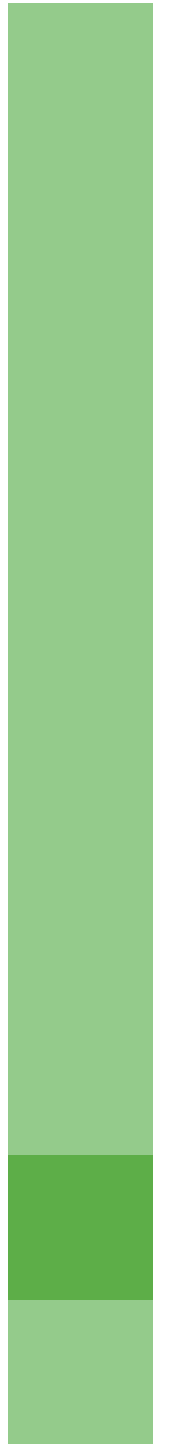




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SECOND EUROPEAN WORKSHOP ON THE ETHICAL
DIMENSIONS OF THE RADIOLOGICAL PROTECTION
SYSTEM

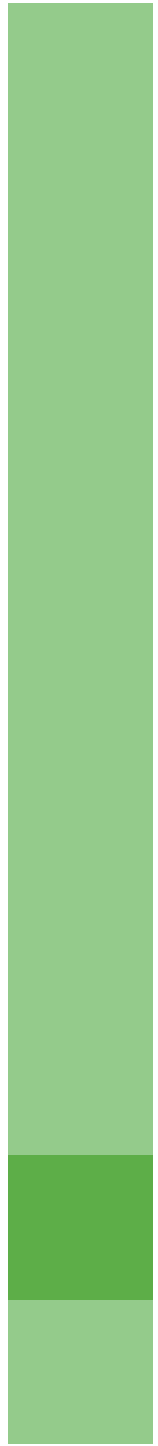
"ETHICAL AND ENVIRONMENTAL CONSIDERATIONS FOR
THE LONG TERM MANAGEMENT OF LONG-LIVED HIGH
LEVEL RADIOACTIVE WASTE AND SPENT NUCLEAR
FUEL"

(The views presented are only those of the author)

