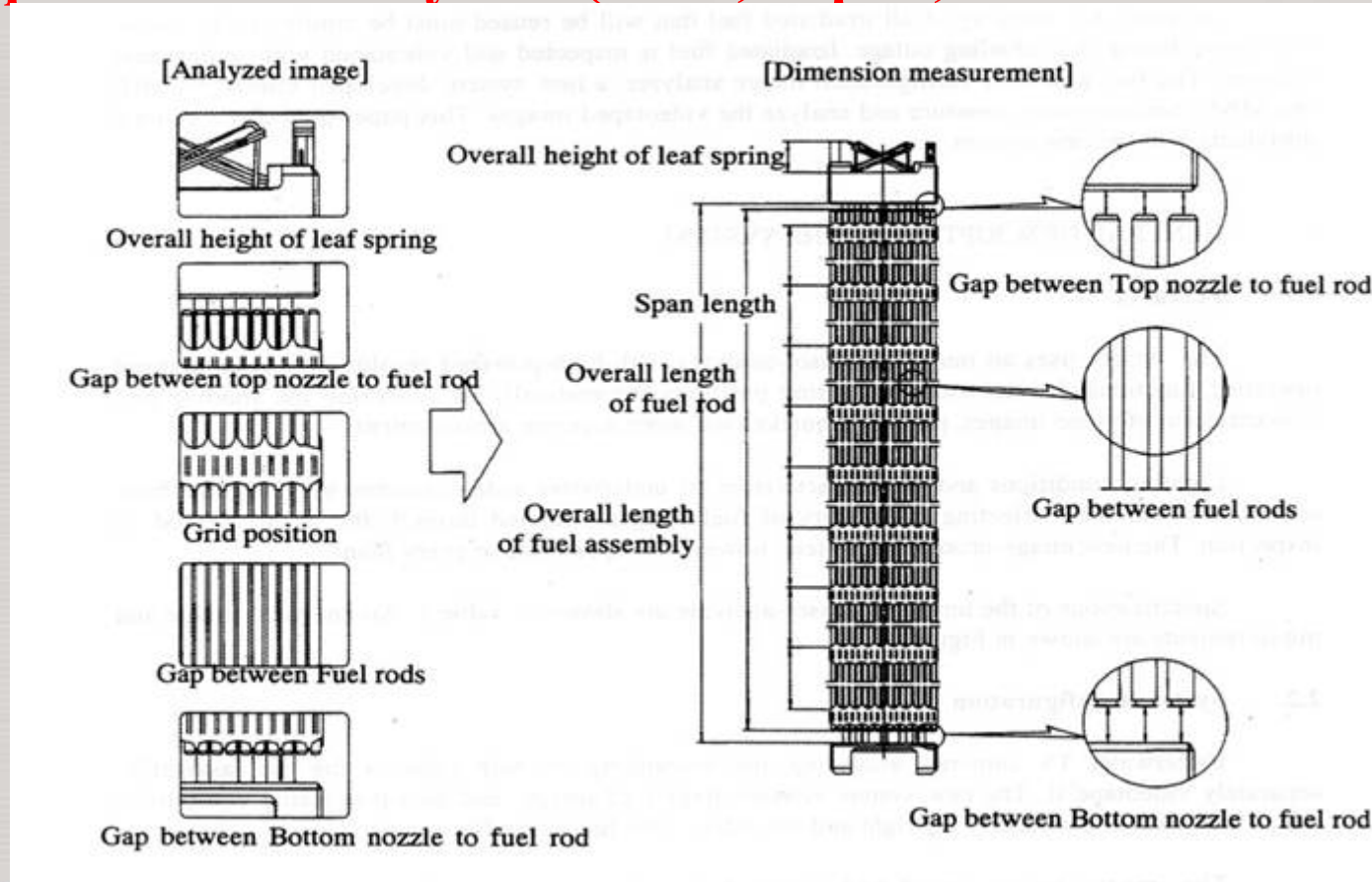
Post-Irradiation Examination of Water Reactor Fuel (PIE) and IAEA PIE Facilities/Techniques Database

Fuel Assembly Dimensional Measurements (1)

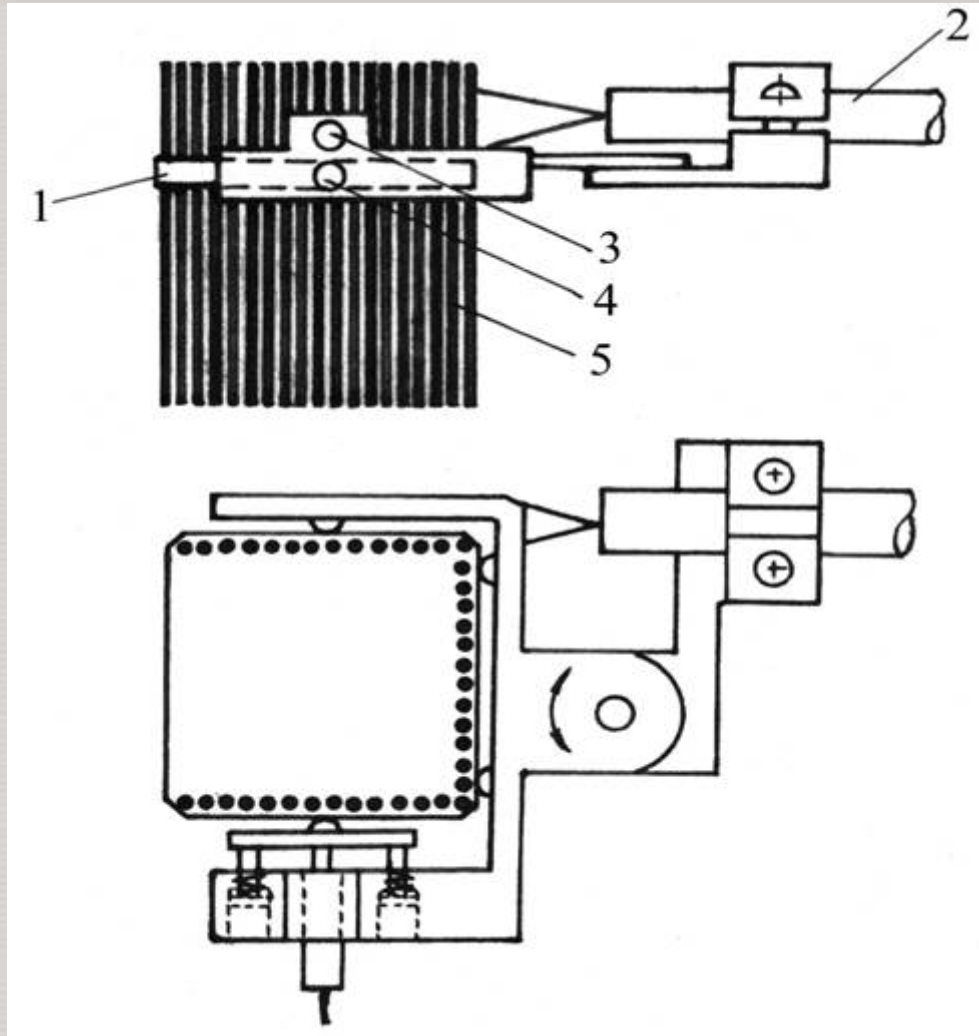
- 1) Visual comparison of the geometry of the object video image with the gauge or coordinate scale – simple, non-contact, all inspection stands are equipped with TV-systems with image analyzing possibilities. Good for measurements of length, cross-section size, gaps and diameters for peripheral row, bow amplitude in case of banana-shape, etc.
- 2) Devices with Linear Variable Differential Transformers (LVDTs) or of another type (e.g. non-contact UT-example is on the next slide) are used for more precise (usually error is in the limit of ± 0.1 mm) or complicated (when TV systems are no good) dimensional measurements.

