ALASKA

Risk Assessment of Oil and Gas Infrastructure

Summary of Phase 1 Alaska Risk Assessment Accomplishments and Challenges

NOVEMBER 2010

NORTH SLOPE Spills Analysis

FINAL REPORT

EXECUTIVE SUMMARY

The State of Alaska initiated the Alaska Risk Assessment (ARA) project in 2007 to provide a baseline risk assessment of the oil and gas infrastructure in Alaska. The purpose of the ARA project was to conduct a system-wide risk assessment that evaluates the safety, environmental, and operational risks associated with the system and to assess the reliability of the existing infrastructure to operate for another generation. The ARA project was to be conducted in three phases: Phase 1 would focus on designing a methodology for the risk assessment; Phase 2 would implement the methodology; and Phase 3 would analyze the data and report on the results.

The ARA project as originally conceived did not proceed past Phase 1, due to problems with the risk assessment design. This report documents Phase 1 of the ARA, highlighting the achievements, challenges and knowledge gained. This report also summarizes and responds to the public and peer review comments on the Proposed Methodology for Phase 1 of the ARA, and describes how the project scope and approach have been revised to address many of these comments.

In March 2009, a Proposed Methodology Report was published as the major deliverable for Phase 1 of the Alaska Risk Assessment. The methodology called for a quantitative risk assessment that would partition the oil and gas infrastructure into small segments called nodes, and systematically analyze the risks for each node. Separate individual risk assessment methodologies were proposed for each of the three major criteria – reliability, environment and safety. Preliminary screening thresholds were established for each of these criteria, and screening would be performed on each node to eliminate insignificant nodes and exclude them from further risk assessment activities. Detailed risk analysis would then be performed on the significant risks for both operational and natural hazards, and the risk analysis results for each of the nodes would then be summarized to illustrate the overall risk profile of the infrastructure.

Input from the public regarding the Phase 1 Proposed Methodology was solicited, and comments were compiled into a database. Each comment was methodically reviewed and categorized according to 15 major themes. Nine major comment themes were identified for those comments that focused on the project in general: infrastructure scope; risk scope; condition assessment vs. risk assessment; data sources and availability; citizen oversight and ombudsmen programs; stakeholder participation and outreach; conflicts of interest; and miscellaneous. Six major comment themes were identified for comments specific to the Proposed Methodology: overall methodological approach; methodology inputs; consequence thresholds; safety consequences; environmental consequences; and reliability consequences. This report summarizes these comments in the body of the report, and includes an appendix listing all comments received. The State's response to these comments is presented in this report, organized by comment theme.

The Transportation Research Board (TRB) of the National Academy of Sciences performed a technical peer review of the Phase 1 Proposed Methodology Report. The peer review committee found the proposed risk assessment methodology to be problematic in three main areas: (a) the management plan was not feasible given real-world constraints, (b) the proposed risk methods were too detailed and lacked a sufficient top-down perspective necessary for capturing the important risks, and (c) the proposed results were static and stopped well short of providing the State with a set of tools for evaluating risk mitigation opportunities.

The committee recommended that future risk assessment efforts conducted by the State of Alaska should:

- Revise the scope of the project to allow for the sequencing of work with an initial focus on reliability of the systems followed by the environmental and safety concerns, and expanding the focus to include all important sources of initiating events (intentional hazards);
- Focus research efforts by using a combination of top-down and bottom-up approaches;
- Work with industry from the earliest possible moment so that common goals can be identified and mutual cooperation can be ensured;
- Focus on the interfaces and linkages in the system; and
- Focus on the risk management process, not on a one-time effort.

The peer review and public review comments on the Proposed Methodology raised serious concerns that the methodology would not provide the type of risk information needed to recommend future mitigation measures. Many comments from the public, oversight agencies, and peer reviewers suggested that the methodology should shift the emphasis from global risk quantification and instead focus on identifying and evaluating mitigation and management measures that reduce the highest priority risks. Comments cited problems with data collection as another potential shortfall for the proposed methodology, since the level of detailed information needed to conduct the analysis was not publicly available. Another major problem was that the proposed quantitative analysis would be static and would not provide the State with the tools needed to evaluate risk mitigation opportunities or to evaluate changes to the system over time.

Many of the questions that the public expected the ARA to answer were in fact beyond the limits of current quantitative risk evaluation models. Public comments cited several types of risks that were omitted from the ARA Proposed Methodology, such as operator management processes and systems, the consequences of delayed leak detection, contingency planning and effectiveness of mitigative measures, and natural hazards. While these may represent significant risks, the characterization of such factors exceeds the capabilities of most existing quantitative risk assessment techniques.

Strong public and peer review criticism highlighted some basic gaps in the methodology and available data, and led the State of Alaska to reconsider the project approach. While the Phase 1 Proposed Methodology was ultimately abandoned, there were several important accomplishments during Phase 1 of the ARA project, including: the cataloguing of North Slope infrastructure components; the formation of a multi-agency oversight team that brought together several agencies and organizations with knowledge, expertise, and oversight related to crude oil infrastructure in Alaska; and the stakeholder outreach efforts and subsequent compilation of stakeholder feedback.

The Alaska Risk Assessment project was significantly revised and a new methodology was developed to emphasize a compilation and analysis of causal information associated with the North Slope crude oil production infrastructure spills, and to use that information to develop recommendations for future mitigation and risk management approaches. The revised approach – called the North Slope Spills Analysis – addresses many of the key concerns raised during Phase 1 of the Alaska Risk Assessment.

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1 INTRODUCTION

1.1 ARA Project Purpose and Approach

The State of Alaska initiated the Alaska Risk Assessment (ARA) project in 2007 to provide a baseline risk assessment of the oil and gas infrastructure in Alaska. The purpose of the ARA project as authorized by the Alaska State Legislature was to conduct a system-wide risk assessment that evaluates the safety, environmental, and operational risks associated with the system and to assess the reliability of the existing infrastructure to operate for another generation. The risk assessment was intended to analyze the likelihood and consequences of potential failures in Alaska's oil and gas infrastructure. The project was intended to provide the state with information about "what's in good shape, what's not, where the risks are, and how serious they are" so that government and industry could use that information to reduce and mitigate the risks.[1]

The ARA project was to be conducted in three phases:

- Phase 1: Design Risk Assessment;
- Phase 2: Implement Methodology; and
- Phase 3: Analyze Data and Report on Results.

The ARA project as originally conceived did not proceed past Phase 1, due to problems with the risk assessment design.

1.2 Purpose and Scope of this Report

This report documents Phase 1 of the Alaska Risk Assessment process, which was initiated in August 2008 and concluded in October 2009. The report describes the process used to gather input from industry, regulators, and the public and to develop a Proposed Methodology for conducting a quantitative risk assessment of Alaska's crude oil infrastructure. The report highlights the achievements, challenges and knowledge gained during Phase 1. This report also summarizes and responds to the public and peer review comments on the Proposed Methodology for Phase 1 of the ARA, and describes how the project scope and approach have been revised to address many of these comments.

1 FY2008 Appropriation Request for Comprehensive Oil and Gas Infrastructure Risk Assessment.

2 ARA PROJECT OVERVIEW

2.1 Phase 1 Project Management and Oversight

The ARA Project was managed by the Alaska Department of Environmental Conservation (ADEC), Division of Spill Prevention and Response, Industry Preparedness Program. To provide guidance and direction to the ARA process, a State Agency Oversight Team (SAOT) was formed in 2008, consisting of representation from the following state agencies and departments:

- Alaska Department of Environmental Conservation
- Alaska Department of Natural Resources (including the State Pipeline Office and Petroleum Systems Integrity Office)
- Alaska Department of Public Safety/State Fire Marshall's Office
- Alaska Oil and Gas Conservation Commission
- Alaska Department of Labor and Workforce Development
- Department of Law
- Department of Revenue
- University of Alaska, College of Engineering and Mines

Federal agencies with responsibility for Alaskan oil and gas infrastructure had the opportunity to provide direct input to the State Agency Oversight Team and the contractor.

A contractor, Doyon/Emerald and ABS (American Bureau of Shipping) Consulting, was hired to conduct Phase 1 of the Alaska Risk Assessment, which included initial stakeholder outreach, development of a proposed methodology for conducting Phases 2 and 3 of the ARA, and participating in a public and peer review of the Proposed Methodology. A website was established and has been used throughout the project to compile documents and communicate project status to the public.[2] A Project Management Plan was developed and published in August 2008, describing the overall approach.[3]

2.2 ARA Project Scope

The proposed geographic scope of the ARA spanned the North Slope production, the Trans-Alaska Pipeline (TAP) corridor connecting the North Slope to the Valdez Marine Terminal (VMT) in Prince William Sound, and the oil and gas infrastructure in Cook Inlet.

2 http://www.dec.state.ak.us/spar/ipp/ara/index.htm

3 "Comprehensive Analysis and Risk Assessment of Alaska's Oil and Gas Infrastructure: Project Management Plan," Prepared by Doyon/Emerald and ABS Consulting. http://www.dec.state.ak.us/spar/ipp/ara/documents/Alaska%20Oil%20%20Gas%20Risk%20Assessment%20PMP%20v%2009.pdf

The proposed scope of infrastructure to be included in the ARA related to the production of crude oil and its storage and distribution through crude oil transmission pipelines. The scope did not include marine transportation or refined product storage or distribution, and did not include areas of future oil development.

2.3 Phase 1 Proposed Methodology

In March 2009, a Proposed Methodology Report was published, presenting a methodology for implementing Phases 2 and 3 of the ARA.[4] The Proposed Methodology was for a quantitative risk assessment that would partition the oil and gas infrastructure into manageable segments called nodes. A node consists of a system or a set of components or equipment that is part of the infrastructure located in a defined geographic location. The nodal approach is a sequential and methodical way of examining all potential initiating events or failures that can occur anywhere in the system.

Separate individual risk assessment methodologies were proposed for each of the three major criteria – reliability, environment and safety. Preliminary screening thresholds were established for each of these criteria. Screening would be performed on each node to eliminate insignificant nodes and exclude them from further risk assessment activities. Detailed risk analysis would then be performed on the significant risks for both operational and natural hazards. The risk analysis results for each of the nodes would then be summarized to illustrate the overall risk profile of the infrastructure. The number of nodes was not determined but was expected to be in the hundreds.

2.4 North Slope Spills Analysis

The proposed Phase 1 Methodology for the Alaska Risk Assessment was not implemented. Strong public and peer review criticism, as discussed in this report, highlighted some basic gaps in the methodology and available data, and led the State of Alaska to reconsider the project approach.

The North Slope Spills Analysis has replaced the proposed ARA methodology. The North Slope Spills Analysis reviews data from North Slope loss-of-integrity spills to identify trends that may be used to target future interventions. Section 5.2 discusses the North Slope Spills Analysis.

4 "Comprehensive Analysis and Risk Assessment of Alaska's Oil and Gas Infrastructure: Proposed Risk Assessment Methodology," Prepared by Doyon/Emerald and ABS Consulting. March 20, 2009. http://www.dec.state.ak.us/spar/ipp/ara/documents/Proposed%20Risk%20Assessment%20Methodology_Rev%201.pdf

3 PUBLIC REVIEW OF PHASE 1 PROPOSED METHODOLOGY AND STATE RESPONSE

This section documents the public comments collected during Phase 1 of the Alaska Risk Assessment process, which was initiated in August 2008 and concluded in October 2009. It describes the process used to gather input from stakeholder groups and the public on a Proposed Methodology for conducting a quantitative risk assessment of Alaska's crude oil infrastructure. This section also summarizes and responds to the public comments on the Proposed Methodology for Phase 1 of the ARA.

3.1 Phase 1 Methodology Stakeholder Outreach Efforts

During the initial phases of the Alaska Risk Assessment project, prior to the development of the Proposed Methodology, stakeholder consultations were conducted to disseminate information and invite participation from key stakeholder organizations. This initial stakeholder outreach process laid the foundation for the stakeholder outreach efforts conducted during the public review period for the Proposed Methodology Report.

Input from the public regarding the Phase 1 Proposed Methodology was solicited through stakeholder workshops and regional meetings in the spring of 2009. Written comments could be submitted via comment cards, phone, email, mail, fax, or through the project website.

Stakeholders who participated and provided comments during the meetings and workshops included representatives of state and federal agencies, the Alaska legislature, oil and gas infrastructure operators, non-governmental organizations, and other concerned citizens. A total of 25 sets of written comments were submitted by stakeholders via email or through the project website.[5]

For the Proposed Methodology public review meetings, the ARA project team returned to four out of the five locations previously visited during the initial stakeholder consultation period to hold meetings with key stakeholders. A more extensive public workshop and an industry workshop were held in Anchorage, in addition to three regional public meetings held in Kenai, Valdez, and Fairbanks, all during May 2009. No public meetings were held in Barrow (North Slope Region) during the Methodology public review period, because the proposed timing conflicted with the spring whaling and subsistence hunting seasons.[6]

Public outreach for the regional meetings and workshops and for soliciting written public comments included the following methods:

- Display and classified advertisements in eight local newspapers and email publications;

5 A table compiling all public comments is included as Appendix G to this report, and copies of all comment letters are included on the project website at http://www.dec.state.ak.us/spar/ipp/ara/documents.htm

6 The State indicated a willingness to meet with North Slope residents to review the Proposed Methodology at some later date.

- Email announcements to over 250 contacts on April 17, 2009;
- Fliers developed and distributed for each meeting;
- Public Service Announcements developed and distributed to local radio stations to announce each meeting;
- Direct outreach to targeted stakeholders, including Alaska state agencies, federal agencies, infrastructure owners/operators, local governments, native organizations, non-governmental organizations, and the public;
- Telephone calls to notify interested stakeholders identified in other meetings; and
- Additional methods as discussed under each workshop summary.

Table 3-1 summarizes stakeholder meetings[7] that were held during the Phase 1 Methodology Public Outreach.

Table 3-1. Summary of Phase 1 Stakeholder Meetings

Meeting	Location, Date & Time	Participation
Anchorage Public Workshop	May 5, 2009 10:00 am to 4:00 pm Z.J. Loussac Library Anchorage, Alaska	A total of 40 individuals were in attendance including the project team, members of the State Agency Oversight Team (SAOT), industry representatives, local businesses, NGOs, members of the National Academy of Sciences (NAS) peer review committee, and the public.
Anchorage Industry Workshop	May 6, 2009 9:00 am to 2:00 pm Robert E. Atwood Building Anchorage, Alaska	A total of 27 individuals were in attendance including members of the project team, members of the State Agency Oversight Team (SAOT), industry representatives, and National Academy of Sciences peer review committee members.
Kenai Public Meeting	May 11, 2009 4:00pm – 7:30pm Alaska Challenger Learning Center Kenai, Alaska	A total of 8 individuals were in attendance including members of the project team, members of the State Agency Oversight Team (SAOT), and the public.
Valdez Public Meeting	May 12, 2009 4:00 PM – 7:30 PM Valdez, Alaska	A total of 8 individuals were in attendance including members of the project team, members of the State Agency Oversight Team (SAOT), local businesses, NGOs, and the public.
Fairbanks Public Meeting	May 13, 2009 4:00 PM – 7:30 PM Fairbanks, Alaska	A total of 13 individuals were in attendance including members of the project team, members of the State Agency Oversight Team (SAOT), representatives from the state legislature, and the public.

3.2 Public Comment Compilation and Organization by Common Theme

All public comments submitted via e-mail, letter, or oral testimony during the public review of the Proposed Methodology Report were compiled into a database.[8] Each comment was methodically reviewed and categorized by theme. The first level of organization distinguished between "general" comments (on the project as a whole) and "methodology" comments (specific to some part of the

7 Meeting summaries are included on the ARA project website at http://www.dec.state.ak.us/spar/ipp/ara/documents.htm

8 Appendix G to this report contains a table of all compiled public comments from the 2009 public review of the Proposed Methodology.

methodology). The General and Methodology categories were then sub-divided into common themes or topics, as listed below. Appendix A contains a complete list of all public comments received.

Themes in comments on General Project:

- Infrastructure Scope
- Risk Scope
- Condition Assessment (Physical Audit) vs. Risk Assessment
- Data Sources and Availability
- Citizen Oversight, Ombudsmen, and Whistle Blower Programs
- Project Outcomes and Future Work
- Stakeholder Participation and Outreach
- Conflicts of Interest
- Miscellaneous

Themes in comments specific to Proposed Methodology;

- Overall Methodological Approach
- Methodology Inputs
- Consequence Thresholds (General)
- Safety Consequences
- Environmental Consequences
- Reliability Consequences

3.3 Public Comments on ARA Project in General and State Response

This section summarizes the general comments received during public review of the Phase 1 ARA Proposed Methodology report and provides the state's response to the comments.

3.3.1 Infrastructure Scope

Public Comments

Several comments addressed the scope of the infrastructure to be included in the ARA – both types of infrastructure and geographic location of infrastructure included in the project scope.

There were comments recommending that the risk assessment scope include additional infrastructure, such as shipping (crude oil tankers), oil and gas refineries and other storage and processing facilities, abandoned or decommissioned infrastructure, gas transmission and distribution pipelines, and future/ planned projects, including offshore development. It was suggested that the results of the ARA should acknowledged that they are skewed by the omission of distribution systems.

Several comments addressed the specific risks associated with Cook Inlet infrastructure and oil and gas operations. It was recommended that the scope of the project specifically address Cook Inlet's aging oil and gas infrastructure, including pipelines, platforms, and decommissioned and abandoned platforms. It was also recommended that the risk assessment address how decommissioned platforms

will be addressed, and that the risk assessment address non-point source discharges under the Cook Inlet NPDES permit, and oil released through bilge water exchange. It was also recommended that the study address ice conditions in Cook Inlet, because they can exacerbate spill risks and complicate cleanup. One comment requested that the risk assessment specifically consider the risk of volcanic incidents at the Drift River Terminal in Cook Inlet.

State Response

The question of which components of Alaska's oil and gas infrastructure would be included in the ARA was a primary focus of initial project scoping, and decisions regarding which elements to include or exclude from the project scope involved a balancing of the need for a comprehensive risk assessment with the funding and timeline constraints of the project. The ARA's goal was to focus the project scope so that it met the legislative intent to conduct an engineering-based risk assessment of Alaska's crude oil infrastructure while allowing for meaningful analysis. The Proposed Methodology Report described the infrastructure scope that was intended for inclusion in the ARA, which included the North Slope, Cook Inlet, TAPS, and the VMT. For the North Slope and Cook Inlet, the infrastructure scope was to begin at the wellbore, excluding issues with reservoirs, formations, and down-hole production. For all three areas, the infrastructure scope was to end at the point of delivery, excluding downstream infrastructure and distribution systems. Shipping, refineries, abandoned infrastructure, distribution pipelines and future/planned projects were all considered in the initial project scoping, but were not included in the proposed infrastructure scope because the legislative intent for the ARA was to focus on crude oil infrastructure, and these other infrastructure elements were considered to be outside of that delineation.

After considering the infrastructure scoping issues raised in public comments, as well as the peer review recommendations of the National Academy of Sciences Transportation Research Board, ADEC determined that the original infrastructure scope, as described in the Proposed Methodology Report, was still too broad to allow for meaningful analysis, especially in consideration of problems accessing industry data. Many of the comments on the Proposed Methodology noted concern about comparative evaluations of Cook Inlet and the North Slope, due to the significant variation in the scale of operations and production in these two regions.

While the ARA scope and methodology has changed, an important achievement of Phase 1 that was carried into the North Slope Spill Analysis is the cataloguing of Alaska's oil and gas infrastructure. This catalogue was developed to provide a baseline description of the entire system, as a starting point for identifying which infrastructure components would be analyzed. It has been incorporated into the causal analysis of North Slope oil spills and expanded in an attempt to link spill occurrences to specific infrastructure components.

3.3.2 Risk Scope

Public Comments

A number of public comments included recommendations that the scope of risks included in the study be expanded. Specific recommendations for expanding the scope of risks included: outside forces (sabotage), natural hazards, human factors, risks from all types of operations, lack of government oversight, strategic reconfiguration, ignition risks, and process safety risks.

State Response

As with the infrastructure scope, the scope of risks to be included in the ARA was carefully considered

early in the project. The Proposed Methodology Report described a project approach that would address both operational risks and natural hazards risks. Several of the recommended items included in public comments – natural hazards, human factors, process safety risks and operational risks – were in fact included in the Proposed Methodology.

Public comments included recommendations that the study consider security threats and acts of sabotage, and that the analysis evaluate the effectiveness of government oversight. These issues were excluded from the ARA scope because the original Request for Proposals for the ARA contractor specified that the study would exclude security threats and intentional acts such as sabotage. An independent evaluation of government oversight is outside of the project intent, and is being conducted by another agency (DNR-PSIO).

3.3.3 Condition Assessment (Physical Audit) vs. Risk Assessment

Public Comments

A number of public comments addressed field verification or recommended that the project be designed to include physical audits of oil and gas infrastructure, including field assessments, infrastructure inspections, engineering analyses, and primary interviews of field personnel. It was also recommended that the project field verify pipeline segments before characterizing them. One comment suggested that additional JPO field offices should be established.

State Response

Work completed during Phase 1 does include the development of a database that catalogues all of the existing crude oil infrastructure; however field inspections of all infrastructure components was not feasible due to legal access constraints and budget limits. This database does not include specific field inspection data for each infrastructure component, as it would not be feasible to conduct such an inspection within the constraints of this project. However, the database offers significant value from an analytic standpoint, and may be used to develop a risk management program in the future.

3.3.4 Data Sources and Availability

Public Comments

There were several public comments that addressed the need to use direct data from industry as the basis of the study. Nearly all of the comments on data sources stated that indirect or composite data sources are invalid, and should be replaced with direct data from the industry. Several comments suggested that industry must co-operate to provide this data. One comment recommended that other published reports should be consulted and referenced during the risk assessment.

State Response

Public comments addressed the need to use direct data from industry as the basis of the study. Direct data from industry would benefit a risk assessment, and the original intent of the ARA project was to work cooperatively with industry. Requests for data from the oil and gas industry operators were repeatedly denied; this was one of the major impediments encountered during Phase 1. Attempts were made to develop a confidentiality program that would address the industry's concerns about handing over proprietary data; however, no solution was identified that was satisfactory to both the project team and the industry. One issue that may have contributed to this problem was overly-broad information requests.

3.3.5 Citizen Oversight, Ombudsmen, and Whistleblower Programs

Public Comments

A number of comments included suggestions that the ARA project would be better served if it were replaced with an ongoing program focused on closer oversight either by making it easier for "whistleblowers" to report problems, or by establishing more active citizen oversight. Some of the comments recommended that the remaining funding available for the risk assessment project be redirected to establish an ombudsmen or "whistleblower" program. The comments suggested that an ombudsmen or "whistleblower" program would provide a mechanism for oil and gas industry employees to report safety risks and other unsafe practices.

Other comments suggested that a citizen oversight group be formed for the Trans-Alaska Pipeline System (TAPS). Comments suggested that a citizen oversight organization, similar to the RCACs in place in Cook Inlet and Prince William Sound, would reduce overall risks by providing direct citizen oversight of industry practices.

State Response

The Alaska Risk Assessment project was funded as a Capital Improvement Project, and as such the funding cannot be re-allocated to establish or fund ongoing programs, such as an ombudsman program. During Phase 1, a process was established to allow for anonymous input from "whistleblowers," but no information was received through these channels.

The idea for a citizen oversight organization was considered during the project scoping, and it was considered again during the methodology development. While this issue may be considered for future study, project funds cannot be used to fund a TAPS advisory group because of the funding constraints for Capital Improvement Projects.

3.3.6 Project Outcomes & Future Work

Public Comments

Many of the public comments contained recommendations or suggestions regarding how the outcome of the ARA should be presented and utilized, and suggesting future work in this area. A few comments suggested that the Alaska Risk Assessment should be a dynamic, rather than a static analysis. It was suggested that the ARA utilize a dynamic process to consider evolving risks and facilitate future analysis that addresses changes in risk factors as originally measured. Comments noted that it would be more valuable to design a process that continuously evaluates the overall risks, rather than taking a "snapshot" of one point in time.

Several comments recommended that the ARA measure risks so that they can be compared across various factors. Public comments included recommendations that the ARA measure risks in a manner that allows for comparison and prioritization of risks both within and across risk categories, not simply to catalog them. One comment noted that a shortcoming of the ARA is that the project will not be able to come up with solutions for minimizing down time, which is the time during which systems may be inoperable, since this is an operational issue that can only be managed by the operator.

Several comments recommended that the outcome of the risk assessment should focus on identifying risk mitigation or management measures that can best mitigate the identified risks. Several of these comments noted concern that the ARA would not provide meaningful direction on how to mitigate or manage risks identified through the analysis. One comment stated that the ARA must

be able to accomplish what the Baker Report did, in order to be of value. The Baker Report was published following an incident at a Texas City oil refinery, and includes recommendations for safety improvements and risk reduction measures at that facility.

Two comments addressed the transparency of ARA methodology and results. Comments noted the importance of ensuring that the ARA methodology and results/recommendations be developed and presented in a fully transparent way to ensure that the outcomes of the study can be put to best use in risk management and mitigation.

