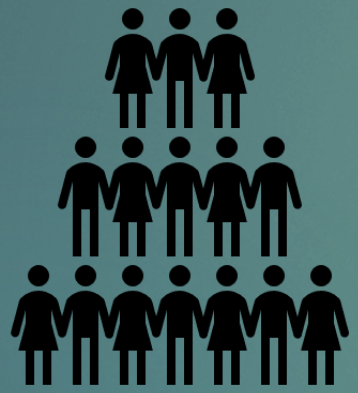
ICAO Language Proficiency Standards in…

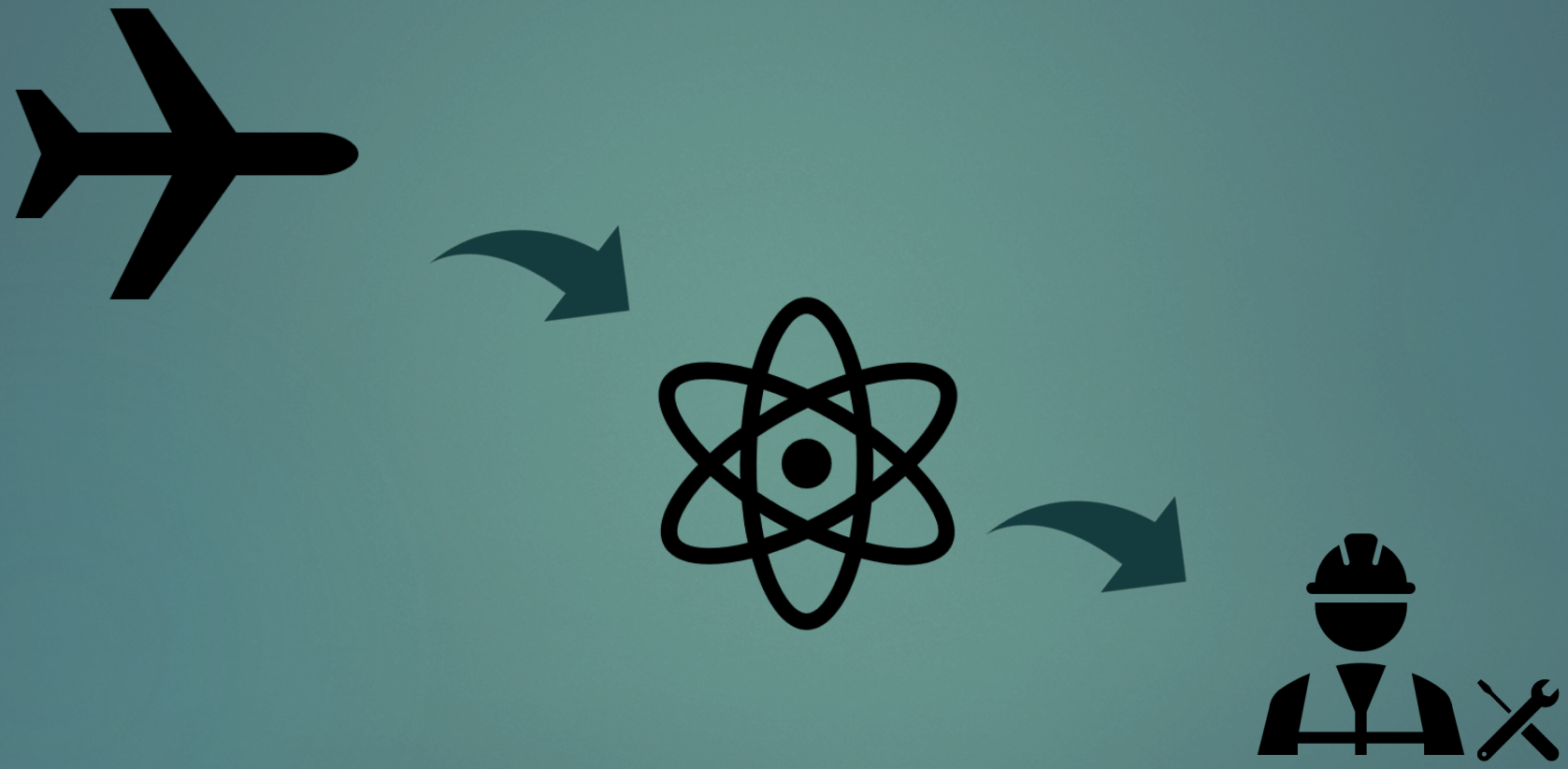
…NUCLEAR ENGLISH?