Post-Irradiation Examination of Water Reactor Fuel (PIE) and IAEA PIE Facilities/Techniques Database

Fuel Assembly Dimensional Measurements (2) – What might be measured using TV cameras and image processors-analyzers (MHI, Japan, TECDOC-1050)



Post-Irradiation Examination of Water Reactor Fuel (PIE) and IAEA PIE Facilities/Techniques Database



FA Dimensional Measurements (3) – Distance between Spacer Grids (SG) – Siemens-KWU

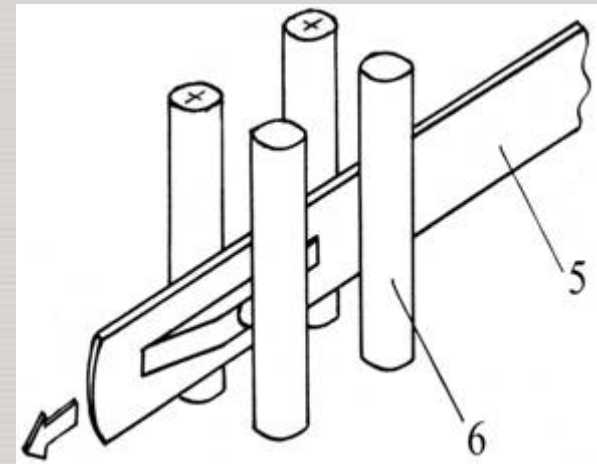
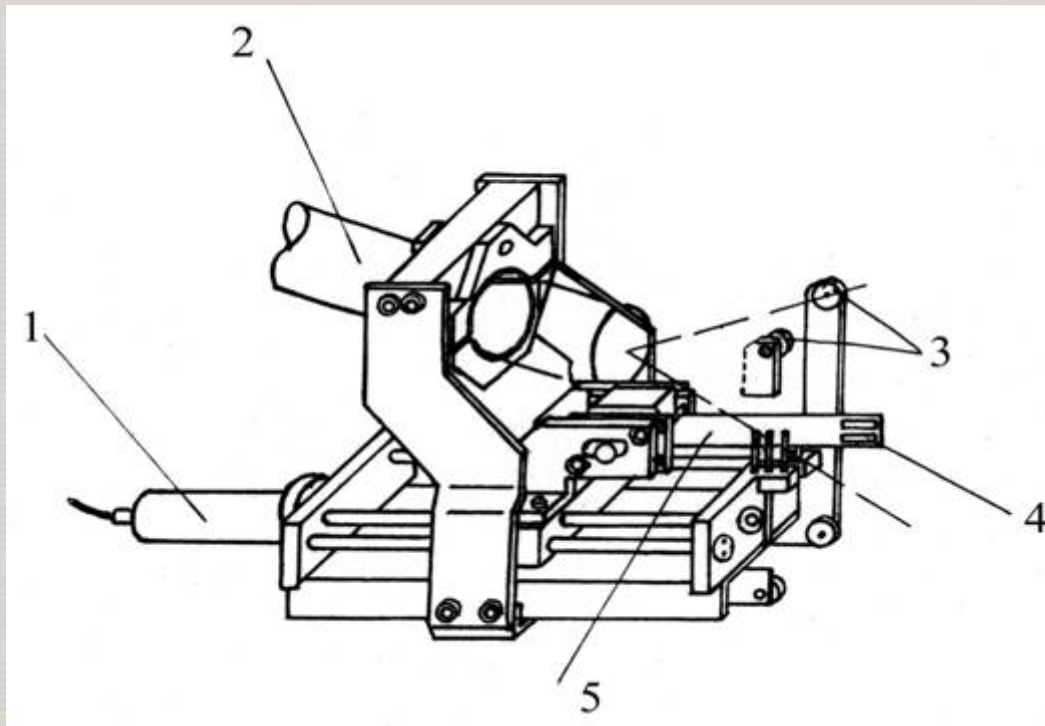
1-SG; 2-TV camera; 3-LVDT; 4-pneumocylinder; 5-FA

U-form jointer with one detector comes up to the SG and it is pressed to it by pneumocylinder. Device allows to measure distance between SGs with error within ± 0.01 mm.

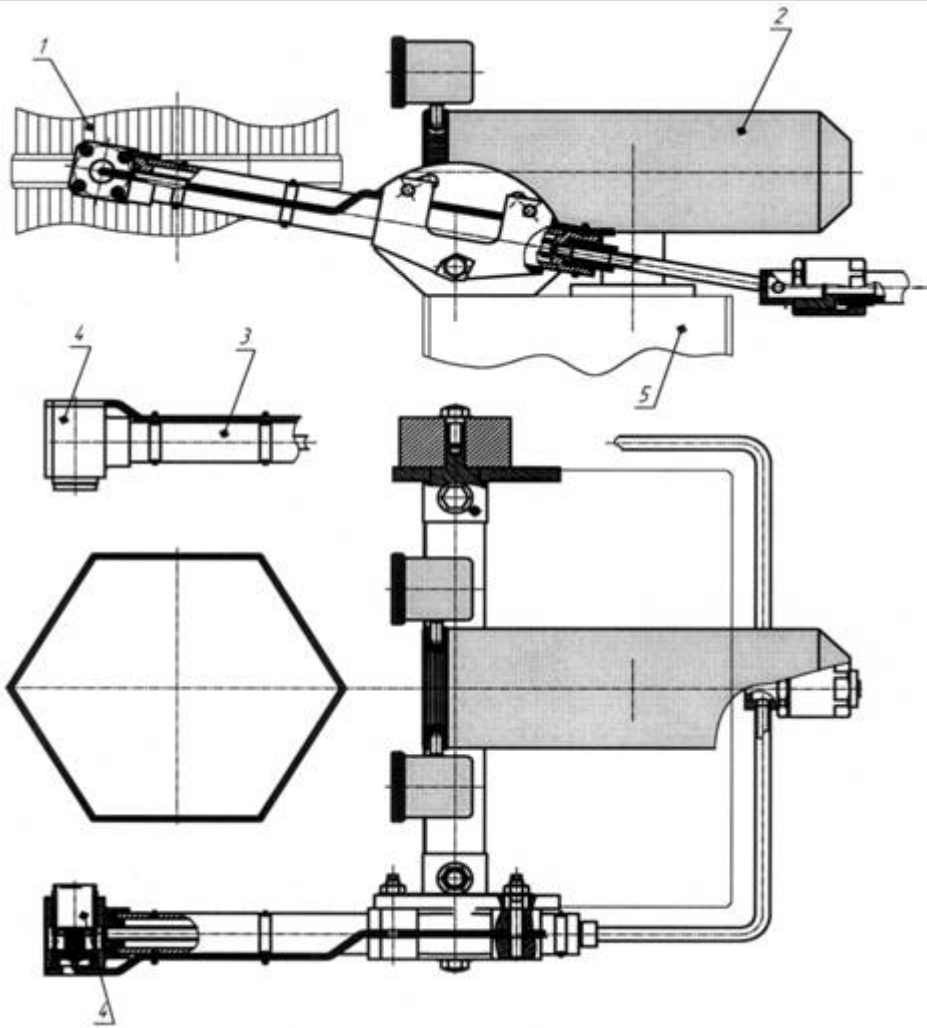
Post-Irradiation Examination of Water Reactor Fuel (PIE) and IAEA PIE Facilities/Techniques Database

Fuel Assembly Dimensional Measurements (4) – FR's Gap

1-motor; 2-TV camera; 3-guide rollers; plate springs; 5-probe; 6-FR



Post-Irradiation Examination of Water Reactor Fuel (PIE) and IAEA PIE Facilities/Techniques Database

