PROBLEM ANALYSIS WORKSHEET – ANNOTATED

Problem Formulation Statement : _____(define the problem here in a broad, detail-free sentence)

State A : (a.k.a. the input or existing condition)

Variables	Constraints
* List here ways the primary	(each variable will have inherent constraints, although it
may be	
* inputs to the solution are	difficult to elaborate on them with much specificity at
first)	
* expected to vary, including	
* outlooks on time, energy, and	
* other important characteristics.	

State B : (a.k.a. the output or desired condition

Variables	Constraints
* Output variables listed here	(each variable will have inherent constraints, although it
may be	
* should include both desired	difficult to elaborate on them with much specificity at first;
but be	
* and ancillary effects as well	sure to identify ways in which the output should be
constrained)	
* as the probable undesirable	
* effects of generic solutions.	

Solution : _____(this statement should be an obvious outgrowth of the problem statement)

Variables	Constraints	Opportunities
* List the obvious ways that	(each variable will have inherent constraints, although it	
may be		
* the generic solution could	difficult to elaborate on them with much specificity at first; but be	
* vary, including such things	sure to identify ways in which the solution <u>must</u> be	
constrained.		
* as physical and non-physical	Also identify all opportunities that come to mind during	
this step		
* attributes, materials of con-	that may be helpful in Step 3, but do so only without	
elaborating		
* struction, cost, etc.	lest you fall into the trap of giving preferential treatment	
to them)		

Production Volume & Design Life : _____(this statement requires some input from your client)

Decision Criteria : Provide a prioritized listing of criteria that will eventually be used in comparing and
screening the various alternative solutions, preferably assigning a relative value to
each. Remember, each alternative solution is potentially viable, satisfies all constraints and criteria
established by the client, so these criteria help us to identify the "best" of the solutions.

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* Adapted from <u>An Introduction to Engineering and Engineering Design</u> by Edward V. Krick ; J. Wiley and Sons (Out-of-print)

Krick's design process:
1. <u>Problem Formulation</u>, wherein the problem at hand is defined in a broad, detail-free sentence, most
probably beginning with "Design a ....";
2. <u>Problem Analysis</u> defines the problem and desired attributes of the solution
3. <u>Search for Alternatives</u>, wherein possible solutions are analyzed through inquiry, research, and
invention, possibly considering how previous designers solved similar problems;