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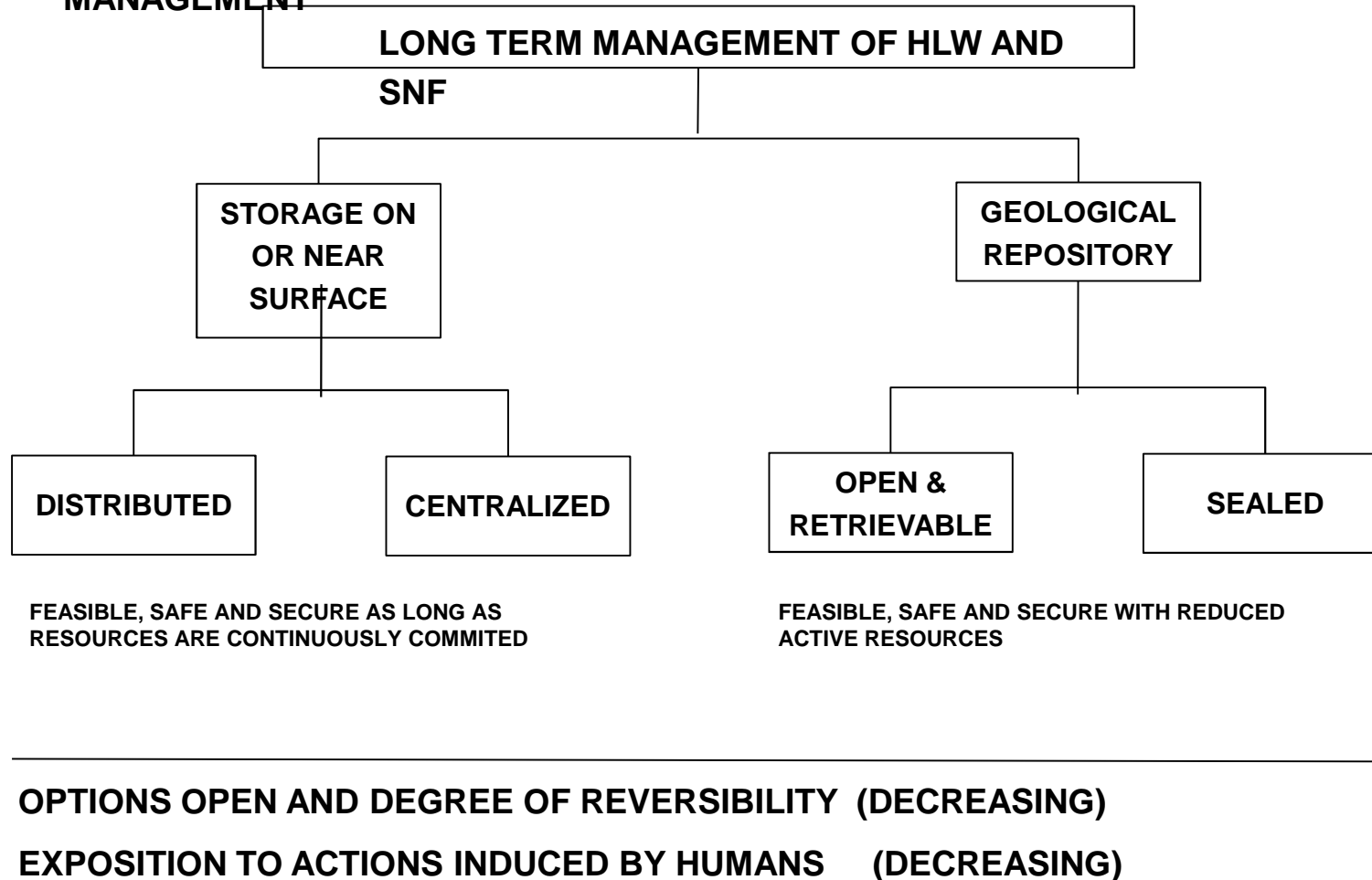
Madrid, 4 to 6 February, 2015



1. DESCRIPTION OF THE "PROBLEM"

- SNF AND HLW NEED VERY LONG TERM CONFINEMENT, WITH POTENTIAL DIFFERENT BASIC OPTIONS (FIGURE 1).
- NOT A RELEVANT RISK FOR THE EXISTENCE OR WELL-BEING OF MAN KIND OR FOR THE SUSTAINABILITY OF THE NATURE (UNLESS VERY LOCALLY).
- PAINFUL PROCESSES TO MAKE PROGRESS IN "FINAL" SOLUTIONS.
- RECOGNISED NEED FOR A CHANGE IN THE GLOBAL APPROACHES.
- ETHICAL AND ENVIRONMENTAL CONSIDERATIONS MUST BE FULLY AND EXPLICITLY TAKEN ON BOARD.
- NEED TO FULLY AND TRULY ENGAGE THE SOCIETY TO DEFINE STRATEGIES AND TO TAKE DECISIONS.
- A SITUATION OF "APPLIED ETHICS" WITH IMPLICATIONS ON THE PRINCIPLES TO APPLY AND THE PROCEDURE TO

Figure 1.- BASIC METHODS OF HLW AND SNF POTENTIAL LONG-TERM MANAGEMENT



2. INITIAL GENERAL AND RELEVANT POINTS TO CONSIDER (1/3)

- THE SYSTEM OF RADIATION PROTECTION (RP) DOES APPLY, ALTHOUGH IT NEEDS TO BE "ADAPTED" TO A CONSIDERABLE EXTENT:
 - Definition of requirements
 - Control of compliance
 - Actions just in case
- } Not possible to be assumed in the
} very long future
} Need to be fine tuned
- THE ETHICAL BASIS OF SUCH RP SYSTEM DO CONSEQUENTLY APPLY, WITH SOME PECULIARITIES:
 - Definition of relative priorities and weights, among several factors
 - Need to consider potential implications for unknown persons and circumstances (intergenerational)
 - Emphasis on the procedural aspects (intragenerational)