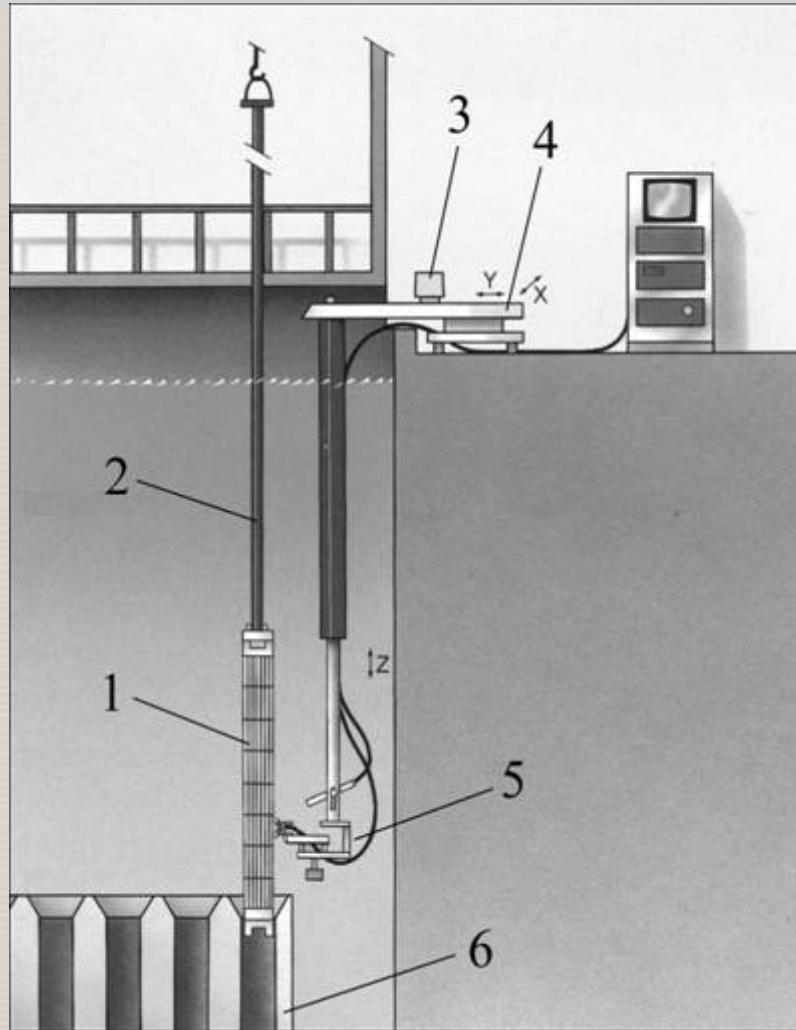


FA Dimensional Measurements (4) – RIAR, Russia

1-FA; 2-TV camera; 3-cramp; 4-ultrasonic detectors; 5-motion table

Device allows to measure FA bowing and twisting, what is necessary in case of S-shape FA bow. Error of the determination of the distance between the detectors and FA surface does not exceed $8 \mu\text{m}$, and twisting angle- 0.03 degrees.

Post-Irradiation Examination of Water Reactor Fuel (PIE) and IAEA PIE Facilities/Techniques Database



Measurement of Oxide Layer Thickness on FA

1-FA; 2-handling tool; 3-Z-motor; 4-X-Y-table; 5-EC probe

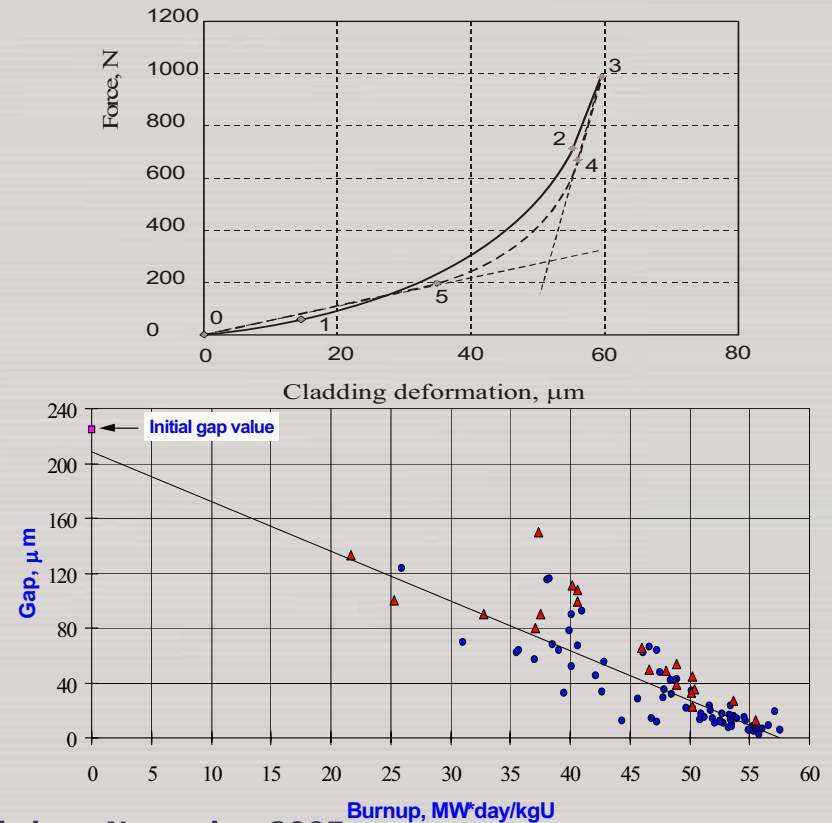
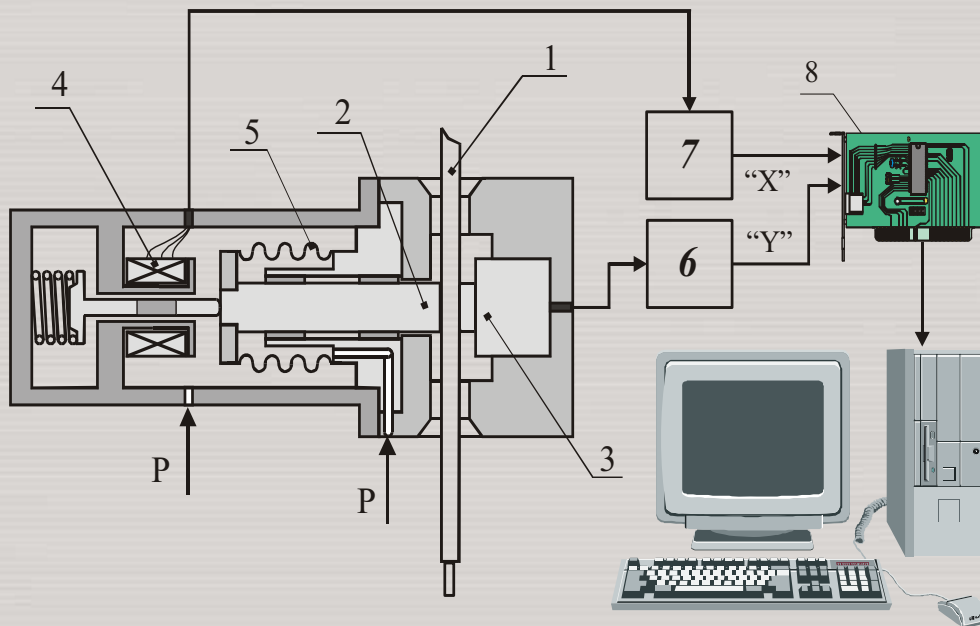
High-frequency electromagnetic field generated by a probe induces EC in the FR sub-surface layer.