State Response

The issue of static vs. dynamic information and analyses was also a concern of the National Academy of Sciences peer reviewers (see Appendix D). The SAOT and ADEC always intended that one of the project outcomes would be a database of crude oil infrastructure components that would be updated and analyzed over time, and possibly collated with other databases like the state oil spill database. In order to be able to evaluate the system over time, an initial or baseline assessment is required. Therefore, the ARA was intended to provide both a "snapshot" of the system as originally evaluated, as well as a mechanism to measure and assess changes within the system over time as they relate to overall risks.

After considering the public and peer review comments relating back to the need for risk management mitigation measures to come out of this project, the ADEC has decided to revise the project approach significantly, so that the outcome of the ARA will include recommendations for risk mitigation measures and risk management programs.

3.3.7 Stakeholder Participation and Outreach

Public Comments

A number of comments provided feedback on the process used to solicit and incorporate feedback from stakeholders during Phase 1 of the ARA. The majority of the comments noted deficiencies or shortcomings in the Stakeholder Outreach process. Criticisms included the low level of participation in many of the stakeholder meetings and forums, a perception that the draft methodology and other project documents did not reflect due consideration of issues raised by stakeholders and the public, and several specific examples where residents of a certain town or region were not allotted sufficient opportunity for project review or input.

One comment addressed the need for public review of and comment on final recommendations of the ARA. The comment requested that the risk reduction recommendations that come out of the ARA project should be subject to additional public review and comment. One comment praised the overall stakeholder outreach effort conducted thus far during the ARA. One comment focused on the tribal consultation component of stakeholder outreach, emphasizing the importance of ensuring that tribal governments are consulted and provided with the opportunity to input into the risk assessment.

State Response

Effective stakeholder outreach is a priority for the ADEC. Specific recommendations for improving stakeholder outreach are welcomed and the ADEC will work to try to improve on the stakeholder communication process as the project continues. All of the reports and findings generated during the ARA project have been and will continue to be made available for public review and input. The ADEC will ensure that tribal governments are included in all future stakeholder consultations.

ADEC agrees that the ARA should be conducted with a high level of transparency so that risk managers can evaluate the risks identified through the study and make decisions regarding risk management and mitigation. The intent of the ARA process was always to present results in as straightforward a way as possible. The same principle has been applied to the North Slope Spills Analysis.

3.3.8 Conflicts of Interest

Public Comments

Several public comments pointed to potential conflicts of interest among parties involved in the ARA, including the industry, the lead consultant, and the state agencies. A few comments noted that Doyon/Emerald and ABS Consulting, the contractor who developed the Preliminary Methodology, had a conflict of interest for this project due to past and ongoing associations with the Alaska oil industry.

Two comments noted an overall conflict of interest within the industry relating to the ARA project that might prejudice their input or involvement. The comments stated that the industry has an inherent conflict of interest in providing information to the ARA regarding oil spill risks, since this information may work contrary to their business or economic interests.

Several comments stated that the State of Alaska has a conflict of interest in conducting this project. Comments noted that since the state relies on revenues from the oil and gas industry to fund many of the programs and agencies involved in the SAOT, it has a conflict of interest relating to the fair evaluation of the industry.

State Response

The state agencies that are involved in the ARA are routinely charged with administering projects and programs that regulate the same oil and gas industry that partially funds state budgets. In order for the ARA project to achieve its objectives, the owners and operators of the infrastructure assets needed to be active participants in the project. While the industry's interests may not always align with the project goals, the project could not produce meaningful results without cooperation from industry. The revised approach to this project will utilize industry representatives as subject matter experts and focus on their review and validation of data, rather than relying on them as a primary source of data. Doyon/Emerald is no longer under contract for this project.

3.3.9 Miscellaneous

Public Comments

Miscellaneous comments on the ARA project in general were received on several topics, which have been combined into a miscellaneous category. Comment topics were:

- Contingency planning and permitting
- Cook Inlet sensitivities
- Definitions and terminology
- General clarifications and technical corrections
- Spill mitigation
- Termination of the ARA
- General support for the industry

A few comments were received regarding contingency planning, permitting, and site location issues for existing facilities. There were recommendations that oil spill contingency plans be given heightened scrutiny, and also comments noting that the state had allowed facilities to be located in high-risk areas and that this, in turn, related back to overall risks. There were also comments received regarding specific environmental sensitivities in Cook Inlet. Comments highlighted the presence of critical habitat and the rich biological and fisheries resources in the region.

A few comments addressed definitions and terminology, and there were recommendations that the ARA terminology remain consistent with federal regulations. There were also a few comments that offered corrections on technical issues covered in the Proposed Methodology Report.

A few comments requested clarification on general issues related to the project scope, process, and project management structure. There were several comments recommending that the ARA project be terminated. The comments expressed the opinion that the ARA is failing to meet its intended purpose and that the most prudent way forward would be to terminate the project.

One comment expressed support for continued operation of the Alaska oil and gas industry.

State Response

Cook Inlet will be excluded from the ARA at this point. The comments regarding environmental sensitivities in the Cook Inlet region will be considered as part of any future study into Cook Inlet crude oil risks.

All definitions will be reviewed against federal regulations and industry publications. The ADEC appreciates the clarifications and technical corrections in public comments and will verify and update the project documents with these corrections.

Like all projects, the ARA has been constrained by the budget and schedule. Several comments identified specific items that were not, but should have been, included in the project scope. Many of these comments also suggested that, because of the project constraints, it will not be successful and should be terminated. The ADEC believes that it is possible for an analysis with a limited scope to still accomplish its objectives and provide meaningful information. The project will be completed with a significantly revised scope and approach, in an attempt to address the recommendations from peer and public review of Phase 1 work.

The ADEC appreciates public support for the continued operation of the crude oil industry; part of the rationale for the project is to allow the oil and gas industry to continue to operate for another 50 years, reliably and safely.

3.4 Public Comments on Proposed Phase 1 ARA Methodology and State Response

This section summarizes the methodology-specific comments received during public review of the Phase 1 ARA Proposed Methodology report and presents the state's response to those comments.

3.4.1 Overall Methodological Approach

Public Comments

A number of comments stated that the methodology as written would not provide the appropriate and necessary information to inform decision-makers about risks. Several comments expressed a concern that the Proposed Methodology was entirely invalid and that the only prudent way forward was to terminate the project altogether or drastically redesign the Methodology.

Comments on the link between the methodology and the results requested clarifications or changes to the methodology to better describe how the information generated through the ARA could be used by decision-makers to set priorities. The general sentiment expressed in these comments was that the proposed methodology does not provide enough information about how the information generated by the risk assessment will actually be used to mitigate risks. The overall recommendation was to refine and improve the methodology so that it is clear how the project will yield meaningful results that can then be applied to the overall study objectives of reducing spill risks from Alaska's oil and gas infrastructure. Most comments seemed to support the idea that a risk assessment was a worthwhile project, but found that the Proposed Methodology did not describe a sound or reasonable approach to accomplish the project goals.

Some comments stated that the project was completely off track. Others noted that the original funding was not sufficient to accomplish the project objectives. Some comments suggested that the contractor, Doyon/Emerald and ABS Consulting, was not capable of fulfilling the project goals and should be replaced. Some comments noted that problems obtaining data from the industry would be a major contributor to the overall project failure. Most of the comments that recommended termination of the project also cited other specific Methodology shortcomings that are described in other areas of this document.

A few comments indicated that the Proposed Methodology overall was too focused on economic risks. The comments suggested that the State was acting more like a business than an agency looking after the public trust. Several comments expressed concern that the Proposed Methodology focused too heavily on analytic evaluation of aggregated data and did not include enough primary data or field verification. Some comments expressed concern that information supplied by the industry would not be field verified, or that there was a difference between prevention measures and systems "on paper" and in reality. Some comments expressed concern that facilities would be risk ranked based on a list of their components, rather than a physical evaluation of their overall operations. One comment described the nodal approach as a blunt tool that would not account for the range of conditions across Alaska.

State Response

The state has considered many of the comments related to the project being off track and needing a complete redesign. The revised approach to completing the project addresses these comments. The revised approach does not rely on industry to provide data, but rather to review and verify data already collected and to contribute technical support to the Expert Panel. The resulting analysis will provide insight into the causal factors behind North Slope oil production infrastructure spills, and the methodology will be replicable and could be used to expand the analysis to other infrastructure components or geographic locations.

The original focus of the ARA was to identify and prioritize the risks, with the intent that mitigation efforts would be addressed in the Risk Management phase, to be accomplished outside of the ARA by agency managers. Moving forward, the ADEC has adopted a revised approach that will include providing recommendations for prioritizing and implementing risk mitigation and risk reduction measures for North Slope operators. This revised approach is intended to address many of the concerns expressed by public and peer reviewers that the ARA Methodology as originally proposed would not yield actionable results to reduce future risks.

3.4.2 Methodology Inputs

Public Comments

Several comments offered suggestions or recommendations for specific issues that should have been included in the methodology, but were not.

A few comments questioned how the ARA methodology would address climate change, and recommended that the ARA Methodology should more explicitly acknowledge and analyze the risk of climate change on oil spill risks. Two comments suggested that the Methodology address how government oversight contributes to overall risks.

A few comments addressed the selection of oil spill sizes and parameters within scenarios, generally recommending a broader range of spill sizes and conditions. It was suggested that the Proposed Methodology did not acknowledge the potential scope of impacts from a worst case oil spill. One comment recommended that the total cost of an oil spill be the primary determinant of its impacts.

Several comments recommended that process safety risks also be included in the risk assessment, pointing out that oil and gas infrastructure is a dynamic system and that the current methodology would provide only a "snapshot" of that system, and not account for the underlying processes and how they relate back to systemic risks. A few comments stated that if the ARA Methodology does not address process safety, it will not provide meaningful or accurate outcomes.

A few comments recommended that natural hazards be more explicitly addressed and incorporated in the Methodology, and it was suggested that local residents would have a good sense for the natural hazards at a given site or facility. It was also suggested that the susceptibility of various designs to failure due to natural hazards must be addressed. A few comments recommended that third party damage and intentional acts be included in the analysis.

State Response

The Proposed Methodology did attempt to include the known effects of climate change. This is a developing area. The ARA focus is on the engineering related aspects of risk.

Natural hazard assessment is no longer a component of the project. Third party and intentional acts are specifically excluded from the project scope of work. Some review of these risks has been done by Federal Department of Homeland Security.

3.4.3 General Consequence Thresholds

Public Comments

Many comments on preliminary screening thresholds recommended reducing these screening thresholds to be more inclusive, and cautioned that if these thresholds were not lowered, the preliminary screening process would not yield a comprehensive list of risks. There were a number of specific recommendations regarding expanding preliminary screening factors, such as considering events that may occur beyond a facility's boundaries, incorporating process safety risks, and revising the threshold for "significant" consequences to incorporate moderate-scale events. Several comments noted that the Proposed Methodology lacked a clear explanation of how "acceptable" vs. "unacceptable" or "significant" vs. "insignificant" consequences would be determined. One comment suggested "binning" consequences as low, medium, high. Comments included several examples where the threshold for "significant" fell considerably higher than expected, and noted that there was some subjectivity in these determinations.

A few comments stated that the preliminary screening thresholds in the Proposed Methodology were not aggressive enough, and that they would lead to a data set that was so large it would not be possible to conduct a meaningful analysis. The 10-barrel screening volume for oil spills was identified as one such example.

State Response

The Proposed Methodology for screening thresholds will not be applied. Instead, a revised approach will provide a qualitative review of past spills and recommendations for risk reduction measures that target spill causal factors.

3.4.4 Safety Consequence

Public Comments

A number of comments contained recommendations for additional safety consequences that should be addressed in the Methodology. Recommendations for additional safety consequences included health consequences from normal operations, near misses, lost time incidents, and other non-fatalities. Comments also recommended that additional scrutiny be given to determine whether industry safety programs and government regulations were effective in preventing accidents, noting that the Methodology incorrectly assumes that "smaller" risks are already regulated and therefore not considered in the scope of this analysis.

A few comments stated that the safety screening thresholds in the Proposed Methodology were too high and should be lowered to be more inclusive. Comments noted that the way the Proposed Methodology treated non-fatality risks was misleading, and suggested that even if non-lethal safety incidents couldn't be accurately measured, they should not be assigned a zero value.

State Response

The scope of work for the ARA was broad and complex, and the budget limited. Reviewing health consequences of normal operations was excluded from the ARA during initial scoping. Public and peer review comments noted problems in applying the Proposed Methodology for safety consequence screening. Moving forward, the ARA will focus on causal factors in North Slope oil production infrastructure spills; safety consequence screening and analysis will not be conducted.

3.4.5 Environmental Consequence

Public Comments

A few comments expressed concern that the environmental consequence screening was based on the assumption that prevention measures would function as intended. Comments pointed to secondary containment as one prevention measure that would not always prevent environmental consequences from a spill. One comment also identified valve failures as a concern. Failures or delays in leak detection were also identified as a concern.

Several comments expressed concern that the environmental consequence screening thresholds were too high, and should be lowered to be more inclusive. (Note that one comment recommended raising the environmental screening thresholds and lowering safety.) Cook Inlet was cited as a specific concern because of much lower production and transport rates than the North Slope. One comment stated that the categorization of spills under 1,000 gallons as zero risk was invalid, since spills in this size category can still have serious environmental consequences. A few comments suggested expanding the environmental consequence category to include a broader scope of impacts, such as considering

the chronic effects of unmitigated oil spills or considering impacts to air as well as to water. It was suggested that event trees be used as a way to estimate environmental consequences based on an initiating event and failure location.

One comment suggested that environmental risks need not be included in the ARA, as they are already sufficiently regulated by state and federal agencies. A few comments related to the importance of considering environmental sensitivities when estimating oil spill consequences. Some of these comments recommended specific criteria and designations that should be considered in establishing environmental sensitivities, such as endangered species and critical habitats. One comment recommended that there be some prioritization of certain types of sensitivities over others. Two comments suggested that the environmental consequence analysis consider impacts from other sources in addition to hydrocarbons.

A few comments related to the assumptions and data underlying the oil spill scenario analyses described in the Proposed Methodology.

State Response

The screening process proposed in the Methodology Report will not be applied. The ARA revised approach will focus on causal factors in North Slope crude oil production infrastructure spills, focusing particularly on spills that involve a loss of integrity, as this is a major risk to reliability of crude oil supply and also has the potential for adverse environmental consequences.

3.4.6 Reliability Consequence

Public Comments

A few comments recommended expanding the types of secondary impacts considered in the reliability consequence category to include socio-economic impacts, potential loss of production following shut-in, and other reasonably foreseeable consequences. One comment requested clarification regarding the demarcation between primary and secondary impacts.

A few comments recommended that the screening thresholds for Reliability be lowered to make them more inclusive, and some of these pointed specifically to Cook Inlet and noted that the thresholds set out in the Proposed Methodology would screen most of Cook Inlet's oil and gas operations out of the risk assessment, because the comparative revenues from Cook Inlet are so much lower than the North Slope.

Two comments stated that reliability should be the primary focus of this analysis.

State Response

Reliability is one of the core elements of the study, and the TRB peer review also recommended a focus on reliability. Moving forward, reliability of crude oil infrastructure on the North Slope has been considered through a causal analysis of past spills from the piping infrastructure.

4 SUMMARY OF PEER REVIEW OF PHASE 1 PROPOSED METHODOLOGY AND STATE RESPONSE

4.1 Transportation Research Board Peer Review Process

The Transportation Research Board (TRB) of the National Academy of Sciences (NAS) performed a technical peer review of the Phase 1 Proposed Methodology Report. Based on their review of the available documentation and meetings in Washington, D.C., and Anchorage, Alaska, to gather public, industry, government, and expert input, the peer review committee found the proposed risk assessment methodology to be problematic in three main areas: (a) the management plan was not feasible given real-world constraints, (b) the proposed risk methods were too detailed and lacked a sufficient top-down perspective necessary for capturing the important risks, and (c) the proposed results were static and stopped well short of providing the State with a set of tools for evaluating risk mitigation opportunities.

The committee recommended that future risk assessment efforts conducted by the State of Alaska should:

- Revise the scope of the project to allow for the sequencing of work with an initial focus on reliability of the systems followed by the environmental and safety concerns, and expanding the focus to include all important sources of initiating events (intentional hazards);
- Focus research efforts by using a combination of top-down and bottom-up approaches;
- Work with industry from the earliest possible moment so that common goals can be identified and mutual cooperation can be ensured;
- Focus on the interfaces and linkages in the system; and
- Focus on the risk management process, not on a one-time effort.

4.2 Peer Review Recommendations

4.2.1 Revise Project Scope

TRB Comments

The peer review committee's first recommendation was that the ARA not attempt to simultaneously evaluate risks to environment, health and safety, and reliability, but that the State conduct separate, sequential analyses of these three types of risks. The peer review committee further recommended that reliability risks should be considered first, deferring the safety and environmental analyses to some future date.

The peer review committee pointed out that while the universe of elements of the oil and gas infrastructure that could be the source of harm to the environment and to people is very large, far

fewer elements could impact reliability. While nearly every potential failure could have an impact to the environment, safety, or both, a much smaller subset of these events would impact reliability of supply. The committee noted that a spill or release would be the likely origin of a reliability event, but that not all spills or releases would impact reliability. The committee made the point that by just looking at the specific failures that might occur, you would not necessarily identify the other factors that contribute to the overall implications of that failure to reliability. The committee recommended that rather than a bottom-up, piece-by-piece analysis of the system, a top-down view should be applied to get a better understanding of the reliability risks within the entire system.

The peer review committee noted that situations with the highest reliability consequences would be those that financially impact the State, such as a shut-down of the TAPS system. The committee recommended that the ARA scope be revised to first focus in on identifying those situations that might lead to major reliability events, and then following up with specific, detailed analyses in order to develop mitigation strategies to eliminate or at least to manage the risks.

State Response

The broad geographic and physical scope of the project and challenges accessing industry data, along with the needs relating to quantification of risk, made data compilation, comparison, and analysis extremely difficult. The broad scope also caused some public misunderstanding of the project, which led to many requests for changes to the scope and methodology.

Upon completion of the public and peer review of the Proposed Methodology during Phase 1 of the project, ADEC and the SAOT determined that the project scope and approach should be significantly revised. The revised scope and shift from a statewide risk assessment to a North Slope Spills Analysis is discussed in the body of this report. The revised scope has been narrowed, focusing on compiling and analyzing causal information associated with the North Slope crude oil production infrastructure spills. Cook Inlet, the Valdez Marine Terminal and TAPS will not be included in the revised scope, but may be considered in the future using a similar analytical approach.

4.2.2 Combine Top-Down and Bottom-Up approaches

TRB Comments

The TRB peer review committee characterized Alaska's crude oil infrastructure as a complex "system of systems" and advised that the ARA apply a top-down approach that focuses on the analysis of the system as a whole and only add details as needed, paying special attention to the interfaces between the major systems and installations. The committee noted that a top-down analysis will facilitate the consideration of system-level failures, which are more relevant to the question of how to mitigate or prevent future occurrences. Rather than conduct a comprehensive bottom-up review of all the components of the system, the committee recommended strategically applying smaller bottom-up analyses only in places where additional information or detail is needed.

The peer review committee cited three main benefits of a top-down analysis:

- Controls the amount of qualitative and quantitative data needed,
- Offers early qualitative insights into system-wide risk vulnerabilities, and
- Provides a frame of reference to relate past incidents and accidents to a broader risk management perspective.

State Response

The revised methodology for a North Slope Spills Analysis will address many of the points made by the TRB peer review committee and in public comments. The analysis of crude oil infrastructure spill causes will focus on those events that have had the greatest potential (or actual) impact on reliability, and will generate some analysis of the trends and occurrences of such events. The North Slope Spills Analysis reflects a top-down analytical approach that realizes the benefits described by the peer review committee. A more manageable amount of data is required to complete this analysis, and the State has ready access to this data. The Spills Analysis will provide some insight into system-wide vulnerabilities, based on past events. And the revised approach focuses very directly on developing risk management recommendations based on past incidents and accidents.

4.2.3 Industry Engagement

TRB Comments

The peer review committee commented on the fact that the ARA faced considerable challenges in compiling industry data, and noted that in part this was due to the fact that data needs were not clearly defined early on, causing a sense of unease with many of the operators. The committee recommended that engaging with the industry earlier in the process might have addressed some of these problems. They also recommended that justifying all data requests, engaging regulatory agencies, and having some flexibility in the methodology might also have helped to avoid some of the challenges that were encountered in obtaining the data needed for the Phase 1 Proposed Methodology.

State Response

The revised methodology also calls for enhanced participation by the operators. The new focus on just the North Slope reduces the number of operators considerably, and the methodology has been designed so that rather than presenting industry with open-ended data requests, their role is to review and verify data.

4.2.4 Human and Organizational Factors and System Interfaces

TRB Comments

The peer review committee observed that the major problem with the oil and gas infrastructure that has had a direct and major economic impact on the State of Alaska is corrosion that was not adequately managed, indicating that a satisfactory integrity management system was not being implemented at that time. The committee pointed to the importance of explicit incorporation of organizational and human factors into the risk assessment, which was not accomplished in the Proposed Phase 1 Methodology.

The peer review committee noted that in the complex system of systems being considered, the interfaces between various elements of the system are critical to understand and evaluate, because it is failures along these clusters of interconnected entities that should be targeted by mitigation and risk reduction measures. The committee found that the Proposed Methodology would not effectively identify these hidden vulnerabilities in the system.

State Response

The revised methodology relies on causal analysis of past spill occurrences from North Slope crude oil piping. The basis for the study is a statistical analysis to identify trends. This approach is standard procedure for many types of engineering investigations. Events that have occurred many times in

the past have a higher likelihood of reoccurring in the future. The revised methodology for a North Slope Spills Analysis will provide insight into common causes of past failures, including human and organizational factors and system interfaces.

4.2.5 Usefulness for Risk Management

TRB Comments

The TRB peer review committee stated that future risk assessment projects should not just identify risks, but also identify ways in which to manage those risks in the future. The committee suggested that the State should be more forward-looking, and that they should relate the analysis back to mitigating measures and risk management programs that could improve reliability in the future. The committee recommended that the State begin with a baseline analysis of current failure trends and actions that have been taken in response to past failures.

State Response

The revised methodology will include an analysis of spill frequency distributions drawn directly from Alaska North Slope spill experience. This analysis will identify risks that are correlated with specific causes, providing insight into the types of risks that could be reduced through mitigation. The North Slope Spill Analysis includes recommendations for mitigation measures to reduce the likelihood of future spills from crude oil production leaks or loss of integrity.

5 LESSONS LEARNED FROM PHASE 1 METHODOLOGY DEVELOPMENT AND OUTREACH

This section summarizes the key challenges with the proposed Phase 1 methodology for a quantitative risk assessment and describes how the change in project scope from a forward-looking risk assessment based on theoretic probabilities to an analysis of past spills based on actual data addresses many of the concerns raised in public comments.

5.1 Problems with Proposed Methodology for Quantitative Risk Analysis

The quantitative, bottom-up approach described in the Proposed Methodology Report for Phase 1 of the ARA was strongly criticized during public and peer review. A major concern was that the proposed methodology for a quantitative risk assessment would not provide the information needed to meet the stated top-level objectives for the project. Feedback on the proposed methodology included a range of concerns that the Methodology report did not adequately explain how the proposed methodology would lead to a quantification of risk, nor how it would relate back to mitigation measures that could be targeted to the risks. Many comments from the public, oversight agencies, and peer reviewers suggested that the methodology should shift the emphasis from global risk quantification and instead focus on identifying and evaluating mitigation and management measures that reduce the highest priority risks.[9]

Collection of data from the operators was a problem from the onset, and operator concerns regarding proprietary information were not adequately resolved. Feedback from the operators suggested that the data needs were overly broad and could present a significant burden to the operators to compile and share the information requested. The Proposed Methodology did not contain a clear process for industry cooperation or inclusion, and some of the sub-objectives discussed in the Methodology Report appeared likely to undermine the potential to secure operator participation – for example, the sub-objective related to determining how much money should reasonably be spent on risk management. The TRB peer review also noted that the information needed to implement the proposed methodology was not necessarily available or accessible, and that without operator-provided information, the analysis would be incomplete.

Another major problem that was cited regarding the Proposed Methodology was that the resulting analysis would be static and would not provide the State with the tools needed to evaluate risk mitigation opportunities or to evaluate changes to the system over time. It was noted that the proposed quantitative risk assessment methodology did not explicitly address human and organizational systems, including management systems, nor did it address the interfaces among these systems, which are critical both to understanding risks and to mitigating them. It was suggested that the study should be designed to address the changing nature and importance of risks. A static

9 Appendix A to this report contains a table listing all public comments received. Additional documentation from the public comment and peer review is available on the project website at http://www.dec.state.ak.us/spar/ipp/ara/documents.htm

risk evaluation only provides insight into risks that exist at the time it is carried out; therefore, any mitigation measures that are implemented as a result of that analysis may lose their validity or effectiveness as changes occur over time within the system. An evaluative process should include a mechanism to consider how the quality and severity of risks may change over time due to changes in management practices, operator knowledge, operating environment, or changes within the system.

