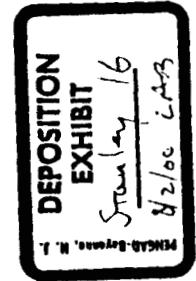


# Groundwater Flow

## comparison of MtBE and Benzene Dilution Factors

SH 007982



- **benzene**

- $C_{\text{source}} = S \cdot MF = (1750 \text{ mg/L} \cdot 0.02) = 35 \text{ mg/L}$
- $C_{\text{receptor}} = 0.005 \text{ mg/L}$
- $C_{\text{source}} / C_{\text{receptor}} = 7000$

- **MtBE**

- $C_{\text{source}} = S \cdot MF = (42\,000 \text{ mg/L} \cdot 0.15) = 6300 \text{ mg/L}$
- $C_{\text{receptor}} = 0.02 \text{ mg/L}$
- $C_{\text{source}} / C_{\text{receptor}} = 315\,000$

MF - mole fraction, S - pure chemical solubility.  
Residual-Phase Source.

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# MTBE OVERVIEW

- MTBE is a motor fuel additive (late '70s)
- Lead replacement in Gasoline up to 8%
- Oxygenate per USEPA reformulated to 15%
- MTBE does escape thru Gasoline releases
- Typically from U/G tanks or flow lines
- MTBE much more soluble/H<sub>2</sub>O than BTX
- MTBE very resistant/microbial degradation



## MTBE Risk (C&L) 100X BTX

- Combination of high mobility/not biodegrad
- Travels further in ground water than BTX
- More likely to impact private/public Wells
- Worst case event is impacts municipal H2O
- Next level is drinking H2O potential threat
- \$5-50MM 1.5/yr vs 1-10MM\$ @ 100/year
- MTBE Station Release vs Refinery problem
- Lake Tahoe, San Amonica & 2 cycle Ski's

# MTBE Risk Reduction

## Alternatives

- Eliminate MTBE from Gasoline Blending
- Reduce MTBE levels in our gasoline
- Inventory control/inspection & maintenance
- Tank upgrade design/installation prevents
- Stations not in sensitive drinking H2O areas
- Ensure gaso releases don't migrate off-site
- Better quantify Drinking H2O contaminants

**' First Pass at Premises.....**  
**MtBE Risk Assessment**

- **MTBE from gaso leaks at stations will NOT result in ground H2O contamination such that municipal H2O (>1000gpm) supplies in vicinity of site are S/D (or alternately NOT result in exceedance of conc criteria @ compliance monitoring points at property boundary**
- **Equilon will strive to comply w/all Envir Laws OR work towards changing laws if deemed appropriate and necessary for long term sustainability of net ROI of business.**
- **Have flexibility to use MTBE and/or Alkylates**

