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Standard for KOLAS system of HANARO NRF

Sim, Cheul-Muu, Nam Ki Yong, Jeong Jeong Hwan, Chang Hee Lee

Korea Atomic Energy Research Institute
Yusung P.O Box 105
Taejon, Korea, 305-600

Abstract

It is imperative to set up QA system of a research experiments in accordance with standards such ISO, ASTM and so on. It is sure that a neutron radiography is demanded by the customer. In order of settling the QA system, it is indispensable to review standards which is the most candidate for preparing the procedures. Recently, KOLAS (Korea of lab accreditation scheme) is spread recognized in a research peer group aimed at a validity of measurement and test. The NRF(neutron radiography facility) of HANARO is a preliminary step for a gaining of the KOLAS. ISO standards and national standards are reviewed to commensurate with a requirement of KOLAS. Forwardly, KOLAS system provides the reliability and consistency of test results and satisfy clients' requirement.

1. A necessity of KOLAS as QA system

Poorly Planned or Executed of R&D budget waste 2% of a monetary amount in case of a simple product. However, a requiring of a high degree of precision, complexity and reliability result in a waste of a 25% of R&D budget. The right way to mange people at all levels become less spend. A hours of all workers is statistically composed of 25% of value-added work, 10% of necessary work which but non value added, 30% of rework, 10% of unnecessary work, 25% of nor working at all. Value-added work adds worth or value to your products and services from your external customers' point of view. QA system allows a possibility to wipe out R&D waste and to meet a demanding of customers. In AT&T Bell Laboratory Walter Shewhart invented SQC(Statistical Quality Control)1920. SQC affected the U.S system so much that a productivity in all national level could harvested. as of fig.1. Japan imported the QA system from US and modified which is called TQC(total quality control)1980, US prevailed the ASI(America standard institute) QSR(quality system requirements)-9000 (Failure mode and effects analysis for CS(customer satisfaction) to overcome the 1980 crisis. In Korea, QA system was adopted in the Nuclear power plant 1970. KAERI was eager to mobilize to QA system of nuclear

fuel fabrication as well as R&D system.[1]