A challenge to the oversight agencies involved in the project was that many elements of risk management and risk mitigation fall outside of regulatory authority, so there was no clear mechanism to implement mitigation or risk management requirements that might have followed from the analysis.

The geographic and operational scope of the proposed quantitative analysis was extremely broad and comprehensive, and sought to use probabilistic and compiled data from other geographic regions to measure risk to safety, health, environment, and economic viability of Alaska's crude oil infrastructure.

Many of the questions that the public expected the ARA to answer were in fact beyond the limits of current quantitative risk evaluation models. Public comments cited several types of risks that were omitted from the ARA Proposed Methodology, such as operator management processes and systems, the consequences of delayed leak detection, contingency planning and effectiveness of mitigative measures, and natural hazards. While these may represent significant risks, the characterization of such factors exceeds the capabilities of most existing quantitative risk assessment techniques.

5.2 Revised Project Scope: North Slope Spill Analysis and Recommendations for Mitigation and Risk Management

Based on an extensive review of the comments from public, state and federal agencies, industry and the Transportation Research Board and the experience and knowledge gained during Phase 1, the ADEC Project Team decided not to implement the proposed quantitative risk assessment described in the Phase 1 Methodology Report. Instead, a new methodology was developed to emphasize a compilation and analysis of causal information associated with the North Slope10 crude oil production infrastructure spills, and to use that information to develop recommendations for future mitigation and risk management approaches. The rationale for changing the project scope related back to the many challenges encountered in collecting the data needed to carry out the quantitative risk assessment described in the Phase 1 Methodology Report.

This shift in scope – from a ground-up, probabilistic quantitative risk analysis of statewide crude oil production infrastructure to a top-down analysis of the relationship between spill causes and North Slope crude oil piping infrastructure – was significant. The North Slope Spill Analysis methodology will ultimately achieve the key legislative mandate, which was to provide information to regulators so that they can so they can focus the state's oversight attention on the infrastructure components with the highest potential failure threats. The geographic scope of this analysis is much narrower than the original ARA scope, which included the Trans-Alaska Pipeline System (TAPS), Cook Inlet, and the Valdez Marine Terminal (VMT). However, the process applied in the North Slope Spill Analysis may be transferred to other regions of the state to accomplish similar analyses. This is consistent with the phased approach recommended in the TRB peer review.

The North Slope Spill Analysis uses actual data from North Slope loss-of-integrity spills to identify trends that may then be used to target future interventions. This type of historical analysis is a

10 Cook Inlet, TAPS and the VMT are no longer included in the scope, but may be considered in the future using a similar analytical approach.

standard approach used in many types of engineering investigations.[11] Analyzing hard data from past events represents a legitimate alternative to future-looking risk analyses, which rely on probabilistic modeling of potential failures based on composite data from other operating areas. The North Slope Spill Analysis will identify any risk trends that may exist, and will lay the foundation for future trend analyses. A companion study has also been published, reviewing risk management programs and approaches in use by foreign jurisdictions and other U.S. industries, and to identify practices that could be borrowed or applied from these models.[12]

The North Slope Spill Analysis is essentially a different type of risk assessment than the quantitative evaluation originally proposed for the ARA. Risk assessment is often described as the probability of an event occurring multiplied by the severity of the consequence. Typically, risk assessments estimate the probability and the severity using various estimating techniques. This analysis will look at actual data rather than estimates, and will analyze the frequency (probability) and the size or volume (consequence) of past spills from North Slope crude oil production infrastructure.

11 See, for example, LeMay and Decker, "Reducing the risk of failure by better training and education," in Engineering Failure Analysis, 16(2009): 1153-1162.

12 Cycla Corporation, "Review of Select Foreign and Domestic Approaches to Oversight and Management of Risk and Recommendations for Candidate Changes to the Oversight Approach for the Alaska Petroleum Transportation Infrastructure," Report to ADEC, June 2010.

CONCLUSIONS 6

While the Proposed Methodology developed during Phase 1 was ultimately abandoned due to concerns about its implementation and appropriateness, there were several important accomplishments during Phase 1 of the ARA project that have contributed to the successful implementation of the North Slope Spills Analysis, and that may provide a foundation for future risk analysis and risk management activities in Alaska.

The catalogue of North Slope crude oil infrastructure that was compiled during Phase 1 (and documented in the Proposed Methodology Report) provided the first such inventory, and continues to be built upon as part of the North Slope Spills Analysis.

The State Agency Oversight Team (SAOT), which was formed to provide project guidance and oversight, brought together representatives from the Alaska Departments of Environmental Conservation, Natural Resources, Public Safety, Labor and Workforce Development, Law and Revenue. The Alaska Oil and Gas Conservation Commission and the University of Alaska College of Engineering and Mines also participated in the SAOT, which met regularly during Phase 1 of the project. The formation of the SAOT brought together a standing body of regulators with a range of regulatory oversight authority to focus on issues concerning the risk to safety, the environment, and the reliability of Alaska's crude oil infrastructure. The process fostered discussions regarding overlap and potential gaps in regulatory oversight, and promoted open communication among agencies and organizations with different purviews. The use of the SAOT during the ARA provided a broader perspective than would have been applied if the project oversight had been resident in a single agency.

The initial project outreach and stakeholder meetings and workshops conducted during Phase 1 also provided a mechanism for input and information from a range of stakeholders and from the public. While the project did not enjoy a great deal of public support, it certainly fostered a dialogue among the industry, the public, and regulators regarding evaluation of risk and priorities for mitigating risks within Alaska's crude oil infrastructure. The public record of comments included in Appendix A of this report should be revisited during any future risk assessment projects undertaken by the State.

Commonalities exist between the North Slope Spills Analysis Expert Panel recommendations, which were developed based on early analysis of the North Slope Spills data, and other comments and recommendations compiled earlier in the Alaska Risk Assessment project cycle. While the Phase 1 methodology for a quantitative risk was replaced with the North Slope Spills Analysis, many of the issues that were raised during the Phase 1 methodology public and peer review are addressed in the Final Report on the North Slope Spills Analysis.[13]

Public comments summarized in this report included recommendations for enhanced field assessments

13 Nuka Research and Planning Group, LLC, "Final Report on North Slope Spills Analysis and Expert Panel Recommendations on Mitigation Measures," Report to ADEC, June 2010.

and infrastructure inspections, to gain a "boots on the ground" perspective on the integrity of the North Slope crude oil infrastructure. While such a field-intense inspection program was not feasible during the Alaska Risk Assessment and was not cogent to the North Slope Spills Analysis, many of the recommendations made by the Expert Panel would likely result in enhanced field inspections.

Public comments summarized in this report also addressed the fact that during Phase 1 of the Alaska Risk Assessment, significant challenges were encountered in compiling the data needed for a comprehensive engineering risk assessment, because such data was maintained by operators and there was no clear path to access this data. The North Slope Spills Analysis was designed to utilize publicly available data, with review and validation by industry. An important outcome of the North Slope Spills Analysis was a systematic examination of the depth and limits of spill data as it is currently compiled and maintained by the State of Alaska. The Expert Panel recommendations identify opportunities to improve current data compilation, emphasizing the need for better causal data to focus future mitigation programs. Moving forward, if the State of Alaska implements the recommendation to improve data collection, there will be a more robust data set available to support future studies and to begin to measure the effectiveness of mitigation programs.

Both public and peer review comments (from the Transportation Research Board of the National Academy of Sciences) indicated that the original Alaska Risk Assessment methodology was fundamentally flawed because it would not provide any insight into how mitigation measures could be applied to reduce the risks identified in the study. The TRB specifically recommended that the State consider forward-looking risk management programs. While the North Slope Spills Analysis analyzed historical spill occurrence rates, it provided a foundation for Expert Panel recommendations that address risk management systems and processes that would mitigate the risks identified in the spills analysis. A companion study to the North Slope Spills Analysis, published by Cycla Corporation,[14] discusses candidate risk management and oversight systems based on models in place in other jurisdictions. There is significant commonality in what these recommendations are designed to accomplish, and considerable overlap between the recommendations in the Cycla report and the recommendations from the North Slope Spills Analysis Expert Panel. The primary purpose of both sets of recommendations is to strengthen the Alaska regulatory agency knowledge and awareness of risks, and to improve agency access to information on the operators' perspective on risk as well as on their plans to manage that risk. More effective management of these risks will result in a reduction to the frequency and severity of spills due to loss-of-intgerity from North Slope crude oil infrastructure.

14 Cycla Corporation, 2010.

APPENDIX A: PUBLIC COMMENTS ON PHASE 1 PROPOSED METHODOLOGY

The following table includes all comments received during public review of the Phase 1 Proposed Methodology for the ARA. Comments have been excerpted from letters, e-mails, and oral testimony and have been numbered for the purpose of organization and review.[15]

Cmnt #	Comment	Submitted by	Date	State Response[16]
1	On page 63 of 165, the TAPS Communications and Control is listing a using Satellite as the Backup communication system, this formerly was the case. The system is now back up by GCI fiber optics circuits. I confirmed this with Betsy Haines, Alyeska Oil Movements Director on April 7, 2009.	BLM	6/10/09	3.3.9
2	Section 4.3 of the report describes the TAPS infrastructure that will be analyzed. Other than for Station 5 which is described as a relief system, no mention is made for the other retro active pump stationsand the Valdez Marine Terminal of the their relief systems. The relief capability is a major element for the safe operations of TAPS. Another major system which is not listed is the backpressure system at the Valdez Marine Terminal.	BLM	6/10/09	3.3.1
3	CIRCAC has reviewed the above-referenced document and has concern regarding the reliability screening threshold level set for inclusion in the risk assessment process.	CIRCAC	6/4/09	3.4.6
4	The Cook Inlet Oil and Gas infrastructure includes production and exploration offshore platforms, their associated subsea pipelines, and above ground transmission lines to and from refinery operations. However, due to the level set out in the current methodology, Cook Inlet would not be considered under the risk category of "Reliability". Since the crude oil production loss of Cook Inlet is considerably less than the 4,200,000 bbls cited, it would be screened out.	CIRCAC	6/4/09	3.4.6
5	In regards to the category of "Environmental" risk, Cook Inlet might have trouble meeting some of the criteria to remain included in the risk assessment process. Since production and transport rates in Cook Inlett are considerably smaller than those found at the North Slope facilities and throughout the Trans Alaska Pipeline System corridor, some nodes in this category may be screened out as well.	CIRCAC	6/4/09	3.4.5

15 Copies of all comment letters are included on the project website at http://www.dec.state.ak.us/spar/ipp/ara/documents.htm

16 Number listed corresponds to section in this report where public comment is summarized and responded to.

Cmnt #	Comment	Submitted by	Date	State Response[16]
6	The majority of the oil and gas infrastructure of Cook Inlet has been in place since the mid 1960's. A significant portion of the Cook Inlet piping infrastructure is subsea and cannot be visibly inspected. A breach in any one of these could be devastating to the Cook Inlet Environment in many ways. A significant discharge could produce a devastating economic blow to the State's economy caused by the interruption of the bulk of Alaska's marine transportation operations, a shut down to the vibrant sport and commercial fisheries and a possible shut down of refinery operations. Unlike a pipeline spill on the North Slope, an equivalent discharge from a Cook Inlet subsea pipeline has the potential to spread rapidly and negatively affect a very large area of extremely sensitive ecosystems. The effects of such a discharge would reflect in the local economy initially then ultimately in the state's economy. The economic consequences are far reaching, from the influencing market perception of Alaska wild caught salmon to increasing the volatility of the national energy market.	CIRCAC	6/4/09	3.3.1
7	In regards to the "safety" category, some of the facilities located within the Cook Inlet area may not meet the level of impact required to pass the screening process. While we realize this situation exists for each node to be evaluated, it is only mentioned to show that it is yet another way the Cook Inlet infrastructure could be screened out to the point where only a few nodes would make the cut. This circumstance would be a gross misrepresentation of the actual risks presented by the Cook Inlet infrastructure and the actual risks to the Cook Inlet infrastructure itself.	CIRCAC	6/4/09	3.4.4
8	While gas production and transportation is not in Cook Inlet RCAC's mandate, we feel it is important enough to the region to mention. Because much of the gas infrastructure in intertwined with the crude oil infrastructure, we feel the same concerns are valid.	CIRCAC	6/4/09	3.3.1
9	... our concern is that through the screening process the Cook Inlet infrastructure overall may not compare significantly enough to remain in the ARA. It is our recommendation that the Cook Inet Oil and Gas infrastructure thresholds be reduced or eliminated to reflect the overall relationships and effects within the region.	CIRCAC	6/4/09	3.4.3
10	With regard to safety concerns, on page 20, the methodology notes that "the required OSHA and EPA process hazard studies should address most of the State's safety concerns within the scope of this project." We agree.	AOGA	6/2/09	3.4.4
11	Many of AOGA's concerns about the draft methodology are a direct result of the overly-broad nature of the project. The methodology notes that "The physical scope of the ARA Project is larger and more complex than other known oil and gas infrastructure risk assessments that have been conducted." The reason such a study has not been conducted is because the massive scope may bog down in details that will provide little value. To avoid the perils of being overly-broad, the risk screening levels should be elevated so the study can focus on those potential hazards that could have a major impact.	AOGA	6/2/09	3.4.3

Cmnt #	Comment	Submitted by	Date	State Response[16]
12	The primary focus of the assessment at the outset was on reliability, or the risk to State revenue. For this effort to be successful, a renewed focus on reliability is warranted. In fact, focusing on reliability also will address environmental and/or safety matters.	AOGA	6/2/09	3.4.6
13	While the methodology mentions qualitative risk assessment, the content is overwhelmingly representative of an extremely complex quantitative risk assessment (QRA) – from consequence modeling through event trees and fault trees. And although the Risk Assessment Methodology provides considerable detail on the how the risk assessments are to be conducted, there is very little information, if any, on what decision the State is trying to make with these risk assessments. A quantitative risk assessment of the scope proposed in the methodology, conducted outside a decision-making context and without clear criteria for determining what risks are tolerable, may generate "more heat than light".	AOGA	6/2/09	3.4.1
14	The methodology anticipates a cost benefit analysis in selection of any risk mitigation investment strategies. The estimation of the risk benefit will be more diificult if the design of the risk methodology does not take into account the need for these future calculations.	AOGA	6/2/09	3.4.1
15	The methodology is silent on how to address intentional acts. If such incidents are excluded from the scope, then that should be affirmatively stated as part of the methodology.	AOGA	6/2/09	3.4.2
16	As it exists right now the methodology results will be presented in a manner that will allow direct comparsion between nodes, geographies, operators and activity types. Differences between risk levels will be very visible. This may create an environment of competition between these various groupings. It may also prompt unfair criticism of certain nodes, geographies or operators simply because they don't compare well to other nodes, geographies or operators. ... if there is no clear benchmark for risk levels or the underlying reasons for differences are not properly communicated, the public is likely to fall back on making judgments simply based on the differences.	AOGA	6/2/09	3.4.1
17	The sheer volume of the potential data requests could present logistical challenges and a significant administrative burden on both the companies who must provide it and the State's contractor who will evaluate it. Without a better focus, the potential volume of data would threaten both the successful outcome of this effort and the ability of the project to be completed on schedule and on budget. Further, issues related to the protection of confidential data and information to be submitted by operators remain unresolved. This issue threatens the timeline for project completion but is being addressed on a separate track with the relevant agencies.	AOGA	6/2/09	3.3.4

Cmnt #	Comment	Submitted by	Date	State Response[16]
18	Finally, the request for previous risk assessments continues to cause a high level of concern for AOGA. Risk assessments conducted privately by individual companies are implemented using individual company specific methodology of the individual company's choice for parameters and other input data. Risk assessment methodologies are not standardized for the industry, and there are many acceptable and recognized approaches to conducting these assessments, making it difficult to compare results from one company to another. We appreciate the opportunity to comment and are committed to working with the State toward a successful outcome.	AOGA	6/2/09	3.3.4
19	This isn't a risk assessment this isn't even a good literature research project for there is no way you can take a pump station, or a pipline, or a gate valve and compare it to a different climate, different oil and totally different culture to get a comparison to TAPs.	Stan Stephens (Valdez)	5/13/09	3.4.1
20	I'm not sure where ABS is coming from, but you have to do an analyses on verified data. How can you have a real methodology that works with published reports and aggregate statistical data from other operations. You have to base your analysis and conclusions on observed field work that takes place from the North Slope to the Terminal.	Stan Stephens (Valdez)	5/13/09	3.4.1
21	Please stop at Phase one, stop listening to who ever you are listening to and regroup.	Stan Stephens (Valdez)	5/13/09	3.4.1
22	You need to focus on field inputs and independent evaluations this will give you a better chance of making a meaningful contribution to risk mitigation efforts.	Stan Stephens (Valdez)	5/13/09	3.4.1
23	It would be better to drop this whole project then to move forward the direction this is going.	Stan Stephens (Valdez)	5/13/09	3.4.1
24	Study Objectives. 1. Achieving the stated ARA objectives will require cooperation from operators, … From the ARA Methodology document, it is unclear how operator involvement is be secured. Several sub-objectives in the approach seem likely to undermine securing operator participation (e.g., the sub-objective related to determining how much money should reasonably be spent on risk management).	PHMSA	5/26/09	3.3.4

Cmnt #	Comment	Submitted by	Date	State Response[16]
25	Study Objectives. 2. It appears that the Objective "recommend measures to mitigate or manage risks" should be the focus of the assessment, and should be pursued by application of a methodology designed to systematically seek answers to the following six questions: a. Which segments of the state's energy infrastructure is the study to assess (inventory)? b. What is known about the factors affecting the risk of these segments? c. What does available information say about current risk of these segments? d. How completely are known risks regulated? e. What (unregulated) management practices are critical to sustainable performance in managing risks? f. What management & mitigative measures should be undertaken to reduce risk?	PHMSA	5/26/09	3.3.6
26	Study Objectives. 3. ADEC should consider rewording the Objective "quantify & rigorously evaluate risks" to focus the assessment on evaluating & characterizing the risks in a manner that supports the following functions: (a) comparison of the relative risks of different segments of the energy infrastructure, and (b) identification and evaluation of risk reducing measures. Because it is not clear how the proposed methodology will support rigorous quantification of risk (as discussed below), the methodologies presented in the ARA Methodology document are unlikely to successfully support either function.	PHMSA	5/26/09	3.4.1
27	Relationship of Study Team to Stakeholders. 4. The scope and nature of regulatory oversight authority of the state and federal governments needs to be explicitly identified to help clarify which agency should take action based on proposed management and mitigation measures. If the ARA is to support understanding and management of risks in the future, special consideration should be given to agency responsibility for regulation of the design, construction and operation of new pipeline facilities.	PHMSA	5/26/09	3.3.6
28	The risk assessment methodology and results must be "transparent" to ensure operators, regulators, and the public are able to understand the source and potential value of recommendations for new pipeline management and mitigation strategies. Study transparency, the quality of operator input, and the prospect of operator support for implementing meaningful mitigation & management measures would all be improved by a more active operator role in the assessment.	PHMSA	5/26/09	3.3.6
29	The makeup of the "Risk Advisory Team" and its responsibilities are not clearly defined. At a minimum, an operator role on this team and representation from jurisdictional agencies seems prudent.	PHMSA	5/26/09	3.3.9

Cmnt #	Comment	Submitted by	Date	State Response[16]
30	Scope, Methodology & Data. 5. It is unclear how the scope and methodology selected support attainment of the stated top-level objectives. Study objectives must drive the selection of scope and methodology. [These objectives have been stated as: (a) identify safety, environmental & operational risks (b) quantify & rigorously evaluate those risks, and (c) recommend measures to mitigate or manage those risks.] Details are discussed below.	PHMSA	5/26/09	3.4.1
31	Scope, Methodology & Data. 6. The ARA Methodology document did not adequately explain how the proposed methodology would lead to a quantification of risk.	PHMSA	5/26/09	3.4.1
32	Scope, Methodology & Data. 7. ADEC should consider an alternative methodology to risk quantification for all segments of the energy infrastructure. Such a methodology might involve initial screening & categorization of risks and characterization of sources of risk, followed by detailed risk quantification only as needed to establish relative risks of dissimilar segments should be considered. Risk quantification as proposed in the ARA Methodology document is unlikely to meet the stated objectives of the risk assessment.	PHMSA	5/26/09	3.4.1
33	Scope, Methodology & Data. 8. The methodology selected for the ARA should make the greatest use possible of the existing risk assessments. … Note that the ARA states it will evaluate the "sufficiency" of Integrity Management (pp 16, 17) but fails to explain what this evaluation will entail. …	PHMSA	5/26/09	3.4.1
34	From the description provided in the proposed methodology, it is very difficult to tell what method or methods are being proposed to estimate the failure frequency for pipeline segments and how the methods employed will allow meaningful results to be generated and the study objectives to be achieved.	PHMSA	5/26/09	3.4.1
35	While good reasons may exist for limiting the project scope, exclusion of distribution systems may impede evaluation of feedback effects on transmission systems (e.g., the study will consider the interruption of electric power to pumps, motors, etc., but not evaluate the causes of that disruption which might be loss of gas flow to a generating station). Additionally, failures in these systems have the potential impacts to public and worker safety, the environment, and state revenues.	PHMSA	5/26/09	3.3.1
36	Some outside force threats that have had a significant impact on both loss of product and disruption of operations are excluded from the scope. An example of this is the release due to a bullet hole in TAPS.	PHMSA	5/26/09	3.3.2
37	Defining "acceptable consequences" is a resource-intensive activity, potentially fraught with controversy, and unnecessary given that new management & mitigation measure implementation will be resource constrained to address the most significant risks. Consequence "binning" (i.e., categorizing consequences as "high", "medium" or "low") may be both easier and more effective in meeting program objectives.	PHMSA	5/26/09	3.4.3

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38	For pipelines subject to provisions of the Integrity Management (IM) regulation, the proposed approach will produce relative risk indices similar to those developed in response to the IM regulation. Consideration needs to be given to the value of carrying out a redundant assessment, how to make use of the existing IM-driven assessments, and how to assure meaningful comparisons among dissimilar segments or segments assessed using dissimilar methodologies.	PHMSA	5/26/09	3.3.4
39	As stated by the ADEC representative during a public meeting, more focus will be placed on assessing non-regulated portions of an operators system. The proposed methodology report does not address how this will be achieved.	PHMSA	5/26/09	3.4.1
40	The preliminary risk screening appears to be subjective in nature and will require collaboration with stakeholders that are very familiar with the specific segments or nodes to effectively determine the susceptibility of identified nodes to specific initiating events. It was not clear in the ARA Methodology document whether this participation would be secured. The preliminary risk screening relies on ruling out "acceptable" consequence, but there is not a clear justification for the premise on which the safety and environmental consequences are considered to be "acceptable". Further background should be provided to support the position that consequences of fewer than 5 worker fatalities or less than 10 barrels are "acceptable". This is not consistent with PHMSA or State guidelines as identified in applicable regulation.	PHMSA	5/26/09	3.4.3
41	The definition of Common Cause used in this study is not typical CCA. ... In this study, a common cause seems to refer to a single event that causes failure in several [typically adjacent] nodes. Consider using wording consistent with practice to avoid confusion.	PHMSA	5/26/09	3.3.9
42	... We recommend using the threat categories given in ASME B31.8S and commonly used in the liquid and gas pipeline industry and by pipeline regulatory agencies. ... Because these categories were developed specifically for pipelines, a logically developed modification of these categories that supports the needs of this specific assessment would be an alternative.	PHMSA	5/26/09	3.4.1
43	Safety Risk. ...Consequence analyses that stem from specific initiating events may be an effective way to consider this point, but was not clear in the ARA Methodology. It is unclear how Figure 7-4 (Potential Incident Outcome Overview) will be utilized in the absence of more specific information. If the initiating events are modified to be consistent with pipeline industry practice (as suggested above), the event trees will be much cleaner and more intuitive. The potential for immediate ignition and human presence will be strongly related to the initiating event and/or failure location.	PHMSA	5/26/09	3.4.4

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44	Safety Risk. The industry (including Muhlbauer) has moved away from the old Muhlbauer risk index model as proposed for the ARA. If applied without specific consideration of operating history and conditions, it can produce misleading results. Public meetings identified several concerns that should be addressed, including: • The impact of snow within secondary containment on the ability to retain spilled petroleum • The impact of crude temperature on snow loading on storage tanks (a validation of design basis) • The potential for support structure collapse resulting from permafrost instability leading to a sink hole (a validation of design basis) • Ability to respond to spills in remote locations during severe weather (a validation of the spill response plans) • Methane hydrates where the potential exists.	PHMSA	5/26/09	3.4.4
45	Environmental Risk. Relative risk rankings are developed based on predefined categories and indices that "cannot be correlated to any physical meaning based on the absolute value of the numbers or index that is assigned to each factor." However, the environmental impacts are defined based on these indices in Table 7-6. As in characterizing safety risk, event trees could be used to estimate likelihood of environmental risk based on the nature of the initiating event and failure location.	PHMSA	5/26/09	3.4.5
46	Reliability Risk. Where is the measurement made for the purpose of determining state revenues? This may be important in clarifying the scope of the project. For example, if the state revenue measurement is made upstream of Valdez or Drift River, should components downstream of the measurement point be included in the reliability analysis? An example scenario: high winds shutdown tanker loading at Valdez but TAPS flow continues because there is available storage capacity versus storage capacity is unavailable which interrupts TAPS flow. If measurement for state revenue purposes is the output of TAPS, one scenario has an impact and the other doesn't, but neither is related to VMT component reliability.	PHMSA	5/26/09	3.4.6
47	Natural Hazards Risk Assessment. The design basis of systems must be considered in determining the failure probabilities from natural hazards. Systems with different design bases would have different susceptibilities to the same severity of natural hazard. … The design basis or each operating system needs to be considered in evaluating risk from natural hazards.	PHMSA	5/26/09	3.4.2
48	Risk Comparisons Risk Comparisons: There is a statement in the methodology document that "agencies have assigned an explicit value to a life lost due to an accident". … Agreeing upon values will be controversial, may not be necessary to achieve study objectives, and will dilute resources assigned to the assessment. …	PHMSA	5/26/09	3.4.4

