

1 **Declaration of Dr. John Talberth**

2 **In the Matter of the Army Corps of Engineers**

3 **Delong Mountain Terminal Project, Kivalina, Alaska**

4 I, John Talberth, declare and state as follows:

5 **I. Introduction and Summary**

6 1. My name is John Talberth. I currently serve as President and Senior Economist  
7 with the Center for Sustainable Economy (CSE) in Santa Fe, New Mexico. CSE is a non-profit  
8 consulting firm that provides expertise in economic analysis, conservation planning, and  
9 environmental law for non-profit, business, and government clients.

10 2. I hold a Ph.D. in Economics from the University of New Mexico and a Masters of  
11 Urban and Regional Planning from the University of Oregon. My areas of expertise include  
12 environmental economics, sustainability metrics, international economics, land use planning, and  
13 regulatory compliance. My professional experience includes analyzing the economic costs and  
14 benefits of federal programs and projects that affect environmental quality. I've attached, hereto  
15 as Exhibit A, a copy of my current vita.

16 3. Since 2002, CSE (formerly Ecology and Law Institute) has been monitoring,  
17 commenting on, and offering critiques of the economic analysis supporting the Delong Mountain  
18 Terminal Project (DMTP) on behalf of the Northern Alaska Environmental Center. Exhibit B is  
19 a 2003 critique based on the Army Corps of Engineers (Corps) preliminary draft feasibility  
20 report and environmental impact statement released in 2002. Exhibit C is a 2007 critique based  
21 on the Corps draft interim feasibility report (DIFR) and draft environmental impact statement  
22 (DEIS) released in September of 2005. Both of these documents have been submitted into the  
23 Administrative Record for the DMTP. Within these documents, CSE has compared legal and

1 professional standards applicable to benefit-cost and economic impact analyses undertaken by  
2 the Corps with the benefit-cost and economic impact analyses that appear in the Corps draft  
3 feasibility reports and draft environmental impact statements for the DMTP. I submit this  
4 declaration to summarize our findings.

5 4. This declaration is organized as follows. In Section II, I review relevant legal  
6 and professional standards. In Section III, I compare the Corps DIFR and DEIS with these  
7 standards and identify unwarranted assumptions, apparent calculation errors, and omissions that  
8 tend to overstate DMTP benefits, understate DMTP costs and otherwise nullify the DIFR and  
9 DEIS as a basis for decision making. In Section IV, I present independent estimates of key cost  
10 factors omitted from the DIFR and DEIS. In Section V, I analyze how the benefit-cost ratio for  
11 the DMTP is likely to change if the modifications suggested by Sections III and IV are  
12 incorporated into the final Feasibility Report and Environmental Impact Statement. In Section  
13 VI, I offer conclusions.

## 14 **II. Relevant Legal and Professional Standards**

15 5. Sections 1 and 2 of Exhibits B and C set forth legal and professional standards  
16 applicable to any benefit-cost or economic impact analyses the Corps prepares pursuant to the  
17 Water Resources Development Act (WRDA),<sup>1</sup> Water Resources Council (WRC) regulations,<sup>2</sup>  
18 National Economic Development (NED) procedures,<sup>3</sup> the National Environmental Policy Act

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<sup>1</sup> Water Resources Development Act (WRDA), 33 USC § 2282 et seq.

<sup>2</sup> Water Resources Council (WRC, 1983). Economic and Environmental Principles for Water and Related Land Resources Implementation Studies. Washington, D.C., Water Resources Council.

<sup>3</sup> Institute for Water Resources (IWR, 1991a). National Economic Development Procedures Manual – Overview Manual for Conducting National Economic Development Analysis. Fort Belvoir, VA, U.S. Army Corps of Engineers, Water Resources Support Center, Institute for Water Resources; Institute for Water Resources (IWR, 1991b). National Economic Development Procedures Manual – National Economic Development Costs. Fort Belvoir, VA, U.S. Army Corps of Engineers, Water Resources Support Center, Institute for Water Resources.