Amplitude of these ECs is a function of oxide thickness and causes variation in probe impedance. Measurement channel evaluates this variation and supplies signal proportional to the thickness. Usually EC probe is included brush device.

Post-Irradiation Examination of Water Reactor Fuel (PIE) and IAEA PIE Facilities/Techniques Database

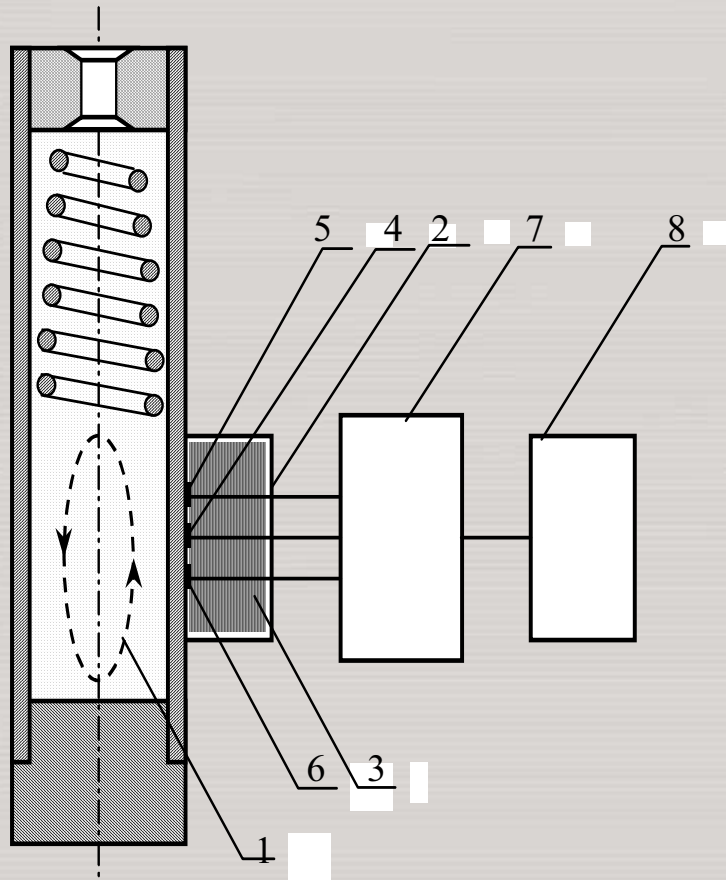
Measurement of Cold Gap on FR –RIAR, Russia

1-FR; 2-loading bar; 3-piezoelectric force transducer ; 4-LVDT; 5-bellows; 6-charge amplifier; 7-normalizing amplifier; 8-analog/digital converter



Post-Irradiation Examination of Water Reactor Fuel (PIE) and IAEA PIE Facilities/Techniques Database

Measurement of FR Internal Gas (He and FPs) Pressure-VNIINM, Russia



1-gas plenum; 2-pressure probe; 3-rubber bed; 4-heater; 5,6-thermoresistors; 7-power/measurement block; 8-PC

Range of gas pressure measurement, MPa-0.1-5.0

Range of He pressure measurement, MPa-0.1-3.0

Error of total pressure measurement, MPa-0.15

Range of FP pressure measurement, MPa-0.1-2.0

Total time of one FR measurement, min-15

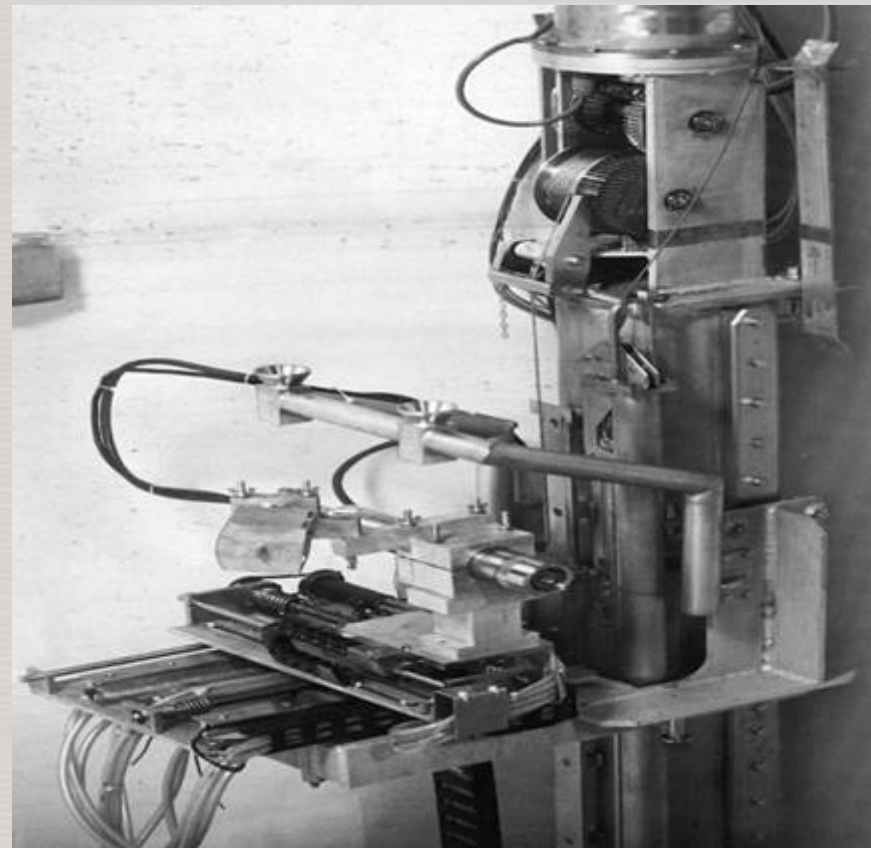
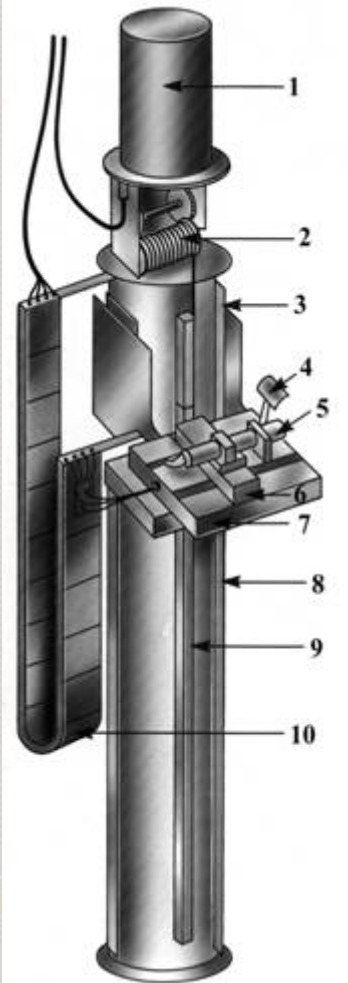
Environment-water or air

Data for WWER-1000 FR (3.6% U-235, 34.7 MWd/kgU, 3 years): Free volume-28 cm³; Total gas pressure-2.4 MPa; He-97.81%; Kr-0.22%; Xe-1.84%; N₂-0.11%; O₂-0.02%

