

**SAT IN ENGINEERING SUPPORT PERSONNEL
TRAINING**

M. Gonzalez, Spain

S.A.T.
SEMINAR

S.A.T
IN

ENGINEERING
SUPPORT
PERSONNEL

(4)

OBJECTIVES

- I MAIN TASKS OF 2 TYPES OF ENGINEERING SUPPORT
- II BRIEF DESCRIPTION OF "SIMPLIFIED" SAT APPROACH
- III ADVANTAGES AND DISADVANTAGES OF BOTH TYPES (COMPLETE & SIMPLIFIED)
- IV REAL EXAMPLE OF SIMPLIFIED MODEL APPLIED TO A CPM.
- V RECOMMENDATIONS OF WHICH MODEL TO APPLY FOR EACH SUPPORT ENGINEER TYPE.

3.1 REACTOR ENGINEER

This section describes activities commonly performed by the reactor engineer.

- Perform post-scrum analysis.
- Prepare control rod withdrawal/insertion sheets.
- Assess core conditions to identify or confirm a degraded core, including abnormal geometry.
- Support a failed fuel action plan.
- Input core operating data into core follow program.
- Evaluate core follow reports for long-term trends.
- Develop a core shuffle and component shuffle sequence.
- Prepare a core physics test plan.
- Evaluate core physics test data.
- Monitor core performance during startup and periodically during operation.
- Perform a routine weekly reactor core surveillance and evaluate the results.
- Perform a core performance computer software safety review.
- Verify data input and updates.
- Determine the life expectancy of expendable core components.
- Perform individual responsibilities as a member of the site emergency response team.

3.2 IN-SERVICE INSPECTION (ISI) ENGINEER

This section describes activities commonly performed by the ISI engineer.

- Determine the applicable ISI requirements for selected plant systems and components.
- Develop ISI test procedures.
- Evaluate ISI test results to ensure conformance with acceptance criteria of applicable documents.
- Perform individual responsibilities as a member of the site emergency response team.

3.3 PERFORMANCE/RELIABILITY ENGINEER

This section describes activities commonly performed by the performance/reliability engineer position.

- Establish the acceptable performance levels for systems and equipment included in the performance/reliability program.
- Evaluate testing intervals using applicable vendor recommendations, operating experience, and equipment performance history.
- Evaluate test data to verify test acceptance criteria are met.
- Determine equipment operability and performance based on test results.
- Evaluate the trend and performance of a system and/or piece of equipment.
- Prepare a performance/reliability engineering analysis for a modification or test.
- Develop a reliability model for a safety system to be used to evaluate equipment performance, proposed modifications, test intervals, and operating practices.
- Test and evaluate the thermal performance of the overall plant, key systems, and components.
- Perform individual responsibilities as a member of the site emergency response team.

34 SYSTEM ENGINEER/MAINTENANCE ENGINEER

This section describes activities commonly performed by the system engineer/maintenance engineer.

- Monitor operation and maintenance activities of assigned systems and components.
- Evaluate system performance to improve efficiency and reliability.
- Determine preventive and predictive maintenance requirements for selected systems and equipment.
- Develop maintenance, surveillance, and other test procedures.
- Conduct walkdowns of assigned systems.
- Prepare, provide technical support, and document special tests as may be required for evaluation of system performance or to determine the cause of system malfunctions.
- Observe ongoing work and identify practices that are inconsistent with quality workmanship and industrial and radiological safety practices.
- Identify system and equipment problems and initiate appropriate corrective actions.
- Analyze system and equipment failures for root causes.
- Specify post-maintenance test requirements.
- Perform technical reviews of temporary modifications and conduct safety evaluations.
- Assist in the preparation and review of design change packages, installation procedures, and testing procedures.
- Assist in the investigation of reportable occurrences or significant operating events.
- Assure maintenance of the environmental and seismic qualification of plant equipment.
- Evaluate isolation boundaries for complex safety tag-outs.
- Perform individual responsibilities as a member of

3.5 STATION MODIFICATION ENGINEER

This section describes activities commonly performed by the station modification engineer.