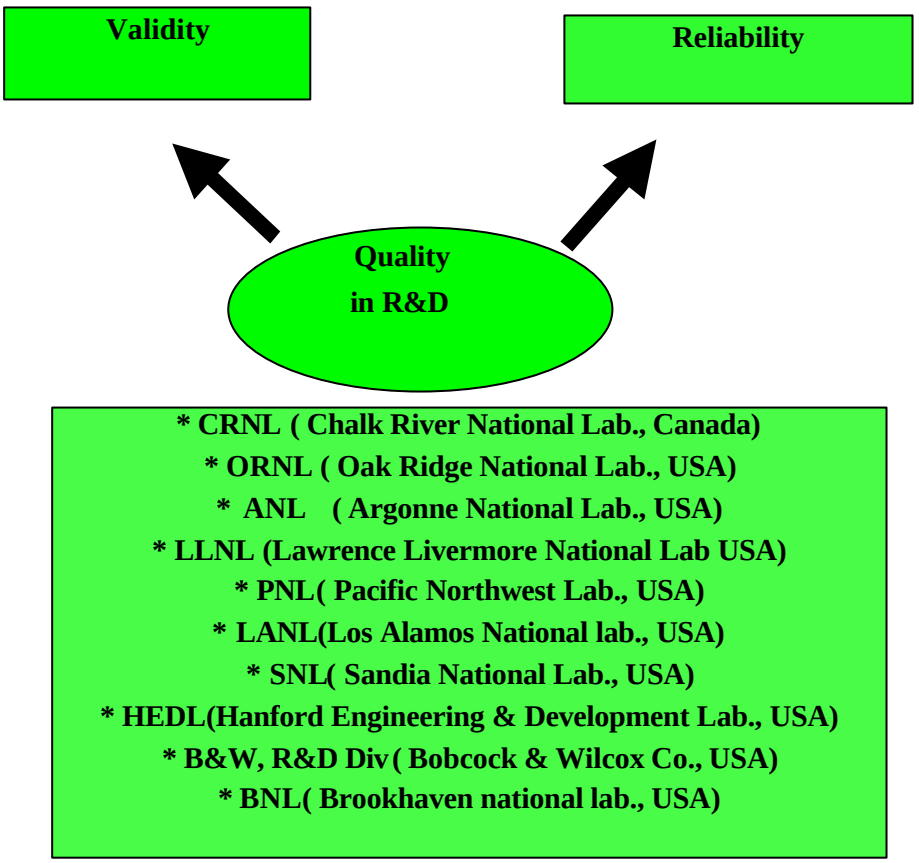

Fig. 1 R/D labs adopts the QA system for a reliability and validity of data.

Measurement 6 categories, (1)management understanding and attitude on QA, (2)Quality organization status, (3)Problems handing, (4)cost of quality, (5)Quality improvement actions, (6) summation of company quality posture, which is evaluated on the status of quality stage. There are 5 stages which are to go through toward the maturity of QA system.[2]

1.1 uncertainty

The management do not have a comprehension of quality as a manage tool. It is tend to blame quality department for quality problems. Quality is hidden in manufacturing or engineering departments. Inspection probably is not part of organization. Emphasis is loaded on appraisal and sorting. Problems are fought as they occur. There is no resolution, inadequate definition, lots of yelling and accusations. The 20% of productivity accounts for a cost of waste.

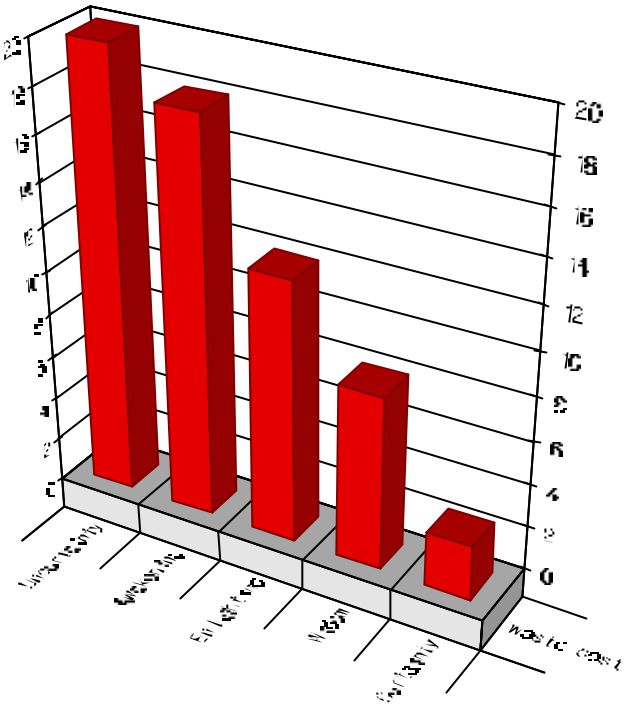

Fig 2. Waste cost of 5 stages

1.2 Awakening

Management recognizing that quality management may be of value but not willing to provide budget and time to make it all happen. A stronger quality leader is appointed but main emphasis is still on appraisal and moving the product. Teams are set up to attack major problems. Long range of solutions is solicited. Actually, The 18% of productivity accounts for a cost of waste.

1.3 Enlightenment

While going through quality improvement program learn more about quality management, management become supportive and helpful. Quality department reports to top management, all appraisal is incorporated and manager has role in management of company. Corrective action communication established. Problem are faced openly and resolved in an orderly way. Actually, the 12% of productivity accounts for a cost of waste.