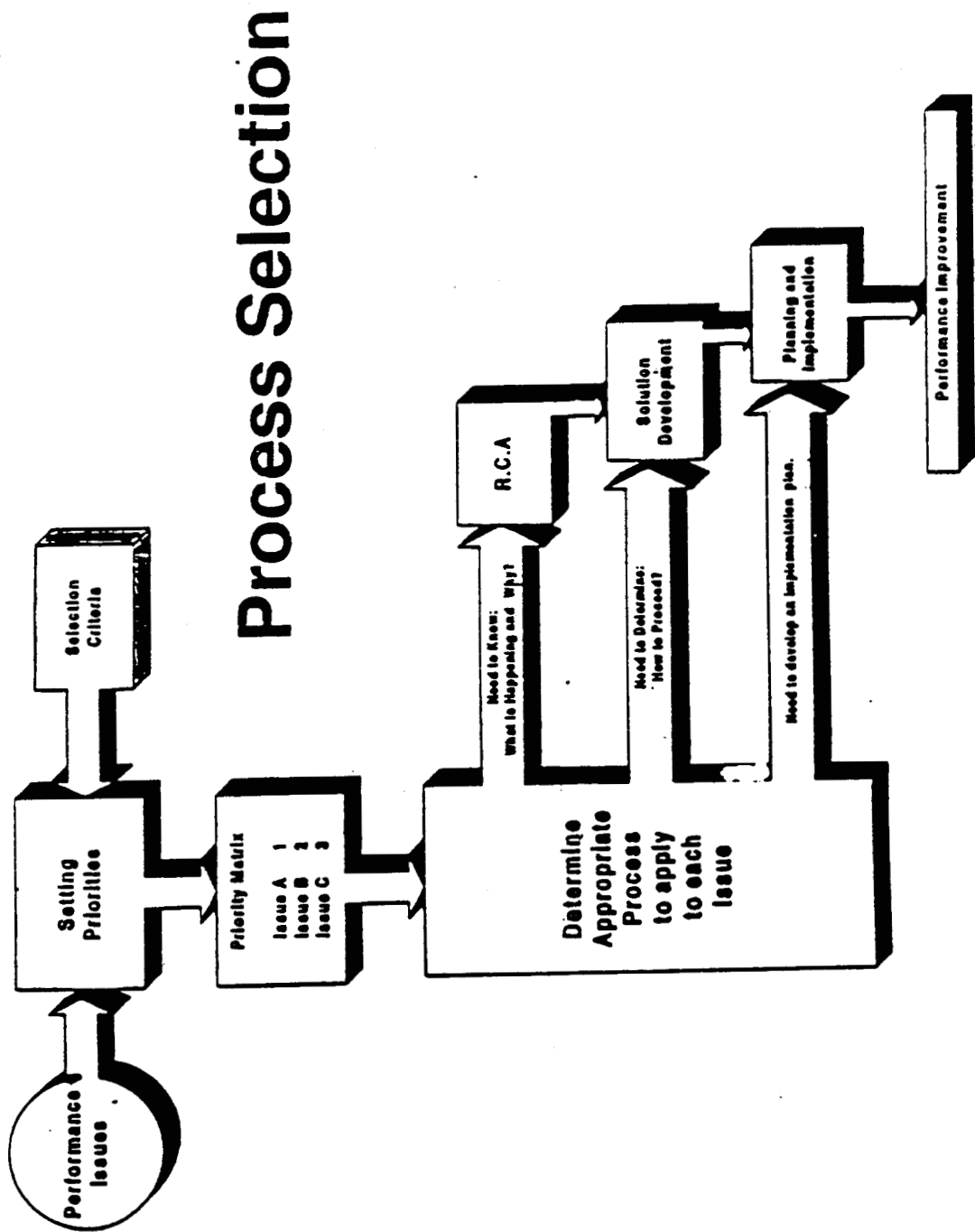
## MTBE selection criterion

- Must meet H2O LAWs (NPDES, permits)
- Want to maintain image/benefits of Ozone and CO reduction with reformulated gaso
- Want to avoid the need for U/G remediation
- Want high REF flexibility in gaso produced
- Want to minimize \$ gaso processing costs
- Want sound reputation (local & corporate)
- Want to generate business opportunities



# Methyl Tertiary Butyl Ether

- **Most Things Biodegrade Easier**
- **Menace Threatening our Bountiful Environment**
- **Major Threat to Better Earnings**
- **Movement towards Bureaucratic Entrenchment**
- **MONEY TO BE EXTRACTED**
- **MGMT Towards a Better ENVIRONMENT**