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49	Consideration of Alternative Approaches. 9. A process by which results and recommendations are updated should be implemented for the ARA to have lasting value. Meaningful characterization of risk is a dynamic process, one that recognizes and integrates changing operating conditions and experience into the characterization.	PHMSA	5/26/09	3.3.6
50	Consideration of Alternative Approaches. 10. Provisions should be included in the risk characterization and updates to consider operator management of system integrity. Experience has shown that the effectiveness of management systems, including their impact on safety culture, play a major role in determining the level of risk.	PHMSA	5/26/09	3.3.6
51	In moving toward finalization of the ARA methodology, ADEC might consider focusing contractor efforts on the following major elements: • Inventory and segment the systems to be studies • Assemble information to support characterization of the segments, including their condition • Identify and evaluate the consequences of major failure modes for the segments • Integrate the information and characterize the risk • Identify high risk segments and the reasons they are high risk • Characterize the effectiveness of the regulatory environment in addressing the major risk contributors • Identify measures to address major risk contributors	PHMSA	5/26/09	3.4.1
52	Appendix B: The maximum probable spill for the North Slope is 4800 barrels in an OTL. This is less than the 2006 release of an estimated 5000 barrels which was detected by smell rather than by a Leak Detection System (LDS). Without human intervention, the release could have been much worse since it was under a snow pack, was not visible to the eye, and was below the detection capability of the LDS.	PHMSA	5/26/09	3.4.5
53	Appendix D: Possible magnitude of releases should be based on the type of LDS employed by an operator. Releases through small diameter defects could result in higher volume releases because they are below detection thresholds. Releases through large diameter defects would result in early detection and termination. In addition, there are exceptions such as the bullet-hole release. This is another area in which access to existing operator analysis could reduce project resource expenditures.	PHMSA	5/26/09	3.4.1
54	Appendix E: The probability of jet fires without ignition sources needs to be accounted for. Ignition could be caused by the heat of friction when high pressure gas is released through a small diameter defect.	PHMSA	5/26/09	3.3.2
55	The Cook Inlet pipelines and platforms are aging and need special risk assessments. There are old and abandoned pipelines at the bottom of the Cook, the Assessment should address what risks are associated with those and what can be done. What will be done with dead oil platforms must be addressed as well.	KBCS	6/1/09	3.3.1

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56	Contingency plans should be re-evaluated and brought up to the same requirements as the Prince William Sound. Expanded role of tugs should be assessed and evaluated. Double-hull tankers should also be looked at.	KBCS	6/1/09	3.3.9
57	Drift River Terminal should be re-evaluated as to the soundness of its location at the base of an active volcano.	KBCS	6/1/09	3.3.1
58	Transportation issues, such as the loss of tankers from the dock moorings at the Kenai docks, are of particular concern. Assessment should identify these problems with docking and be addressed.	KBCS	6/1/09	3.3.1
59	Oil Spills: Assessment should identify issues with transportation and shipping in waters that for a significant part of the year contain ice and large chunks of ice. There is currently no way to clean oil out of ice laden waters. This is a risk that affects the entire state. Cook Inlet has never had sufficient contingency plans for an oil spill during icy water months. This risk should be assessed and evaluated, then addressed.	KBCS	6/1/09	3.3.1
60	The exemption from aspects of the Clean Water Act, as permitted in the NPDES permitting process should be examined for its necessity and appropriateness given current industry profits and needs. ... These exemptions are not allowed in any other coastal body of water in the United States for oil industry. Why they are provided here is questionable. Clearly the exemptions benefit the industry at the expense of other valuable industries that rely on clean water and a clean environment, mainly fishing and tourism.	KBCS	6/1/09	3.3.1
61	2. Terminals in Danger zones 85% of the state's tank farms are located in risky locations and there are no state regulations regarding the placement of tank farms. This oversight needs to be rectified in the assessment. This should be an unacceptable risk for Alaskans and the state. Evaluation of other options and what to do about the siting of these terminals should be considered.	KBCS	6/1/09	3.3.9
62	2. Terminals in Danger zones Evaluation of current contingency plans for response to Redoubt calls into concern overall response plans for the Drift River Terminal. Both state and federal contingency plans were insufficient in the current Redoubt crisis.	KBCS	6/1/09	3.3.9
63	3. Kachemak Bay The use of Kachemak Bay should be re-evaluated given these important issues regarding the area: i. Kachemak Bay is a Critical Habitat Area. ii. Kachemak Bay is National Estuarine Research Reserve iii. Fox River Flats at the head of Kachemak Bay is also a Critical Habitat Area.	KBCS	6/1/09	3.3.9
64	3. Kachemak Bay Other options, such as not leaving dockage in Kenai until weather has passed or docking at Kenai during storms should be considered. The convenience of pulling into Kachemak Bay rather than going farther up the Cook Inlet to Kenai should be evaluated in comparison to the risks given to the people and economy of Kachemak Bay and Lower Cook Inlet.	KBCS	6/1/09	3.3.9

Cmnt #	Comment	Submitted by	Date	State Response[16]
65	3. Kachemak Bay • Evaluation of oversight effectiveness for bilge release into Kachemak Bay by tankers and other large shipping traffic should be evaluated.	KBCS	6/1/09	3.3.1
66	4. Finally, KBCS would like to remind the Assessment team of the following important aspects of the Cook Inlet and Kachemak Bay that should be reflected in the risk assessment final document and considered as risks are assessed. • Significant commercial, sport, subsistence and personal use fisheries are located in the Cook and Kachemak Bay, including the world renowned Kenai River • The economy of the lower Cook Inlet and Kachemak Bay is dependant on the Cook Inlet for tourism and fishing incomes. • Lower Cook Inlet is extraordinarily rich in fish and wildlife species and their critical coastal or marine habitats. • The inlet and its shoreline are home to the only National Estuarine Research Reserve in the state (KBNERR aka KBRR) • 2 National Parks have local coastline (Lake Clark and Katmai) • Several islands within Alaska Maritime National Wildlife Refuge are located in Cook Inlet region • Significant seabird rookeries are in Cook Inlet and Kachemak Bay • 6 state Critical Habitat Areas (Redoubt Bay, Kalgin Island, Clam Gulch, Anchor River- Fritz Creek, Kachemak Bay and Fox River Flats) • 2 state game refuges (McNeil and Trading Bay) and the McNeil State Wildlife Sanctuary are located on the western Cook • Western Hemisphere Shorebird Network Site is in Kachemak Bay • Numerous coastal and marine species of special concern (some listed, some recovering, others unique or declining) exist within our waters: Steller sea lions, Beluga whales, fin, minke, and humpback whales, Northern sea otters, harbor seals, the Pribilof subspecies of Rock sandpiper that winters in Cook Inlet, and Steller's, Spectacled, King eiders among other seaducks, the Peregrine falcon, Bald Eagle, and KP brown bear. • The region is relied on as well for subsistence foods, some of which were impacted by EVOS.	KBCS	6/1/09	3.3.9
67	In conclusion, KBCS takes issue with the statement, "[The Assessment] will identify and rank risks based on consequences to state revenue, safety, and the environment and will assist the state in making mitigation recommendations." KBCS believes that local and regional economics should play a significant role in the Assessment. Without a state tax, one area of the state and one industry – in this case oil – can take precedent over the needs and issues of local and regional issues, concerns, and risks. Clearly, if the state makes its money not on state taxes but on purely oil revenue, this assessment could be skewed to benefit the oil industry rather than residents and other businesses and industries.	KBCS	6/1/09	3.4.6
68	Mitigation cannot – and did not – repair the lives of most of the victims of oil spills or industry accidents, such as the Exxon Valdez Oil Spill. Yet, mitigation is relied upon as a solution to inconvenient realities like the potential risks associated with oil spills in icy waters.	KBCS	6/1/09	3.3.9

Cmnt #	Comment	Submitted by	Date	State Response[16]
69	KBCS believes that Alaskans have the right to know what the true and real risks associated with oil development are. However, we are not confident that the current Risk Assessment process will successfully identify these issues. We also are concerned that the risks – and the threats they pose to local Alaskans not employed in the oil industry – will be equally weighed against state revenue from oil. KBCS has high expectations of the state's role in regulating the oil industry and we are happy to see the National Academy of Sciences a part of this study.	KBCS	6/1/09	3.4.1
70	I've read through the assorted documents and comments with a fresh look. It seems apparent that the methodology is less than empirical - no field studies, no interviews with operators, little cooperation from the companies who own the infrastructure. Cascadia had the most comprehensive analysis and I would echo their major concerns with the methodology as has been presented. Without a real world analysis of how this infrastructure is operated, the educated guesses do not meet the criteria for protection/analysis that the risk assessment was intended to provide.	Gary Newman (Fairbanks)	6/2/09	3.4.1
71	As such, I would recommend that this contract be halted until such time as real world data and input can be received with the cooperation of those who own and operate this infrastructure.	Gary Newman (Fairbanks)	6/2/09	3.3.4
72	While I don't make any allegations of actual conflict, I do also have some concern over the appearance of conflict in that Doyon, a partner in this assessment, is involved in the oil industry that this assessment seeks to analyze.	Gary Newman (Fairbanks)	6/2/09	3.3.8
73	On page 63 of 165, the TAPS Communications and Control is listing a using Satellite as the Backup communication system, this formerly was the case. The system is now back up by GCI fiber optics circuits. I confirmed this with Betsy Haines, Alyeska Oil Movements Director on April 7, 2009.	JPO, BLM	6/10/09	3.3.9
74	Additionally, certain key threats to infrastructure, e.g., natural gas distribution system threats to electrical power, a bullet hitting the Trans-Alaska Pipeline System6, have been excluded from the Project's scope. With many types of oil and gas infrastructure and a number of key potential threats to operation not included in the risk assessment, the scope of the project has been so narrowed that it is technically unsupportable (especially not including shipping hazards, perhaps the greatest risk in Cook Inlet). Additionally, the project's title and substantive results will be highly misleading to the public.	LNE Engineering and Policy	6/10/09	3.3.2
75	I would like to make a comment that Alaska's Oil and Gas … should be continuing… We need the resources up in Arctic – Alaska… I live at Barrow, Alaska-where we are dependent on the renewable resources to sustain our livelihood in keeping our homes warm and safe for our families.	Vera Williams (Barrow)	6/1/09	3.3.9

Cmnt #	Comment	Submitted by	Date	State Response[16]
76	I believe it is important for the public to have the opportunity to hear your entire presentation and fully understand the methodology you are proposing. Therefore I ask that please return to Fairbanks to go through the entire presentation. Additionally, I ask that a greater effort be given to inform the public of the time and place of the presentation to ensure that all who are concerned with this issue are able to attend if they wish.		5/19/09	3.3.7
77	We feel that the Alaska Risk Assessment is failing us and all those who live along the entire pipeline corridor, because we are the ones who will suffer if there is a major oil spill from TAPS.	CCA	6/1/09	3.3.9
78	As we understand it, the State of Alaska appropriated $5 million for a three-year risk assessment. Two years and over $1.5 million have been spent just determining how that assessment will be done. We also understand that there have been no field inspections, and none are part of the proposed assessment.	CCA	6/1/09	3.3.3
79	The State of Alaska needs an Ombudsman with solid oil transportation experience to whom these workers could report their concerns without fearing for their jobs.	CCA	6/1/09	3.3.5
80	The Joint Pipeline Office should also be doing more field inspections. Most of the staff work from offices in Anchorage (which isn't even on the pipeline). Instead, there should be more field offices. One such office should be in the Copper Basin, where TAPS crosses five major salmon-bearing tributaries of the Copper River.	CCA	6/1/09	3.3.3
81	CCA and many other organizations have long asked for a TAPS Citizens Oversight Group, similar to the Prince William Sound Regional Citizens Advisory Council. PWSRCAC has been key to safe marine oil transport.	CCA	6/1/09	3.3.5
82	We urge that the State of Alaska abandon the current Alaska Risk Assessment. The money could be better spent on an Ombudsman and field inspections. We also request that the State vigorously promote the creation of a TAPS Citizens Oversight Group.	CCA	6/1/09	3.3.5
83	It is my professional opinion that no meaningful risk assessment can be conducted without a thorough assessment of process safety. Unfortunately, the proposed Doyon-Emerald/ABS proposed Methodology for the State of Alaska Oil and Gas Infrastructure Risk Assessment Project will not assess process safety. As a result of this fundamental omission (and other to be discussed), I most strongly recommend that the risk assessment be halted until circumstances allow it to be conducted in a meaningful manner, or be abandoned altogether. (Abandonment has the advantage of saving the state $3.5 million if executed promptly.)	Edward L. Morgan (Fairbanks)	5/29/09	3.4.2

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84	Based on the discussions at the May 13 meeting and review of the Doyon-Emerald/ABS proposed Methodology for the State of Alaska Oil and Gas Infrastructure Risk Assessment Project, it is evident that the project team has been unable or unwilling to incorporate procedures to assess process safety in its review. Process safety encompasses: the design and engineering of facilities; management of change; inspection, testing, and maintenance of equipment; process controls; and other human factors which if absent increase the risk of major accidents (additional information on Process safety is also attached). because of this omission, it is my professional opinion that this project will not result in a meaningful analysis of the major risks associated with Alaska oil and gas infrastructure operations.	Edward L. Morgan (Fairbanks)	5/29/09	3.4.2
85	The proposed methodology for the risk assessment relies almost completely on an analytical evaluation of facility risk which is based on the type and number of components, their process interconnectivity, and estimates of the consequences of natural and manmade disasters. Little or no effort is being expended to actually study the facilities being risk ranked.	Edward L. Morgan (Fairbanks)	5/29/09	3.3.5
86	The American Lifelines Alliance guideline being used to assess natural hazard and human threat events is only in draft form and cannot even be view on their website without agreeing to the following caveat: "Neither ALA, NIBS, nor FEMA makes any warranty, express or implied, that any document available on this website is accurate or complete, or that it is fit for any specific purpose or any specific situation or will produce any specific result." Does it make sense to use this reference as an analytical guideline? Based on my experience with risk-related issues in Alaska and elsewhere in the world, I question whether this one-size-fits-all reference is an appropriate analytical guide to assess the unique natural and social conditions that confront the managers of Alaska's oil and gas infrastructure.	Edward L. Morgan (Fairbanks)	5/29/09	3.4.2
87	Anyone with basic knowledge could say that refineries are more risky than pipelines, that gathering stations are more risky than well houses, that pump stations are more risky than etc., but wait: refineries are not even included in the risk assessment even though they are a lot closer to the public than most other oil and gas components and would certainly be high on most risk lists. ... None, because this project is ignoring the major source of risk: the risk of a process accident occurring in a specific facility.	Edward L. Morgan (Fairbanks)	5/29/09	3.3.1

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88	As discussed in Attachment 1, implementation of process safety plans is the principal mechanism by which the likelihood of process safety accidents can be reduced. ... It is impossible to tell without conducting audits, assessments, and observations to determine the extent to which their individual process safety plans have been implemented. To conduct these audits, assessments, and observations requires a physical presence in each of the facilities, access to administrative records, test and inspection results, interviews with managers and individual contributors, and facility plans. ... based on comments by Doyon-Emerald/ABS and ADEC representatives at the Fairbanks spring public meeting, the oil and gas industry is not willing to provide the information necessary to enable an adequate risk assessment. In fact, they are refusing to even provide their process safety plans, which for some facilities, are required by and have been submitted to OSHA.	Edward L. Morgan (Fairbanks)	5/29/09	3.3.4
89	The proposed risk assessment is being conducted under the direction of the ADEC and the ADEC has been charged with providing recommendations based on the risk assessment results. Does this make sense? The ADEC is the agency charged with regulatory oversight of many aspects of the Alaska oil and gas industries. In the unlikely event that the risk assessment might actually determine that a here-to-fore unrecognized risk factor exists, it would reflect badly on them. ... Someone else should be in charge if the risk assessment is to have any public creditability.	Edward L. Morgan (Fairbanks)	5/29/09	3.3.8
90	The risk assessment is divided into three categories: Safety, Environment, and Reliability. The reliability leg, or more accurately 'financial leg', is concerned with the effects on the state's oil money in the event of an interruption of oil flow. The proposed methodology to evaluate financial loss seems burdensome, out of place in a document originally intended to determine safety and environmental risk, and unnecessarily expensive to complete.	Edward L. Morgan (Fairbanks)	5/29/09	3.4.6
91	Risk Assessment or Risk Catalog. When the ARA Process started, it appeared that the goal was to assess risks associated with development and operation of the many components of Alaska's oil handling infrastructure. It now appears that the process has evolved into a process of merely cataloging the risks. While risk may be useful in some circumstances, they are not sufficiently quantitative to permit reasonable comparison of risks by Alaska's decision makers, which would be so useful in the ARA case. Consequently, when the Risk Assessment is finished, it will not enhance decision making associated with the oil handling infrastructure. The current process should revert to the original concept of risk assessment.	PWSRCAC	6/2/09	3.3.6

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92	Completeness of ARA. Even the original risk assessment concept omitted some very important components of the infrastructure, including the on water infrastructure, namely the transportation systems for moving oil on Alaskan waters. The exclusions from the ARA included some of the riskiest infrastructures systems in the State, those that have produced the biggest and environmentally most destructive oil spills that have ever occurred in Alaska. A risk assessment that is incomplete will have very limited utility. We believe the ARA should consider the complete set of Alaska's infrastructure if the term "comprehensive" is to be applied to the efforts.	PWSRCAC	6/2/09	3.3.1
93	Outreach to Stakeholders. The public meeting approach to reach stakeholders is commendable; however, attendees at the meetings appear to be primarily the "players" from the oil industry and their regulators. Very few bona fide public stakeholders appear among those listed as having attended the outreach meetings. Disinterest in the process on the part of the public is quite evident. It is reasonable to believe that the outreach did not achieve its goal of meaningfully involving the public. We recommend that additional outreach methods or more aggressive invitations to participate in the ARA process be tried.	PWSRCAC	6/2/09	3.3.7
94	Access to Facilities. Most, if not all of the infrastructure to be assessed is privately owned. Permission of the owners of the facilities to access both the facilities and the records pertaining to operational risk is needed to assure a meaningful risk assessment. There are indications, however, that the owners are being only minimally cooperative (i.e. providing no more information or access that required by law or regulation) with respect to facility and records access. Unfettered access to records and facilities is needed such that all relevant information is considered in conducting the risk assessment.	PWSRCAC	6/2/09	3.3.4
95	End Uses of the Risk Assessment. The ARA process appears to be producing a risk assessment without considering the end use to which it will be put. ... Recommendations for reducing or mitigating risks, we believe, could be perhaps the most useful part of any risk assessment. We suggest that well development risk reducing or mitigating recommendations be included as an integral part of the final risk assessment report.	PWSRCAC	6/2/09	3.3.6
96	Process Introspectiong. ... A reasonable person might be interested in knowing whether the occurrence of a high-consequence event might have been prevented had the risk of it happening been identified before the occurrence. For example, is it likely that the already occurred failure of the North Slope gathering lines would have been identified and the associated spill event prevented if this methodology had been applied ahead of time to those systems? There is little evidence that this is significant enough quantity to be included in the production loss boundaries being considered within this assessment methodology.	PWSRCAC	6/2/09	3.4.1

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97	Five million dollars were appropriated to accomplish the entire risk assessment. A considerable portion of this appropriation has already been spent on developing the methodology. When the Joint Pipeline Office sponsored development of Environmental Impact Statement (EIS) in 2003 to support renewal of the Grant and Lease for the Trans Alaska Pipeline System, the funding thought necessary to develop the EIS was initially estimated at approximately $4M. Although a final accounting was never released, final costs appear to have overrun the initial estimates by a factor of 4 or 5. Thus, it appears that the $5M funding is woefully insufficient for implementing the proposed methodology.	PWSRCAC	6/2/09	3.4.1
98	The methodology contains a very large set of tactical procedures for evaluating small elements of risk. The appendices of the methodology are especially rich with respect to tactics that can be applied to build a risk assessment of an infrastructure component. The tactics have not been integrated into strategies that will produce an infrastructure risk assessment that can be meaningfully used to compare risks among individual infrastructures components and then select the most serious risk for mitigation. When lack of completeness, inadequacy of available funding, and the decision not to produce recommendations are considered, there is reason for concern that the end product of methodology will have extremely limited usefulness.	PWSRCAC	6/2/09	3.3.6
99	The statistical mathematics underlying best-practices risk-assessment methodology, while somewhat complicated, are well developed and will understood, so we will not attempt to reproduce them here. However, we would note that they lead to two inescapable requirements for a credible risk assessment: 1. Errors associated with each risk analyzed must be fully propagated in the risk calculations all the way through the process to the final estimates for the composite risks. 2. Probabilities and costs whose bases are mainly speculative or matters of "professional judgment" must not be use in the risk calculations. The ARA methodology appears to be silent on the propagation and handling of errors, and on quality control in the development of estimates for probabilities and costs.	PWSRCAC	6/2/09	3.4.1
100	In summary, we believe the ARA methodology suffers from significant deficiencies that, left uncorrected, will seriously compromise the utility and credibility of any risk assessment produced from it, both for the public at large and for regulators tasked with using the results.	PWSRCAC	6/2/09	3.4.1

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101	... my first question to project contractors on October 14, 2008 was whether the project would be making recommendations for mitigation of risks. Recommendations for mitigation of risk are critical components of risk assessments because they can change the outcomes of the risk assessment. If mitigation measures are simple and comparatively inexpensive (e.g., draining oil from the tanks at the Drift River tank terminal prior to the volcanic eruption rather than after the eruption began), they can be implemented readily and the risk assessment can focus on risk issues that are tougher to prioritize. At the October 14 meeting with project contractors that I participated in, project contractors stated that "Potential mitigation measures and recommendations are out of scope."2 Despite the points we made at this meeting, the contractors reaffirmed this position at the public meetings for the project in May 2009. As a result of policy-making purposes and not worthy of additional planned expenditures.	LNE Engineering and Policy	6/2/09	3.3.6
102	There is a second reason that recommendations for mitigation of risk need to be an outcome of the project – these recommendations will inform the public so it can participate in policy debates regarding implementation of the recommendations. If only the state and industry decide on what recommendations to move forward, there could be substantial conflicts of interest.	LNE Engineering and Policy	6/2/09	3.3.6
103	In addition to not including recommendations for mitigation of risk, the scope of the project does not including the following: • Shipping (including potentially, supply ships hitting offshore platforms which was the case this year5) • Oil and Gas processing facilities • Exploration activities • Abandoned infrastructure (which can and do cause releases, albeit frequently not large releases.) • Distribution pipelines. • Certain gas transmission pipelines (Beluga gas transmission line and the Kenai to Anchorage transmission lines under Turnagain Arm) • Product Pipelines.	LNE Engineering and Policy	6/2/09	3.3.1

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104	The project's analysis of pipelines has fundamental problems. The project is not using consistent, field-checked definitions for pipeline segments. These definitions affect the regulations that apply and the risks the pipeline segments pose. ... Because the state no longer uses the term "gathering line" in its pipeline regulations whereas the federal government still uses that term but began a process several years ago to clarify its definitions of oil and gas gathering lines, the term has a very unclear meaning to pipeline owners and operators. ...What is needed is for the project team to define different types of pipeline segments (preferably using the state's definitions of flowlines and transmission lines, and eliminating the term gathering line), to field-check those pipeline segments and their release history using owner/operator, state, and federal records, and then to identify which state and federal regulations apply now or in the past to determine risk prioritization. This is the most direct means to identifying regulatory deficiencies, however the project also should query federal and state pipeline inspectors. The definitions for "gathering lines" and "transmission lines" in Table 5.1.2 (p. 80) are extremely problematic, and that imprecision carries on in the text following which needs to be changed as well. According to the existing definitions in Table 5.1.2, it is completely unclear where gathering lines end and transmission lines begin. As stated above, LNE Engineering and Policy recommends eliminating the term gathering line from this analysis and performing field checks of pipeline segment types.	LNE Engineering and Policy	6/2/09	3.3.3
105	As currently structured, the project ignores injuries to workers and the public and focuses only on fatalities. This disregards two key concerns: • When there are injuries, there are operational problems which could be systemic, and • Injuries could be indicators of "near misses" that avoided fatalities only by chance. Any injuries – of workers or the public – requiring hospitalization should be considered having severe/significant consequences.	LNE Engineering and Policy	6/2/09	3.4.4
106	Table 6-1, shown below, and its note are particularly problematic. First, though the note states otherwise, members of the public who are killed are ignored as well, as accidents with less than five deaths. It is clear from the note that the project contractors and/or the state wished to reduce the scope of the analysis and used the questionable rationale that, "Less severe safety threats to workers and the public are already managed by regulations and extensive corporate safety/risk management programs." A well-done risk assessment would not assume that existing regulations and corporate safety/risk management programs were effective without examining outcomes.	LNE Engineering and Policy	6/2/09	3.4.4