2. INITIAL GENERAL AND RELEVANT POINTS TO CONSIDER (2/3)

- THE CLASSICAL COMPONENTS OF THE DECISION-MAKING PROCESS USED IN THIS FIELD MUST BE RECONSIDERED AND FULLY ADJUSTED:

- Definition of regulatory requirements
- Set of arguments to show compliance
- Judgement of compliance

} Specially difficult in the very long-term
Need to be refined

- "ABSOLUTE PROOFS" CANNOT BE EXPECTED. REASONABLENESS AND TOLERABLENESS KEY CONCEPTS. BOTH HAVE SOCIETAL IMPLICATIONS!
- DEFINITION OF STRATEGIES AND DECISIONS TO AUTHORIZE THE DEVELOPMENT OF FACILITIES LARGELY EXCEED THE CLASSICAL ROLE OF THE "REGULATORS" TO BECOME A "SOCIAL ENDEAVOR"
- THE PROCESS MAY WELL TAKE A HUNDRED OF YEARS (OR

2. INITIAL GENERAL AND RELEVANT POINTS TO CONSIDER (3/3)

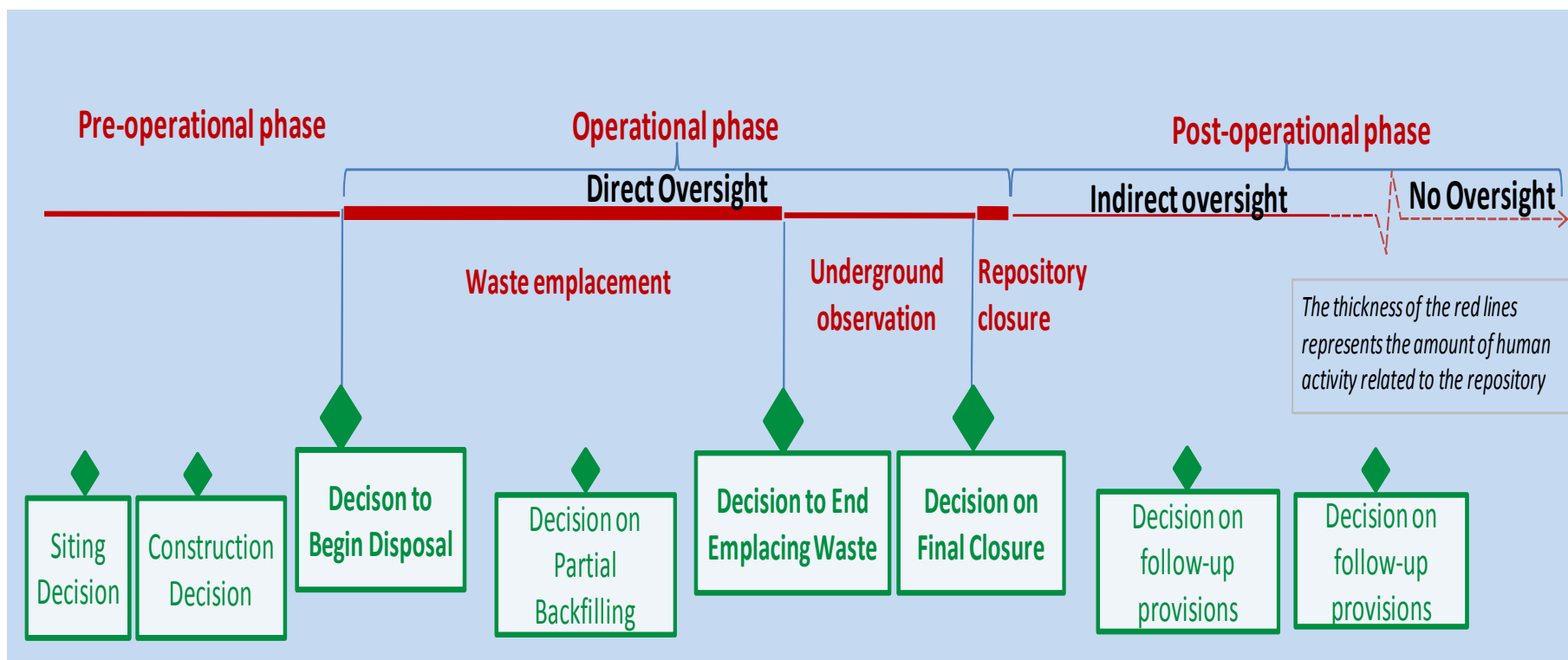
- UNLESS FORCED BY DICTATORIAL MEANS, SEVERAL DIVERSE INDIVIDUAL CULTURAL VIEWS ARE PRESENT IN HUMAN SOCIETIES.
- SOCIETIES ASSIGN DIFFERENT PRIORITIES AND WEIGHTS TO ETHICAL AND/OR MORAL FACTORS. EQUALLY, THEY USE TO HAVE DIFFERENT BASIC VIEWS ABOUT THE NATURE AND ITS RELATION WITH MANKIND.
- ALL THESE PLURALITIES MUST BE FULLY AND DULY CONSIDERED TO REACH ROBUST AND ETHICALLY AND ENVIRONMENTALLY WELL BASED DECISIONS. THERE IS NOT THE "ONE FITS ALL SITUATION!".