1 (NEPA),<sup>4</sup> the Council on Environmental Quality (CEQ) regulations implementing NEPA,<sup>5</sup>  
2 Executive Order 12893 (Principles for Federal Infrastructure Investments) and case law  
3 interpreting these statutes and regulations.

4           6. There are seven key standards at issue here. The first standard involves how the  
5 Corps determines whether or not federal involvement in navigation or civil works projects like  
6 the DMTP is warranted. There are two key factors to consider. First, in order for the Corps to  
7 participate in the design and funding of a civil works or navigation project, the benefit-cost ratio  
8 for the project must be greater than one. In fact, the Corps must select as their preferred  
9 alternative an “alternative reasonably demonstrating maximum net benefits with a benefit-cost  
10 ratio over 1:1” (DIFR Appendix E at E-194).<sup>6</sup> In other words, the Corps preferred alternative  
11 must be the alternative with the greatest margin of benefits over costs. Secondly, the project  
12 must produce public, rather than private benefits. In particular, Corps regulations prohibit  
13 federal involvement in projects that primarily benefit single users or which primarily benefit land  
14 development schemes, waterway cargo transfer and lightering activities, or barge fleeting areas.<sup>7</sup>  
15 The Corps has been directed not to recommend any federal cost participation in construction or  
16 expansion of a federal navigation project where the improvement would serve, for the  
17 foreseeable future, only property served by a single individual, commercial/ business enterprise,

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<sup>4</sup> 42 USC § 421 et seq.

<sup>5</sup> 40 CFR § 1500 et seq.

<sup>6</sup> “In the case of any water resources project-related study authorized to be undertaken by the Secretary, the Secretary shall prepare a feasibility report .... Such feasibility report shall describe, with reasonable certainty, the economic, environmental, and social benefits and detriments of the recommended plan and alternative plans considered by the Secretary ....” 33 U.S.C. § 2282(a). “A plan recommending Federal action is to be the alternative plan with the greatest net economic benefit consistent with protecting the Nation’s environment (the [National Economic Development] plan), unless the Secretary of a department or head of an independent agency grants an exception to this rule” (WRC, 1983).

<sup>7</sup> U.S. Army Corps of Engineers (USACE, 1999). EP 1165-2-1, Chapter 12, Navigation. Washington, D.C., U.S. Army Corps of Engineers.

1 or corporation (Id. at 12-7). A more detailed discussion of this standard appears in Section 2.1 of  
2 Appendix C.

3 7. The second standard involves how the Corps incorporates its benefit-cost analyses  
4 (BCA) into the NEPA process. CEQ regulations implementing NEPA require that any BCA  
5 must discuss “the relationship between that analysis and any analyses of unquantified  
6 environmental impacts, values, and amenities” (40 CFR § 1502.23). To operationalize this  
7 requirement, the WRC regulations require the Corps to maintain four separate sets of accounts  
8 which enable Corps decision makers to compare economic values and impacts that are not  
9 included in NED analysis but which, none the less, may have significant bearing on a project’s  
10 feasibility with those that are included in NED.

11 8. The four accounts include (1) the National Economic Development (NED)  
12 account which describes that part of the NEPA human environment, as defined in 40 CFR  
13 §1508.14, that identifies beneficial and adverse effects on the economy (WRC, 1983, 8); (2) a  
14 Regional Economic Development (RED) account, which registers changes in the distribution of  
15 regional economic activity that result from each alternative plan. Two measures of the effects of  
16 the plan on regional economies are used in the account: regional income and regional  
17 employment. The regions used for RED analysis are those regions with in which the plan will  
18 have particularly significant income and employment effects (WRC, 1983, 11); (3) an  
19 Environmental Quality account (EQ) account, which is a means of displaying and integrating  
20 into water resources planning that information on the effects of alternative plans on significant  
21 EQ resources and attributes of the NEPA human environment, as defined in 40 CFR § 1507.14,  
22 that is essential to a reasoned choice among alternative plans. Significant means likely to have a  
23 material bearing on the decision making process (WRC, 1983, 10), and (4) an Other Social

1 Effects (OSE) account, which is a means of displaying and integrating into water resource  
2 planning information on alternative plan effects from perspectives that are not reflected in the  
3 other three accounts. The categories of effects in the OSE account include the following: urban  
4 and community impacts; life, health, and safety factors; displacement; long-term productivity;  
5 energy requirements and energy conservation (WRC, 1983, 12).