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107	By spending millions of dollars on this risk assessment project which has numerous methodological problems as discussed in this letter and in the comments submitted by the federal PHMSA, the AWL et al., and others, the State of Alaska is foregoing opportunities to spend the money in more productive ways. These strategies include: • Creating an oil and gas Ombudsman position to receive and act on public and whistleblower-identified problems. The Ombudsman position would have funds for field investigation and analysis; • Increasing enforcement of existing regulations, especially for large releases, chronic releases, and releases into environmentally (and historic or culturally) sensitive areas; • Strengthening regulations where needed so Alaska would, in fact, have the best possible oil and gas regulatory system in the world. This can be done by conducting a comparative analysis; • Contracting with accident investigators so severe/significant accidents are investigated for root causes, with recommendations made to prevent future similar events. This is needed because the National Transportation Safety Board and the Chemical Safety and Hazard Investigation Board rarely, if ever, come to Alaska to investigate accidents, and they will never investigate large numbers of severe/significant accidents in the state due to the lack of federal resources, and; • Developing a reporting requirement to the state for "near misses" which would protect confidential business information but provide enough information to ensure that the Ombudsman and state regulators would be able to detect problematic patterns of behavior.	LNE Engineering and Policy	6/2/09	3.3.5
108	LNE Engineering and Policy recommends that project contractors review reports and data I compiled while a Senior Engineer for Cook Inletkeeper. At http://www.inletkeeper.org/pipelines.htm, you can click on a comprehensive 2002 report entitled Lurking Below: Oil and Gas Pipeline Problems in the Cook Inlet Watershed, and focus especially on the information about large spills in 1999-2001 in the Kenai National Wildlife Refuge, Captain Cook State Recreation Area, and offshore in Cook Inlet (pp. 6-8). Additionally, I compiled updated pipeline release data in 2005 for the previous 8 years, which are available at that same site. The project also needs to review all applicable Situation Reports from the Alaska Department of Environmental Conservation, including those earlier than the ones posted on the website.9 To be successful, the project needs to have the full cooperation of the oil and gas infrastructure owners and operators. Additionally, the project needs to have the full cooperation of all relevant regulators, including the Minerals Management Service. It's unclear that either of those conditions exists.	LNE Engineering and Policy	6/2/09	3.3.4

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109	We would like to emphasize the vital importance of including Tribal Governments in all consultation stages of the ARA. We expect that the State of Alaska, and key departments responsible for implementing the ARA, will consult with the YRITWC and Tribal Governments in all matters of safety and environmental risks that may impact the safety of tribal members and/or environmental conditions on tribal lands. In terms of environmental risks, we would like to emphasize that consultation with Tribal Governments be made whenever a category 3 environmental sensitivity category ('waterways')2 is identified. Further, consultation with local Tribal Governments should be made in the determination of category 2 environmental sensitivity category sites ('sensitive lands')3, to account for traditional knowledge regarding unique ecosystems, cultural or historic sites, and specific areas used for local subsistence hunting activities. We request that the State of Alaska share information with the YRITWC and Tribal Governments on both the risk profiles eventually compiled through the finalized risk assessment process, as well as the associated risk management decisions and specific actions planned to mitigate these risks.	YRITWC	6/2/09	3.3.7
110	We agree with the comment submission made by Alaska Wild that the proposed nodal analysis framework adopted for petroleum facility event classification is an insufficient tool to incorporate the issues arising from the extreme variability of Alaska's geography, hydrology and climatic conditions. We do not believe that this ARA will provide the State of Alaska with valuable risk assessment results for use in policy decisions without the acquistion of sufficient field data (which must be secured from facility operators, and not merely estimated from public resources) and without the derivation of stronger definitions.	YRITWC	6/2/09	3.4.1
111	... Based on our review, we do not feel that there has been sufficient accounting for climate change considerations in the proposed ARA, especially for the northern Alaskan environment which is particularly vulnerable to these impacts. Although climate change and permafrost are occasionally mentioned in the proposed methodology, we do not feel that the methodology, as a whole, sufficiently incorporates the increasing complex impacts of climate change. This is further evidenced by select statements included in the ARA, including the statement that "natural hazards occur at low frequencies"4. ... We recommend that, at a minimum, the potential impacts of climate change be incorporated in the first step of the Natural Hazards Assessment Process5. Scientific data to support the climate change impacts in the risk assessment can be obtained from various sources, including those listed in the ARA6, as long as there is an emphasis on circumstances unique to northern environments.	YRITWC	6/2/09	3.4.2

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112	In terms of the components required for establishing worst case environmental scenarios, the second component (namely that the liquid release event is not contained in secondary containment7) does not sufficiently incorporate permafrost and climate change considerations, which may significantly increase the potential for the rupture of secondary containments (as discussed briefly in the ARA with respect to major earthquakes8). Therefore, we do not feel that 'worst case environmental scenarios' have been adequately evaluated / defined in the ARA.	YRITWC	6/2/09	3.4.2
113	... We are concerned that no plans have been outlined for incorporating future oil and gas development projects (i.e., those for which production start-up was planned after July 1, 2009) into the ARA. We recommend that facility owners / operators of future oil and gas development projects be required to produce (or at a minimum estimate) the data required for the risk assessment evaluation prior to their projects being given final approval by the State of Alaska. Significant resources have already been expended in this ARA process, and it would be an unfortunate loss to the State if this important management tool could not be easily extended to future development projects.	YRITWC	6/2/09	3.3.1
114	The ARA limits environmental consequences to those that would arise from spills of hydrocarbons and seawater10. Seawater is held to include produced water11. In turn,produced water typically includes oil along with various metals. However, there is no indication in the ARA that metals, and their associated environmental impacts, are to be included in the risk assessment process. ... As mentioned previously, metal contamination was not expressly discussed in the ARA. However, based on its potential deleterious impacts, we contend that it must be incorporated into the risk assessment methodology to adequately inform the process on the magnitude of potential environmental consequences.	YRITWC	6/2/09	3.4.5
115	According to the ARA, the size of a potential spill is the initial factor to be used in "determining whether or not the impacts may be significant enough to be included in the risk assessment"12. We believe that applying this factor as the primary factor in screening environmental consequences significantly undermines the environmental component of the risk assessment. There are several cases where a smaller spill into an ecologically sensitive area will result in a much greater detrimental environmental impact than a larger one might have in a different environment with greater contaminant assimilation capacity (a fact acknowledged by the authors in the ARA13).	YRITWC	6/2/09	3.4.5
116	The following comments concern other specific issues that we identified during our review of the ARA: • Operational Hazard Events: We contend that although the operational hazard events "can occur within the boundaries of a plant or facility"14, it should be acknowledged that these hazard events also have the potential to impact the surrounding environment, outside the boundaries of the specific plant or facility.	YRITWC	6/2/09	3.4.3

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117	• Definition of "Environmental Risk": 'Air' should be included in the definition of Environmental Risk15. In addition, 'water' should include both water flowing through the facility boundaries, and groundwater flowing below the relevant infrastructure or facility.	YRITWC	6/2/09	3.4.5
118	• Facility-Specific Information and Data: It is vital that facility operators directly provide the risk assessment team with all required assessment input data to ensure the validity and strength of the overall risk assessment process16. Without accurate input data, risk management decisions cannot be adequately developed. For example, if the normal production flow rates and estimated time for shutoff are not accurately reported, the spill size, a key element in the environmental risk classification, cannot be adequately predicted. This would lead to an ultimate erroneous risk assessment of the specific infrastructure in terms of worst case environmental scenario.	YRITWC	6/2/09	3.3.4
119	• Environmental Risk Assessment: We are concerned about the approach taken towards the environmental risk assessment component of the ARA. A typical approach in environmental risk assessments is to evaluate contaminant sources, local receptors, and possible pathways. We do not feel that the ARA sufficiently incorporates a pathway analysis in the environmental risk assessment.	YRITWC	6/2/09	3.4.5
120	When Sarah Palin announced the Alaska Risk Assessment we cheered the move. Comprehensive, objective information regarding risks would give badly needed common ground for public, regulators, and industry to engage in partnership to reduce risks. This is a worthwhile goal. Enthusiasm dimmed as the bureaucracy took hold. It took nearly a year for the project to be contracted, and another year now for a methodology to be proposed. It was impossible not to notice the conflict of interest of the selected contractor—Doyon/Emerald—the parent corporation of which holds oilfield contracts on some of the infrastructure being examined and is seeking controversial new petroleum development. But, we were encouraged by good communication with the project team, and sincere efforts to provide transparency.	Cascadia Wildlands	5/20/09	3.3.8
121	The questions listed on page 8 are an excellent summary of the root purpose of this project. • What risk management initiatives should be pursued? • What risk management initiatives should not be pursued? • How much money should reasonably be spent on risk management? • How should that money be spent to obtain the most value? The proposed methodology does not provide the information needed to answer these questions. The fact that the ARA project may in the end be used to answer these questions, is positively dangerous because decisions would be based on an inaccurate picture of reality. The ARA risk profile would be incomplete, biased, and inaccurately skewed to understating the level of risk. Importantly, it would have included absolutely no consideration of mitigation, so managers will be starting at square one.	Cascadia Wildlands	5/20/09	3.4.1

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122	The turning point for me, in retrospect, was the October 14, 2008, meeting in Anchorage between the SAOT, and a table packed with oil company attorneys. Talk was in vague terms about trade secrets and proprietary data. It was clear industry brought no good will to the project. What has happened, in my view, is that industry has held the project hostage using bogus concerns about proprietary data. The State has made itself available for transparent input, and is anxious to accommodate industry interests. But the oil companies aren't playing along. Industry is refusing to turn over even publicly available, published, non-proprietary information on their risk management practices. In the last several months, the project has taken a turn for the worse. When industry refused to play along, the contractor and State had a choice of how to deal with it. You could have 1) gotten needed information independently in the field 2) gotten legal authority to compel production of needed information from industry, or 3) passively submitted to the lack of cooperation, and abandoned the original project goals. It seems the SAOT and Contractors have opted for the third approach.	Cascadia Wildlands	5/20/09	3.3.4
123	The proposed methodology gives no hope of an outcome worthy of the importance of the project purpose.Mistakes range from minor to massive, but a pattern is apparent. Errors all tend in the direction of diminishing risk and avoiding recommendations for any changes. It is time to pull the plug on this project, and implement three needed reforms: 1) State legislation and/or ADEC or DNR regulations, requiring industry to release their internal risk analyses to regulators (ADEC or PSIO). 2) Spend remaining ARA funds to establish independent ombudsman to hear and investigate worker complaints.3) Support federal legislation creating Regional Citizen Advisory Councils, such as exist in Cook Inlet and Prince William Sound, to cover TAPS and North Slope operations.	Cascadia Wildlands	5/20/09	3.3.5
124	The whole point of this project is to recommend and ultimately adopt mitigation measures that could effectively, efficiently and demonstratively make operation of Alaska's oil infrastructure safer and more reliable. The Draft Methodology is totally inadequate to this task due to several specific failures. a. Methodology fails to provide for specific recommendations for mitigation Public pronouncements of this project have been that offering recommendations for mitigation measures was a central task of the ARA contract. It now appears this will be cut out of the contract. This is a major lost opportunity to get independent, objective analysis. Department of Environmental Conservation will be left evaluating itself. One would hope this is part of normal ADEC operations. Leaving mitigation recommendations up to the SAOT will be a bureaucratic quagmire, and will result in a product that lacks objectivity and stakeholder credibility. ... This sort of self-policing by industry is exactly what got us into this mess to begin with, and is an unacceptable direction for this project.	Cascadia Wildlands	5/20/09	3.3.6

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125	b. Risk methodology filters out cost-effective, needed mitigation measures Focused as it is only on unforeseen, catastrophic events, the draft methodology will screen out all risk factors that do not have direct potential to cause major disasters in a very specific subset of circumstances. Ironically, these one-in-a-million, catastrophic events are (arguably) the most difficult and least cost-effective to mitigate. By contrast, there are many steps that could be taken that would cost-effectively mitigate risks of lesser, but still important, risks. In order to make an informed comparison, we'd need hard data. Data this methodology will not provide.	Cascadia Wildlands	5/20/09	3.4.1
126	c. Risk Assessment needs to assess mitigation measures. Mitigation measures should be included as a third column, alongside risk and consequence, as part of the risk analysis. This is absolutely essential in order to use the final product to conduct cost-benefit analysis of which mitigation measures to use. The determinative issue may not be which event or node is the greatest risk, but which course of action would most decrease risk.	Cascadia Wildlands	5/20/09	3.4.1
127	The scope of risks considered in the draft methodology is much too narrow. The final result as it is proposed (p.7) lends itself to misinterpretation because it frames itself as a cumulative total of risks. In reality it is nothing of the sort. It is only going to list some of the risks—the largest & simplest ones springing from a subset of the possible causes. It will collect and provide no information on a wide range of very real and important risks. Whether the risks the ARA project examines are a large or a small part of the overall risk picture will remain a mystery. Based on past studies (e.g. Capstone 2001; BLM 2002), the smaller spills are a much larger proportion of the risk in terms of frequency. According to Alyeska's 2005 risk analysis, damage from maintenance (14.3%), and sabotage (37.9%) are predicted as the two leading causes of TAPS leaks, which together are likely to cause most moderate-to-large spills. (DNV Screening Risk Assessment 2005, p.42). Process Safety risks are certainly among the most important.	Cascadia Wildlands	5/20/09	3.3.2
128	In its initial conception this project would have been a thorough ground-truthing of Alaska infrastructure. ... Instead of doing an engineering analysis, the contractor plans to run a statistical analysis that is based on industry-supplied data without verification. This is an outrageous failure to meet the core purpose of the risk analysis—providing objective data. The methodology would need to be re-worked to conduct fieldwork to analyze and verify the state of infrastructure.	Cascadia Wildlands	5/20/09	3.3.3

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129	The approach proposed in the methodology is, basically, to ask industry to provide their own information for operational hazards, leak detection times, corrosive levels, etc. Because there is little indication they will provide this data, the fallback plan is to rely on industry average data. I cannot emphasize how lacking in credibility this approach is. If the industry won't provide the data, you need to get it. ... On page 18, the methodology indicates the liklihood that industry has conducted risk analyses that are not publicly available. First, it is hard to fathom why this information would remain a secret. ... Second, some of the risk analyses conducted by industry are pubicly available. ... At this stage of the project, his should already be gathered.	Cascadia Wildlands	5/20/09	3.3.4
130	3. Static assessment of a dynamic system is not very useful – process safety must be considered. Pipelines are dynamic systems with management systems that are in constant flux. The methodology takes a snapshot and analyzes it pixel by pixel. This approach is not going to provide information relevant to mitigating risks in a dynamic system. This flaw appears in the methodology when it hinges the entire assessment on discreet physical nodes. While in some respects this approach has merit, using it alone ensures a complete picture of risks will not emerge. Some components do not have significant event potential on their own, but feed into larger systematic failures.	Cascadia Wildlands	5/20/09	3.4.2
131	Many risks have no geographic location, but are organizational, or process-oriented. … Process safety is not a minor component of risk. According to The Pipeline Safety Trust, all six of the "primary reasons why pipeline disasters occur" are process safety oriented.1 The methodology screens all of these factors out.	Cascadia Wildlands	5/20/09	3.3.2
132	I am not an expert on process safety, but from reading the Baker Report it is apparent that a large body of work exists to support meaningful process safety risks. Again, we strongly urge you to incorporate that report's recommendations in full, and adopt a methodology that builds on that approach.	Cascadia Wildlands	5/20/09	3.3.2
133	One key process safety risk on TAPS is the Strategic Reconfiguration. The proposed methodology looks at nodes pre- or post-SR based on case-by-case judgment, but will not consider the fact that the project is ongoing. Yet, clearly, SR increases risks in many key ways—cost pressure, problems with management on change, loss of spill response capability, loss of workers on the ground, changes in reliability (e.g. cold restart), potential confusion of roles in emergencies, etc. etc. Even if SR went smoothly this massive project would increase risk, but the SR has been anything but. The SR itself has been reconfigured. Serious complications have dogged the project from its start in 2003. The original 2005 completion date is now pushed back to 2011. It is hundreds of millions of dollars over-budget. Complications have resulted in ongoing and very complex modifications to everything from oil flow to staff levels to oil spill response. Exactly what SR is remains in a state of flux.	Cascadia Wildlands	5/20/09	3.4.1

Cmnt #	Comment	Submitted by	Date	State Response[16]
134	4. Standard for "Unacceptable Consequences" to Safety, is unacceptable. The standards set for safety are so grossly out of whack that in my opinion they represent a reckless disregard for human life. Four dead workers is being considered such a low risk that it will be screened out as "insignificant." That this would even be proposed is disturbing. This horrific definition of acceptable safety risks is an outgrowth of the failure to consult with oilfield workers... It is beyond me why the ARA team would show less concern for workers than the oil companies. The Note to Table 6-1 in the Draft Methodology is the ARA team's disclaimer, but it is a poor excuse. The first reason given, that the safety consequence categories reflect the purpose of the State charter, is ridiculous. ... Also, this is not the charter. "Catastrophic level events that are potentially high risk which could result in severe or significant consequences" is the ARA team's language, not the State's. The charter is to comprehensively evaluate risks and recommend mitigations, not to list only high-risk catastrophes. This is what was presented to the legislature, and is what they agreed to fund.	Cascadia Wildlands	5/20/09	3.4.4
135	4. Standard for "Unacceptable Consequences" to Safety, is unacceptable. The second reason given is that, "large quantity of resources that are already dedicated to protecting the workers and members of the public from accidents that involve the oil and gas infrastructure. Less severe safety threats to workers and the public are already managed by regulations and extensive corporate safety/risk management programs." This too is incorrect. Small risks are no more regulated than are large ones, so this logic gives no argument for the choice to focus only on catastrophes. You are prejudging conclusions based on no data. It is simply not true that, prima facia, non-severe health and safety risks are fully managed. If they were then we would not have unnecessary accidents. ... Secondly, existing management deals with both large and small risks to safety, so this is not a unique property of either. If the standard is that any risk that is already managed will be screened out, then both large and small risks would need to be. Thirdly, even if it were true that these lesser risks were perfectly managed already, it remains important in a comprehensive risk analysis to know what those risks are. If these risks are so comprehensively managed then it should be easy to obtain data. Rather than gather that information, though, the draft methodology has arbitrarily predetermined the conclusion that these risks will be ranked "zero."	Cascadia Wildlands	5/20/09	3.4.4
136	3.5.4 Significant Consequences First, in the early phases of the project, stakeholders were asked what they considered to be an "unacceptable consequence." My perception of this change of terms, for "unacceptable" to "insignificant", is that the input into what was acceptable and what was not was not what the project team wanted to hear. You'd rather deal with a smaller universe of risks, so re-defined terms of the study to narrow the scope. This a clear example of stakeholder input being taken, then disregarded.	Cascadia Wildlands	5/20/09	3.4.1

Cmnt #	Comment	Submitted by	Date	State Response[16]
137	Stakeholder comments have not been incorporated into the Methodology. ... In general, it seems input was used where it served the pre-determined objectives of the project, and was disregarded where it did not. The lack of any systematic way of considering input is a key methodological problem. The closest thing I've seen to a tracking of stakeholder input were the reports that came out of the public meetings, that were posted on the project website. Those forms have two columns—one for each comment, and another stating follow-up action to be taken based on the comment. Those forms show that for almost every single comment, the ARA team took "no action." This is one of the clearest, documented examples of stakeholder input being disregarded that I've ever seen. If these forms are accurate, then the public process can only be considered a monumental failure and waste of time. Rather than frankly deal with ongoing problems gathering stakeholder input, the methodology misleadingly touts the public process as "extensive" and a total success. Simply adding the total number of people contacted and meetings held is misleading. ... The truth is that the meetings were sparsely attended (except for Anchorage), and that a great many key stakeholders have not been consulted. Oilfield workers, unions, tribal governments, villages, and others have not been consulted. I think the contractor has a fundamental misconception of the purpose of this stakeholder process. ... The ARA public process is different. The purpose here is to affirmatively gather stakeholder input. ... If the ARA team put out a public notice and no oilfield workers responded to it, that's not the oilfield workers' problem, it's the ARA team's problem.	Cascadia Wildlands	5/20/09	3.4.1
138	While much has been made about the allegedly huge scope of this risk analysis, what is not mentioned are the many aspects of risk that are being defined out of the risk analysis. A quick review of the risk aspects that are being excluded: • Regulatory Oversight (or lack thereof) • Marine transportation (the highest-risk aspect of oil transportation, by far) • Sabotage/ terrorism (empirically the cause of the largest spills on TAPS) • Cat. 1 Risks (e.g. Safety risks that would kill four people or less) • Process Safety • Maintenance & 3rd party damage • Strategic Reconfiguration We would much rather have a comprehensive, comprehensive assessment, and a partially comprehensive one.	Cascadia Wildlands	5/20/09	3.3.2

Cmnt #	Comment	Submitted by	Date	State Response[16]
139	On the whole, the methodology is much too aggressive about preliminary screens. A precautionary principle should be applied instead. Please error on the side of caution when deciding what risks and factors are worth considering. The purpose and need for these screens is not explained, and there is no warrant for them. The only rationale that I can think of, based on public presentations so far, is that the contractor is trying to reduce workload in order to more cheaply fulfill the contract. But at least be clear—all these screening mechanisms are measures of convenience, and they come at a cost to precision and accuracy of the final assessment.	Cascadia Wildlands	5/20/09	3.4.3
140	Process safety risks are being excluded by use of this screening methodology. On page 15, the methodology says, "compliance with original design standards does not guarantee that systems will not fail." This logic is properly being applied to the Natural Hazards Risk Assessment, but is improperly not being applied to Operational Hazards. The same thing is true, for example, of the safety risks that are being excluded here because they are already managed. The fact they are managed does not, in reality, reduce their risk to zero, as this methodology would express it. Even if you insist on using such aggressive screens, please do not express the value of these risks as "zero."	Cascadia Wildlands	5/20/09	3.4.3
141	This section does not make clear how IM standards are going to be applied. While we certainly agree that segments having IM standards are safer with them than without them, how this actually applies to risk calculations is very unclear. As the methodology notes these are relatively new standards, so we do not have enough experience to say how effective they would be. How would they be applied? The methodology does not say.	Cascadia Wildlands	5/20/09	3.4.1
142	3.4.2.4 Business Continuity Regarding availability of industry risk assessments, please obtain them. … The current methodology makes no distinction between the "good" and "bad" operators. This is key information also considering mitigation measures, because if the State were implement management measures to decrease a given risk in a given place, depending on the operator's position that may simply cause them to cut back in some other areas, bringing the risk back to the level it was before. Mitigation in this circumstance would be counter-productive because it simply shifts the cost of risk mitigation from the operator to the public. Where this is the situation, risk management steps would need to include mandatory, binding rules to correct industry behavior.	Cascadia Wildlands	5/20/09	3.3.4

Cmnt #	Comment	Submitted by	Date	State Response[16]
143	The methodology indicates confusion as to whether risk analyses done under these regulations are provided to agencies or not. In the case of Alyeska's 2005 risk analysis I can tell you that it is, because I got a copy of it from the JPO. I hoped those agencies would be more helpful and have provided copies of those studies by now. Even if JPO does not ordinarily obtain copies of IM risk analyses, they certainly have the authority to get them. Please request that DOT obtain the needed studies and share them. These are federal requirements and risk analysis results should not be hidden from the State.	Cascadia Wildlands	5/20/09	3.3.4
144	How can you not know whether EPA/OSHA process safety studies are available? This task should have been completed long ago and these studies clearly need to be incorporated. It remains unclear how this information, where it is available, will be used. Will the industry studies just be photocopied and the conclusions repeated? How will differences in methodology between studies be accounted for? How will industry average information, and site-specific data provided by industry, be integrated? These questions came up at the Anchorage workshop, May 5, 2009, and the answers were much too vague. ... Doing engineering assessment yourself in the field yourself according to a consistent, comprehensive methodology, would solve this problem.	Cascadia Wildlands	5/20/09	3.3.4
145	The term "significant consequences," rather than "unacceptable consequences," seems semantic. "Unacceptable consequences" really most accurate, but really it is of little importance which term you use. The approach we urge is to abandon the use of such aggressive screens, and conduct a truly comprehensive risk analysis. The decision about what is "unacceptable" or "significant" is best made later when all of the information is in front of us. These judgments are likely to change over time, anyway. Making this decision of what is worth worrying about, on an arbitrary basis, ahead of time, guarantees the statistical outcome of the risk analysis will be false. ... The definition of what is unacceptable is truly, the central point on which the outcome of the risk analysis hinges.	Cascadia Wildlands	5/20/09	3.4.3
146	3.5.4 Significant Consequences Second, "significant" is not the right word for what the methodology is talking about. Four deaths, for example, are surely significant, but do not fall within the definition. If you are to use the word "significant", then please use it the way everyone else does.	Cascadia Wildlands	5/20/09	3.4.3
147	3.5.4 Significant Consequences Third, the decision to allow the ARA team to administratively screen out "insignificant" consequences, as you define them, along with broad aspects of physical infrastructure and spill causes, is misplaced. If risk management decisions are all going to be made by the SAOT, then that is who ought to define what is and is not significant. But by screening out so much to begin with, the methodology predetermines the outcome, and will prevent decision-makers from an informed judgment of their own.	Cascadia Wildlands	5/20/09	3.4.3