- Prepare a station modification package.
- Develop modification conceptual designs.
- Evaluate detailed modification designs.
- Test modifications.
- Prepare a safety evaluation for a modification.
- Review proposed temporary modifications and jumpers, including technical and safety reviews (10CFR50.59) and safety evaluations.
- Periodically evaluate temporary modifications to determine continued need.
- Review setpoint and computer software changes.
- Perform individual responsibilities as a member of the site emergency response team.

3.6 QUALITY ASSURANCE (QA) ENGINEER

This section describes activities commonly performed by the quality assurance engineers.

- Develop a surveillance plan and method.
- Observe a surveillance test and evaluate the process and results.
- Perform QA review of engineering modification documents.
- Perform QA review of work order documents.
- Perform QA review of procurement documents.
- Perform individual responsibilities as a member of the site emergency response team.

3.7 REGULATORY COMPLIANCE ENGINEER

This section describes activities commonly performed by the regulatory compliance engineers.

- Review proposed plant modifications to verify compliance with license requirements.
- Review procedures and procedure changes to verify compliance with license requirements.
- Observe plant conditions and evolutions to verify compliance with license requirements.
- Verify compliance with technical specification surveillance requirements and other required surveillances.
- Review/screen industry operating event reports, notices, and bulletins for plant applicability.
- Develop a license change recommendation.
- Assist in the investigation of reportable occurrences or significant operating events.
- Perform individual responsibilities as a member of the site emergency response team.

19890371, S. 1

SUMMARY OF FACTS
ABOUT S.A.T.

*C.N ALMARAZ: 23 JOB POSTS---8 YEARS
(FIRST ONE DEVELOPED)

*REDUCED METHOD
(CORRELATION PROCESS)
276 JOB POSTS: 7 MONTHS

*TYPICAL NUMBER OF TASKS:
REACTOR OPERATOR: 400
ENGINEERING JOB: 15 (MACROTASKS)
MAINTENANCE: 40-50 TASKS

TIME DEVOTED TO ERT(JPM):
USA: 1,2T/D/M
SPAIN(AMA):1,5T/D/M

SAT (COMPLETE PROCESS)
ATUCHA(ARGENTINA):
7 JOB POSTS:15 MEN 1 YEAR
(ONLY ANALYSIS&DESIGN PHASES)
15 ANALYSTS, ONE DATA BASE MANAGER
2 SW/HW EXPERTS

tecnatom, s.a.