6 9. Importantly, all four accounts are needed to satisfy the CEQ NEPA obligations:  
7 “[t]hese four accounts encompass all significant effects of a plan on the human environment as  
8 required by the National Environmental Policy Act of 1969 (NEPA) (42 USC § 4321 et  
9 seq.)”(WRC, 1983, 8). Thus, the proper manner in which to incorporate BCA findings into an  
10 EIS is to include the BCA in the NED account, and then compare its findings and values with  
11 those reported by the other three accounts. A more detailed discussion of this standard appears  
12 in Section 2.8 of Appendix C.

13 10. The third standard involves analysis of cumulative economic impacts. Pursuant to  
14 40 C.F.R. §1508.25(c)(3), an environmental impact statement must consider a proposed project's  
15 “cumulative impact.” 40 CFR. §1508.7 defines cumulative impacts as “the impact on the  
16 environment which results from the incremental impact of the action when added to other past,  
17 present, and reasonably foreseeable future actions regardless of what agency (Federal or non-  
18 Federal) or person undertakes such other actions. Cumulative impacts can result from  
19 individually minor but collectively significant actions taking place over a period of time.” A  
20 more detailed discussion of this standard appears in Section 2.9 of Appendix C.

21 11. The fourth standard deals with adding interest charges during construction. In  
22 order for Corps BCA to reflect the opportunity costs of money spent on civil works projects  
23 during the construction phase, benefits or costs incurred in the years prior to the base year must

1 be “moved forward” to the base year by adding compound interest.<sup>8</sup> A more detailed discussion  
2 of this standard appears in Section 1.4 of Appendix C.

3           12. The fifth standard deals with the quality of the data the Corps relies upon in its  
4 benefit-cost analyses, the validity of the Corps’ assumptions, and the accuracy of its calculation  
5 methods. Of course, professional standards for BCA require that the Corps use the most  
6 accurate, up to date, and credible information available, the most realistic assumptions, and peer  
7 reviewed methodologies. Standards can also be drawn from the federal Data Quality Act as well  
8 as case law. The Data Quality Act requires all federal agencies to promulgate guidelines  
9 “ensuring and maximizing the quality, objectivity, utility, and integrity of information (including  
10 statistical information) disseminated by the agency” (Sec. 515 of the Treasury and General  
11 Government Appropriations Act for Fiscal Year 2001, Public Law 106-554; H.R. 5658). Federal  
12 case law suggests that the primary concerns which may lead a court to find a BCA sufficiently  
13 skewed to warrant reversal of an agency’s proposed action include: (1) a failure to consider  
14 significant and reasonably foreseeable economic, environmental, and social costs of the project  
15 which are clearly pertinent to the agency’s consideration of alternatives for the project, and/or (2)  
16 errors or faulty assumptions in the analysis which substantially inflate the economic benefits of a  
17 proposed project or which substantially misrepresents or minimize the environmental and social  
18 costs. A more complete discussion of this standard appears in Section 3.2 of Appendix C.

19           13. The sixth standard involves displacement costs, or transfers of economic activity  
20 from one region to another. If Corps’ sponsored projects cause economic activity to increase in  
21 one region at the expense of another, Corps’ regulations explicitly require quantification of the  
22 costs to the latter as well as benefits to the former. For example, Water Resources Council

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<sup>8</sup> Corps’ regulation ER 1105-2-100 Appendix D, Amendment #1, June 30th, 2005.

1 guidance contains clear direction to disclose the “net income losses from plan-induced shifts of  
2 economic activity” from one region to another, and to list such transfers of economic activity in  
3 national economic development accounts (WRC, 1983, 12). A more complete discussion of this  
4 standard appears in Section 2.7 of Appendix C.