Cmnt #	Comment	Submitted by	Date	State Response[16]
148	3.5.4 Significant Consequences Fourth, by over-limiting this definition of significant to extraordinary, catastrophic events, the methodology cancels out a large universe of risks that likely could be effectively managed and mitigated. If we have the ability to eliminate some of the lesser risks, then that needs to be reflected in this project.	Cascadia Wildlands	5/20/09	3.4.3
149	3.5.4 Significant Consequences Fifth, insignificant risks are counted as zero in the methodology, but it does not need to be this way. The methodology could be corrected to count screened-out risks in some different way. A better last-ditch method would be to use industry average statistical data that is available.	Cascadia Wildlands	5/20/09	3.4.3
150	The methodology says, "health consequences from the normal operation… are not included in the scope…" (p.25) We strongly argue against this decision. This is not an abstract issue. Health risks from oilfield infrastructure, for example from flaring in the vicinity of Nuiqsut, are making Alaskans sick right now. These risks have not been thoroughly managed or analyzed. The ARA team has no idea whether or not these risks are higher or lower than those from unanticipated events. In response to public comments identifying these risks as some of the most important, the ARA team has argued they come from "normal" operations, and so are screened out. This is an incorrect decision that needs to be reversed. A situation where an oilfield is making citizens sick is an operational failure. It is unanticipated. Health consequences were not necessarily foreseen. Health risks certainly are significant and preventable. ... At the May 5, 2009 public workshop, an ABS presenter said that contractors were not exercising their own judgment on what risks were acceptable. But the methodology does exactly that by giving a free pass for any risk that could be construed as coming from "normal" operations. If the State wants to make the decision to do nothing about these risks, then that is one thing. But it remains vital that these risks be tabulated and considered. They are a key part of the overall weight of risk associated with the infrastructure.	Cascadia Wildlands	5/20/09	3.4.4
151	Thank you for the clear identification of spills to water as being in a class by itself. This is an instance where you did a good job of incorporating stakeholder input.	Cascadia Wildlands	5/20/09	3.4.5
152	Again there are problems with overly aggressive screens. The methodology states that environmental consequences are not considered where they result from activities that are legal. Whether an activity is legal or not is not an appropriate place to draw this line. Lots of things are legal that increase risk. The key problem is that use of this standard as an early screen eliminates the possibility that project results will reveal any needed (or desirable) statutory or regulatory changes. It presumes (without basis) that what is legal now, is acceptable and not worth considering for improvement. If it turns out existing regulations are the desirable response to existing risks, then fine. But this needs to be based on information.	Cascadia Wildlands	5/20/09	3.4.3

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153	Thank you for broadening the definition of high environmental consequence areas. The various legal definitions (Environmentally Sensitive Areas, USAs, HCAs, etc.) are legalistic, confusing, inconsistently applied, and not a full representation of actual environmental risk. Our local concern is, as you know, that a spill to any part of the Copper River Watershed be appreciated as an environmental disaster and absolutely unacceptable risk. Please include consideration of perception-based impacts, for example to subsistence use and tourism. Consequences of a spill can be out of proportion to physical damage based on perceptions of toxicity that prevent resources from being utilized, or perceptions that precious wilderness or cultural cites have been contaminated and ruined. It is in the mainstream of science to appreciate disasters like spills cause substantial psychological and social harm to impacted communities. As with reliability, please carefully consider reasonably foreseeable secondary environmental effects. The draft methodology seems to accommodate this in weighing environmental consequences, although this is a little unclear.	Cascadia Wildlands	5/20/09	3.4.5
156	3.5.7 Reliability. Under the draft methodology, "impacts [that] relate to secondary, socioeconomic consequences that were not defined as consequence areas of concern and are outside the scope of this project." (p.26) Defined where? By whom? Why? The methodology does not provide any reason. This appears to be yet another case where stakeholder concerns raised inconvenient truths to the project team, who then redefined the parameters to count these risks as "0." Secondary, socio-economic impacts, such as cascading effects to the military, municipalities, other industries, and other citizens need to be considered. These impacts are obviously important. Importance of these risks was expressed by stakeholders in early project feedback. In public meetings the project team seemed to agree. ... Expense is no excuse for failing to consider some secondary impacts. It is far from prohibitively difficult. Federal agencies do it all the time, for much smaller amounts of money than the ARA team has, in Environmental Assessments and Environmental Impact Statements.	Cascadia Wildlands	5/20/09	3.4.6
157	3.5.7 Reliability. The line of where "secondary" impacts begin is not defined in the methodology, and is always arbitrary anyway. Actions can always be broken down into more and more steps, or grouped into fewer. Rather than excluding all steps after the second one, we recommend that you draw the line at reasonably foreseeable effects. This protects you from engaging in guesswork, while including the full range of predictable consequences. If you know it'll happen, then consider it. If you don't, then don't.	Cascadia Wildlands	5/20/09	3.4.6
158	One specific indirect impact that needs to be considered is the cascade of effects of spills into the Copper River watershed on both commercial and subsistence fisheries. For example, one of the primary negative consequences of a spill into the would be immediate impacts to the carefully crafted marketing message of clean, wild, Copper River Salmon. This vulnerability is especially troubling because it is perception-based. ... These are economic impacts that would be locally severe, and significant in terms of the state economy.	Cascadia Wildlands	5/20/09	3.4.2

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159	4 Physical Infrastructure Scope. The physical scope of this project should be expanded to incorporate marine transportation aspects of infrastructure. Experience is that these are among the highest risk components of the system. The idea that marine transportation is somehow so perfectly regulated that further analysis is unneeded is preposterous. ... Again, even if you choose not to study it, it biases the study to count these risks as zero, so known risk levels should be incorporated into the ARA.	Cascadia Wildlands	5/20/09	3.3.1
160	4 Physical Infrastructure Scope. It is disappointing that future, especially offshore, infrastructure is not being incorporated in any way. There must be a way of expressing an expandable portfolio model for expressing risk. By the time this assessment is done, the important risk areas may well have moved on to different seas.	Cascadia Wildlands	5/20/09	3.3.1
161	Abandoned facilities should also be re-included into the scope. At the 2008 Fairbanks public hearing, I asked whether abandoned facilities were within the scope, and was told that yes, they probably were. This seems like another instance where the project scope has narrowed. Examples of facilities that should be included are abandoned reserve pits, fuel and chemicals, and improperly capped or uncapped wells. One risky location is at Katalla, where an open reserve pit and abandoned drill rig over an uncapped well with dozens of rusty drums of fuel & oil, sit a couple hundred yards above spawning salmon and the commercial Copper River fishing grounds. I've provided documentation of all this to ADEC, and they have extensive information on thousands of abandoned oil facilities in the state. Again, as explained above, by focusing only on physical infrastructure the methodology needlessly excludes important process-safety risks.	Cascadia Wildlands	5/20/09	3.3.1
162	6 Preliminary Screening. This whole part of the methodology is arbitrary and totally unnecessary. The Hazard ID described sounds like a fancy description of brainstorming. How will the team know when they've brainstormed the complete list of hazards? I asked this question at the May 5, 2009 workshop, and it was explained that a single, worst-case scenario would be uniformly applied to all segments. That would be a bad method to apply because different threats are highest in different places. ... One thing that is certain is that this method will result in only a partial list of potential hazards. Yet, many of the worst events are things that people hadn't thought of before. It is generally the lessobvious threats that turn out to be the most dangerous.	Cascadia Wildlands	5/20/09	3.4.3

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163	6 Preliminary Screening. If secondary measures are relied on to mitigate risks at a particular node, then the ARA team should conduct validation monitoring of those measures. As the Fineberg reports have documented, the historical problem has been that oil company assertions of sparkling mitigation measures that are never implemented. For example, there are check valves and remote gate valves on TAPS to limit the size of potential spills, but many of these valves are leaky. There are miles of boom in containers, but in many cases response times would be much too slow for them to make any difference. The point is that the risk analysis needs to assess the integrity of these risk management components of the system, just like you assess whether a given pipe is corroded or not. As Mr. French correctly pointed out at the May 5, 2009 workshop, it is also important to consider the impacts of what happens after a spill. In the Exxon Valdez spill, the cleanup was worse environmentally and socially, than the spill itself. We're not asking you to look into a crystal ball, but don't put on blinders, either.	Cascadia Wildlands	5/20/09	3.4.1
164	6.2 Safety Consequence Screening. This section is unwarranted backpedaling away from considering very serious safety impacts. Truly, this to me is a gross disregard for human life. The only safety impacts that will be considered, apparently, are explosions where people—lots of people— are in the immediate vicinity of the blast. This administrative decision, that getting blown up and killed is the only safety risk of our infrastructure worth considering here, is inexplicable to me. It is unreasonable, unsupported, and arbitrary.	Cascadia Wildlands	5/20/09	3.4.4
165	6.2 Safety Consequence Screening. I urge you to pay close attention to Ott (2005), which details some of the health consequences of large oil spills. Cleanup and response are particularly unhealthy activities, and should be considered among the negative consequences of spills. As Dr. Ott details, the tendency of risk analyses is to try not to learn about health concerns. It is seen as a can of worms, and indeed it is. But not opening the can doesn't make the worms go away. The basic science Ott cites regarding long-term, sub lethal toxicity of PAHs, has become conventional wisdom in the scientific community. You are not going out on any limbs to consider health among the impacts of spills.	Cascadia Wildlands	5/20/09	3.4.4
166	6.2 Safety Consequence Screening. As with other factors, the methodology inaccurately lists all safety risks except for explosions resulting in fatalities as "0". That is plainly not the truth, so the ARA result will understate safety risks. Even if you aren't able to analyze these factors, it is no solution to assign them a value you know to be wrong. ... The State could be exposing itself to liability for future, preventable fatalities on the patch, because it codifies a reckless disregard for human life.	Cascadia Wildlands	5/20/09	3.4.4

Cmnt #	Comment	Submitted by	Date	State Response[16]
167	6.3 Environmental Consequences Screening. As with so much else, the methodology inaccurately characterizes spills of less than 1,000 gallons as zero-risk. Even if you don't want to think about those spills, they are a risk factor and it is highly misleading to characterize them as not existing. The whole issue of setting a lower limit on spill volumes to consider is specious. Why do that at all? Records are just as available for the smaller spills, and those risks could just as easily be calculated. Records show that the vast majority of spill events are of relatively smaller volumes, so by setting a lower volume limit the methodology is severely skewing the frequency analysis. Ten spills of 100 gallons is the same volume as one spill of 1,000 gallons. To consider one but not the other is irrational. Particularly since the ten, ten gallon spills are more likely preventable, than the 1,000 gallon one. ... Why set a lower limit in the first place? ... Consider a hypothetical scenario in which Alyeska inspected the belowground Klutina River crossing, and discovered some leakage from pinhole corrosion leaks. Imagine they report the spill volume as ten gallons. What would be the response? Would fishermen, still traumatized (and I mean clinically traumatized) from the Exxon Valdez, trust that only that much had spilled? This situation is not true in every location. For tundra areas, perhaps 1,000 gallons is a reasonable lower limit (although it seems high to me), but at a river crossing it wouldn't be. The best solution is to recognize certain geographic places (primarily rivers) where any spill would cause significant effects. There are not so awful many such places that we can't afford to protect them specially.	Cascadia Wildlands	5/20/09	3.4.5
168	6.3 Environmental Consequences Screening. What is the rationale for only dealing in hydrocarbons, and not, "other types of hazardous substances?" (p.98) That makes no sense. If there are risks from other substances then evaluate them.	Cascadia Wildlands	5/20/09	3.4.5
169	6.3 Environmental Consequences Screening. The screening may put too much faith in secondary containment. In the vicinity of river crossings, for example, there needs to be some review of that containment. There are dikes in places near TAPS river crossings, for example, but those aren't reliable secondary containment the way that dikes around a tank farm are. In the TAPS contingency plan they consider the banks of the Gulkana River as "containment." The mere fact of asserted "secondary containment" is not the end of the story. Further assessment is necessary.	Cascadia Wildlands	5/20/09	3.4.5
170	6.3 Environmental Consequences Screening. The methodology has a number of shortcomings in consideration of potential spill volumes. First, please do not just assume that RGVs and CVs will work. Many of those valves are leaky including at latest information RGVs 73, 31, 95B, 103, CKV 5 , CKV 84A, PS 10 BL1, and PS6 BL1.4	Cascadia Wildlands	5/20/09	3.4.5

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171	6.3 Environmental Consequences Screening. Second, we question the statistical reliability of self-reported spill volumes. A highranking ADEC spill responder once told me her rule of thumb for oil company first reports of spill volumes, was to multiply the provided figure by a factor or ten. Reported volumes are calculated more on the basis of legal factors than a scientific calculation of the actual volume. The determinative factor in those volumes is whether they achieve a legal settlement for spill penalties. Incentives are to settle quickly on a volume, not to investigate, for fear of upsetting delicate negotiations. Using those legal fictions for a scientific study such as this is unreliable, and almost certainly slants the risk calculation towards smaller spills than will actually occur.	Cascadia Wildlands	5/20/09	3.4.5
172	6.3 Environmental Consequences Screening. Third, consideration of leak detection time needs to be given. For all but the most massive spills, leak detection is highly unreliable and quite slow. This has several implications. The longer leaks go undetected, the larger the volume. Also, slower leak detection increases environmental damage of a spill, independent of the volume, because spills migrate further downstream, impact larger (and harder to define) areas, and greatly diminish the potential for effective response or avoidance by those downstream.	Cascadia Wildlands	5/20/09	3.4.5
173	6.3 Environmental Consequences Screening. Fourth, it is crazy to rely only on data from 1996 to 2004 to figure potential spill volumes on the North Slope. The largest volume spill there, some 260,000 (or so) gallons, happened in 2006. Yet the methodology imagines the largest-ever spill was only 38,000 gallons. It is ironic that the spill that sparked this study, is not being considered in it.	Cascadia Wildlands	5/20/09	3.4.5
174	6.4 Reliability Consequence Screening. Your characterization of the mandate from the state with regard to reliability is wrong. Surely the legislature, when they appropriated $5 million, had in mind the economic interests of all their constituents. This analysis would screen out the loss of all Cook Inlet production. Clearly, the threshold for significance is drawn too high. I don't think anyone would argue that loss of all that oil and gas production would not have significant impacts on the state economy.	Cascadia Wildlands	5/20/09	3.4.6
175	6.4 Reliability Consequence Screening. Lack of cold restart ability is a key reliability factor that needs to be considered on TAPS. I'm reliably told Alyeska's cold restart plans post-SR are untested and uncertain, and that many lack confidence in the plan. Anything that might cause a prolonged shutdown of TAPS during winter should be considered a major risk to reliability. Along these same lines, please conduct validation on estimated times to repair and get back up and running. Experience certainly is that restarts are themselves risky and tricky, and things go wrong.	Cascadia Wildlands	5/20/09	3.4.6
176	7 Operational Hazards Assessment. With regard to operational hazards, on page 4 the methodology does not offer a methodology. Rather, it just indicates that information will be gathered and failure rates calculated by statistical methods. What methods? How will the failure rates be measured? The purpose of the methodology is to answer these questions, and it doesn't. At a fundamental level, this section of the proposed methodology is simply not done.	Cascadia Wildlands	5/20/09	3.4.1

Cmnt #	Comment	Submitted by	Date	State Response[16]
177	7 Operational Hazards Assessment. As also indicated above, we have fundamental problems with the way this information is being gathered and applied. What is proposed amounts to simply copying industry supplied data, with no independent assessment whatsoever. This method amounts to more of the same self-policing. It would all take place behind closed doors, and the product isn't being peer reviewed. This is worse than doing no risk assessment at all. The solution, as we indicate in our attached letter to the Governor, is to grant ADEC authority to subpoena or otherwise gain access to industry risk analyses. This gets all the same advantages of the proposed risk assessment methodology, more reliably, and for free.	Cascadia Wildlands	5/20/09	3.4.1
178	7 Operational Hazards Assessment. As indicated above, chronic risks, for example of toxic discharges, should be considered within the scope of this study.	Cascadia Wildlands	5/20/09	3.4.1
179	7 Operational Hazards Assessment. Third party damage, including that caused by sabotage/ terrorism and maintenance work, needs to be considered as part of the operational hazards. These are statistically some of the leading causes of pipeline damage. (DNV 2005) This is especially true of the largest and worst spills. The two largest TAPS spills, by a large margin, were both caused by sabotage. These risks are real, there are steps we could be taking to make ourselves safer, and there's is no reason to exclude them from this analysis. Damage from maintenance, and other complications such as those caused by SR, are similarly likely to show fruitful opportunities for improvement.	Cascadia Wildlands	5/20/09	3.4.2
180	6 Natural Hazards. The draft methodology appears to exclude hazards insofar as they interact with access. For example, a flood could not only cause a breach of the pipeline but, if it did so, would also likely cause road closures that would prevent access to the spill location, preventing both detection and response. If that is the case, please fix it. Please consult with local residents when evaluating locally significant natural hazards. Nature's challenges are something we know probably the most about.	Cascadia Wildlands	5/20/09	3.4.2
181	6 Natural Hazards. For all of these reasons, we feel that continuing forward with this study, using this methodology, would do more harm than good. If Doyon/Emerald and ABS are not up to the task they signed up to do, then the State needs to find someone who is.	Cascadia Wildlands	5/20/09	3.4.1
182	Based on review of the proposed methodology prepared by project contractor Doyon-Emerald/ABS, the undersigned organizations are concerned that during its two-year gestation period this project has undergone significant design changes that severly diminish its ability to accomplish its stated purpose - to identify and mitigate risks associated with the operation of Alaska's oil and gas infrastructure. We therefore respectfully recommend that the state exercise its option to terminate the plan outlined in the proposed methodology.	AWL, et. al.	6/2/09	3.3.9

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183	With an estimated $1.5 million to $2.0 million of the project's original $5.0 million state appropriation reportedly spent at the end of the second year of a three-year project, the ARA is still in the design phase. In light of these circumstances, we believe the project's fundamental purposes would be better served by using the remaining funds to establish an ombudsman program that would enable workers employed at Alaska oil and gas production and transportation facilities to come forward to identify operational problems without fear of losing their jobs.	AWL, et. al.	6/2/09	3.3.5
184	When ADEC received authorization for this project from the State Legislature in May 2007, the ARA was billed as a three-year initiative designed to assure that events such as BP's North Slope corrosion problems the preceding year would not be repeated. The state spent the first year developing its game plan and hiring its independent contractor, whose team tendered its proposed methodology for public discussion in March of this year, as the project neared the end of its second year. During this period, the scope of the project has been narrowed significantly. Here are some key examples: • As ADEC originally outlined the ARA project, an independent team was supposed to identify risks and recommend measures to mitigate them. It now appears that the risk assessment team will submit a catalogue of risks but will not make recommendations. Due to this change (requested by Doyon-Emerald/ ABS after it secured the contract) the state loses the benefit of retaining a fresh and independent set of eyes and ears to examine Alaska petroleum production and transportation activities.	AWL, et. al.	6/2/09	3.3.8
185	• Instead of intensive field inspections to determine the condition of facilities and examine first-hand the implementation of operating, maintenance and training procedures, the ARA team hopes to gather and rely on aggregate data. (At this late date, however, the state and the project team have been unwilling or unable to obtain access to industry operations records. Nor have arrangements been completed to grant the risk assessors access to facilities to conduct initial or follow-up observations to ensure the validity of whatever data the project team does manage to obtain.)	AWL, et. al.	6/2/09	3.3.3
186	In developing its risk list, the assessment team proposes to screen out problems such as chronic small oil spills, other toxic spills and various safety infractions, reasoning that minor incidents do not cause serious problems. This approach is liable to overlook both problems with more than one cause and cumulative impacts – to the detriment of safety and the environment.	AWL, et. al.	6/2/09	3.4.3
187	The project use of terms such as "significant consequence areas," "unacceptable consequences" and "significant" environmental consequences set preliminary screening threshold levels that are far too high to reflect public concerns about loss of human life and adverse impacts on Alaska's environment.	AWL, et. al.	6/2/09	3.4.3
188	• The proposed methodology also fails to provide essential focus on how the various state and federal oversight agencies fulfill their responsibilities.	AWL, et. al.	6/2/09	3.4.2

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189	In addition to the narrowing of tasks, targets and inputs summarized above, we find the proposed methodology critically deficient in its characterization of Alaska land and waters potentially affected by the mishaps the ARA is supposed to identify and prevent. The proposed methodology lacks maps and other spatial documentation necessary to identify and locate with precision sensitive areas such as critical fish and wildlife habitats, cultural and historical sites, recreational areas and subsistence areas.	AWL, et. al.	6/2/09	3.4.1
190	Moreover, the "node" framework adopted by Doyon-Emerald/ABS for petroleum facility event classification and review is a blunt tool that does not mesh well with the extreme variability of Alaska's geography, hydrology and climate conditions. Without better definitions – and field research to verify their applicability – project data inputs will not reflect actual conditions and the resulting statistics will not be meaningful.	AWL, et. al.	6/2/09	3.4.1
191	These developments and concerns lead us to conclude that this project is not capable of effectively identifying and reducing risks so that events such as BP's 2006 North Slope corrosion problems will not occur in the future. The principal underlying problem, as we see it, is that the Doyon-Emerald/ABS proposal relies on abstract information instead of "boots on the ground" observation of the condition of the state's petroleum production and transportation facilities, how those facilities are operated and maintained, how personnel are trained to perform their tasks and the character of the potentially affected Alaska locales. Due to economic and social pressures, a report that is not grounded in thorough and objective field work is liable to be overly optimistic, creating a false sense of security about risky petroleum operations. The flawed results are liable to overlook or downplay serious risks, thereby adversely affecting identification and resolution ofpotentially significant problems and the land and waters the ARA is supposed to protect.	AWL, et. al.	6/2/09	3.3.3
192	Further undermining our confidence in this project is the notable discrepancy between the glowing depiction of the ARA outreach process presented by Doyon-Emerald/ABS, on the one hand, and the views of NGO representatives and other public citizens who have taken the time to participate in this process, on the other. The small showing by NGO representatives and the general public calls into question the effectiveness of the ARA outreach effort, as most of the 200 participants in the ARA stakeholder process counted by Doyon-Emerald/ABS were government or industry personnel.	AWL, et. al.	6/2/09	3.3.7

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193	At the same time, the nearly unanimous rejection of the proposed methodology by the participating NGO and general public cohort is striking. For example, each of the six NGO and general public person who participated in the day-long methodology meeting in Anchorage May 5 voiced strong reservations about the proposed game plan. In Fairbanks, all four members of the public who provided input to the project team at the public outreach meeting in Fairbanks last Sept. 25 now feel that the proposed methodology does not reflect their input to the ARA team; they now believe the project should be terminated. 1 We note that strong concerns were raised about the project's application to various regions from Cook Inlet to the North Slope, and we are particularly concerned that the ARA team did not obtain face-to-face feedback on its proposed methodology from Alaska rural communities, particularly the North Slope.	AWL, et. al.	6/2/09	3.3.7
194	Instead, we urge ADEC to consider what we believe to be the far greater risk mitigation potential of alternative programs. For example, the creation of an effective ombudsman program for workers employed at Alaska oil and gas production and transportation facilities would enable workers to come forward to identify operational problems without fear of suffering harassment, intimidation and/or job loss. The history of TAPS and North Slope problems strongly suggest that this approach might be particularly useful for its far-flung facilities, where three oil companies control an unprecedented 95% share of the operations that provide the vast preponderance of state government revenue.	AWL, et. al.	6/2/09	3.3.5
195	Finally, we note that the experience of those who have participated in the ARA process demonstrates once again the need to establish citizen oversight groups for TAPS and the North Slope. Many people were disappointed seven years ago when state and federal agencies summarily turned down a similar environmental and public community request made during the public meetings to consider federal and state grant and lease renewal. We continue to recommend the establishment of regional groups along the lines of the federally mandated Prince William Sound and Cook Inlet Regional Citizens' Advisory Councils in order to provide the public with the means to secure and evaluate better information on petroleum system operations issues and a forum for interchange with industry practitioners.	AWL, et. al.	6/2/09	3.3.5
196	June 2nd is here and according to your website this is the last day of the public review period. As I emphasized before, this is a critical issue for the state and we need to do everything we can to ensure that the public is given a chance to understand and comment on how the state's money is being spent. Seeing that you were unable to finish your presentation in Fairbanks, I do not believe that the public review process is complete. … I do not believe you should be satisfied with the level of feedback that you have received. … I ask you to please consider coming back to Fairbanks to finish your presentation, and increase your efforts to make the public aware of the meeting so that they have an adequate opportunity to be a part of this process.	Rep. David Guttenberg	6/10/09	3.3.7