1.4 Wisdom

Management participates and understands absolutes of quality management and recognizes their personal role in continuing emphasis. Quality manager is an officer of company. A preventive action and an effective status report is available. QA activity is involved with customer affairs and special assignments. Problems are identified early in

their development. All functions are open to suggestion and improvements. Actually, the 8% of productivity accounts for a cost of waste

1.5. Certainty

The management considers quality management an essential part of system. QA manager is son board of directors. Prevention is a main concern. Quality is a thought leader. QA problems are prevented except in the most unusual cases. Actually, the 2.5 % of productivity account for a cost of QA

KOLAS is the most considerable candidate of QA system in 6 labs of KAERI. KOLAS is connected to ILAS(International lab accreditation scheme) and APLAS(Asia Pacific lab accreditation scheme), which is originated from ISO 17025. KOLAS is founded on KTAS-Notice 1999-259. KATS (Korea Agent of technology standard) governs the KOLAS. [3][4]

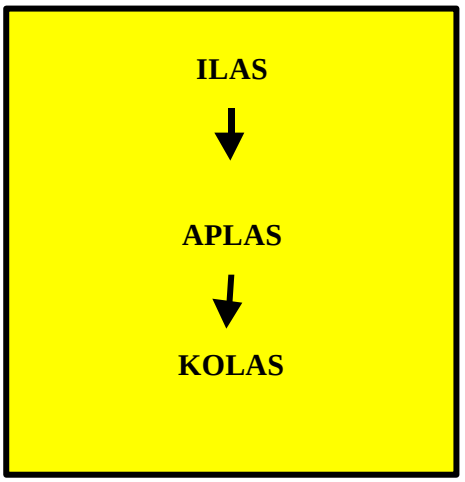

Fig.3 KOLAS is linked to APLAS, KOLAS

2. Neutron radiography standards

Neutron radiography standards has been addressed, reviewed and revised by two groups ISO, ASTM.

2.1 National standards

KS(Korea Standards) addressed the standard of KS B 0845 in radiography. It is not so for neutron radiography. ASME Sec V " Non destructive testing" does not describe the neutron radiography. ASTM(America society for testing and materials) and ISO(international organization for standardization)both have groups issuing standards in neutron radiography. On the national level, ASTM has the four standards which details the neutron radiography. ASTM Practice for thermal neutron radiography of materials (E748-95)provides a good introduction to the neutron radiographic techniques. This document is intended to be a instruction manual, describing the thermal neutron radiographic method and personal qualification required facilities and equipment. A description of neutron sources, beam filters, and collimators is presented. The use of

conversion screens and film cassettes for the direct and indirect imaging methods is discussed in details. ASTM method for determining Imaging quality in direct thermal neutron radiographic testing (E545-91) is widely used by neutron radiography practitioner. This standard is used to determine the relative quality of radiograph images produced by direct, thermal neutron radiography examination. The requirements expressed in this method are not intended to control the quality level of materials and components. The judgment of the radiography's quality is based on the evaluation of images different indicators that are exposed simultaneously with or under exactly the same conditions as those used to examine a test object. The information obtained from the BPI(beam purity indicator)of fig. 5 and SI(sensitivity indicator)of fig. 6 on radiographic images is then used to determine the Neutron Radiographic Category for the facility in accordance with E 545 Table 4.[5]