5 14. The seventh and final standard at issue involves externalities. To complete a  
6 reasonably accurate NED account, the Corps must provide a full accounting of costs and benefits  
7 that would accrue to all parties regardless of whether they are directly affected by a proposed  
8 project. As explained by the Corps in its NED guidance manual, “[m]any economic activities  
9 provide incidental benefits to people for whom they were not intended. Other activities  
10 indiscriminately impose incidental costs on others. These effects are called externalities” (IWR,  
11 1991a, 21). The Corps has a mandate to incorporate external costs into its NED analysis: “[t]he  
12 NED principle requires that externalities be accounted for in order to assure efficient allocation  
13 of resources” (*Id.* at 23). Tracking external costs is a standard requirement for evaluating all  
14 public expenditures.<sup>9</sup> Consideration of externalities, whether they affect marketed or non-  
15 marketed goods and services, is a required component of all economic analyses supporting  
16 federal infrastructure investments.<sup>10</sup> Federal environmental justice guidelines require the Corps  
17 to pay particular attention to externalized costs of pollution when subsistence uses by Native  
18 Americans is at issue.<sup>11</sup> A more complete discussion of this standard appears in Section 2.5 of  
19 Appendix C.  
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<sup>9</sup> See, e.g. Office of Management and Budget, Circular A-94 at 6.

<sup>10</sup> Principles for Federal Infrastructure Investments, Executive Order 12893 at Section 2(a)1.

<sup>11</sup> Presidential Executive Order on Environmental Justice, Executive Order 12898 at Section 4-401.

1 **III. Critique of the DIFR and DEIS**

2 15. Against these standards, it is abundantly clear that the BCA presented in the DIFR  
3 and incorporated into the DEIS is deficient from both a legal and professional standard and ought  
4 not to be used as a basis for decision making. First, neither the DIFR nor the DEIS provide  
5 justification for federal involvement. The sole public benefit cited by the Corps as a basis for  
6 federal involvement is the potential for the Delong Mountain Terminal, once improved, to be  
7 used as a fuel distribution center that can pass along fuel cost savings to area villages. However,  
8 there is nothing in the DIFR nor the DEIS that suggests that the Delong Mountain Terminal  
9 (DMT), once improved, would actually be used for this purpose. As discussed in Section 3.1 and  
10 3.8 of Appendix C, there are numerous logistical and economic barriers that must be overcome  
11 in order for the DMT to be used as a regional fuel distribution center, and even if these were  
12 overcome, it is unclear whether fuel savings would be passed on. As a result, the village fuel  
13 savings benefit included in the DIFR and DEIS is highly speculative.

14 16. As reviewed in Section 2.1 of Appendix C, Corps involvement in navigation  
15 projects is limited to those projects that are clearly in the public interest. Federal involvement in  
16 projects such as the DMTP which primarily benefit a single user and which are primarily  
17 designed to improve waterway cargo transfer and lightering activities is specifically barred.<sup>12</sup> As  
18 explained in Section 2.1, there are limited exceptions to this rule, but to demonstrate that the  
19 DMTP qualifies for such an exemption, a rigorous analysis of federal interest must be completed  
20 using the factors identified on page 13 of Appendix C.<sup>13</sup> That analysis must demonstrate that a  
21 “reasonable prospect exists for the improvement to later serve multiple properties with multiple

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<sup>12</sup> Army Corps of Engineers, (ACOE, 1999). EP 1165-2-1, Chapter 12, Navigation. Washington, D.C., U.S. Army Corps of Engineers.

<sup>13</sup> In addition, the Rivers and Harbors Act of 1920 directs the Corps to describe the “special or local benefit” as well as the “general or national benefit” of all proposed improvements.

1 owners” (ACOE, 1999, 12-8). Neither the DIFR nor the DEIS contains such an analysis.  
2 Therefore, the Corps has not demonstrated that federal involvement in the DMTP is justified. A  
3 more complete discussion of these deficiencies appears in Section 3.1 of Appendix C. Federal  
4 involvement appears not to be justified, as well, because the benefit-cost ratio for the project is  
5 likely far below the 1:1 threshold. A more complete discussion of this issue follows in Section V  
6 of this declaration.