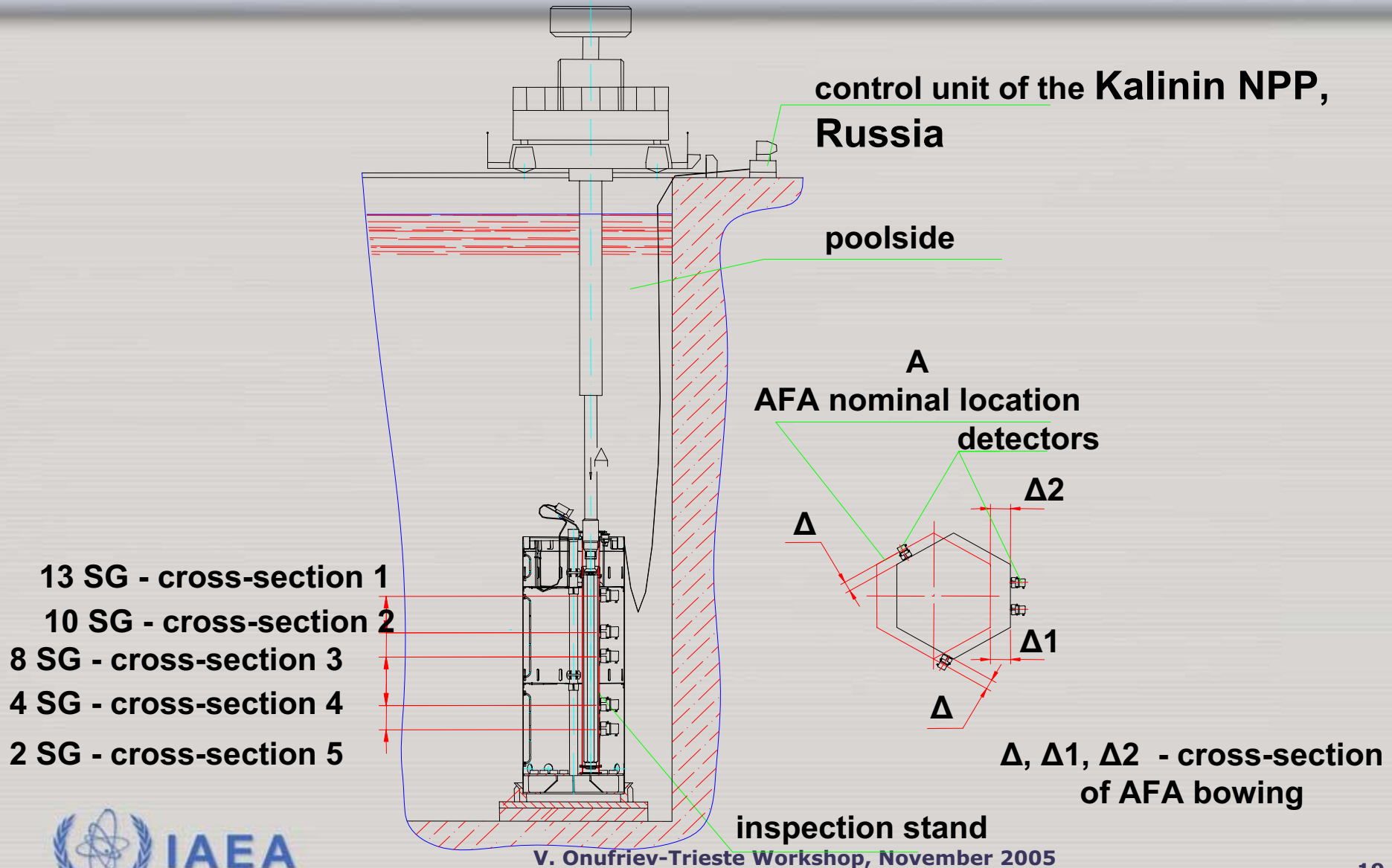
Post-Irradiation Examination of Water Reactor Fuel (PIE) and IAEA PIE Facilities/Techniques Database

Multi-Site FRAGEMA Examination Stand

1-Z drive unit; 2-Z winch; 3-Z carriage; 4-projector; 5-TV camera; 6-Y carriage; 7-X carriage; 8-Z rails; 9-Z beam; 10-cable chain



Post-Irradiation Examination of Water Reactor Fuel (PIE) and IAEA PIE Facilities/Techniques Database



Post-Irradiation Examination of Water Reactor Fuel (PIE) and IAEA PIE Facilities/Techniques Database

Fuel Assembly Repair and Reconstitution

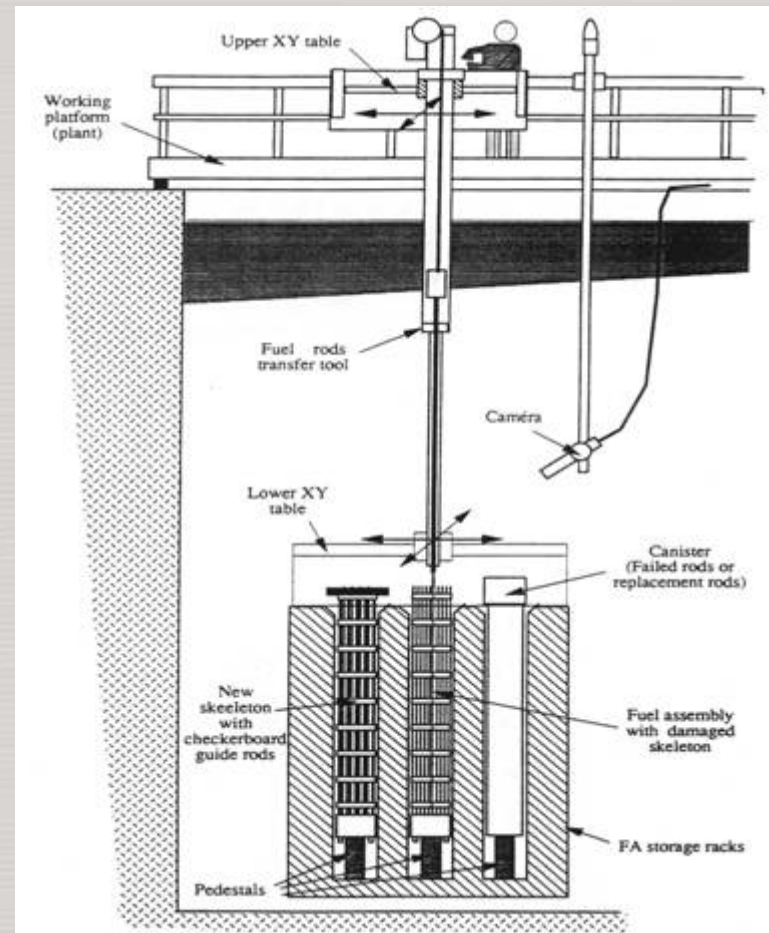
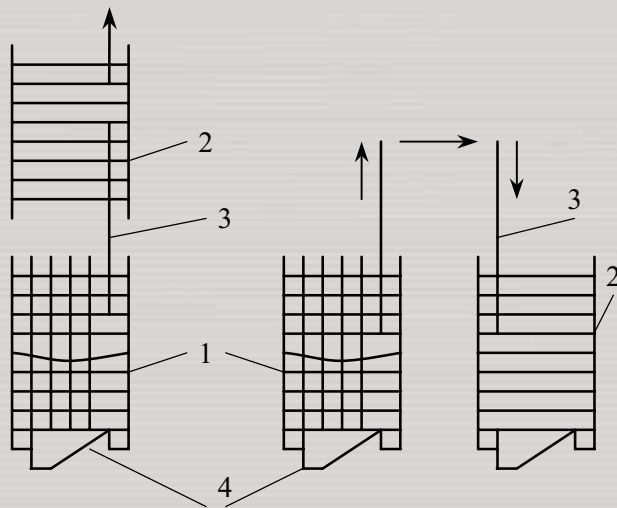
- 1) In case of finding one or more leaky fuel rods in the FA, it might be repaired. **Repair** of FA assumes removal of the leaky rod/rods from the skeleton and insertion of the mock-up (usually Zr bar) or similar good fuel rod. Equipment for removal of separate fuel rods for examination might be used in this case.
- 2) In case of significant damage of the FA skeleton (mainly Spacer Grids), Reconstitution might be carried out. **Reconstitution** assumes removal of intact fuel rods from the skeleton and their insertion into a new skeleton. Special equipment is required for this procedure.