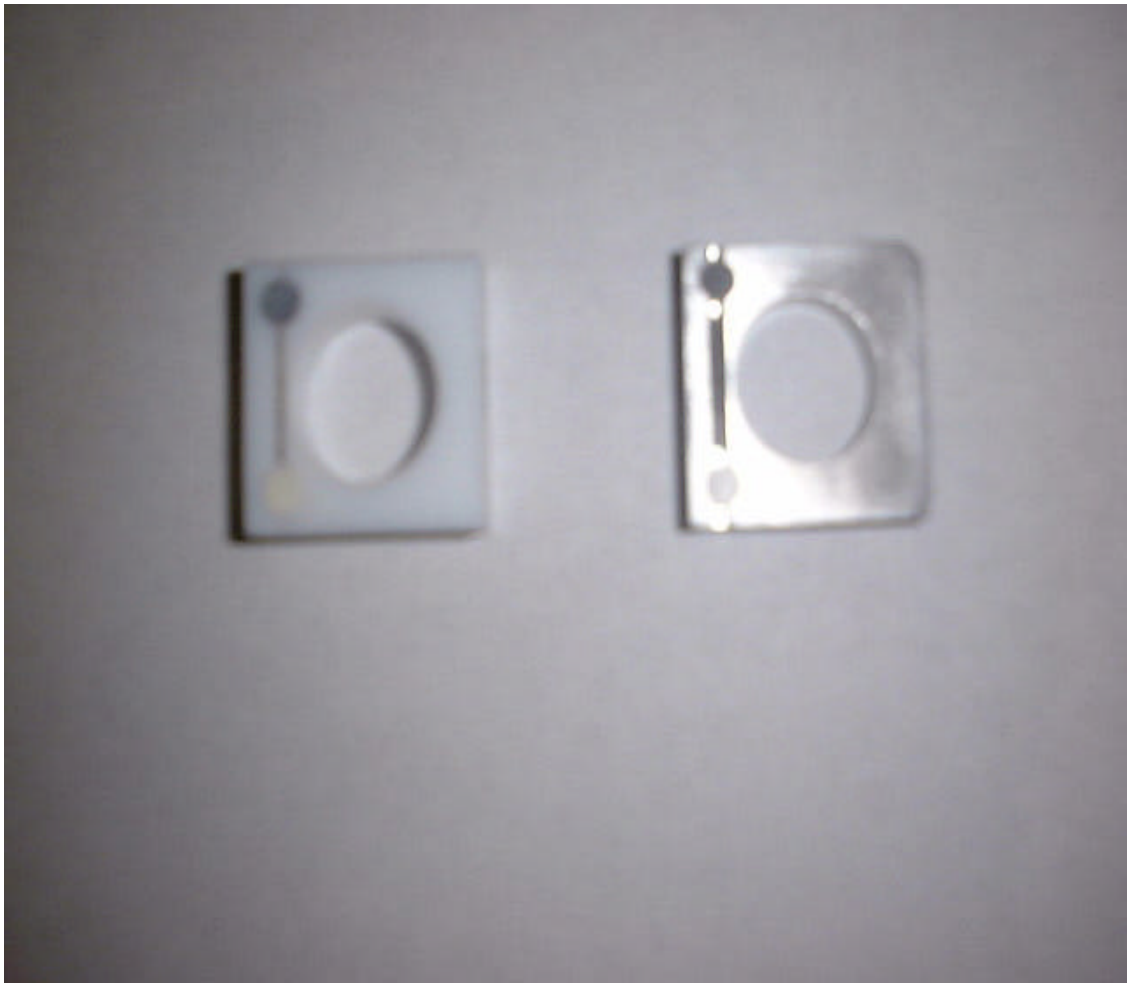

Fig .5. Beam purity Indicator

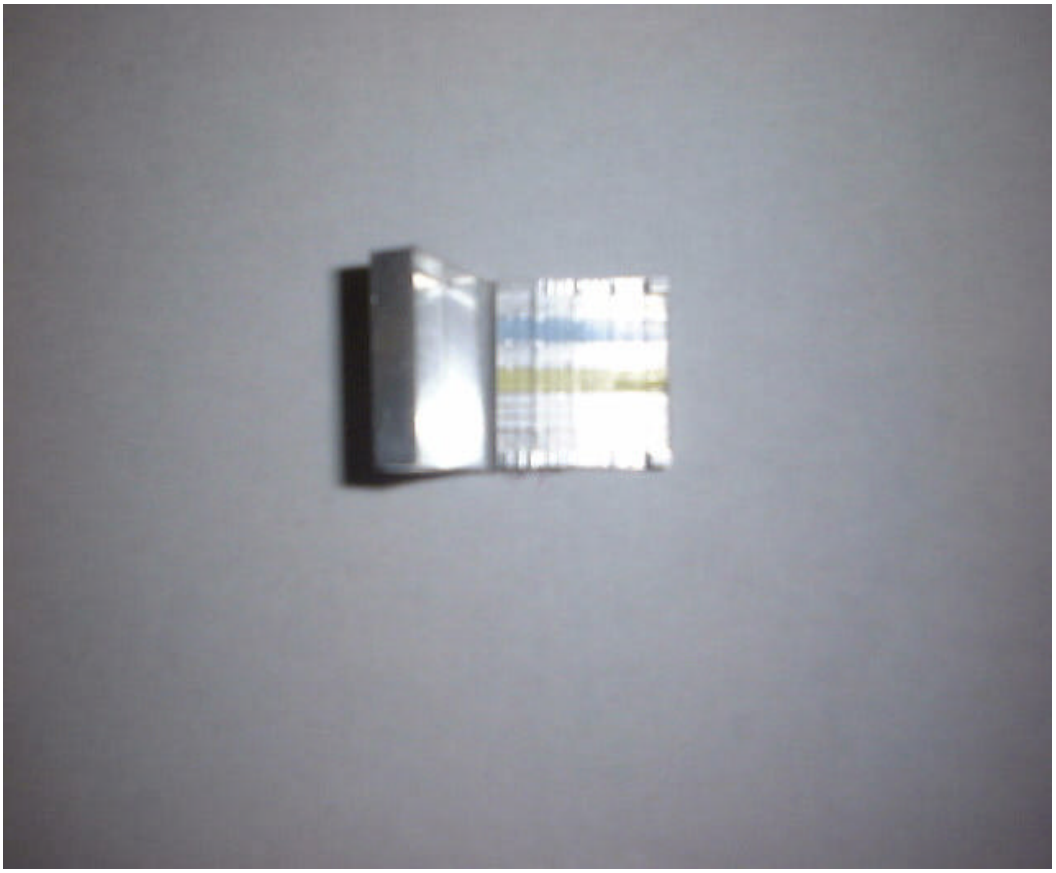

Fig. 6 Sensitivity Indicator

ASTM method for determining the L/D ratio of neutron radiography beams(E 803-91) is also widely used by neutron radiography practitioner. It provide an experimental techniques to determine the ratio of the effective collimator length to effective collimator length and aperture diameter, since neutrons scattered off both the collimator and shielding walls affect the L/D ratio. The E803 method involves examining the radiographic image of a no-umbra device of fig. 7 to determine the point where the umbral shadow disappear. The device consists of an U shaped aluminum channel with a series of parallel V groves at specified intervals along its length. ASTM standard method for neutron radiographic dimensional measurements(E1496-97). This test method provides techniques for extracting quantitative dimensional information on an object from its neutron radiography. The techniques are based on the identification of changes in film density caused by material changes where a corresponding discontinuity in film density exists. This test method is designed to be used with neutron densities in the vicinity of the edge must be in the linear portion of the density versus exposure curve. The accuracy of

Fig 7. DU device