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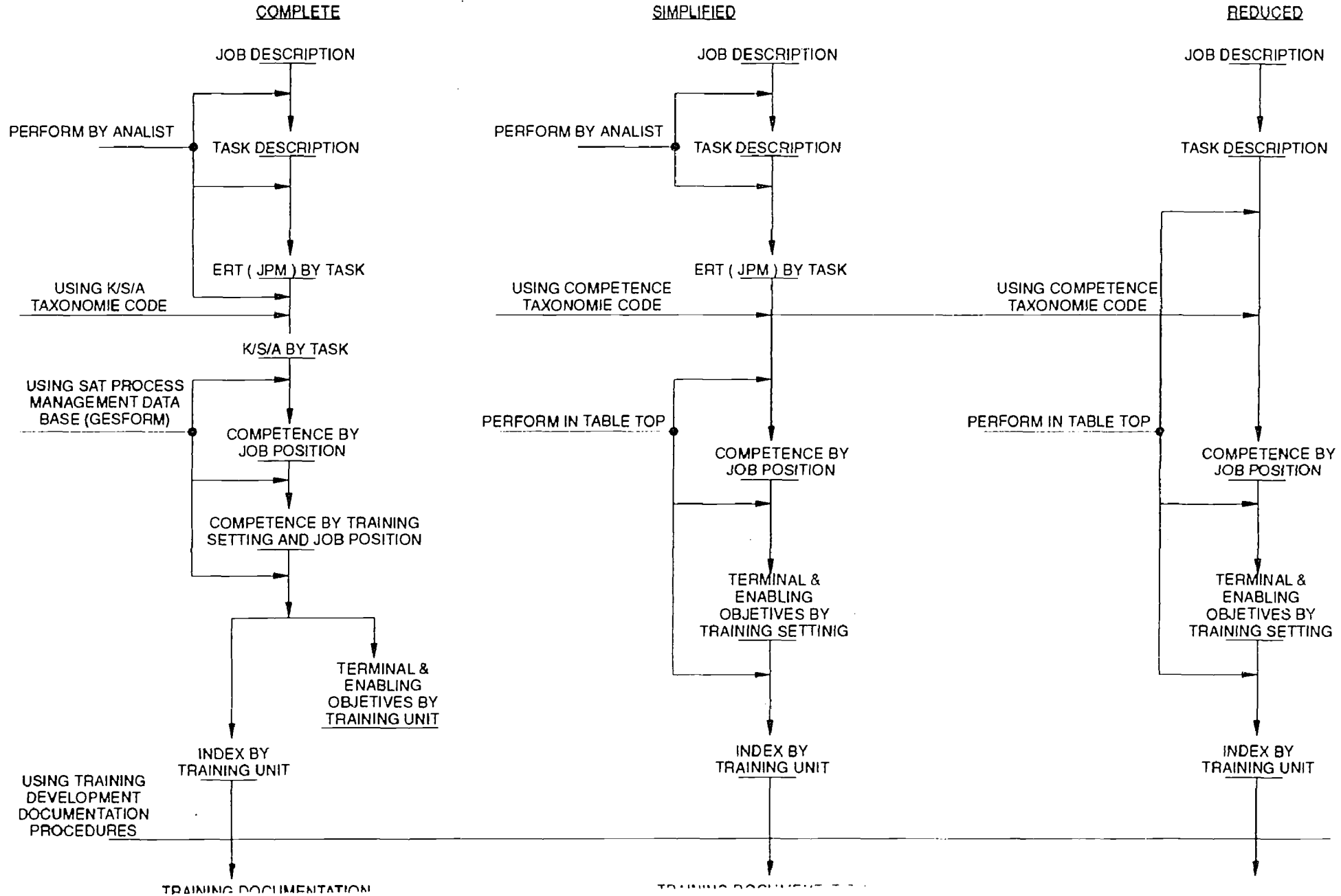
HUNGARIA: 10 JOB POSTS FOR MAINTENAN.
(SIMPLIFIED SAT): 2 YEARS

COMPLETE SAT: 1,5T/D/M

SIMPLIFIED SAT: 8T/D/TOP TABLE

tecnatom, s.a.