3. BASIC SAFETY AND RADIATION PROTECTION REQUIREMENTS (1/3)

3.1. ICRP (1/2)

- PROTECTION OF "FUTURE GENERATIONS" WAS NOT EXPLICIT IN THE ENUNCIATION OF THE THREE BASIC PRINCIPLES: JUSTIFICATION; OPTIMIZATION; AND LIMITATION.
- ACTIONS IN THE LAST 30 YEARS TO ADAPT THE ICRP SYSTEM FOR ITS APPLICATION TO RWM. STRONG EFFORTS WERE NEEDED BECAUSE SOME OF ITS BASIS ARE CHALLENGED (Publications 46; 77; and 81).
- THE MOST RECENT IN PUBLICATION 122 (2013) AND ADDITIONAL EFFORTS IN PROGRESS (TG-94)
 - THE ESSENCE OF THE POSSIBLE ETHICAL AND ENVIRONMENTAL CONSIDERATIONS IN RWM ARE SOMEHOW WELL REPRESENTED.
 - IT IS A PROCESS WITH STEPS ! (FIGURE 3).

Figure 3 DISPOSAL FACILITY PHASES AND RELEVANT OVERSIGHT PERIODS



3. BASIC SAFETY AND RADIATION PROTECTION REQUIREMENTS (2/3)

3.1. ICRP (2/2).

KEY IDEAS FROM THE LATEST ICRP RECOMMENDATIONS

- Application mainly influenced by the level of “oversight”.
- Future generation the same level of protection than current.
- Coherence with the principle of “sustainable development”.
- Long term dose estimates only “indicators” (no health detriment).
- Emphasis on the “optimization under constraints”.
- Different application between assumed exposure scenarios and human induced (intrusion) scenarios.
- Emphasis on the need for a good management system
- Defence in depth as a key technical principle
- Due consideration to environmental protection in the decision

TOO LITTLE DISCUSSION ABOUT “COMPLIANCE”! (Perhaps for good reasons)

3. BASIC SAFETY AND RADIATION PROTECTION REQUIREMENTS (3/3)

3.2. IAEA

- SEVERAL ACTIONS TO EXPLORE HOW THE "CLASSICAL" IAEA REQUIREMENTS SHOULD BE ADAPTED IN RWM (1985-1995).
- SAFETY SERIES 111-F (1995): "THE PRINCIPLES OF RWM"; FURTHER INTEGRATED (SOMEHOW) INTO THE "FUNDAMENTAL SAFETY PRINCIPLES" (SF1) (2006).
- KEY MESSAGES IN BOTH DOCUMENTS
 - SF-1 DOES NOT REFLECT ADEQUATELY SOME OF THE KEY IDEAS IN 111-F. IT HOWEVER RECOGNIZES THE NEED FOR A GOOD MANAGEMENT SYSTEM (Not in 111-F).
 - BOTH REFLECT ALSO, SOMEHOW, THE ESSENCES OF THE ETHICAL AND ENVIRONMENTAL CONSIDERATIONS TO BE APPLIED.
 - "CLASSICAL" IMAGE OF AN "IMPLEMENTER" AND A "REGULATOR", WITH LITTLE CONSIDERATION OF "PROCEDURAL ETHICS" (Stakeholder engagement and judgment of compliance).
- LOOKING AHEAD AND FOR RWM PURPOSES, THEY SHOULD HAVE TO BE REVISITED IN THE COMING FUTURE TO REFORMULATE SOME OF THE PRINCIPLES CONSIDER BETTER "COMPLIANCE", AS WELL AS TO COMPLETE AND UPDATE THE PICTURE (See ICRP- 122).