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197	Additionally, I want to express my concern over the lack of involvement in the proposed risk assessment from industry. Is it reasonable to expect a useful final product without their participation? I believe this is a serious issue that needs to be discussed further in the public forum before this project continues.	Rep. David Guttenberg	6/10/09	3.3.4
198	pg. 51 of 165 MGS Platform A (Correction needed on well info) 15 OIL, 6 WINJ, 2 Other (24) Total MGS Platform C (Correction needed on well info) 13 OIL, 6 WINJ, 4 Other (24) Total MGS Platform C (Correction needed on Associated Pipeline info) Produced oil/gas water emulsion subsea pipeline to Dillon Platform (ABANDONED) ...not inactive. pg. 54 of 165 XTO East Forelands Facility (Correction to Drillsites / Wellpads) Dillon Platform - Chevron Asset ...Does not produce into XTO East Forelands Facility - Remove from list. Baker Platform - Chevron Asset ...Does not produce into XTO East Forelands Facility - Remove from list. XTO East Forelands Facility (Correction to Associated Pipelines) 16 in Gas Pipeline North Cook Inlet - Not Applicable - Remove from list.	XTO Energy	6/2/09	3.3.9
199	Sarah Palin's "Alaska Risk Assessment," which once held promise of reforming oversight of Alaska's crumbling oilfield infrastructure, is in a death spiral. Watchdogs who've been following it are now calling on the State to hit the eject button. This conclusion was reached reluctantly after several of us attended a day-long workshop, May 5 in Anchorage, held by project contractors Doyon/ Emerald and ABS consulting. The workshop presented the draft methodology for conducting the risk assessment. The document is available for review, and public comments are being accepted through June 2. What Palin announced way back in 2007 was a "comprehensive assessment of Alaska's Oil and Gas Infrastructure." Great! But like the Sarah we once knew and loved, the ARA has transformed into something very different. First of all, the study is not even remotely comprehensive. With fancy logic puzzles they put on an elaborate set of blinders. Here is a partial list of the aspects of risk being totally excluded from ARA: • Process Safety (e.g corporate cost cutting, cheating, not following procedures) • Marine transportation • 3rd party damage (terrorism, sabotage, maintenance damage) • Abandoned facilities • Facilities not yet in operation • Refineries • Gas distribution lines • Government oversight (or, lack thereof) • Maintenance • Management of Change	Cascadia Wildlands	no date	3.3.9

Cmnt #	Comment	Submitted by	Date	State Response[16]
200	Having cut out MOST of the risks we face, they continue putting on blinders. Further screening criteria filter out "insignificant," or "acceptable," risks. Among the things they consider not worth their bother: • Any safety risk that would kill fewer than five workers in an explosion • Reliability of Cook Inlet infrastructure • "indirect" impacts of spills, such as to the fishing industry or subsistence • Health impacts (ie. from toxic exposure to the public) • Spills less that 10 bbl Risks thus screened out will be assigned a "zero" ranking in the final risk profile. So, for example, if the ARA team discovers, even as a certainty, that some risk-a corroded pipeline, say- was likely to kill four oilfield workers and shut down Cook Inlet oil and gas production forever, that will be considered "insignificant" and given a "zero" risk ranking. Poof. Not that they're likely to discover anything. The project was pitched as "an engineering analysis involving a thorough, independent appraisal of the condition of the state's oil and gas facilities." (Palin 2007 Press Release)	Cascadia Wildlands	no date	3.3.2
201	What has emerged is nothing of the sort. Take a claim of, "independent." The contract was awarded to Doyon/Emerald. Doyon has millions in oilfield contracts- about $25 million in annual contracts with Alyeska alone. (Source: ExxonMobil Pipeline Company 2007/Q4 FERC Form No.6/6-Q) Doyon also hopes to start controversial drilling in the Yukon flats. They are independent? Alaska pioneer Walt Park, Governor Hammond's technical advisor during TAPS construction and Alaska's first Commissioner of Transportation, filed an official protest of Doyon's contract because of the conflict of interest. Parker's protest was dismissed by the State, but his point in being validated by what is happening.	Cascadia Wildlands	no date	3.3.8
202	The methodology involves no fieldwork, no inspections, no verifications of any sort. They will ask the oil industry to share their own appraisals of their facilities, and report back whatever they're given as fact, without doing any validation. How can they discover problems if they don't look for them?	Cascadia Wildlands	no date	3.3.3
203	You'd thinK the chance to present their own side of the story as undisputed fact would be enough for the oil industry. You'd be wrong. Industry has provided essentially no information, and there's no sign they will. Industry provided no comments whatever on the methodology. They've shared nothing regarding their own risk management procedures. Assuming that have any. Industry cites bogus concerns about trade secrets and proprietary data, but it's clear they are sabotaging Palin's effort. Without an independent contractor to shake loose some real facts, the State's effort it sunk.	Cascadia Wildlands	no date	3.3.4

Cmnt #	Comment	Submitted by	Date	State Response[16]
204	It gets worse. When it was announced, Palin's press release said the study would "identify facilities and systems that pose the greatest risk of failure, along with measure to reduce risk." But Doyon/Emerald has backed off of making any recommendations. They are especially concerned not to recommend any increase in regulation or oversight. This is apparently based on industry pressure. (See followup comments of Richard Fineberg for documentation of this.)	Cascadia Wildlands	no date	3.3.6
205	So, the ARA is not comprehensive, it is not an assessment, and it will not result in any recommendations for change. We're paying $5 million to get an incomplete photocopy of part of industry's own appraisal of itself and put it on a musty shelf. The only part of the original mandate they seem to be fulfilling is to spend the allotted $5 million.	Cascadia Wildlands	no date	3.3.9
206	National Academy of Sciences is peer reviewing the methodology concurrent with the public review. Doing my best impression of The Eternal Optimist, I'm hopeful this group will put the hammer down. They're extremely smart people with lots of professional pride, and signs so far are of a rigorous process. But then, on the committee for NAS are Richard Rabinow, who made a 34-year career with Exxon and held high-ranking corporate positions on TAPS in 1994-1995, and Shirish Patil, who does research for the University of Alaska, Fairbanks. Again, smart and professional. But how long do technocrats expect us regular idiots- who just live on the rivers, work in the oilfields, and clean up the spills- to ignore our own common sense and just trust them? Especially when all we see is paper flying, nothing changing, and oil spilling?	Cascadia Wildlands	no date	3.3.9
207	Given the methodology now proposed, the only possible purpose the ARA will serve is as a whitewash for industry and overseers to remain complacent with regard to oil spills. In this, ARA today is a complete transformation from its original, stated purpose.	Cascadia Wildlands	no date	3.4.1
208	The best way put now for the State is to cancel the contract with DoyonEmerald/ABS, invest the remaining funds in an oilfield ombudsman program, and support creation of a TAPS Citizens Advisory Council. There's a sign-on letter circulating that should draw broad support. Contact Betsy at AWL (betsy@alaskawild.org), or me at Cascadia Wildlands Alaska Field Office, or if you or your group would like to sign on._Or, submit your own comments by June 2. When it comes to preventing and accidents, we're all in this together, and complacency is our worst enemy.	Cascadia Wildlands	no date	3.3.5
209	The website does not appear to reflect this process(in regards to the Gap Analysis being performed by PSIO and the results of the risk assessment… refer to document.).	Anchorage Public Workshop	5/5/09	3.3.9
210	It was stated that the public was not adequately informed about the stakeholder's meetings.	Anchorage Public Workshop	5/5/09	3.3.7

Cmnt #	Comment	Submitted by	Date	State Response[16]
211	Why does the scale for safety consequences exclude injuries? The preliminary screening scale for safety should be broadened to include serious injuries requiring hospitalization. The occupational safety impact of 4 worker fatalities as a Category 1 risk seems high. Why is this consequence screened out?	Anchorage Public Workshop	5/5/09	3.4.4
212	Concern was raised regarding whether failures such as closing a valve will be considered, as these types of things are a major problem on the Slope. Using generic data will not take into account North Slope-specific problems. Human errors should include cutting of maintenance costs.	Anchorage Public Workshop	5/5/09	3.3.2
213	"Smaller" events can have huge consequences outside of the oil and gas industry. An example of this is when a small number of containers are contaminated in the commercial food products industry, which can result in significant economic damage to the brand and loss of sales. As far as environmental products critical to the State are concerned, there is a tendency for the public to view any spill as unacceptable. This makes it difficult to determine consequence levels. Some environmental consequences may be enormous to non-oil and gas industries. More work should have been done to determine environmental consequence levels.	Anchorage Public Workshop	5/5/09	3.4.3
214	The berms along the TAPS pipeline should not be considered secondary containment. Currently ADEC does define them as secondary containment, but they do not really act as secondary containment. This should be considered in the risk assessment.	Anchorage Public Workshop	5/5/09	3.4.5
215	Spills can have severe localized consequences. It does not appear that the methodology addresses this adequately.	Anchorage Public Workshop	5/5/09	3.4.5
216	Environmentally sensitive areas are a wide ranging, broad category. The Environmental Sensitivity index should give consideration to highly sensitive habitats with endangered species. Other areas that should be considered include areas where commercial fishing or subsistence use could be affected. These concerns should have been brought up in stakeholder meetings.	Anchorage Public Workshop	5/5/09	3.4.5
217	The study should broaden the environmental consequence categories/scale for environmental sensitivity. The full scope of environmental effects should be considered.	Anchorage Public Workshop	5/5/09	3.4.5
218	The assessment should also find a way to assess the chronic environmental effects of oil that is not mitigated or remediated. This is typically a weak point in assessments of this type.	Anchorage Public Workshop	5/5/09	3.4.5
219	Areas that support endangered species such as Beluga whales, orcas, etc. should be considered as more critically sensitive habitats than for example, salmon habitats.	Anchorage Public Workshop	5/5/09	3.4.5
220	Perceived risk is often different than what actually occurs, for example, the Prince William Sound spill still has lasting effects to public perceptions. The largest single damage of the PWS spill (more than everything else combined) was the perception of environmental damage.	Anchorage Public Workshop	5/5/09	3.4.5

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221	Secondary impacts should be considered. It is not difficult to assess economic impacts to commercial fisheries, and these effects should be included. This shouldn't add greatly to the workload. Copper River economic effects should be included.	Anchorage Public Workshop	5/5/09	3.4.3
222	Lack of consideration of human causation/human error factors and a lack of field research are a weakness of this methodology.	Anchorage Public Workshop	5/5/09	3.3.2
223	The term "gathering line" is not currently in use by ADEC. The project should remove references to "gathering lines" throughout the report, as this makes a difference as far as these components are regulated. The study should use ADEC's terms and definitions of "flowlines" and "transmission lines" instead.	Anchorage Public Workshop	5/5/09	3.3.9
224	Will the public be able to review recommendations that come out of this project? Recommendations from the study should have a public review.	Anchorage Public Workshop	5/5/09	3.3.7
225	There needs to be clarification about why recommendations are not going to be issued by the study. There should also be an audit of the project itself. There needs to be a candid discussion of the problems that the project is encountering.	Anchorage Public Workshop	5/5/09	3.3.6
226	Clarity on the Gap Analysis and its relationship with the risk assessment should be provided, as well as how these studies will be utilized together. No public information has been provided on this.	Anchorage Public Workshop	5/5/09	3.3.9
227	The title of the study is misleading. Use of the word "comprehensive" implies that this study includes more than it actually does, given the infrastructure boundaries. This is a concern because it affects the public perception of this risk assessment. Suggest changing the name to better reflect the actual scope of the study.	Anchorage Public Workshop	5/5/09	3.3.9
228	There should be a strong continuing audit of maintenance of facilities after the final risk assessment report is released. Concerned that the methodology does not include the government oversight role as a priority, project should be discontinued if not able to adequately address risks. Government oversight should have similar priority as human error and field information.A stronger regulatory presence by state and federal government is needed.	Anchorage Public Workshop	5/5/09	3.3.6
229	On pages 92-97 of the Interim Report, it appears that the project is having problems getting information from industry. It seems that industry is responding to project with passive hostility by not cooperating. The project appears to be having problems because of this. The State should demand this information.	Anchorage Public Workshop	5/5/09	3.3.4
230	After the study is completed, the State should consider having an audit in 3-5 years to review the results of the study. It would be valuable to know what the State does with the information from the study, what measures it initiated and the progress on implementing them (example of previous Coast Guard Ports & Waterways Safety Analysis for Aleutian Islands).	Anchorage Public Workshop	5/5/09	3.3.6
231	The Risk Matrix model encourages people to just exclude low risk scenarios. The risk ranking exercise doesn't serve a purpose.	Anchorage Public Workshop	5/5/09	3.4.3

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232	Public input may be confused with public endorsement of this project. Rather than just taking comments, stakeholder input should be incorporated more. Ultimately, the solution is to have citizen oversight councils to audit and make recommendations on continuing basis.	Anchorage Public Workshop	5/5/09	3.3.7
233	Stakeholder education should be enhanced, as opposed to just getting stakeholder input. Most stakeholders can give better input if they are fully aware of the effects on their lives of studies like this.	Anchorage Public Workshop	5/5/09	3.3.7
234	The risk assessment should consider consulting the residents in areas of higher consequence, e.g., residents of the Copper River Valley (during discussion of Natural Hazards).	Anchorage Public Workshop	5/5/09	3.3.7
235	Propose to take whatever is left in funding for project and hire ombudsman/whistleblower person for 5 years to deal with problems as they come up in the field rather than finish project as designed. Although the work remaining in this project should be completed as quickly as possible.	Anchorage Public Workshop	5/5/09	3.3.5
236	The State should increase funding for ombudsmen/ whistleblowers to be sent out into the field.	Anchorage Public Workshop	5/5/09	3.3.5
237	Even if people did not attend this meeting, it is important for the project team to make an effort to solicit input in places like Kenai and to hold meetings such as this so people have an opportunity to participate if they choose to.	Kenai Public Meeting	5/11/09	3.3.7
238	Other places do not have the same conditions, e.g. the heavy crude. This creates a whole new risk that you just won't find by looking at data from Texas, Africa, or the North Sea, etc. This is a very unusual pipeline here in Alaska, a great engineering feat but it has major problems. I don't believe a literature search for data outside of Alaska is valid for this risk assessment, and many other people share this opinion. (In response to a question that was asked: "How do you apply data that is not specific to Alaska?"	Valdez Public Meeting	5/12/09	3.4.1
239	It is clear that people have the wrong idea about what this risk assessment will do.	Valdez Public Meeting	5/12/09	3.3.7
240	Here is an example: at the East Metering facility, there was a pigging event that resulted in a release. If the East Metering facility were to explode this would take out the whole pipeline. This is one that is very important. (regarding senarios)	Valdez Public Meeting	5/12/09	3.4.5
241	Does the reliability model show that for highest category consequence, for a 2 month shutdown, you would only lose 2 months production, or did you also consider that if you shut in production, some of those wells may never produce again? In January, I understand that we were pretty close to irretrievable consequences. You can't just turn it off and then on again. I think this is an extremely significant consequence that you might need to go back and revisit.	Valdez Public Meeting	5/12/09	3.4.6

Cmnt #	Comment	Submitted by	Date	State Response[16]
242	Can we talk about Natural Hazards? The pipeline was built 30 yrs ago, and has major problems, e.g. bending. If you walk the pipeline, you'd be amazed at the problems that exist. Alyeska says this is a slow process. The pipeline was designed for an 8-8.5 earthquake and will no longer meet those standards. This has to be a part of the risk assessment. On the other side of the Gulkana it is designed for 8.5, but if there is an earthquake (e.g. the Denali fault), it would fail. This is my concern with this project. You can't know the actual risks of infrastructure from a literature search. Issues like corrosion and bending in the line won't come from Alyeska. It would take $30 million to do this right. Nothing against where you're trying to go, but I don't think this is a true risk assessment.	Valdez Public Meeting	5/12/09	3.3.2
243	All waterways are not equal. There is no way to clean up a spill on a river. What you have to look at is "how do you prevent the spill?" Any spill of any kind to Copper River is not acceptable. If we're going to give the legislature and governor information, it should be accurate and real. This is not acceptable and I'm upset with what is going here. I understand that the budget is not enough. If there is damage to Copper River, it is a sin. Need to look at what is actually wrong with the pipeline, not a literature search. There are issues with valves leaking. This doesn't fit – you can put it on paper and make a profit off of it, but it's not real.	Valdez Public Meeting	5/12/09	3.4.5
244	The Pump Station 1 incident in January would have been a catastrophic event that would have shut [Alaska production] down, period. You can't do a risk assessment without physically examining infrastructure. We need to know what the real risk is.	Valdez Public Meeting	5/12/09	3.3.3
245	The frustrating thing for me was I thought we were actually going to examine the facilities. This is a paper examination, not physical. There are so many areas where you can have physical issues, and by not physically examining these, it won't be an honest picture to the governor or citizens of Alaska. The results will show the possibilities only. I would stop right here and take a new look at the funding. This won't get the true answers. Let's just be honest and quit here to determine whether this should be done in a different way.	Valdez Public Meeting	5/12/09	3.3.3
246	Efforts should be continued to do a more specific assessment of risk. As far as operational risks go, it's more than just operating procedures and inspections, it's general oversight to make sure these things are being done. I would hope that this would come out of this assessment.	Valdez Public Meeting	5/12/09	3.4.1
247	An RCAC would help on the North Slope. Having presence of regulators helps keep industry on track. There is no magic solution, but these things would help.	Valdez Public Meeting	5/12/09	3.3.5
248	Next time you should consider going to Cordova instead of Valdez.	Valdez Public Meeting	5/12/09	3.3.7

Cmnt #	Comment	Submitted by	Date	State Response[16]
249	I don't think that is what a risk assessment is supposed to do. (regarding this question and answer scenario: Q: How does this (referring to the North Slope infrastructure component slide) determine the risk for the North Slope? Have you looked at industry's budgets for the year, the human factors (overworking people so they're catnapping on the job)? Those are all issues that should be considered. A: Those elements will be considered during implementation. The purpose of Phase 1 was to determine the components that are in scope and the methodology to be used to assess them)	Valdez Public Meeting	5/12/09	3.3.2
250	The project team needs to look at how the system interacts as a whole. Separating the factors will not give you the answer. I thought the reason Palin initiated this was to look at the system as a whole. What I see happening is that the three consequence categories are separate. I do not think that even one death is acceptable for the safety consequence scale. You are not considering how long a spill may occur, if it will get to water, etc. I think the safety criteria and the environmental scale are fatally flawed. We are undercutting our own state law because we are not looking at every regulated spills. Any spill to water should be considered. With the way this is written, we are missing those spills.	Fairbanks Public Meeting	5/13/09	3.4.2
251	It is not possible to complete an accurate risk assessment without data from the industry operators.	Fairbanks Public Meeting	5/13/09	3.3.4
252	The operators have already done all this work including in the field. The team needs to work with them.	Fairbanks Public Meeting	5/13/09	3.3.4
253	The description of the infrastructure understates the pipeline complexity. All pipelines should be considered.	Fairbanks Public Meeting	5/13/09	3.3.9
254	If the operator's PSM program is good, the team should be able to rely on the risk rankings that are included in their PHAs. I am surprised that industry is not even providing you with this information. If you are not looking at the quality of the PSM Program, there is no point to this project.	Fairbanks Public Meeting	5/13/09	3.3.4
255	You need industry cooperation; so you can look at layer of protection.	Fairbanks Public Meeting	5/13/09	3.3.4
256	Where it says "no public impact" on level one of the scale; does that mean 0 fatalities? On the worker safety scale, 5 fatalities is definitely unacceptable.	Fairbanks Public Meeting	5/13/09	3.4.4
257	There is no legitimate citation in the methodology to back up the safety numbers.	Fairbanks Public Meeting	5/13/09	3.4.4
258	They are trying to differentiate between process safety risk and the one-off slips, trips and falls. This safety scale makes sense in that context.	Fairbanks Public Meeting	5/13/09	3.4.4
259	I would recommend that you remove the public safety impact scale completely because it will not be meaningful.	Fairbanks Public Meeting	5/13/09	3.4.4

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260	The 10 barrel screening volume seems to create an impossible task. Because of the high volume running through the infrastructure, you will pretty much be looking at everything.	Fairbanks Public Meeting	5/13/09	3.4.3
261	I would recommend changing the safety scale to zero fatalities for both the public and workers and instead raise the environmental threshold.	Fairbanks Public Meeting	5/13/09	3.4.4
262	The approach is fundamentally flawed. The state's goal is to prevent spills. In this study, how will you look problems on stretches of pipeline where spills could occur, there is no leak detection, and the spill would go to water? This project could undermine the state's spill prevention goals. There is a portion of the modeling analysis that I do not understand.	Fairbanks Public Meeting	5/13/09	3.4.1
263	You could designate those portions of pipeline that cross rivers as higher risk.	Fairbanks Public Meeting	5/13/09	3.3.2
264	You should be able to include lower level risks in your final product such as facilities that do not meet the safety threshold. The occupational safety thresholds are too blunt a tool.	Fairbanks Public Meeting	5/13/09	3.4.3
265	I would suggest the scale be altered to capture injuries and 0 fatalities.	Fairbanks Public Meeting	5/13/09	3.4.4
266	Your scale should be on loss time incidences. If you are saying there have been no historical events of such fatalities on record, no facilities will make it through screening.	Fairbanks Public Meeting	5/13/09	3.4.4
267	My understanding was that there would be a physical inspection component to this project; work that would occur in the field. The project team needs to have seen the infrastructure in person to understand it. I think without field inspections, it is better to cancel the project and spend the money on regulating instead. I would recommend that we don't move forward with Phase 2 of the project.	Fairbanks Public Meeting	5/13/09	3.3.3
268	In terms of safe operations you should consider the price of oil. What the reliability factor has introduced is that as the price of oil goes down, you are considering spills less risky.	Fairbanks Public Meeting	5/13/09	3.4.4
269	Chronic concerns are not being included in the methodology.	Fairbanks Public Meeting	5/13/09	3.4.1
270	Sociologically I would handle this very differently. The project team needs to go to the North Slope and talk with those people whose land is impacted. I would like to go back to the topic of no North Slope deaths resulting from equipment failure. What about the individual who was in the well house that blew up? When the price of oil is lower and production is decreased, the companies cut their budgets and do not operate as safely.	Fairbanks Public Meeting	5/13/09	3.3.7

Cmnt #	Comment	Submitted by	Date	State Response[16]
271	How will the team possibly go to and evaluate each piece of equipment that is at risk? There are too many pieces of equipment in the scope to do that. It cannot possible be done within the current budget and schedule. It seems that the way this project is set up will not work. This project should be looking at process safety management, management systems, etc. If the team does not look at these things, the state will not get anything out of the project.	Fairbanks Public Meeting	5/13/09	3.4.2
272	I spent most of my life working construction on the North Slope. I learned that it is important to look at it from a practical perspective. All the facilities are accessible. Having hands on perspective gives you the practical experience so it does not all become theoretical.	Fairbanks Public Meeting	5/13/09	3.3.3
273	I do not feel that our concerns were considered in the state's response to our November 4th letter. I feel that we were almost completely ignored. You are not going to get the true risks without boots on the ground. We keep getting off track and avoiding the real problems. There is very little public participation, but almost all of the public input is negative. I am not sure if this is being taped, but just because I am participating in this process does not mean I am acquiescing. Just because we fall off the wagon sometimes, does not mean that our concerns are not valid. It is not simply altering thresholds that will make the public happy.	Fairbanks Public Meeting	5/13/09	3.3.7
274	Setting thresholds for unacceptable consequences is setting policy. The state is saying that the risks have to be of a certain magnitude before considered significant. The companies have been running the facilities into the ground just waiting for something to go wrong. This just gives them more excuses to keep doing this while actually lowering the standards. The state is saying it is okay. I think this whole project is risky from the state's perspective.	Fairbanks Public Meeting	5/13/09	3.4.3
275	The state is not unbiased in this. The state is worried about economics because they get so much money from production.	Fairbanks Public Meeting	5/13/09	3.3.8
276	I do not believe the state has the information to judge what the size of a spill might be. You were tasked with doing a condition assessment.	Fairbanks Public Meeting	5/13/09	3.3.3
277	The state is approaching this in the same way a business would, but the state is not a business. It is a government. Businesses look at risk from an economic perspective.	Fairbanks Public Meeting	5/13/09	3.4.1
278	If you do not have the ability to do what the Baker Report did, the project will not result in a valuable product.	Fairbanks Public Meeting	5/13/09	3.3.6
279	This project can learn lessons from the nuclear industry. For each and every problem that exists on the North Slope, someone knows about it and has probably reported it to their supervisor. The state needs to talk to employees, but not through the survey mentioned. AOGCC has regulatory authority to inspect. To do a risk assessment, you need to do an in-the-field inspection. Things can look good on paper. This is not worth doing if the team will not be in the field.	Fairbanks Public Meeting	5/13/09	3.3.3