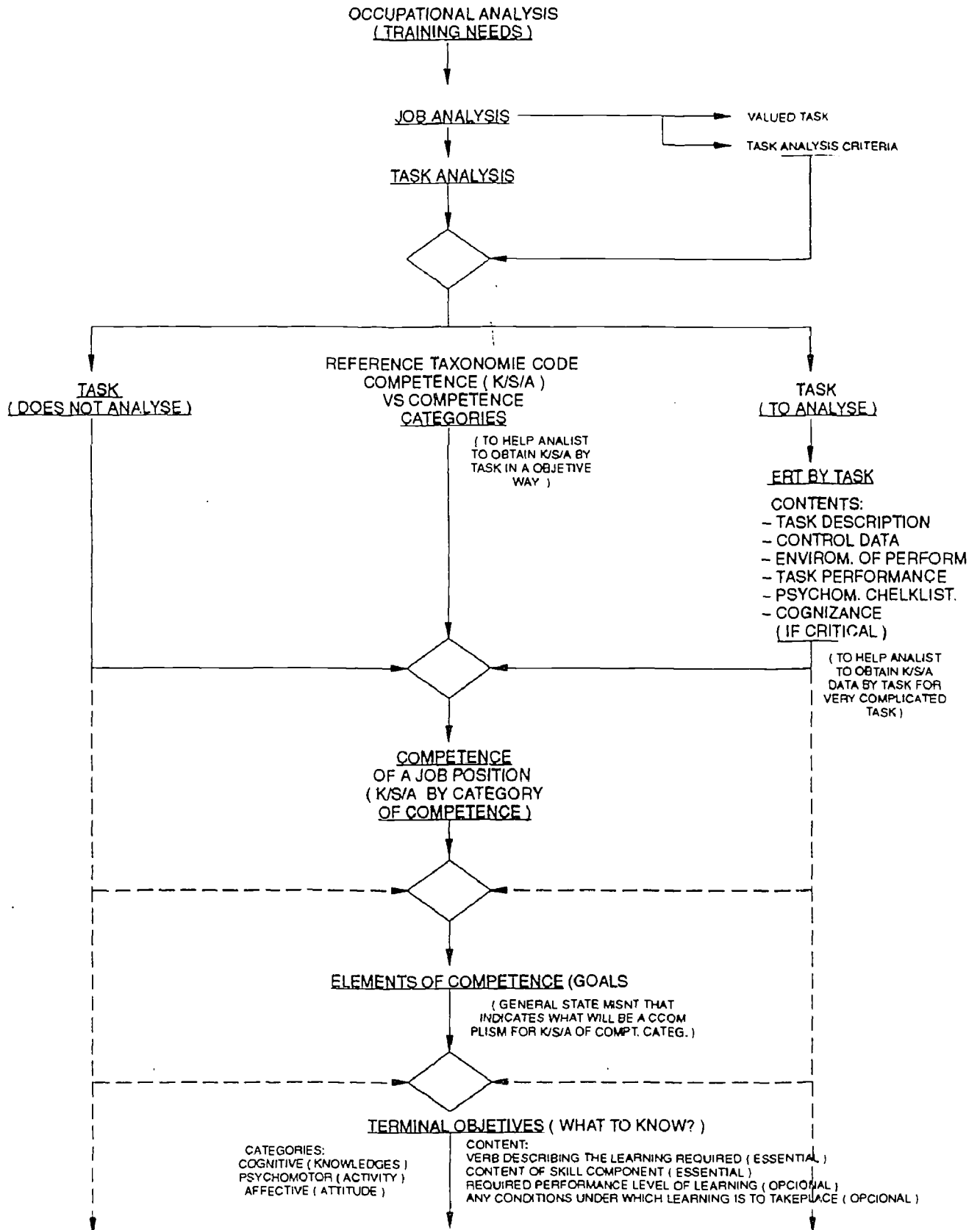
ANNEXE III – FLOWCHART OF THE DIFFERENT METHODS PROPOSAL BY TECNATOM TO DEVELOP A SAT