7 17. Secondly, it is clear that the Corps has not followed procedures for incorporating  
8 the benefit-cost analysis (BCA) into the DEIS. In particular, the Corps failed to prepare three of  
9 the four accounts – regional economic development (RED), environmental quality (EQ), and  
10 other social effects (OSE) – needed to satisfy NEPA obligations and account for all of the  
11 economic and social costs and benefits of relevance to the DMTP’s feasibility. The DEIS also  
12 fails to discuss the relationship between the BCA and any analyses of “unquantified  
13 environmental impacts, values, and amenities” as required by 40 CFR § 1502.23. Instead, the  
14 BCA was simply incorporated by reference on page 47 without reference to economic impacts  
15 that ought to have been considered in the RED, EQ, or OSE accounts and without any other  
16 discussion of how the BCA relates to unquantified impacts, values, and amenities. A more  
17 complete discussion of these deficiencies appears in Section 3.2 of Appendix C.

18 18. Third, the DEIS fails to include an actual analysis of cumulative economic  
19 impacts associated with past, present, or reasonably foreseeable actions. The DEIS identifies  
20 existing in water, on shore, and inland development in the affected region (DEIS at 392-393).  
21 However, impacts associated with existing development are dismissed as minimal, and therefore  
22 not examined. Likewise, the DEIS contains a list of 12 reasonably foreseeable future actions  
23 including increased throughput for the Red Dog Mine, new zinc mining, other mining, coal

1 mining in the northern Northwest Arctic Borough, development of transportation corridors, a  
2 new airport at Portsie, trans-shipment of goods for communities, fuel transfer to communities, a  
3 road system from the DMT to communities, Kivalina relocation, an expanded airport at Noatak,  
4 and natural gas exploration. Once again, however, the environmental, economic, and social  
5 impacts are not discussed or disclosed in any meaningful manner. While the Corps justifies its  
6 failure to include a meaningful analysis of reasonably foreseeable actions by assuming that such  
7 actions are too speculative or too distant in the future, evidence presented in Section 3.3 of  
8 Appendix C shows that there is more than enough specificity in terms of activity location,  
9 magnitude, intensity, and duration for the Corps to take the requisite hard look at cumulative  
10 environmental, economic, and social impacts associated with these actions.

11           19. By failing to take a hard look at the cumulative impacts of reasonably foreseeable  
12 future actions, the DEIS omits information with direct bearing on the DMTP's economic  
13 feasibility. For example, the DEIS fails to incorporate the likely economic benefits associated  
14 with Teck-Cominco's gas shale development activities. Teck-Cominco's lease agreement states  
15 that a key economic benefit is the "potential to lower the cost of power at the Red Dog Mine,  
16 improving competitiveness of the mine...".<sup>14</sup> Of course, if gas share were to be substituted for  
17 fuel oil powering the mine, it would have significant consequences on the DMTP's justification  
18 since the mine fuel savings benefit could no longer be counted. A more complete discussion of  
19 these deficiencies appears in Section 3.3 of Appendix C.

20           20. Fourth, there appears to be an error in the way the Corps calculated interest during  
21 construction, an error that works to understate true project costs. Instead of adding compound  
22 interest to project costs incurred before 2011 (the base year) the Corps appears to have used a

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<sup>14</sup> Division of Oil and Gas (DOG, 2006). Findings and Decision Approving the Sakkan Unit Application. State of Alaska, Department of Natural Resources, Division of Oil and Gas.

1 different methodology; however, this methodology has not been disclosed. In Section 3.5 of  
2 Appendix C, we apply the precise formula specified by Corps regulations and arrive at figures  
3 considerably higher than those used in the DIFR. As a result, we conclude that by failing to  
4 follow standard procedures for adding compound interest to project costs incurred before 2011  
5 the Corps has underestimated annualized project costs by \$1,188,364, or 5.3%. A more  
6 complete discussion of how we arrived at this figure appears in Section 3.5 of Appendix C.