this test method may be affected adversely in installations with high-angular-divergence neutron beams or with large object-to films distances. Standard Terminology for Nondestructive(E 1316-section H -99a)defines the glossary of NR. Guide for radiographic testing(E 94) describes many important aspects of neutron radiography such as techniques, files, viewing of radiographs, storage of radiography, film processing, and recording. ASTM standards will continue to be used for the foreseeable future. These standards are under periodic review and are revised to reflect both improvements in the procedures.

2.2 ISO standards[5,6]

Up till now, ISO has published 25 international standards in the whole field of NDT. Only 8 standards, from which 8 pertain to recommend practice for radiographic examination of different items and 2 to radiographic image quality indicator(IQI)deal with radiography. The ISO working group is also developed three standards relating to the neutron radiography. The ISO organized a working group, ISO/TC135/SC5/WG 4. The ISO TC 135" Nondestructive testing has a SC5" radiation methods" and WG4 on "thermal neutron radiography" Ten countries have representative participating in the working group as either members or observers. Work item 5.5 " Non-destructive testing; thermal neutron radiographic testing; General Principles" is based on ASTM E 748. The draft was successfully ballot under SC5 and is designated ISO/CD 11537. Work item 5.6 "Non-destructive testing Thermal neutron radiographic testing; Determination of beam L/D ratio" has been reviewed and rewritten several times since the original submission of ASTM E 803 as working draft.