Post-Irradiation Examination of Water Reactor Fuel (PIE) and IAEA PIE Facilities/Techniques Database

Fuel Assembly Reconstitution

(left-scheme of two methods, right-FRAMATOME stand

1-FA with damaged skeleton;
2-new skeleton; 3-FR, 4-top nozzle



Post-Irradiation Examination of Water Reactor Fuel (PIE) and IAEA PIE Facilities/Techniques Database

IAEA Activities in PIE Area (1)

- 1) Co-ordinated Research Project (CRP) on Examination and Documentation Methodology for Water Reactor Fuel (ED-WARF-1), 1983-1988 with publication in 1991 Guidebook on Non-Destructive Examination of Water Reactor Fuel, TRS-322.
- 2) CRP on Examination and Documentation Methodology for Water Reactor Fuel (ED-WARF-2), 1990-1995 with publication in 1997 Guidebook on Destructive Examination of Water Reactor Fuel, TRS-385 and Catalogue on PIE Facilities and Techniques (collection of tables) in 1996.

Post-Irradiation Examination of Water Reactor Fuel (PIE) and IAEA PIE Facilities/Techniques Database

IAEA Activities in PIE Area (2) – Technical Meetings

1) TMs on PIE Techniques for Water Reactor Fuel:

1990 (IWGFPT-37, 1991)

2001 (IAEA-TECDOC-1277, 2002)

2) TM on Poolside Inspection, Repair and Reconstitution of Water Reactor Fuel:

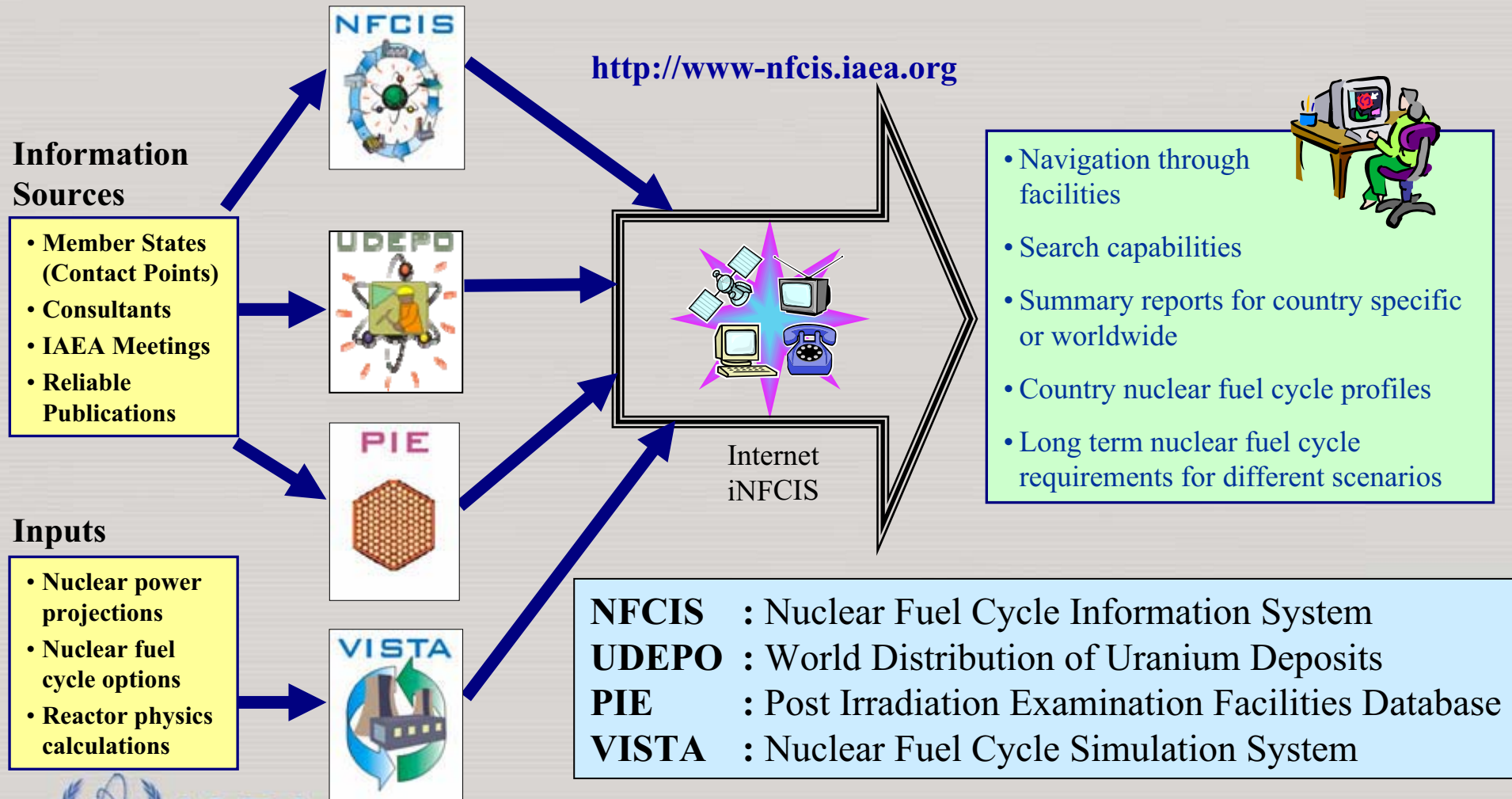
1992 (IAEA-TECDOC-692, 1993)

1997 (IAEA-TECDOC-1050, 1998)

2003 (IAEA-Working Material, 2003)

Post-Irradiation Examination of Water Reactor Fuel (PIE) and IAEA PIE Facilities/Techniques Database

IAEA Databases Related to the Nuclear Fuel Cycle



Post-Irradiation Examination of Water Reactor Fuel (PIE) and IAEA PIE Facilities/Techniques Database

Nuclear Fuel Cycle Information System (NFCIS)

- Directory of Civilian Nuclear Fuel Cycle Facilities Worldwide
- Milling, conversion, enrichment, fuel fabrication, spent fuel storage, heavy water production, zircaloy facilities
- Annual update through questionnaire to officially nominated contact points in member states
- Access on the internet with some search and filter capabilities
(www-nfcis.iaea.org)



The screenshot displays the IAEA NFCIS website interface. At the top, the IAEA logo and 'INFCIS' are visible, along with navigation links for 'Home' and 'Logout'. Below this, the 'NFCIS Nuclear Fuel Cycle Information System' title is shown. A navigation bar includes 'Facilities', 'Statistics', 'Country Reports', and 'Help'. The main content area is titled 'NFCIS Facility Report' and shows details for 'Advanced Nuclear Fuels GmbH'. A pink box highlights the text 'New web site (in test operation)'. Below this, a table provides general information and activity details for the facility.

General Information	
Country	Germany
Location	Lingen
Data Source	IAEA NFCIS Questionnaire to Member States 2003

Activity	
Facility Type	Fuel fabrication (LWR)
Design Capacity (*)	650 t HM/a
Status	In operation
Scale	Commercial

Post-Irradiation Examination of Water Reactor Fuel (PIE) and IAEA PIE Facilities/Techniques Database

Post Irradiation Examination (PIE) Facilities Database (1)

- Catalogue of PIE Facilities Worldwide
- General and technical information about the facilities
- Access on the internet with some search and filter capabilities (www-nfcis.iaea.org)

The screenshot displays the IAEA INFICIS website interface. At the top, the IAEA logo and 'INFICIS' are visible, along with navigation links for 'Home' and 'Logout'. The main heading is 'PIE Post Irradiation Examination Facilities'. Below this, there are tabs for 'Facilities', 'Help', and 'Admin Page'. The current view is a 'PIE Facility Report' for the facility 'ATALANTE-alpha workshop, lab., analyses, transuraniens, reprocess...'. The report includes sections for 'General & Cell Charac.', 'Acceptance Info.', 'Techniques', and 'Refabrication & Ins...'. The 'General' section contains a table with the following data:

General	
Facility Name	ATALANTE-alpha workshop, lab., analyses, transuraniens, reprocessing studies
Country	France

A pink banner below the table reads 'New web site (in test operation)'. Below this, another table provides contact information:

Second Contact Person	
Phone	+33 4 66 79 66 18
Email	magali.ranchoux@cea.fr
Web Address	-

The 'Cell Characteristics' section includes a table with the following data:

Cell Characteristics	
Purpose	Shearing of weighed fuel pins, fuel treatment operations, analysis in high-level radioactive media.