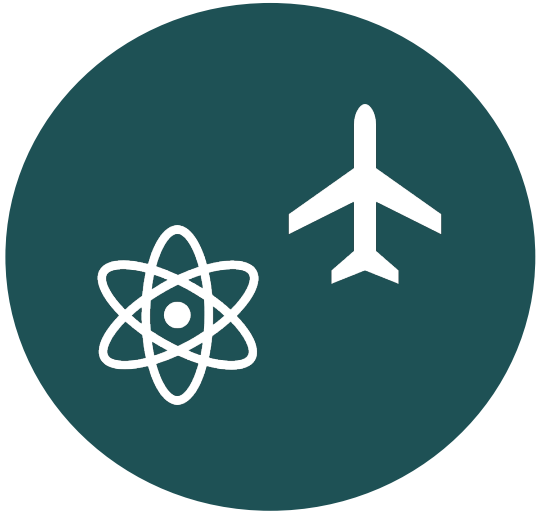


20 000
people

60+
nationalities

1 common
language



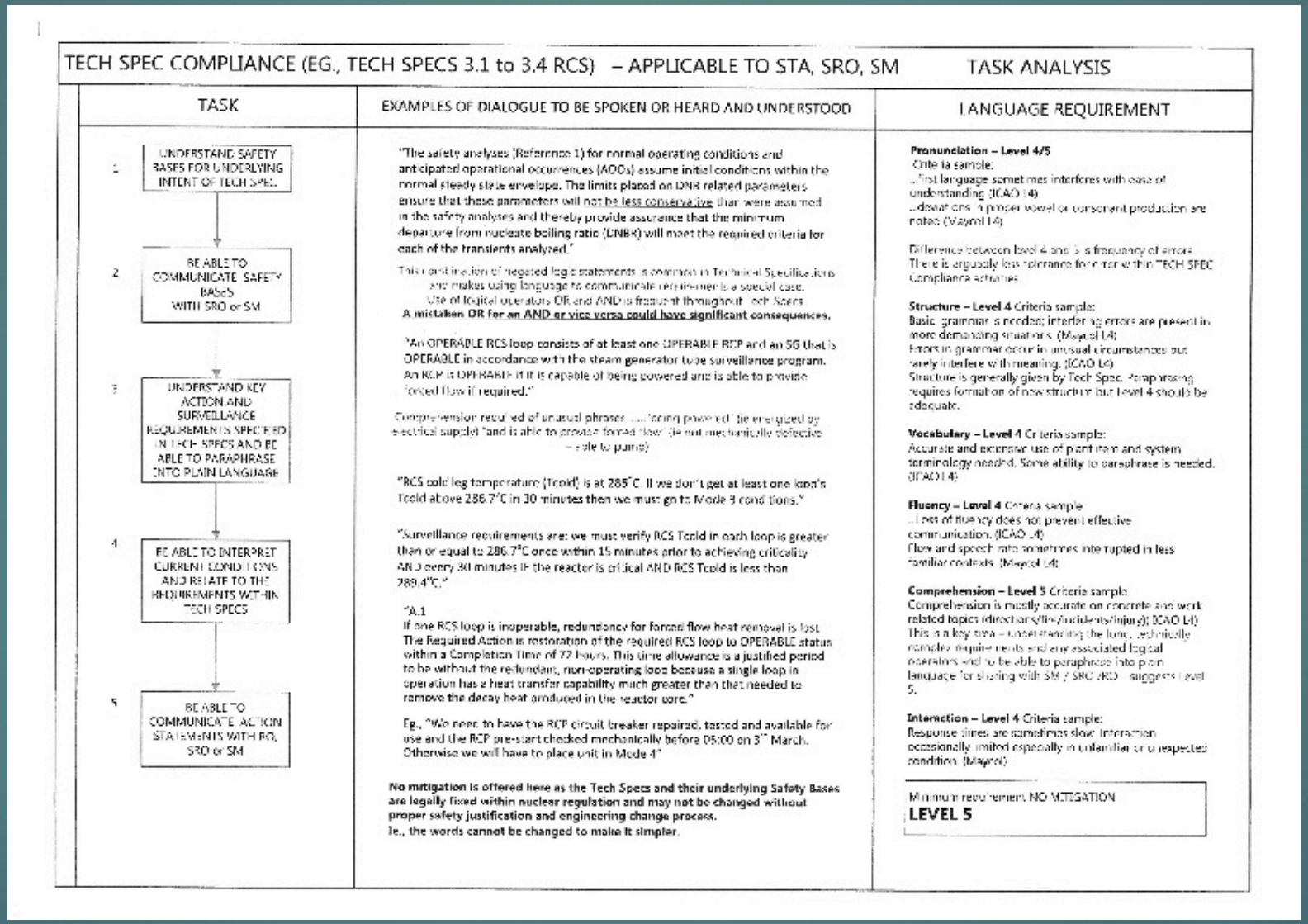


TWO INDUSTRIES IN PARALLEL…

WITH LESSONS TO LEARN BETWEEN THEM

MCR = RO TO EO AO STA + S S + SM …LO

Sample Task Analysis

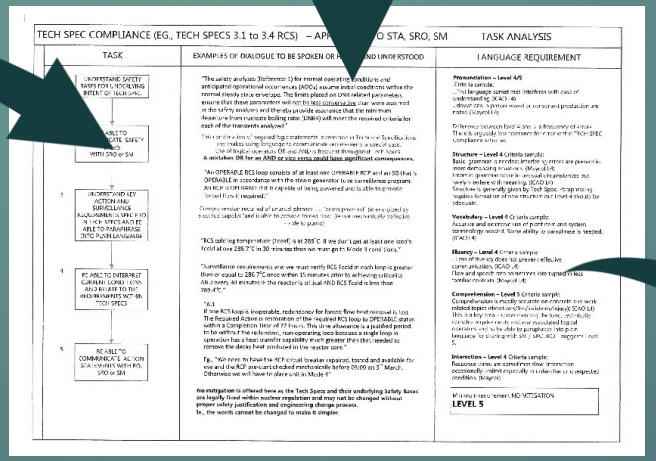


TECH SPEC COMPLIANCE (EG., TECH SPECS 3.1 to 3.4 RCS) – APPLICABLE TO STA, SRO, SM TASK ANALYSIS

TASK	EXAMPLES OF DIALOGUE TO BE SPOKEN OR HEARD AND UNDERSTOOD	LANGUAGE REQUIREMENT
1 UNDERSTAND SAFETY BASES FOR UNDERLYING INTENT OF TECH SPEC. 2 BE ABLE TO COMMUNICATE SAFETY BASES WITH SRO or SM 3 UNDERSTAND KEY ACTION AND SURVEILLANCE REQUIREMENTS SPECIFIED IN TECH SPECS AND BE ABLE TO PARAPHRASE INTO PLAIN LANGUAGE 4 BE ABLE TO INTERPRET CURRENT CONDITIONS AND RELATE TO THE REQUIREMENTS WITHIN TECH SPECS 5 BE ABLE TO COMMUNICATE ACTION STATEMENTS WITH RO, SRO or SM	"The safety analyses (Reference 1) for normal operating conditions and anticipated operational occurrences (AOOs) assume initial conditions within the normal steady state envelope. The limits placed on DNB related parameters ensure that these parameters will not be less conservative than were assumed in the safety analyses and thereby provide assurance that the minimum departure from nucleate boiling ratio (DNBR) will meet the required criteria for each of the transients analyzed." This combination of negated logic statements is common to Technical Specifications and makes using language to communicate requirements a special case. Use of logical operators OR and AND is frequent throughout each Specs **A mistaken OR for an AND or vice versa could have significant consequences.