2.3 Future

These standards are under periodic review and review and are revised to reflect both improvements in the procedures, methods and device used as well as to correct incomplete, inaccurate, or outdated data. New ASTM standards currently being drafted include a standards on neutron radioscopic practice and a method for neutron radiologic system. ASTM E261 "Method for determining neutron flux, fluence and spectra by radioactivation techniques will be issued. ISO group and ASTM group will have a cooperation for a round robin test to evaluate the every proposed method or device.

3. Conclusion

HANARO NRF system of fig. 7 has been operating since 1996. Several items such as turbine blade, composition lens, explosive components, archaeological relics, pyrex glass RI in Pb vessel, fuel pellet and internal structural of carburet had been tested. The results of tests which is similar and identical specimen to above tested items will be getting more reliable and valid by way of QA. In preliminary preparation of KOLAS, 21 items will be organized and set up.[7] The process of accreditation of KOLAS will be followed in accordance with Fig 9.

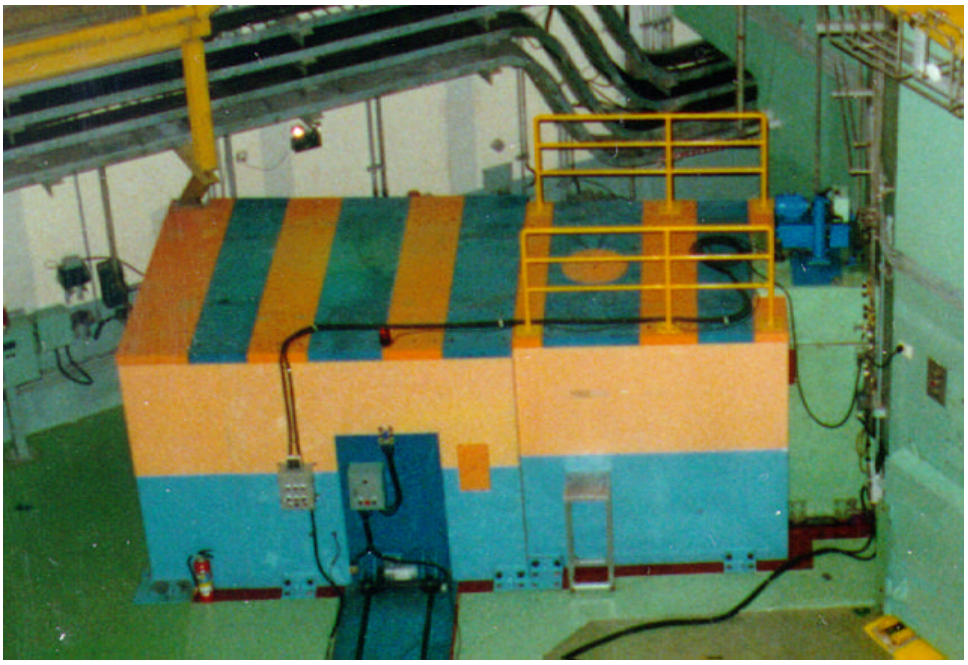

Fig. 8 NRF in HANARO

Table. 1 KOLAS requirement : 21 items

item	Subject		
QM-B-01	Organization, operation		
QM-B-02	Quality Control system		
QM-B-03	Quality Audit		
QM-B-04	Management Review		
QM-B-05	Training **certification**		Important
QM-B-06	facility envirorment		
QM-B-07	Test facility control		
QM-B-08	Standard specimen control		
QM-B-09	Roundrobintest& bench marking		Important
QM-B-10	Test process control		
QM-B-11	Test result certification		
QM-B-12	Test object control		
QM-B-13	Recording		
QM-B-14	Procurement		
QM-B-15	Code		
QM-B-16	Customer's satisfaction		
QM-B-17	Correction action		
QM-B-18	Classified confidentiality		
QM-B-19	Safety control		
QM-B-20	Prevention system		
QM-B-21	Document		