Post-Irradiation Examination of Water Reactor Fuel (PIE) and IAEA PIE Facilities/Techniques Database

Post Irradiation Examination (PIE) Facilities Database (2)

- Data are given for 31 Hot Labs from 17 countries including:
 - Characteristics of Cells and Acceptance Info;
 - Description of available Destructive & Non-Destructive Examination Techniques;
 - Rod Refabrication and Instrumentation Description , if any;
 - Availability of Storage and Conditioning Capabilities;
 - Altogether about 100 different PIE techniques described

The screenshot shows the IAEA INFCIS website interface. At the top, there is the IAEA logo and the text 'International Atomic Energy Agency' and 'INFCIS'. To the right, there are links for 'Home | Logout' and 'NFCIS | UDEPO'. Below this is a header for 'PIE Post Irradiation Examination Facilities'. A navigation bar contains 'Facilities', 'Help', and 'Admin Page'. The main content area is titled 'PIE Facility Report' and shows 'Facility : ATALANTE-alpha workshop, lab., analyses, transuraniens, reprocess'. Below this are four tabs: 'General & Cell Charac.', 'Acceptance Info.', 'Techniques', and 'Refabrication & Ins'. The 'General' tab is selected, showing a table with the following data:

Facility Name	ATALANTE-alpha workshop, lab., analyses, transuraniens, reprocessing studies
Country	France

Below the table is a pink banner that reads 'New web site (in test operation)'. Underneath this banner is another table with contact information:

Second Contact Person	
Phone	+33 4 66 79 66 18
Email	magali.ranchoux@cea.fr
Web Address	-

At the bottom of the screenshot, there is a section for 'Cell Characteristics' with a table:

Purpose	Shearing of weighed fuel pins, fuel treatment operations, analysis in high-level radioactive media.
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Post-Irradiation Examination of Water Reactor Fuel (PIE) and IAEA PIE Facilities/Techniques Database

PIE Database - Background

- Created in 1990s
- Published as a working material in 1996
- Transformed into an electronic database in 2003
- Published in the internet in 2004
- Data is being updated through contact points in PIE facilities

Post-Irradiation Examination of Water Reactor Fuel (PIE) and IAEA PIE Facilities/Techniques Database

PIE Database New Web Site

- List of facilities
- Filtered by
 - available technique
 - facility name

The screenshot shows the IAEA INFCIS PIE database interface. At the top, there is a navigation bar with the IAEA logo and the text 'INFCIS' in large yellow letters. Below this, there are links for 'Home', 'Logout', 'Feedback', and 'Disclaimer'. The main header reads 'PIE Post Irradiation Examination Facilities'. A user menu shows 'User Mehmet Ceyhan'. There are three tabs: 'Facilities', 'Help', and 'Admin Page'. The main content area is titled 'List of PIE Facilities'. It features three dropdown filters: 'Technique' (set to 'Any'), 'Region' (set to 'The World'), and 'Country' (set to 'All'). Below the filters is a search box labeled 'Name contains:' and a 'Go' button, along with a 'Reset All Filters' button. A summary bar indicates 'Total 31 records found in 2 pages.' with pagination controls. The main data is presented in a table with the following columns: Facility Name, Country, Region, #-of-DE Techniques, and #-of-NDE Techniques.

Facility Name	Country	Region	#-of-DE Techniques	#-of-NDE Techniques
CELCA	Argentina	Latin America	3	4
LHMA - Laboratory for High and Medium Activity - SCK-CEN, Belgium	Belgium	Western Europe	20	10
CTMSP - Hot Cell Pilot Laboratory	Brazil	Latin America	2	5
Chalk River Laboratories, AECL	Canada	North America	16	7
AMI - Electricité de France Chinon Laboratory	France	Western Europe	15	7
ATALANTE-alpha workshop, lab., analyses, transuraniens, reprocessing studies	France	Western Europe	6	1
LECA - Laboratoire d'Examen de Combustibles Actifs	France	Western Europe	15	5
LECI - Laboratoire d'Etudes des Combustibles Irradiés	France	Western Europe	24	9
STAR - Station de Traitement, Assainissement Reconditionnement	France	Western Europe	0	7

Post-Irradiation Examination of Water Reactor Fuel (PIE) and IAEA PIE Facilities/Techniques Database

PIE Database New Web Site

- Details of the selected facility

The screenshot shows the IAEA INFCS PIE database interface. At the top, there is a navigation bar with the IAEA logo, the text 'IAEA International Atomic Energy Agency', and 'INFCS' in large yellow letters. To the right of 'INFCS' are links for 'Home | Logout | Feedback | Disclaimer'. Below this, there are more links: 'NFCIS | UDEPO | PIE | VISTA | MADB'. The main header reads 'PIE Post Irradiation Examination Facilities'. A secondary navigation bar contains 'Facilities', 'Help', and 'Admin Page' buttons, along with the user name 'User Mehmet Ceyhan'. The main content area is titled 'PIE Facility Report' and shows the facility name 'AMI - Electricité de France Chinon Laboratory'. Below this are several tabs: 'General & Cell Charac.', 'Acceptance Info.', 'Techniques', 'Refabrication & Instrumentation', and 'Storage & C'. The 'General' tab is active, displaying a table with the following data:

General			
Facility Name	AMI - Electricité de France Chinon Laboratory	IAEA Ref #	5-PIE
Country	France	Last Update	2003
Address	GDL/SCMI, BP 23, 37420 Avoine		
Contact Person	Philippe Geyer		
Second Contact Person			
Phone	+33 4 47986700	Fax	+33 4 47986709
Email	philippe.geyer@edf.fr		
Web Address	-	(Please notify us if you can not reach this web address!)	
Cell Characteristics			
Purpose	No more activities on fuel rods and absorber materials, mainly on mechanical tests on surveillance capsules, irradiated grids, etc.		

Post-Irradiation Examination of Water Reactor Fuel (PIE) and IAEA PIE Facilities/Techniques Database

PIE Database New Web Site

- Details of selected technique

The screenshot shows the IAEA INFCIS website interface. At the top, there is a navigation bar with links for Home, Logout, Feedback, and Disclaimer. Below this is the IAEA logo and the INFCIS logo. The main header reads "PIE Post Irradiation Examination Facilities". A secondary navigation bar contains "Facilities", "Help", and "Admin Page" buttons, along with a user login field for "User Mehmet Cey".

The main content area displays a "PIE Technique Report" for the technique "Visual Examination" at the facility "LHMA - Laboratory for High and Medium Activity - SCK-CEN, Belgium".