7           21. Fifth, the Corps has made three unwarranted assumptions that tend to inflate  
8 project benefits. The first assumption involves the operating life of the Red Dog Mine. The  
9 DIFR assumes that the Red Dog Mine will stay in operation until 2041, and models five of the  
10 six benefit streams included in the BCA accordingly. However, the mine's owner, Teck-  
11 Cominco, has published information on-line indicating that the mine will close in 2029. On its  
12 official website, last updated October 4th, 2006, the company states: "[t]he main pit has an  
13 expected life of seven years at current rates of production. Additional reserves have been  
14 identified in the vicinity of the processing facilities sufficient to extend the life of the operation  
15 by a further 16 years for a total mine life of 23 years."<sup>15</sup> The Corps' use of inaccurate mine life  
16 forecasts was underscored in Teck-Cominco's comments on the DEIS and DIFR. According to  
17 Teck-Cominco, "the DEIS is incorrect on the reported mine life of the Red Dog Mine."<sup>16</sup> By  
18 modeling DMTP benefit streams until 2029 rather than 2041, we conclude that the DIFR and  
19 BCA overestimate annualized DMTP benefits by \$4,495,018. A detailed description of how we  
20 arrived at this figure appears in Section 3.6 of Appendix C.

21           22. The second assumption involves fuel price trends. Fuel cost enters the benefit-  
22 cost equation in many ways; nearly every component of the project relies on fuel. Electricity

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<sup>15</sup> See <http://www.teckcominco.com/operations/reddog/index.htm>, accessed December 12th, 2006.

<sup>16</sup> Comments submitted by James Kulas, Environmental Specialist, Teck-Cominco, December 27<sup>th</sup>, 2005.

1 generation at Portsite, mine operation, concentrate trucks, tugs, village power and heating, and  
2 trestle construction all rely on fuel. Therefore, it is critical to use the most current and  
3 reasonable projections of fuel costs in order to determine project feasibility. All the benefit and  
4 cost calculations set forth in the DIFR rely on a fuel price assumption of \$1.40 per gallon. This  
5 figure was based on the midpoint between the Energy Information Administration (EIA) average  
6 low (\$1.37) and high (\$1.42) price projections for 2010 at the time the DIFR was drafted (DIFR  
7 Appendix E at E-209). The Corps also justified the use of \$1.40 based on an analysis of actual  
8 prices for refined products used in the marine transportation industry within northwest Alaska,  
9 and regional fuel sales records prior to 2003. Fuel prices have increased nearly 92% since that  
10 time, and significantly higher prices are now predicted to be permanent. As such, the Corps'  
11 estimates for future fuel prices are at least one-half to one-third of the EIA's current fuel price  
12 projections. By incorporating EIA's most recent fuel price projections into the benefit-cost  
13 analysis we estimate a reduction in annualized tug and barge savings benefits from \$8,469,714 to  
14 \$7,382,573, a reduction of annualized fuel savings benefits accruing to villages from \$6,250,212  
15 to \$4,622,912, and an increase in annualized project costs from \$23,527,672 to \$24,115,887. A  
16 detailed discussion of how we arrived at these figures appears in Section 3.7 of Appendix C.

17           23. The third assumption involves the likelihood that the village fuel savings benefit  
18 will actually be generated by the DMTP. In the DIFR and BCA, the Corps assumes that it is  
19 100% likely that a fuel distribution center will be established at the DMT, that fuel purchases  
20 from Singapore will always be cheaper than fuel purchased from Puget Sound and the Kenai  
21 peninsula, that fuel delivery savings will be passed on to village electric cooperatives, and that  
22 village electric cooperatives will pass any fuel delivery savings benefits on to end users. For  
23 reasons discussed in Sections 3.1 and 3.8 in Appendix C, a more realistic assumption would be

1 that the joint likelihood of these events occurring is no more than 50%. Thus, to be accurate, the  
2 DIFR and BCA need to discount the predicted annual village fuel savings benefit by at least this  
3 amount. Doing so, we estimate a reduction in the predicted village fuel savings benefit from  
4 \$4,622,912 to \$2,311,434. A detailed discussion of how we arrived at this figure appears in  
5 Section 3.8 of Appendix C.