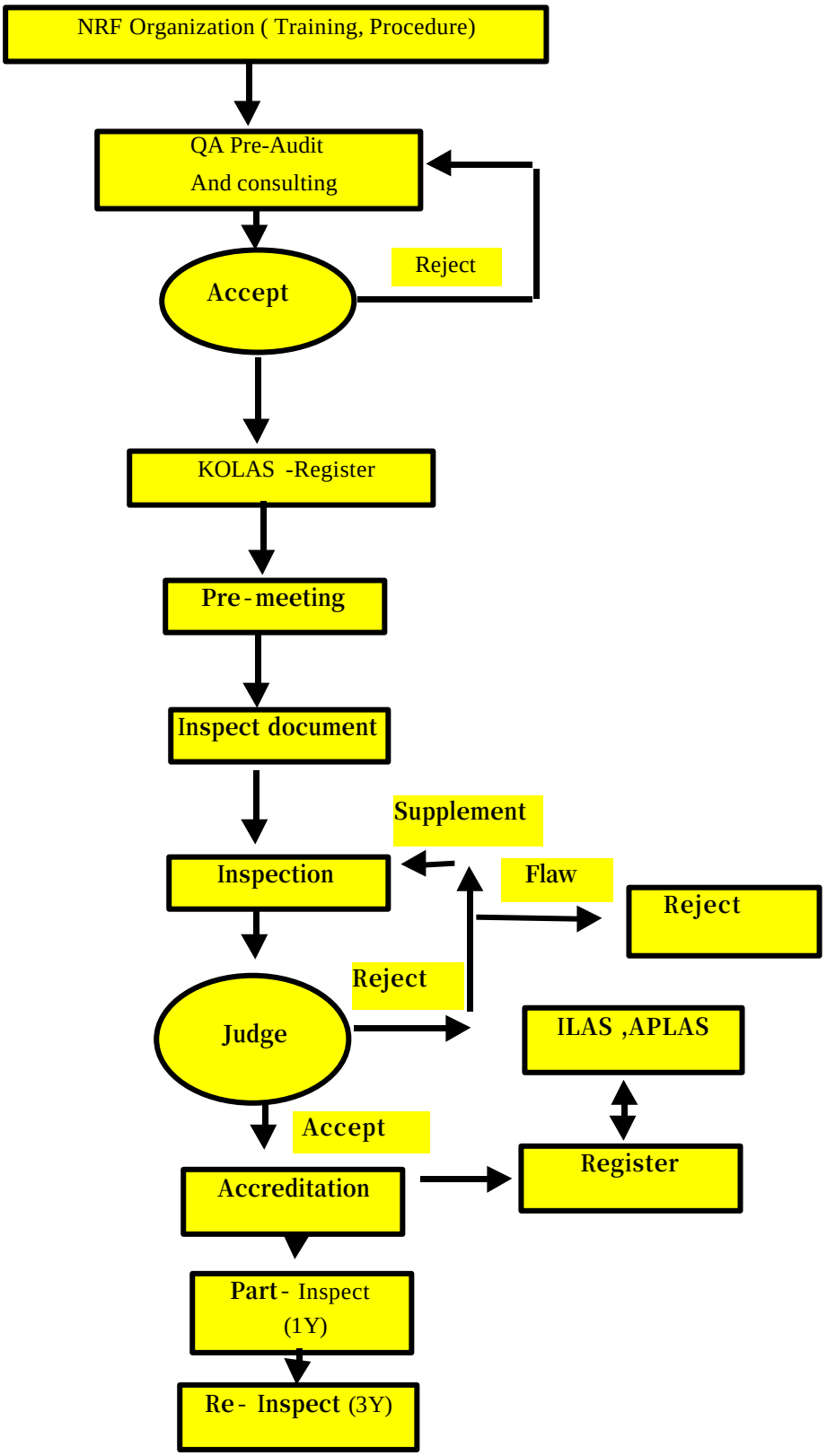

Fig 9.Flow chart of KOLAS

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