4. ETHICAL AND ENVIRONMENTAL CONSIDERATIONS

(1/6)

4.1. SOME GENERAL REFLECTIONS (1/2)

- BASIC ETHICAL SCHOOLS BETTER ORIENTED TO DEAL WITH REAL INDIVIDUALS AND RATHER "REAL" SITUATIONS. CONFRONT MORAL VALUES VS SOME KIND OF INTERESTS OF THE INVOLVED PARTIES.
- THE "ARETAIC" SCHOOL (VALUE ETHICS) SPECIALLY USEFUL TO DEAL WITH ISSUES AFFECTING UNKNOWN PEOPLE AND CIRCUMSTANCES.
- IN "APPLIED ETHICS", A NEED TO FIX PRIORITIES AND ASSIGN WEIGHTS. DIFFERENT CULTURES AND INDIVIDUALS MAY HAVE DIFFERENT VIEWS.
- SUSTAINABLE DEVELOPMENT IS WELL ACCEPTED AND POSSIBLE IN RWM. DIFFERENT SENSIBILITIES TO BE INTEGRATED IN THE PROCESS.

- THE ETHICAL FOUNDATIONS OF THE RP SYSTEM ARE THE

4. ETHICAL AND ENVIRONMENTAL CONSIDERATIONS

(2/6)

4.1. SOME GENERAL REFLECTIONS (2/2)

- RWM NOT JUST FOR "EXPERTS", BUT A "SOCIETAL ENDEAVOR" AS IN MANY OTHER AREAS PRODUCING LONG TERM LIABILITIES.
- EXPERTS ON RWM ARE NORMALLY BASED ON "SCIENCE", WHILE PEOPLE'S VIEWS ARE NORMALLY BASED ON "VALUES".
- NEED TO BLEND "FACTS" (SCIENCE) AND "VALUES" (ETHICS), WITH A SOCIAL DEBATE TO AGREE ON WHAT IS "ACCEPTABLE" (REASONABLE AND TOLERABLE).
- THE MAIN ISSUE IS "PROCEDURAL" WITH NEED TO SHARE ACCEPTANCE OF CHOICES AND DECISIONS: STRATEGIES AND TECHNICAL STEPS.
- HUMILITY, HONESTY, PRUDENCE, EQUITY;..... ARE "MAGIC WORDS" ALL THROUGHOUT THESE PROCESSES.

4. ETHICAL AND ENVIRONMENTAL CONSIDERATIONS (3/6)

4.2. DETAILED CONSIDERATIONS (1/4): INTRAGENERATIONAL EQUITY

- BALANCE OF RESOURCE ALLOCATION WITH FULL ENGAGEMENT OF THE SOCIETY TO DECIDE STRATEGIES AND TO IMPLEMENT THEM.
- WIDELY ACCEPTED CONCEPTS SEEM TO EMERGE: national solutions; safety first; compensations acceptable; limit future RW; need to engage; etc.
- UNDERLYING ETHICAL PRINCIPLES: FAIRNESS, COMPETENCE AND SPECIAL VALUE OF "DIGNITY" FOR ACCEPTABILITY OF COMPENSATIONS AS A RECOGNITION OF THE SHARED RESPONSIBILITY.
- OVERARCHING ISSUE "PROCEDURAL" WITH "HUMILITY", "HONESTY" AND FULL ENGAGEMENT OF ALL THOSE LEGITIMATELY CONCERNED: Key ideas: Informed consent; right to "veto"; representativeness; provision of resources, etc.
- VERY MUCH INFLUENCED BY POLITICAL AND CULTURAL TRADITIONS.
- INTERNATIONAL, REGIONAL AND NATIONAL EXPERIENCES TO SHARE
- WHAT TO DO IF NO STRATEGY SUITS THE VIEWS OF ALL CONCERNED PARTIES REMAINS OPEN!. DEMOCRACY AND LAW SHOULD PREVAIL, BUT...