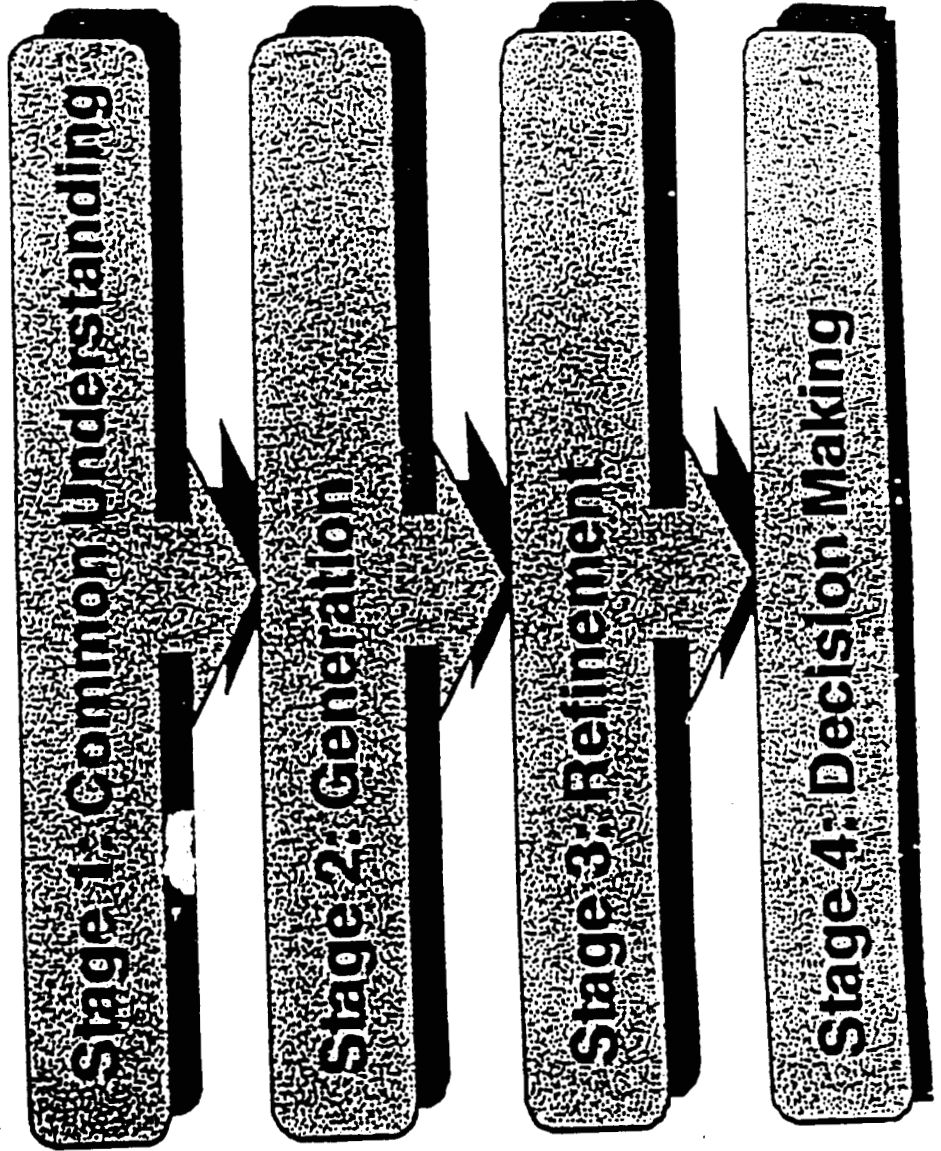
Root Cause Analysis



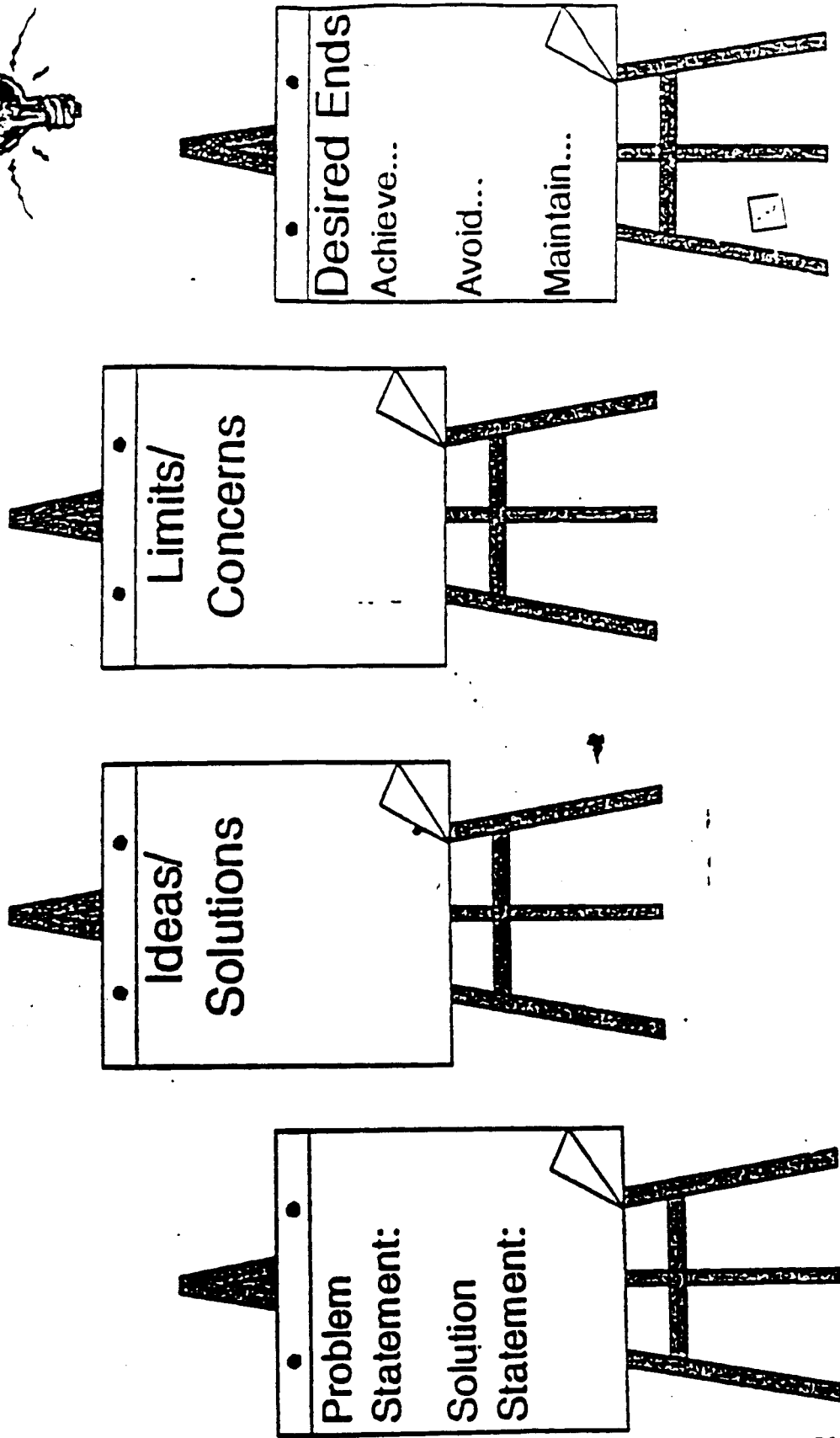
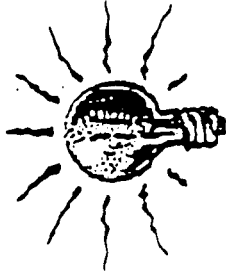
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# The Four Stage Structured Solution Development Process