** "An OPERABLE RCS loop consists of at least one OPERABLE RCP and an SG that is OPERABLE in accordance with the steam generator tube surveillance program. An RCP is OPERABLE if it is capable of being powered and is able to provide forced flow if required." Comprehension required of unusual phrases ....."being powered" (ie energized by electrical supply) "and is able to provide forced flow" (ie not mechanically defective – able to pump) "RCS cold leg temperature (Tcold) is at 285°C. If we don't get at least one loop's Tcold above 286.7°C in 30 minutes then we must go to Mode 3 conditions." "Surveillance requirements are: we must verify RCS Tcold in each loop is greater than or equal to 286.7°C once within 15 minutes prior to achieving criticality AND every 30 minutes if the reactor is critical AND RCS Tcold is less than 289.4°C." "A.1 If one RCS loop is inoperable, redundancy for forced flow heat removal is lost. The Required Action is restoration of the required RCS loop to OPERABLE status within a Completion Time of 72 hours. This time allowance is a justified period to be without the redundant, non-operating loop because a single loop in operation has a heat transfer capability much greater than that needed to remove the decay heat produced in the reactor core." Eg., "We need to have the RCP circuit breaker repaired, tested and available for use and the RCP pre-start checked mechanically before 05:00 on 3rd March. Otherwise we will have to place unit in Mode 4" **No mitigation is offered here as the Tech Specs and their underlying Safety Bases are legally fixed within nuclear regulation and may not be changed without proper safety justification and engineering change process.** **Ie., the words cannot be changed to make it simpler.