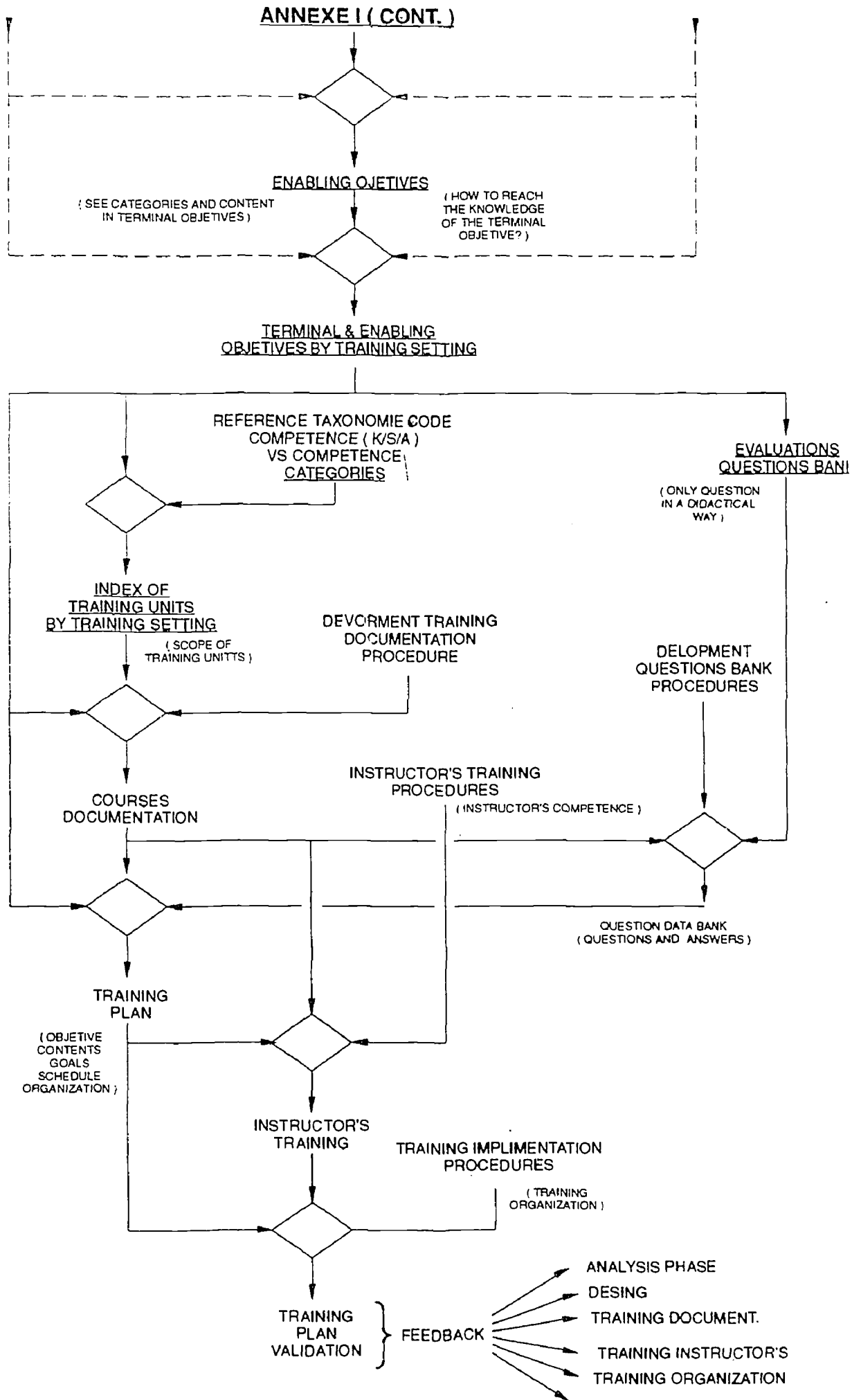
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ANNEXE I
PROPOSAL SAT SEQUENCE

(PAKS NPP
P.M.C PROJECT)



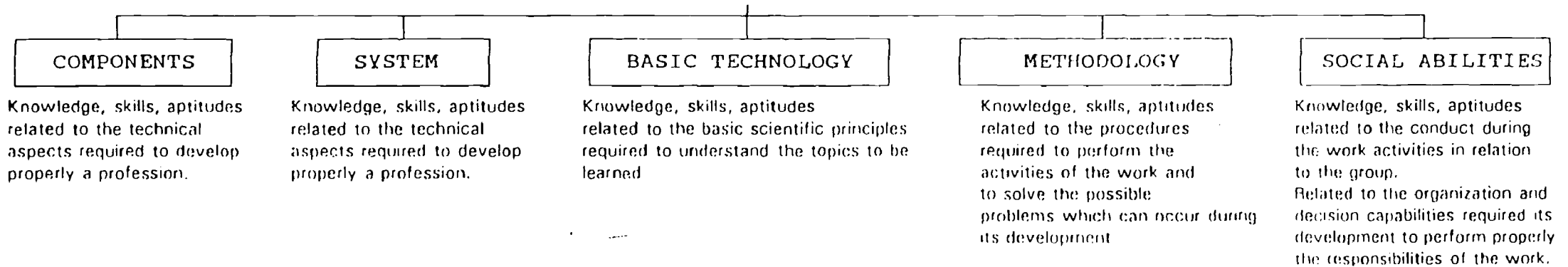
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ANNEXE IV

