

Risk Questions in NEPA Analysis and Management Actions

by Larry Freeman, PhD
The Shibley Group, *Senior Consultant*

Risk Questions in NEPA Analyses

A participant in a recent Shibley Group NEPA workshop asked if risk was a relevant question during NEPA analyses. I assured him it was. Then when I next checked my emails, I had an email from the Shibley office asking if Shibley could sponsor a workshop on “Advanced Categorical Exclusions.” My answer was that we could and that a major focus of that workshop would be the risks from an agency’s decision about the appropriate level of NEPA analysis.

Both of these initial questions led me to consider if Shibley Group should develop a workshop on risk and NEPA analyses. So, let me ask you—readers of this newsletter article—the following:

- 1. Would you be interested in attending a workshop focused on risk questions as related to NEPA?**
- 2. Where in your routine NEPA work have you found risk questions relevant?**
- 3. What is an example of a specific proposed action and associated decisions when risk was a relevant concern?**
- 4. How did you and your colleagues analyze this risk (from question 3) and how did you record this identified risk in the NEPA legal record?**

If you have answers to or comments about the preceding questions, please send an email to **Sid Allen, Chief Operations Officer of The Shibley Group**, at sid.allen@shibleygroup.com.

Optionally, send your email to **Larry Freeman**, at lfreeman@shibleygroup.com. We welcome any and all responses. As has been our practice in the past, we will not use the name of anyone sending in comments or examples. We also have routinely changed the name of the agency when a cited example appears to be sensitive.

In the following newsletter, I discuss several types of risk. My comments address the following observations about risk and its relation to NEPA analyses:

- 1. Define risk broadly to include a number of routine NEPA analysis steps.**
- 2. Establish clear methodologies to forecast impacts on all affected resources**
- 3. Use, if available, risk assessment methodologies that develop quantified estimates of potential risk. (To date, such methodologies are not widely used in NEPA analyses.)**
- 4. Assess from a risk perspective your agency’s NEPA procedures and its routine process decisions related to NEPA analyses.**

5. **Frame your impact analyses to address possible impacts that might be severe (significant?) but highly unlikely.**
6. **Record both routine NEPA analysis risk questions and, if available, the technical calculations of risk probabilities.**

As I say below, risk is not in the statute language of the National Environmental Policy Act, but it is surely implied. And risk is increasingly important as we see events with serious or disastrous environmental consequence. The BP oil spill in the Gulf is just the latest in a series of problems where Federal agencies have major roles in addressing environmental questions.

1. Define risk broadly to include a number of routine NEPA analysis steps.

Risk considerations include many of the routine and traditional steps in a NEPA analysis. Practitioners often use risk considerations when they make routine decisions. Here are some examples of decisions that include implied risk:

- Agency personnel choose to use either a categorical exclusion analysis or an Environmental Assessment to satisfy NEPA requirements. Either choice introduces the risk that internal or external critics can challenge the chosen level of NEPA analysis as inadequate. External critics might even choose to appeal or litigate the agency's chosen NEPA process.
- Agency personnel conduct internal and, if appropriate, external scoping. Deciding whom to contact and whom not to contact reflects the agency's perception of risk. Sometimes an agency limits external scoping when risk is deemed to be low. In other cases, an agency uses extensive external scoping to validate its project decisions and to protect itself from late-stage challenges to a project that seems to have high risk.
- Agency resource specialists decide how much and what kinds of resource analyses are appropriate. The more risk, usually the more extensive the resource analyses. As with other NEPA processes, agencies vary their resource requirements based on their perception of possible risk.
- An agency manager (often with input from an agency legal counsel) decides to sign off on a NEPA decision (Record of Decision for an EIS, Finding of No Significant Impact for an EA, or Checklist for a Categorical Exclusion). This step is usually the go or no-go risk decision when the agency decides to go forward with project implementation. Challenges, either internal appeals or legal actions, follow if one or more interested or affected parties to the project object.

Note that all of the preceding examples are not direct risks to resources or people. Instead, risks come from the agency's attempts to complete NEPA satisfactorily. The risk is that one or more parties object to the agency's NEPA decisions. The damage is that the NEPA process is delayed and either withdrawn or changed. So risk considerations for an agency reflect a delay in a project (and, of course, damage to its credibility with its publics).

This sort of agency risk is far different from the project risks to the physical, biological, or human environment. See the next recommendation for details about how risks to environmental resources affect NEPA analyses.

2. Establish clear methodologies to forecast impacts on all affected resources.

NEPA's legal mandates are the agencies assess/discover all potential impacts and then disclose the impacts to all interested and affected parties. Impacts include both adverse and beneficial effects. Adverse effects are of special concern because they represent risks to a physical, biological, social, or economic resource. Examples would be the following:

- Destruction of wildlife habitat during the drilling of an exploratory oil and gas well
- Debatable repairs to an existing, but old levee protecting a housing development and prime farmland
- Permitted expansion of a mine operation when potential impacts are severe if safety measures fail
- Possible rupture of a oil pipeline and the likelihood that oil might reach prime stream habitats
- Permit to dispose of toxic and smelly waste from a pig farm
- Limited maintenance to a major highway bridge that is nearing the end of its engineered service life

All of the preceding actions have environmental risks. After all, risks of some degree are present in any NEPA analysis. A typical NEPA analysis begins with the current conditions under the No Action alternative and measures the degree of potential environment change under the action alternatives, especially if the possible changes are forecast to be severe and hazardous.

So, although not the common language in many NEPA discussions, the legal of mandate of NEPA can be seen as a risk assessment activity, with a focus on the potential risks to resources under any proposed Federal actions.