Cmnt #	Comment	Submitted by	Date	State Response[16]
280	My fundamental problem with this project is that the State is focusing this as an economic perspective when the state's job is to protect the public.	Fairbanks Public Meeting	5/13/09	3.4.1
281	I am concerned about the consequence thresholds. What has not been answered by the methodology is the question, without being there, how can you know what is being done in the field and the difference between what is on paper and real life?	Fairbanks Public Meeting	5/13/09	3.4.1
282	You should have worked backwards and looked at the cost consequences of spills and use that information to create the scale.	Fairbanks Public Meeting	5/13/09	3.4.2
283	I appreciate the effort that has been made to come here. I can see that you considered the input that I gave last fall and included it in the methodology. It is unfortunate that you will not get data from industry so you will not really be able to do anything with this, but I do appreciate you listening to us.	Fairbanks Public Meeting	5/13/09	3.3.4
283	So because the scope is so big you are doing a watered down version instead of honing in on known chronic problems like corrosion.	Fairbanks Public Meeting	5/13/09	3.4.1
284	The state's response to Fineberg's letter (submitted in November 2008) was very telling. It was honest, but disturbing because all his comments were considered outside the scope of project or are being addressed by other projects. I would be willing to bet that what Palin thinks is coming out of this project will not match what actually results from it.	Fairbanks Public Meeting	5/13/09	3.3.9
285	The State of Alaska is the largest investor in Prudhoe Bay. If this was another country, BP would be kicked out because they are not looking out for the state's interests. It is the state's oil and gas. What I am looking for is what needs to be done to protect that.	Fairbanks Public Meeting	5/13/09	3.3.8
286	It seems that if the operators are all doing the same types of operations they will all have fairly high risks….Unless a company operates one of the critical nodes (i.e. single point of failure). ...As an operator, I would be reluctant to take action if it did not have an economic benefit. (these 3 comments were combined)	Fairbanks Public Meeting	5/13/09	3.3.8
287	The project team will not be able to come up with solutions for minimizing down time. Only industry can do that.	Fairbanks Public Meeting	5/13/09	3.3.6
288	Alyeska has already analyzed the impacts of production interruptions.	Fairbanks Public Meeting	5/13/09	3.3.4
289	C: Last time we talked about the full blown audit for TAPS that was done in the late 1980's. C: That was called a vertical slice. While the people were in the facilities asking for data, the Alyeska personnel were in the other room making up data to give them. (These 2 comments were grouped.)	Fairbanks Public Meeting	5/13/09	3.3.4
290	If you are able to evaluate who has PHA procedures, management of changes processes, and other such documents it will impact your risk rankings.	Fairbanks Public Meeting	5/13/09	3.3.2

Cmnt #	Comment	Submitted by	Date	State Response[16]
291	I would like further information on the index. It needs to be based on scientific information.	Fairbanks Public Meeting	5/13/09	3.4.1
292	I have a problem with this slide (referring to slide 48 of the presentation). The state is saying it is okay for someone to die.	Fairbanks Public Meeting	5/13/09	3.4.1
293	Then your write-up is faulty. (In response to the answer: Screening out of an event in one category does not necessarily mean it will be screened out of the other categories. In the example you just gave, the event would be screened out for safety analysis, but would receive detailed analysis for environmental risks.)	Fairbanks Public Meeting	5/13/09	3.4.3
294	The Texas City fatalities were operations-related. (In response to the answer: Thresholds for industry workers are typically set higher than that of the public. The project team took a look a fatalities on the North Slope and there have not been any related to operations. All of the fatalities that have occurred are related to construction activities, falls, and other such events.)	Fairbanks Public Meeting	5/13/09	3.4.4
295	C: Nuiqsut is in the vicinity of facilities. Hunters might be close to facilities. C: The people of Nuiqsut were there before industry was there. (These 2 comments were grouped together. An answer was given in between the two comments: The community of Nuiqsut and other communities like it will be considered in terms of safety consequences if they are in close proximity to infrastructure, but the team will not look at individual fatalities because someone is in the wrong place at the wrong time.)	Fairbanks Public Meeting	5/13/09	3.4.4

Cmnt #	Comment	Submitted by	Date	State Response[16]
296	On review, I find that the Alaska Risk Assessment (ARA) project has been fundamentally changed from its original design in ways that diminish this project's capability to accomplish its stated goals. The state's request for proposals (RFP), issued in March 2008, tasked the independent contractor with recommending mitigation measures to reduce risks in categories that included physical changes covering the following categories: physical changes to infrastructure, changes to policies, procedures, standards, or regulations; and changes to infrastructure audits, management, or oversight.1 But two changes to the original project plan, quietly made In September 2008, significantly alter the terms: •The project contractor selected by the state to conduct the risk assessment on Alaska's oil and gas production and delivery systems will not be making independent recommendations on risk mitigation; and •The project contractor and will not be evaluating the government oversight system. These changes were made at independent contractor Doyon-Emerald/ABS's request, shortly before the Alaska Department of Environmental Conservation (ADEC) and Doyon-Emerald/ABS convened a series of meetings in September 2008 to introduce the project to the public in five Alaska communities. I find no record that these changes were discussed during the public meetings. But at the end of the first paragraph of the ARA web site's "Introduction" page, the following statement was removed from the original posted project description: The risk assessment will conclude with a list of recommended mitigation measures based on the risks identified. And although the phrase "regulations and agency oversight" still appears on the web site in the final list of subjects to be included in the contractor's report, this task also appears to have been transferred from the independent contractor to the state. It appears that responsibility for making recommendations now falls to ADEC), placing the agency in the awkward position of evaluating itself and other government monitors. As a result of these changes, the independent review mission of the ARA contract team is now considerably narrower in scope than initially intended, to the detriment of the stated goals of assuring facility integrity and safe operations. The narrowed scope of the independent contractor's report may relieve the state's contractor of criticizing its government client and its industry associates, but this quiet change in the game plan does not serve the public interest.	AFER, et. al.	5/5/09	3.4.1
297	In response to a Nov. 4, 2008 comment letter I co-signed calling for field observations to identify problems associated with the erosion of operating standards that were supposed to ensure safe petroleum production and transport, ADEC Project Manager Ira Rosen responded that "[t]he project team will consider operations and management practices as part of the risk assessment, but conducting extensive field inspections and review of regulatory oversight is not within the scope of the project."4 In light of TAPS history, I find it almost inconceivable that extensive field inspections are beyond the scope of this project.	AFER, et. al.	5/5/09	3.3.3

Cmnt #	Comment	Submitted by	Date	State Response[16]
298	My 1996 and 2002 status reports on TAPS, supplemented by reports on my web site since 2004, contain numerous examples of problems on TAPS that the facility owner/operators were too slow to identify and, once identified, too slow to address, placing the environment at undue risk. Based on case studies documented in these reports, it is my opinion that lax government oversight can be clearly identified as a major contributing factor to many of these problems.	AFER, et. al.	5/5/09	3.3.2
299	Based on the experiences I have documented, I conclude that the proposed Alaska Risk Assessment methodology is fundamentally – if not fatally flawed by • failure to base its conclusions on first-hand field observation and document inputs; and • failure to confirm the validity of source information and conclusions through (a) observation of field operations; (b) on-site inspection of physical facilities; and (c) a randomized spot-check system to provide quality assurance verification of ARA input data. Similarly troubling in this regard are passages in the Doyon-Emerald/ABS January 2009 interim report suggesting that, as of that date, the industry had not been forthcoming with written information.6 In sum, on review of the proposed methodology, I respectfully suggest that without extensive field observation and ground-truthing of data the proposed ARA methodology cannot be expected to deliver anything more than a sad, multi-million-dollar example of the phenomenon known as GIGO (garbage in, garbage out).	AFER, et. al.	5/5/09	3.4.1
300	As an Alaska stakeholder, I have conducted extensive research on the operations of Alaska petroleum facilities in the past and, more recently, co-signed an extensive letter on this project at the close of the initial public comment period in November 2008 after attending public meetings on project. At this time I feel compelled to state for the record that I do not believe the ARA Stakeholder Process has been appropriately responsive to the concerns I have attempted to share with the ARA team.	AFER, et. al.	5/5/09	3.3.7

Cmnt #	Comment	Submitted by	Date	State Response[16]
301	Academic critiques of risk analysis suggest that attitude may be an important factor that separates risk analysis practitioners, acting on behalf of development agents, from concerned members of the public.7 Consider in this regard the evident approval with which the Doyon-Emerald/ABS team cites the Environmental Impact Statement contractors prepared in 2001-2002 for renewal of TAPS right-of-way agreements with the state and federal governments. The Doyon-Emerald/ABS team wrote: A unique aspect of the ARA project is that it considers three different classes of consequences: environment, safety, and reliability. The TAPS Renewal EIS is the only past study known to the project team that also addressed all three of these consequence classes. …it remains a valuable reference document because of historical outage and spill data collected and documented and the analyses regarding future environmental impacts of TAPS operations. Some who participated in the 2002 TAPS lease renewal process (myself included) take a very different view of the role the TAPS EIS played in the 2002 right-of-way renewal. In 2004 I reported that the TAPS EIS uncritically relied on shoddy government monitoring reports to dismiss public concerns about chronic performance failures. State and federal officials then used the EIS findings to validate their decision to renew the right-of-way agreements without strengthening the right-of-way provisions to insure improved oversight. Although the Doyon-Emerald / ABS report praises the TAPS EIS analysis of future operations, it is my view that the TAPS EIS deliberately sidestepped consideration of the plans for the major overhaul of TAPS facilities known as Strategic Reconfiguration, to the detriment of the public interest in enhanced safety.9 My own concerns aside, I do not believe that the ARA process has been responsive to the concerns of citizen stakeholders in general.	AFER, et. al.	5/5/09	3.3.4
302	The narrowed scope of the independent contractor's report may relieve the state's contractor of criticizing its government client and its industry associates, but this quiet change in the game plan does not serve the public interest.	AFER, et. al.	5/5/09	3.3.8
303	In any event, the ARA's failure to ground-truth its report in on-site field work severely diminishes the likelihood that its survey will get to the heart of the problems that threaten the safety of Alaska oil and gas infrastructure operations.	AFER, et. al.	5/5/09	3.3.3
304	In addition to the historical documentary record of lax government oversight on TAPS and the North Slope to which I have referred in the preceding comments, recent articles available on my web site strongly suggest that independent review of government monitoring programs should be considered an essential component of a comprehensive evaluation and risk assessment of Alaska's oil and gas infrastructure.	AFER, et. al.	5/5/09	3.3.4

Cmnt #	Comment	Submitted by	Date	State Response[16]
305	The state's request for proposals (RFP), issued in March 2008, tasked the independent contractor with recommending mitigation measures to reduce risks "after considering at least the following possible mitigation categories:" •Physical changes to infrastructure; •Changes to policies, procedures, standards, or regulations; and •Changes to infrastructure audits, management, or oversight. As noted in my preliminary comments May 5, at the end of the first paragraph of the ARA web site's "Introduction" page the following statement has been removed from the original posted project description: The risk assessment will conclude with a list of recommended mitigation measures based on the risks identified. In an e-mail to ADEC Project Manager Ira Rosen Sept. 3, 2008 (copy attached), Doyon Emerald President and General Manager Bettina S. Chastain, P.E., submitted documentation to support a requested "change to eliminate the need for us to develop Recommendations as part of our final deliverable." The following day, Rosen e-mailed colleagues to advise them that "[p]er internal discussions, I asked that the task to Recommend Mitigation Measures be taken out. The recommendations will come from the State." When an ADEC colleague wrote back to question the proposed contract change because it would place ADEC in the position of "making recommendations/conclusions on ourselves," Rosen responded that the possibility of recommendations regarding "increased oversight or regulation" was of concern to industry owners/ operators." For that reason, Rosen wrote, "the current thinking is to leave that to the state," rather than to the consultants.3 At the meeting in Anchorage last Tuesday morning (May 5), I asked Ms. Chastain if Doyon-Emerald / ABS would be making recommendations. She responded that recommendations were a part of the contract, and that she wished Mr. Rosen (who had stepped out of the room a few moments before) were present to comment. I requested that this subject receive further consideration during the afternoon session. However, during the afternoon a Doyon-Emerald / ABS representative said that he did not wish to discuss whether the independent consultants would be making recommendations, adding that the state is still deciding this question.	AFER, et. al.	5/13/09	3.3.6

Cmnt #	Comment	Submitted by	Date	State Response[16]
306	In sum, it appears that the independent contractor's mission is quietly being narrowed in scope by the transfer to the state of responsibility for making recommendations regarding both risk mitigation and the effectiveness of the oversight regime that is supposed to protect the public interest by mitigating those risks. But if the independent contractor does not make recommendations about what it finds, will the project provide the "thorough, independent appraisal of the condition of the state's oil and gas facilities" the governor intended when she launched the project two years ago? The manner in which this issue is being handled raises the following additional questions: •What factors prompted Doyon-Emerald to request that the Doyon-Emerald / ABS contract be modified to eliminate the requirement to make independent recommendations? •Why are the members of the public who have been encouraged to participate in the review of the ARA methodology having such a difficult time learning whether the project recommendations function is being changed? •Should the public have confidence in the results of a supposedly independent risk assessment when the independent contractor is relieved of tasks that are "of concern to industry owners/ operators"?	AFER, et. al.	5/13/09	3.3.6
307	A significant portion of the meeting in Anchorage May 5 was devoted to the difficulties that ADEC and Doyon-Emerald / ABS have encountered in their efforts to secure from industry access to data and facilities. Apparently the industry has refused to cooperate with the project. Consequently, at this late date the project team is still negotiating to secure access to data. Meanwhile, Doyon-Emerald / ABS and ADEC say they intend to work around this problem by using published reports and aggregate statistical data from other operations to hypothesize the probable effects of hazards which they will not observe and for which they have not been able to obtain real-world data. Although the proposed methodology is supposed to be complete, it emerged from discussion in Anchorage May 5 that it is not entirely clear how the ARA team will obtain data, confirm whatever data it obtains or graft its generalized probabilities onto the realities of the Alaska infrastructure's operating environment.	AFER, et. al.	5/13/09	3.3.4

Cmnt #	Comment	Submitted by	Date	State Response[16]
308	In my estimation, the problems of data acquisition and analysis discussed in Anchorage last week are overshadowed by the basic methodological issue I raised in my May 5 preliminary comments – the failure of the ARA to base its analysis and conclusions on observed field work. As stated in my preliminary comments May 5, it is my view that the approach that ADEC and Doyon-Emerald / ABS are attempting to implement severely diminishes the likelihood that this project will get to the heart of the potential problems that threaten the safety of Alaska oil and gas infrastructure operations. In sum, discussions in Anchorage May 5 confirmed previous concerns about data acquisition and interpretation while failing to address the more fundamental problem delineated in my preliminary comments. Again I respectfully suggest that without extensive field observation and ground-truthing of data the proposed ARA methodology cannot be expected to deliver anything more than a sad, multi-million-dollar example of the phenomenon known as GIGO.	AFER, et. al.	5/13/09	3.3.3
309	Open dialogue is essential to the identification and resolution of problems that might otherwise work against project success. The interchange process also helps bridge the gap between members of the public affected by the risks being evaluated and the technical world of the evaluators. I therefore I commend ADEC for its recent outreach efforts, including the prompt posting of my May 5 comments on the proposed ARA project methodology.	AFER, et. al.	5/13/09	3.3.7
310	At the same time, it remains my view that until recently the public outreach effort and the public review process have been severely hampered by failure to post information in a timely manner. Additionally, the failure to disclose the apparent transfer of responsibility for project recommendations from independent contractor to the state (placing the state in the awkward position of evaluating itself), discussed above, undermines confidence in the public outreach process.	AFER, et. al.	5/13/09	3.3.7
311	At present, the entry in the "Date" column of the ARA web site "Documents" page displays dates inconsistently. Entries may show the date the document was written, the date it was posted, or the date of the event to which the document refers. To alert participants in the public process to delayed postings when they occur, I recommend that the header for the "Date" column of the documents listed on the "Documents" page be changed to "Date Posted," and the date of posting be shown in that column.	AFER, et. al.	5/13/09	3.3.7
312	1. ADEC and Doyon-Emerald / ABS have failed to recognize the need for independent assessment of government efforts that will identify and close gaps in the government regulatory web to assure that processes such as training, management of change, quality control and quality assurance are functioning in the field to support safe maintenance and operations.	AFER, et. al.	5/13/09	3.4.2
313	2. ADEC and Doyon-Emerald / ABS failed to recognize the importance of unlimited access to facilities, documents and data (a) to determine that potential problems are correctly recognized and (b) to assure that risk mitigation measures are actually (i) in place and (ii) implemented in a timely manner, rather than promised.	AFER, et. al.	5/13/09	3.3.4

Cmnt #	Comment	Submitted by	Date	State Response[16]
314	3. ADEC and Doyon-Emerald / ABS failed to recognize the importance of identifying and mitigating risks created by human error, and to recognize that mistakes classified as human error that may place safety, the environment and revenue flows at risk are most liable to occur when workers are overworked, confronted by the simultaneous occurrence of problems or stressed by other factors.	AFER, et. al.	5/13/09	3.3.2
315	4. Although ADEC initially ruled that Doyon-Emerald's ties to industry did not pose a conflict of interest, Doyon-Emerald's close relationships with the petroleum industry may have prevented the consultants from recognizing the significance of the three preceding conclusions and the need to assure independent field inputs and quality checks to prevent statistical project results from GIGO contamination.	AFER, et. al.	5/13/09	3.3.8
316	The ARA was conceived in response to BP's corrosion problems in 2006 at Prudhoe Bay, where the oil spills and shutdown of the nation's largest oil field resulted from poor management, abetted by lax government oversight.6 Due to the shortcomings in the risk assessment methodology summarized in the conclusions above, the Doyon-Emerald / ABS project is not likely to reveal the potential operational and environmental risks associated with Alaska petroleum production and onshore transportation. For this reason, I recommend that this RFP should be terminated at the close of Phase I. The information assembled to date should be applied to a new assessment. With a revised focus on field inputs and independent evaluation, the new project will have a better chance of making meaningful contributions to risk mitigation efforts than continuing the current project under the Doyon-Emerald / ABS proposed methodology.	AFER, et. al.	5/13/09	3.3.9
317	The ARA team received many stakeholder expressions of concern about SR during its original outreach effort in 2008 but failed to ascertain what those concern might have been or take action to assure that the ARA methodology addressed them, suggesting an apparent lack of responsiveness to stakeholder concerns. The fact that the ARA team's public outreach program failed to identify the significance of the relationship between SR program implementation and safe operations suggests that the public process may not have provided the would-be risk assessment practitioners with sufficient empirical input information to assure identification of the conditions that might put facilities at risk.	AFER, et. al.	6/2/09	3.3.7
318	Input from on-site inspections can serve two fundamental purposes: (1) to validate the appropriateness of data selected for analysis and (2) to quality check the results of that analysis.	AFER, et. al.	6/2/09	3.3.3
319	The documentary information supporting this case study shows the importance of information that is most likely to be obtained through direct contact with people involved in day-to-day operations of the facilities whose operating and maintenance risks the ARA project is supposed to identify and reduce.	AFER, et. al.	6/2/09	3.3.3

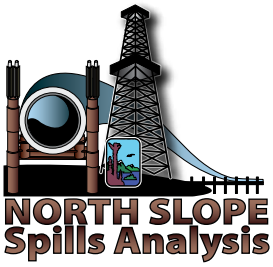
Cmnt #	Comment	Submitted by	Date	State Response[16]
320	In the absence of empirical data analogous to the information presented in this case study, a risk analysis based on abstract data is liable to miss critical causal factors and therefore suffer from the well-known phenomenon (sometimes called "GIGO") which occurs when faulty inputs lead to invalid results.	AFER, et. al.	6/2/09	3.4.1
321	It is frequently asserted that TAPS is well operated, well maintained, and that government oversight is appropriate and effective in assuring optimal risk mitigation; the problems associated with putting SR facilities and equipment into service at Pump Station #9 in early 2007 suggests otherwise.	AFER, et. al.	6/2/09	3.4.1
322	Regarding government oversight, this case study shows: -the fallacy of excluding government oversight from evaluation as a part of the petroleum production and transportation facilities; and -the fallacy of assuming, without objective corroboration, that government monitors of Alaska oil and gas facilities are (a) immune from socio-economic pressures to support development and (b) performing their oversight mission effectively to assure that risks are appropriately minimized and/or mitigated.	AFER, et. al.	6/2/09	3.3.8
323	The JPO granting of a phased permit at the outset of the SR project and BLM's preparation of a flawed CMP report on implementation suggest that JPO's development-oriented mission51 may conflict with the need for independent oversight of the industry.	AFER, et. al.	6/2/09	3.3.8
324	Alternately, a detailed analysis for the Cook Inlet Oil and Gas infrastructure, as a whole, would be considered. It is our desire to insure Cook Inlet will remain in the ARA process to insure this vital part of our State's environment, economy, and safety of the population is not overlooked.	CIRCAC	6/4/09	3.3.1
325	It is not clear how statistical failure data and Bayesian Analysis are to be used to support the project objectives. Models like Muhlbauer's pipeline risk index do not use failure rate data. It appears a combination of quantitative and qualitative methods is being proposed, but the approach to be taken is not clearly described. Also, it is not clear how single value methods are being combined with distributions through Bayesian Analysis, or how the results are to be applied.	PHMSA	5/26/09	3.4.1
326	There is very limited data on the reliability performance of oil and gas industry components, especially in environments found in Alaska (e.g., high winds, sub-zero temperatures, ice buildup, and dust as a result of high winds). The contractor has proposed multiple data sources, many of which are not applicable to pipeline components. The resultant quantification of pipeline reliability may be questionable. Military and nuclear power electronic component failure data must be used judiciously as those components are probably designed to different standards than those used in the oil and gas industries and the impact of adverse environmental conditions may not be adequately reflected.	PHMSA	5/26/09	3.3.6
327	Again, as explained above, by focusing only on physical infrastructure the methodology needlessly excludes important process-safety risks.	Cascadia Wildlands	5/20/09	3.4.2

Cmnt #	Comment	Submitted by	Date	State Response[16]
328	Study results should be presented with note that exclusion of distribution systems and certain outside force threats will likely skew safety and environmental results.	PHMSA		3.3.1
329	If the methodology were to focus more clearly on reliability, the potential for this undesirable outcome would be minimized.	AOGA	6/2/09	3.4.6
330	Similarly, the environmental issues are thoroughly regulated and overseen by among others ADEC, PSIO, EPA, DOT, and DNR.	AOGA	6/2/09	3.4.5
331	As Mr. French correctly pointed out at the May 5, 2009 workshop, it is also important to consider the impacts of what happens after a spill. In the Exxon Valdez spill, the cleanup was worse environmentally and socially, than the spill itself. We're not asking you to look into a crystal ball, but don't put on blinders, either.	AFER, et. al.	6/2/09	3.4.2

APPENDIX B: ACRONYMS AND ABBREVIATIONS

ABS	American Bureau of Shipping
AK	Alaska
ALA	American Lifelines Association
ADEC	Alaska Department of Environmental Conservation
AFER	Alaska Forum for Environmental Responsibility
AOGA	Alaska Oil & Gas Association
AOGCC	Alaska Oil and Gas Conservation Commission
ARA	Alaska Risk Assessment
ASME	American Society of Mechanical Engineers
BC	British Columbia
BLM	Bureau of Land Management
CCA	Common cause analysis
CCA	Copper County Alliance
CIRCAC	Cook Inlet Regional Citizens' Advisory Council
DNR	Department of Natural Resources
DNV	Det Norske Veritas
DOT	Department of Transportation
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
EVOS	Exxon Valdez Oil Spill
FEMA	Federal Emergency Management Agency
FY	Fiscal Year
ID	Identification
IM	Integrity Management
GIGO	Garbage in, garbage out
JPO	Joint Pipeline Office
KBCS	Kachemak Bay Conservation Society
KBNERR/ KBRR	Kachemak Bay National Estuarine Research Reserve
LDS	Leak detection system
NAS	National Academy of Sciences
NPDES	National Pollution Discharge Elimination System
OSHA	Occupational Safety and Health Administration
PHMSA	Pipeline and Hazardous Materials Safety Administration
PSIO	Petroleum Systems Integrity Office
PWS	Prince William Sound
PWSRCAC	Prince William Sound Regional Citizens' Advisory Council

QRA	Quantitative Risk Analysis or Assessment
RCAC	Regional Citizen's Advisory Council
RFP	Request for Proposal
RGV	Remote Gate Valve
SAOT	State Agency Oversight Team
SR	Strategic Reconfiguration
TAPS	Trans Alaska Pipeline System
TRB	Transportation Research Board
VMT	Valdez Marine Terminal
YRITWC	Yukon River Intertribal Watershed Council


NORTH SLOPE
Spills Analysis