4. ETHICAL AND ENVIRONMENTAL CONSIDERATIONS (4/6)

4.2. DETAILED CONSIDERATIONS (2/4): INTERGENERATIONAL EQUITY (1/2)

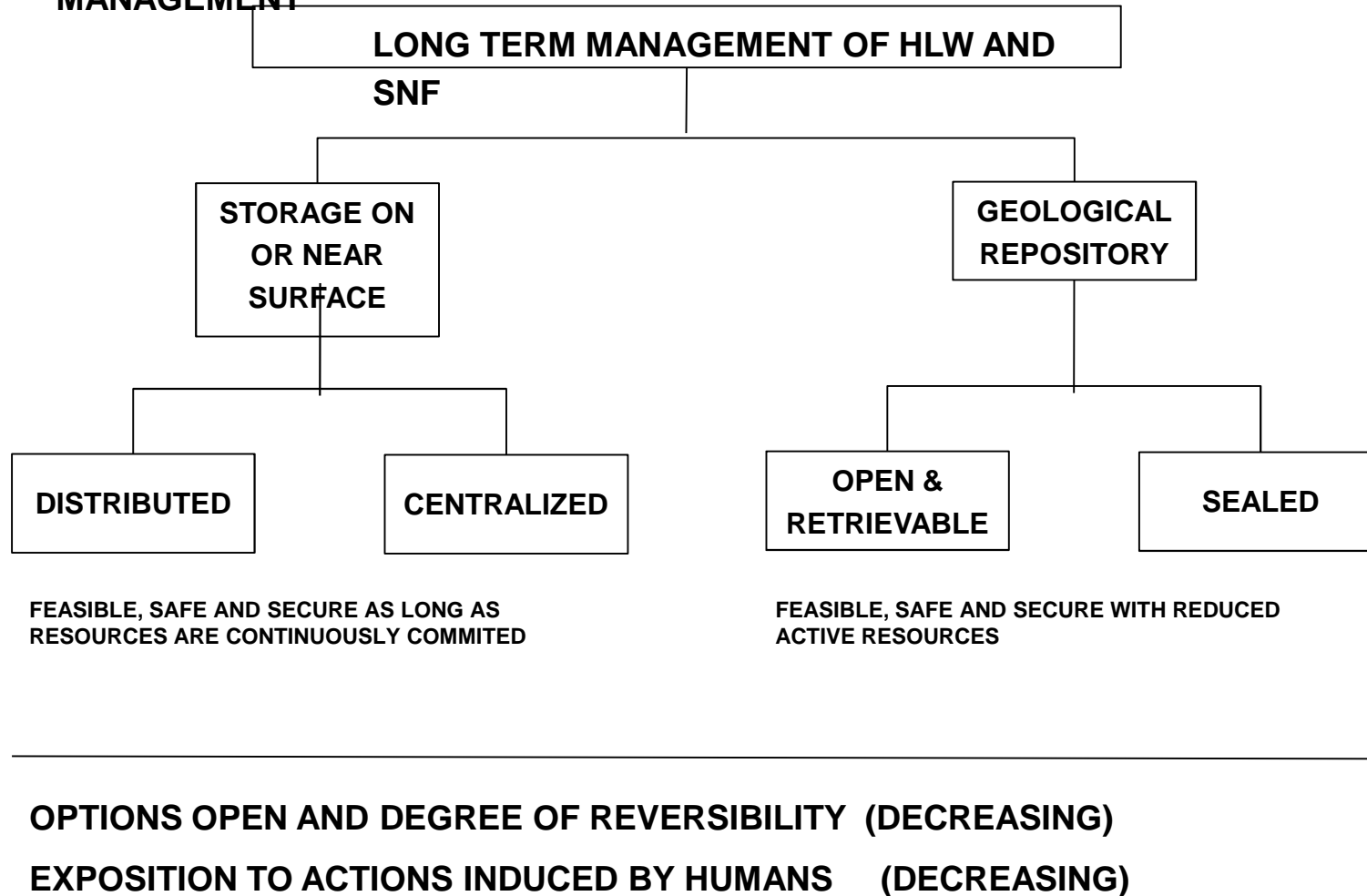
- A BALANCE BETWEEN IMPOSE BURDENS (do it now) AND FREEDOM TO MAKE CHOICES (delay decision). SOME RESPONSIBILITIES MUST BE PAST UNAVOIDABLY TO SOME COMING GENERATIONS.
- THERE IS NOT A SINGLE SET OF GENERALLY JUSTIFIED AND WIDELY ACCEPTED "INTERGENERATIONAL EQUITY PRINCIPLES".
- MANKIND IS LIMITED TO FORESEE THE FUTURE. WE HAVE TO USE WHAT WE KNOW ABOUT OURSELVES AND OUR SOCIETY. THE BEST CHOICE WOULD BE AN ADAPTIVE AND PRECAUTIONARY APPROACH.
- ETHICS IS PRAGMATIC ENOUGH TO ACCEPT A BALANCE BETWEEN OUR RESPONSABILITIES AND OUR ABILITIES, PROVIDED WE ACTED IN GOOD FAITH, USING THE BEST POSSIBLE INFORMATION AND RESOURCES AVAILABLE AND WITH A GENUINE CONCERN FOR THE WELL BEING OF FUTURE