Under this risk assessment approach, agencies should explain clearly just how accurate and reliable their resource forecasts are. After all, if an agency expects an adverse impact, then it should explain how likely the adverse impact will be. Such an explanation is an obvious requirement in any risk assessment.

As I discuss below in recommendation 6, a clear, legally credible conclusion about resource impacts should always discuss the validity of any methodology used to measure impacts. After all, a methodology is somewhat speculative—that is, its impact projections are always less than 100 percent accurate.

Readers of a good NEPA document should always know how accurate the agency's projected impacts are. Shipley Group newsletter 55 (June 2007) discusses techniques for making impact projections credible. The archive of newsletters is at:

<http://www.shipleygroup.com/environmental/index.html?pg=news>

3. Use, if available, risk assessment methodologies that develop quantified estimates of potential risk. (To date, such methodologies are not widely used in NEPA analyses.)

Quantified risk assessments usually deal with two variables: (1) the projected impacts when an engineering failure or a resource problem might occur, especially when a problem is adverse and likely severe, and (2) the probability of such a failure is occurring.

A risk assessment methodology then translates these two variables into a quantified numerical risk projection that reflects the probability that a risk event will occur.

Shipley Group has never been involved in the use or teaching of a risk assessment methodology. And it would not plan to do so in any proposed workshop. For similar reasons, Shipley consultants do not routinely tell agency specialists how to estimate NEPA impacts on wildlife populations or changes in fish habitats. Such topics represent the expertise of agency resource specialists. Shipley consultants routinely rely on such agency expertise as the starting point for a sound NEPA analysis process.

From my review of hundreds of agency NEPA documents, I conclude that Federal land management agencies do not routinely use quantified risk assessments (such as those expressed as probabilistic estimates). Numerical risk assessments have been most successful dealing with engineering analyses. For example, decades ago the National Aeronautical and Space Administration (NASA) developed quantified failure models for all of the major component systems on space shuttles. Such models allowed NASA to project the risk or hazard of flying under specific atmospheric conditions.

But such engineering models are relatively simple when compared to physical and biological conditions in a project area.

Most NEPA analyses deal with ongoing and uncertain natural events. A projection that vegetation in a project area will be in excellent condition 10 years from now relies on complex assumptions about weather, possible vehicular disturbance, wildfire occurrence, and grazing pressure from big game. Note that these conditions vary from season to season and from day to day. These assumptions and others make any projection about vegetative health speculative. Specialists rightly worry that their impact projections are shaky science and, thus, debatable. Such are the problems of NEPA impact projections! And such problems are why statistically framed risk projections are not routinely available for land management decision making. In place of statistical projections (which are often hard for the average reader to understand), agencies have used descriptive scenarios of what future impacts might be. And then the supporting text goes on to explain just how likely each scenario would be.

4. Assess from a risk perspective your agency's NEPA procedures and its routine process decisions related to NEPA analyses.

All agencies in their NEPA implementation procedures have lists of agency-specific categorical exclusions. They also list and describe exceptional resource conditions that would prevent an agency from using a categorical exclusion.

Agencies vary greatly in how they use such guidance about categorical exclusions. Even with well-established checklists, agency NEPA specialists are likely not consistent in their implementation of the categorical exclusion compliance path. Such inconsistencies reflect a potential risk in how an agency complies with NEPA. Such risks are the basis for the agency risk scenarios recorded above under recommendation 1.

Such procedural risks are why I was confident saying that Shipley Group could present a Shipley workshop on “Advanced Categorical Exclusions.” The workshop would examine the sources for an agency’s categorical exclusions, agency checklists for processing categorical exclusions, and content requirements for verifying that uncertain exceptional circumstances do not invalidate any agency’s use of a categorical exclusion.

Similar risk concerns also occur when an agency decides to prepare an EA, not an EIS. And risk is even present when an agency makes its many analysis decisions related to impacts disclosed in an EIS.

5. Frame your impact analyses to address possible impacts that might be severe (significant?) but highly unlikely.

This recommendation returns to the two variables for a risk assessment analysis. See recommendation 3 above.

Prior to 1986 the Council on Environmental Quality (CEQ) Regulations had a worst-case provision in Section 1502.22. In 1986 this provision was replaced by a new Section 1502.22 on Incomplete and Unavailable Information. This new approach directs agencies to admit when they have incomplete and unavailable information. But even in such cases, an agency must survey the existing information and still make its best projection of impacts.

So, as recommendation 5 says, agencies facing a high-risk situation should do two things: (1) summarize/forecast potentially severe impacts and (2) discuss how probable or likely such impacts would be. One NEPA strategy for doing these two things is to estimate the maximum impacts under an alternative; these impacts become an upper bound for likely impacts. Similarly, agencies sometimes forecast the lowest or most unlikely impacts under another alternative; these impacts become a lower bound. Then the agency can argue that it has addressed a full range of likely impacts.

6. Record both routine NEPA analysis risk questions and, if available, the technical calculations of risk probabilities.

Make risk discussions a central topic when agency resource specialists are recording impact projects. So when an agency specialist says that the potential impacts on a resource are minor or moderate, the next sentences in the text should list the chain of credible evidence that the specialist used to decide if the impacts were indeed minor (or moderate).

Credible evidence includes some discussion of how accurate and reliable existing resource information is. Also, the specialist should explain just how valid a chosen resource methodology is. And if numerical risk estimates are available, the specialist should provide these estimates, along with an explanation of the estimates for lay readers.

So, as the best strategy for managing risk, specialists (and NEPA teams) should document clearly their discussions about agency risks for each proposed Federal action.