COMPETENCE

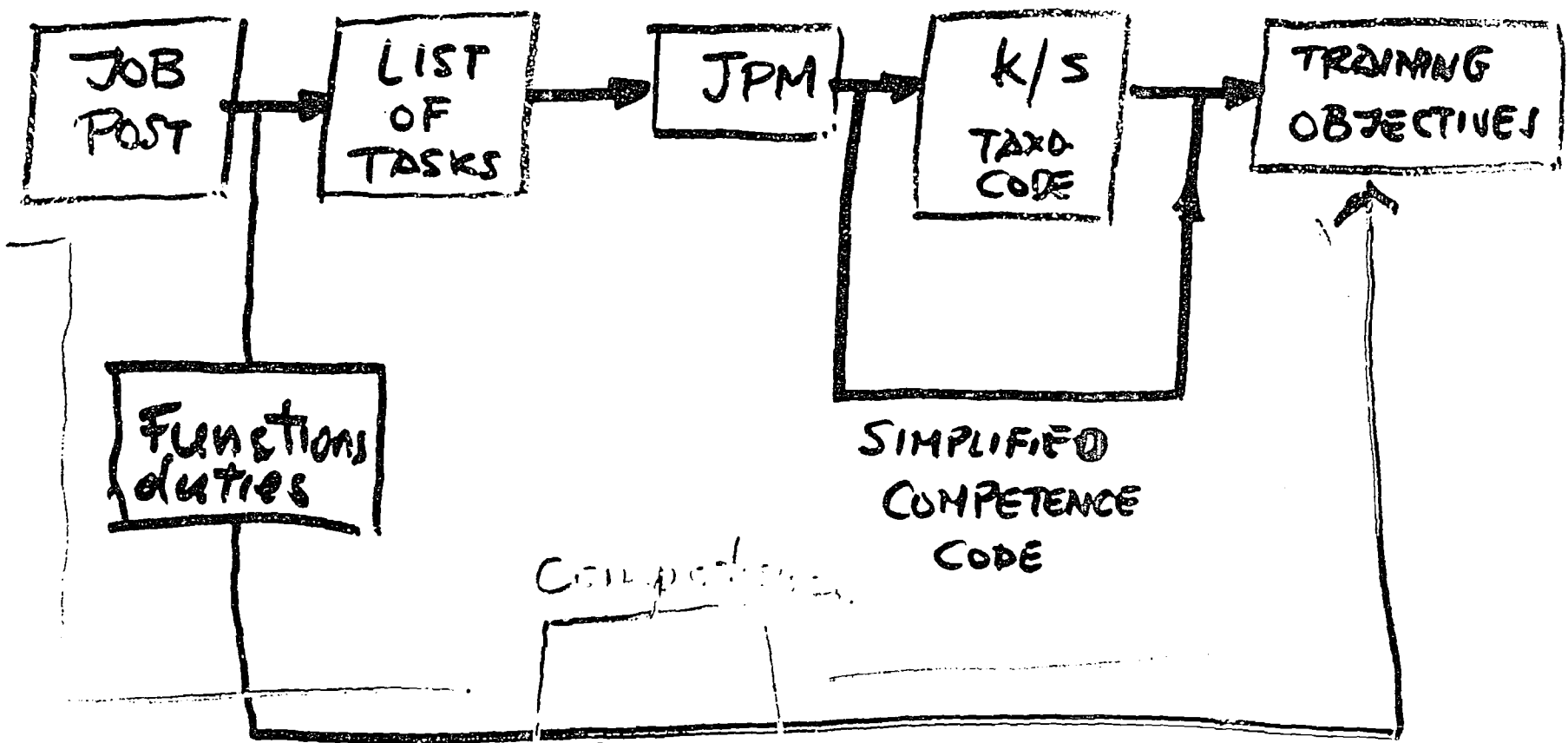
[We say that someone own "professional competence" when he owes the knowledge, skills and aptitudes needed to develop a profession in order to solve the professional problems in a selfsufficient and flexible way and when he is training to colaborate in the professional environment and in the work organization].



• Categories of competence

Contents of the professional competence.

The categoric of competence can be different according to the own organization needs.



Nikita

dg

	course 1	course 2	course 3		
1					X
2	X				
3					
4			X		