# Working the Generation Process



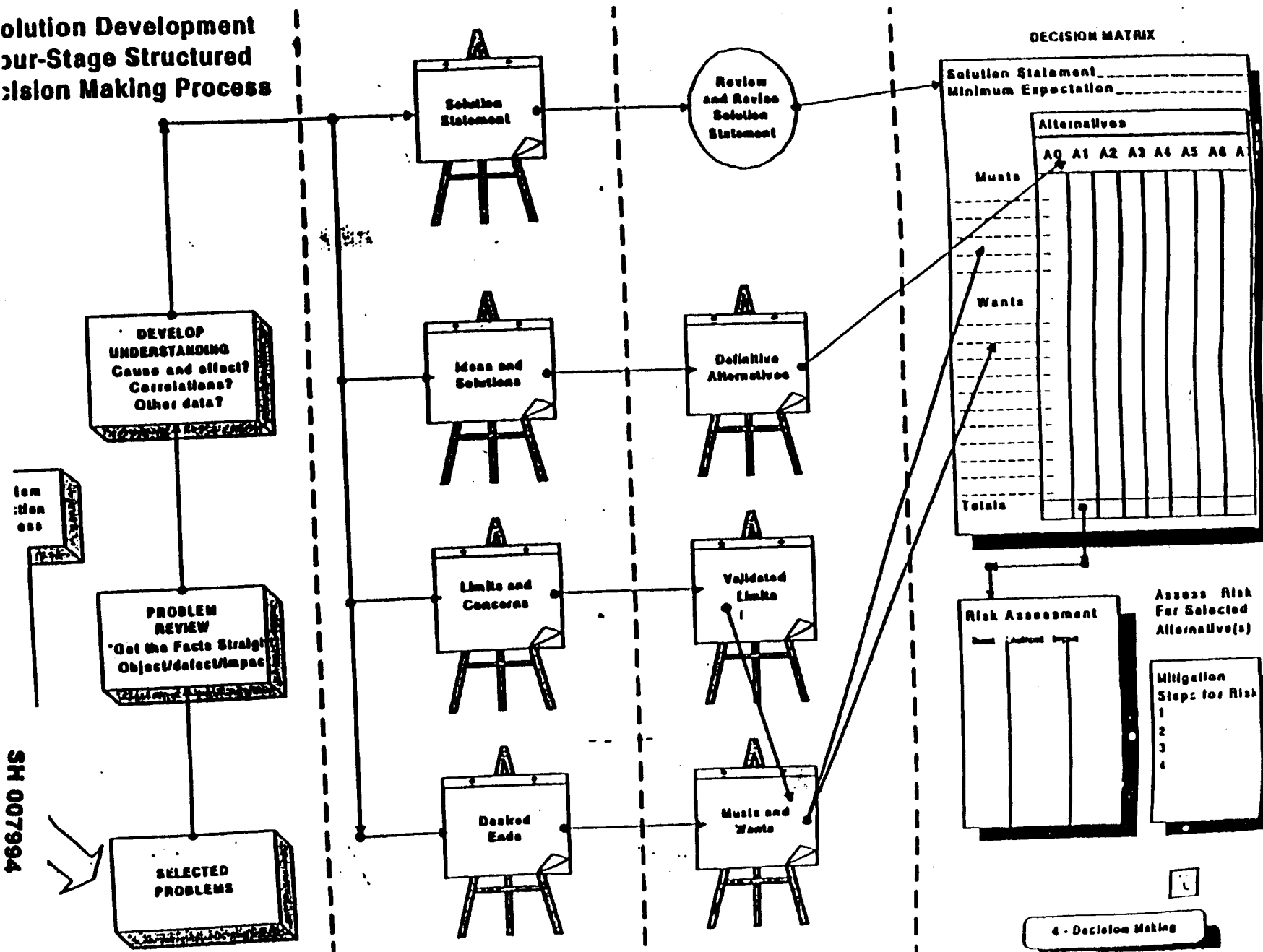
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Solution Development

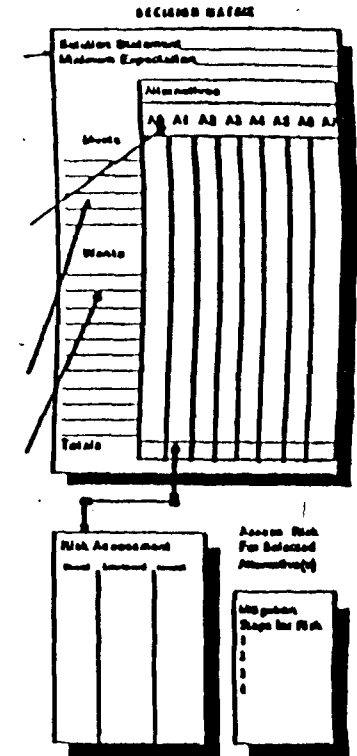
# Solution Development Four-Stage Structured Decision Making Process



# Stage 4: Decision Making

*What is the desired outcome of this activity?*

- **Best Balanced Solution(s)**
  - Solutions that represent the best means to achieve desired ends (all musts and most wants)



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Solution Development



# **MTBE Leak Prevention Mtg -** **5/11/98**

- Improved Decision Making - what & why?
- Why Use Octane Enhancers/oxygenates?
- What MTBE Leak Rate Is Acceptable?
- Current History on Releases, how frequent, what are remediation costs and IMPACTS?
- Let's reach "common understanding" of the PROBLEM, define it and refine it together!