4. ETHICAL AND ENVIRONMENTAL CONSIDERATIONS (5/6)

4.2. DETAILED CONSIDERATIONS (3/4): INTERGENERATIONAL EQUITY (2/2)

- DIFFERENT CONFINEMENT ALTERNATIVES (See Figure 1).
- WHILE IN "STORAGE", ACTIVE "CARE" IS MANDATORY.
- IN THE OPTION OF "DISPOSAL", SEVERAL ASSOCIATED CONCEPTS HAVE BEEN DISCUSSED AS RELEVANT: Control; monitoring; oversight; stewardship; guardianship; etc. (Their real meaning and limitations in practice need to be fully and jointly established).
- AS SAID THE PROCESS WILL TAKE UP TO A HUNDRED YEARS (or even longer). THE IDEA OF A "STEPWISE" APPROACH AND THE CONCEPT OF THE "ROLLING PRESENT" ARE CONSIDERED CRUCIAL.
- CREDIBILITY AND ACCEPTABILITY NO LONGER BASED ON INDIVIDUAL OR SPECIFIC DECISIONS, BUT ON A CHAIN OF DECISIONS FOUNDED ON THE STABILITY OF THE SOCIETY AND INSTITUTIONS.

Figure 1.- BASIC METHODS OF HLW AND SNF POTENTIAL LONG-TERM MANAGEMENT



4. ETHICAL AND ENVIRONMENTAL CONSIDERATIONS (6/6)

4.2. DETAILED CONSIDERATIONS (4/4): ETHICS AND THE ENVIRONMENT

- THE EXISTING BASIC REQUIREMENTS IN RWM ARE WELL ALIGNED WITH "SUSTAINABLE DEVELOPMENT".
- UNLESS VERY POORLY MANAGED, RWM CAN HARDLY REPRESENT SPECIAL CONCERNS IN SUCH CONTEXT, AND EVEN IF SO, ONLY AT A RATHER LOCAL LEVEL.
- THE GLOBAL CONCEPT OF "PROTECTION OF THE ENVIRONMENT" IS VERY LOOSELY DEFINED AND NORMALLY INTRODUCED IN THE LEGAL SYSTEMS AS "SOFT LAW".
- IN RP, THE BASIC DEFINITIONS, CONCEPTS, METHODS AND TOOLS TO BE APPLIED ARE ESSENTIALLY AVAILABLE, ALTHOUGH THEIR APPLICATION IN PRACTICE IS STILL UNDER DEVELOPMENT.
- SEVERAL CHALLENGES ARE FORESEEN, BUT THE CRUCIAL ISSUE IS AGAIN "PROCEDURAL", TO ENSURE THE ENGAGEMENT AND CONSIDERATION OF ALL LEGITIMATE SENSIBILITIES AND WORLD VIEWS