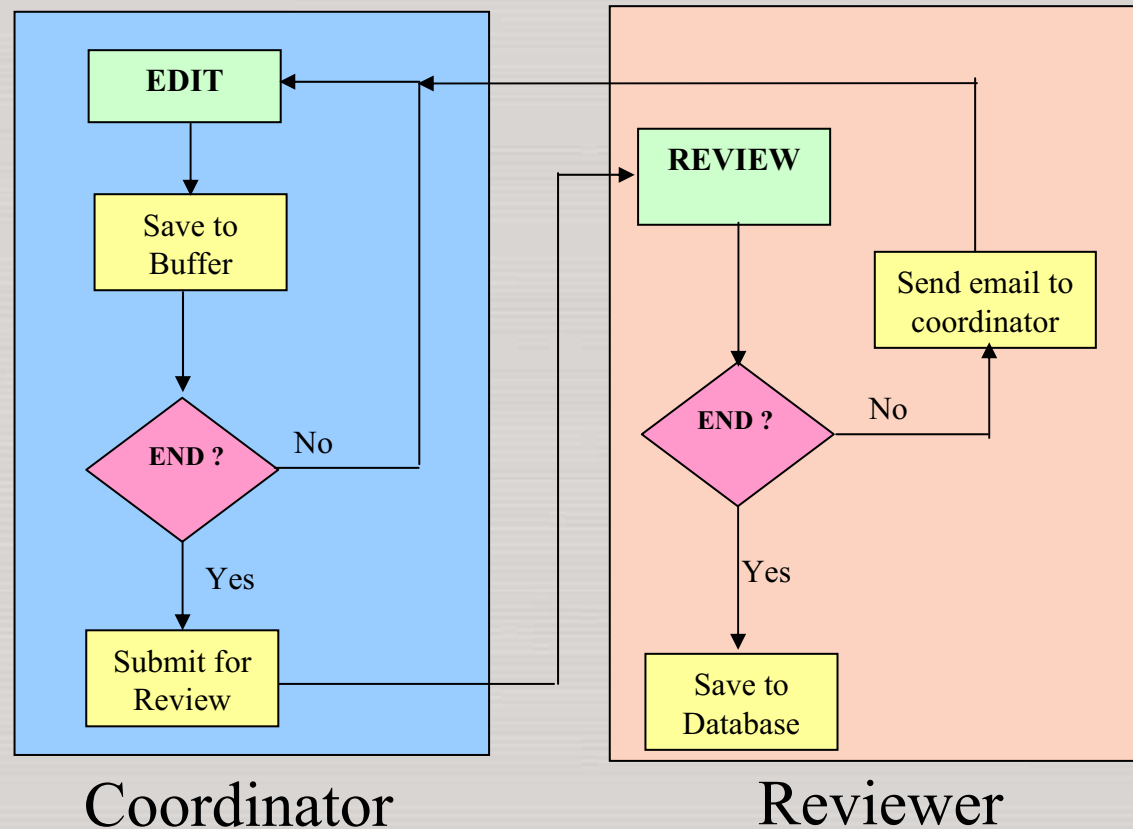
Technical Information	
Type	NDE
Short Description	The fuel rod defiles in front of the objective of the stereo-microscope or a video-camera allowing optical observations over the total external surface.
Form of Data Presentation	Pictures (analog & digital) & Videofilm
Comment	
References	
Equipment	Stereo-microscope & Video-camera
Standards	
Test Parameters	
Type of Specimen	fuel rod
Measured Parameters	Aspect, location and dimensions of visible surface features.
Calculated Parameters	Dimension of features
Features	Magnification max. x15. Accurate axial (± 0.5 mm) and azimuthal ($\pm 1^\circ$) location of observations.

Post-Irradiation Examination of Water Reactor Fuel (PIE) and IAEA PIE Facilities/Techniques Database

PIE Database

Admin Web Site – Data Update Flowchart and Roles

- Owner
- Coordinator
- Reviewer



Post-Irradiation Examination of Water Reactor Fuel (PIE) and IAEA PIE Facilities/Techniques Database

PIE Database Admin Web Site

- Operations:
 - Add facility,
 - Delete facility,
 - Edit facility,
- Statuses:
 - OK,
 - EDIT,
 - REVIEW

The screenshot shows the IAEA INFCIS PIE Admin Web Site interface. At the top, there is a navigation bar with the IAEA logo, the text 'IAEA International Atomic Energy Agency', and 'INFCIS'. To the right of the INFCIS logo are links for 'Home | Logout | Feedback | Disclaimer'. Below this, there are more links: 'NFCIS | UDEPO | PIE | VISTA | MADB'. The main header area contains 'PIE Post Irradiation Examination Facilities'. Below the header, there are tabs for 'Facilities', 'Help', and 'Admin Page', with 'Admin Page' being the active tab. The user is identified as 'User Mehmet Ceyhan'. The main content area is titled 'List of PIE Facilities in Admin Page'. It features a search and filter section with dropdown menus for 'Technique' (set to 'Any'), 'Region' (set to 'The World'), and 'Country' (set to 'All'). There is also a 'Name contains:' search box, a 'Go' button, and a 'Reset All Filters' button. Below the search section, it indicates 'Total 38 records found in 2 pages.' with pagination controls. The main data table has columns for 'Facility Name', 'Country', 'Region', 'Publish?', 'Operation', and 'Data Status'. The table lists several facilities, including 'Mehmet Test', 'Test Facility', 'CELCA', 'LHMA - Laboratory for High and Medium Activity - SCK-CEN, Belgium', 'CTMSP - Hot Cell Pilot Laboratory', 'Chalk River Laboratories, AECL', 'AMI - Electricité de France Chinon Laboratory', and 'ATALANTE-alpha workshop, lab., analyses, transuraniens, reprocessing studies'. Each row includes icons for adding, deleting, and editing, as well as a 'Data Status' icon (EDIT or OK).

Technique	Region	Country			
Any	The World	All			
Name contains: <input type="text"/> <input type="button" value="Go"/> <input type="button" value="Reset All Filters"/>					
Total 38 records found in 2 pages.					
Facility Name	Country	Region	Publish?	Operation	Data Status
Mehmet Test			No		
Test Facility			No		
CELCA	Argentina	Latin America	Yes		
LHMA - Laboratory for High and Medium Activity - SCK-CEN, Belgium	Belgium	Western Europe	Yes		
CTMSP - Hot Cell Pilot Laboratory	Brazil	Latin America	Yes		
Chalk River Laboratories, AECL	Canada	North America	Yes		
AMI - Electricité de France Chinon Laboratory	France	Western Europe	Yes		
ATALANTE-alpha workshop, lab., analyses, transuraniens, reprocessing studies	France	Western Europe	Yes		



Post-Irradiation Examination of Water Reactor Fuel (PIE) and IAEA PIE Facilities/Techniques Database

PIE Database Admin Web Site

- Operations for Coordinator
 - Cancel editing
 - Save to buffer
 - Submit for review
- Operations for Reviewer
 - Send email to coordinator
 - Save to main database

The screenshot displays the IAEA INFCIS PIE Admin Web Site interface. The header includes the IAEA logo and the text 'International Atomic Energy Agency' and 'INFCIS'. Navigation links for 'Home', 'Logout', 'Feedback', and 'Disclaimer' are present. Below the header, the site title 'PIE Post Irradiation Examination Facilities' is shown. A navigation bar contains 'Facilities', 'Help', and 'Admin Page' tabs, with the user 'User Mehmet Ceyhan' logged in. The main content area is titled 'Facility Edit' and shows the facility name 'CELCA'. A 'Data from buffer!' section includes 'Facility Operations' icons. Below this are tabs for 'General & Cell Charac.', 'Acceptance Info.', 'Techniques', 'Refabrication & Instrumentation', and 'Storage'. The 'General' section contains a form with the following fields: Facility Name (CELCA), IAEA Ref # (34-PIE), Country (Argentina), Last Update (2004), Address (Av. Del Libertador 8250 (1429) Buenos Aires), Contact Person (Ing. Gabriel Rugeirelo), and Publish (Yes...). A Second Contact Person field is also present.