**	**Pronunciation – Level 4/5** Cite ia sample: ...first language somet mes interferes with ease of understanding. (ICAO L4) ...deviations in proper vowel or consonant production are noted. (Mayrol L4) Difference between level 4 and 5 is frequency of errors There is arguably less tolerance for error within TECH SPEC compliance activities **Structure – Level 4** Criteria sample: Basic grammar is needed; interfering errors are present in more demanding situations. (Mayrol L4) Errors in grammar occur in unusual circumstances but rarely interfere with meaning. (ICAO L4) Structure is generally given by Tech Spec. Paraphrasing requires formation of new structure but Level 4 should be adequate. **Vocabulary – Level 4** Criteria sample: Accurate and extensive use of plant/area and system terminology needed. Some ability to paraphrase is needed. (ICAO L4) **Fluency – Level 4** Criteria sample ...Loss of fluency does not prevent effective communication. (ICAO L4) Flow and speech rate sometimes interrupted in less familiar contexts. (Mayrol L4) **Comprehension – Level 5** Criteria sample: Comprehension is mostly accurate on concrete and work related topics (directions/life/accidents/injury); (ICAO L4) This is a key area – understanding the long, technically complex requirements and their associated logical operators and to be able to paraphrase into plain language for sharing with SM / SRO (RO – suggest Level 5. **Interaction – Level 4** Criteria sample: Response times are sometimes slow. Interaction occasionally limited especially in unfamiliar or unexpected conditions. (Mayrol) Minimum requirement NO MITIGATION **LEVEL 5**

"RCS cold leg temperature (Tcold) is at 285C. If we don't get at least one APA's Tcold at 287.6C in 30 minutes then we must go to Mode 3 conditions."

Be able to understand current conditions and relate these to requirements in Tech Specs



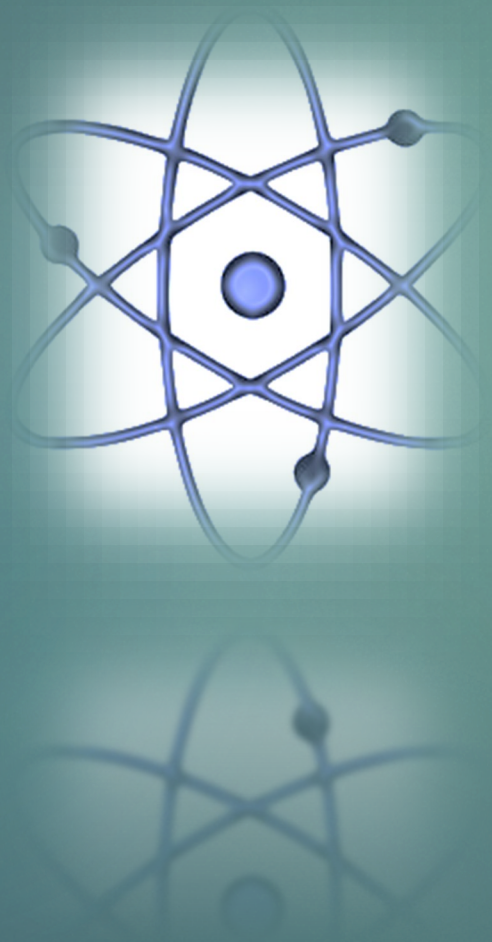
Minimum requirement: No Mitigation Level 5

FLUENCY

STRUCTURE

COMPREHENSION

VOCABULARY



Thank you