5. CONCLUSIONS AND RECOMMENDATIONS (1/4)

- THE CLASSICAL RP SYSTEM, BASED OF THE ICRP RECOMMENDATION, IS APPLICABLE, WITH THE NECESSARY ADAPTATION (ICRP-122).
- SUCH SYSTEM HAS STRONG ETHICAL AND ENVIRONMENTAL FOUNDATIONS, WHICH NEED CONSOLIDATION AND SUBSEQUENT ADAPTATION TO DULY CONSIDER THE LONG TERM IMPLICATIONS.
- RWM IS NOT A PURE SCIENTIFIC OR TECHNICAL AFFAIR. WE ARE IN THE REALM OF ETHICS AND VALUES, REQUIRING SOCIETAL RESPONSES.
- THERE ARE CONFLICTS IN PRIORITIES AND RELATIVE WEIGHTS AMONG ETHICAL SCHOOLS, AS WELL AS VARIABILITY AMONG DIFFERENT CULTURES AND SOCIETIES IN THEIR VIEWS OF VALUES AND NATURE, WHEN APPLYNG ETHICAL AND ENVIRONMENTAL CONSIDERATION.

5. CONCLUSIONS AND RECOMMENDATIONS (2/4)

- THREE KEY IDEAS HAVE SOMEHOW CRYSTALIZED AS PERHAPS BETTER JUSTIFIED AND MORE WIDELY ACCEPTED:
 - To provide good (beneficence) and prevent harm (no maleficence) (UTILITARIANISM))
 - To recognize the norm of justice (EGALITARIANISM AND VIRTUE)
 - To respect dignity (DEONTOLOGY)
- RWM IS A SITUATION OF "APPLIED ETHICS", AFFECTING BASICALLY "PROCEDURAL ASPECTS":
 - Definition of strategies (Intergenerational)
 - Decision making process (Intragenerational)
- FULL ENGAGEMENT OF THE SOCIETY IS NEEDED, AND POLITICAL AND SOCIETAL CONTINUITY, STABILITY AND COMMITMENT ARE ESSENTIAL.

5. CONCLUSIONS AND RECOMMENDATIONS (3/4)

- BASED ON THE EXISTING CRITERIA AND REQUIREMENTS, A DISPOSAL STRATEGY WELL DESIGNED AND IMPLEMENTED THROUGH A "STEPWISE" OR "ROLLING PRESENT" APPROACH, WITH FULL SOCIETAL IMPLICATION CAN VERY WELL COVER THE NECESSARY ETHICAL AND ENVIRONMENTAL CONSIDERATIONS.
- THE EXISTING CRITERIA AND CLASSICAL APPROACHES SHOULD NEVERTHELESS BE UPDATED, REFINED AND ADJUSTED PROPERLY
- OVERALL, A STRONG "RADIATION PROTECTION AND SAFETY CULTURE" MUST BE ESTABLISHED AND MAINTAINED ALONG THE PROCESS.
- ADVICE FROM EXPERTS ON "ETHICS" ALONG THE PROCESS IN BADLY NEEDED.

5. CONCLUSIONS AND RECOMMENDATIONS (4/4)

SOME QUALITATIVE "RECOMENDATIONS".

- Care the "wording": Use "disposition" instead of "disposal". Consider visibly the role of active management, control and oversight.
- The "urgency" of disposal may vary among countries, but safety and security must prevail.
- Participation should be broad, but responsibilities must be duly assigned and governments are finally responsible.
- Although decisions will be mainly national, international cooperation is essential and potential regional (or international) solutions should not be completely disregarded.
- A substantial, peer reviewed, social research effort should be mounted and maintained.
- Classical review structures should integrate social sciences competences and counsel.



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