6 24. Sixth, the DIFR fails to include as a cost the loss of economic activity in the Puget  
7 Sound region associated with the DMTP induced diversion of over \$82 million in fuel purchases  
8 to Singapore each year. Consideration of direct, indirect, and induced economic costs associated  
9 Corps-induced transfer of economic activity out of a region is explicitly required by the Corps  
10 own regulations. In particular, WRC guidance requires (1) analysis of direct income changes  
11 arising from differences between the with and without plan conditions; (2) analysis of indirect  
12 income changes associated with expansion or reduction in the production of inputs to industries  
13 supplying the final product at issue (in this case fuel), and (3) analysis of induced changes in  
14 consumption expenditures generated by changes in personal income (WRC, 1983, 11). The  
15 DIFR fails to disclose these direct, indirect, or induced economic costs or incorporate them into  
16 the BCA or DEIS in any manner. A more complete discussion of these deficiencies appears in  
17 Section 4.1 of Appendix C.

18 25. Lastly, the DIFR fails to discuss or include in the BCA even a single externalized  
19 cost. As planned, the DMTP will generate externalized costs in the form of marine pollution,  
20 carbon emissions, loss of passive use values, and damage to subsistence uses. While there is  
21 some dispute over the precise methods that should be used to quantify such costs, the Corps did  
22 not even attempt to use any method. As a result, the DIFR omits several significant costs that

1 have bearing on the DMTP's feasibility. A more complete discussion of these deficiencies  
2 appears in Sections 4.2, 4.4, 4.5, and 4.6 of Appendix C.

#### 3 **IV. Independent Assessment of Key Costs Omitted from the DIFR**

4           26. In Section III of this declaration, I identified five key costs omitted from the DIFR  
5 and BCA: (a) costs associated with the substitution of Singapore fuel oil purchases for purchases  
6 now being made in Puget Sound; (b) costs associated with marine pollution; (c) costs associated  
7 with carbon emissions; (d) costs associated with loss of passive use values, and (e) damage to  
8 subsistence uses. Appendix C provides an estimate of the likely magnitude of such values based  
9 on the best information available to us. In this Section, I will summarize key results.

10           27. To estimate the likely magnitude of damages associated with the DMTP-induced  
11 diversion of \$82 million of fuel oil purchases from Puget Sound to Singapore, we employed a  
12 standard input-output model known as IMPLAN. IMPLAN is a peer reviewed input-output  
13 model used extensively by federal agencies and particularly well suited to the analysis of  
14 displacement costs or transfers of economic activity from one region to another. In fact, the  
15 IMPLAN model generates the precise types of economic benefits and costs specified by Corps  
16 regulations described in paragraph 24, above: direct, indirect, and induced changes in income  
17 and employment. By employing IMPLAN, we estimate that the DMTP-induced diversion of  
18 fuel oil purchases from Puget Sound to Singapore will cause direct losses of over \$72 million in  
19 lost labor income and value of output, indirect losses of nearly \$16 million, induced losses of  
20 roughly \$55 million, and job losses of roughly 886 workers per year in the Puget Sound region.  
21 By converting these figures to "annualized" amounts averaged over the 50 year DMTP life and  
22 discounting the probability that such losses will actually occur (i.e. because DMT may not, in  
23 fact, be used as a fuel distribution center) we estimate that the DIFR and BCA omits a NED or

1 RED cost of up to \$60,848,972 each year. While there are many complicating factors that may  
2 be present in Puget Sound that would work to mitigate these costs, this is the cost estimate  
3 yielded by IMPLAN and a good starting point for discussing the true magnitude of displacement  
4 costs caused by the DMTP. A detailed discussion of how we arrived at this figure is included in  
5 Section 4.1 of Appendix C.

6 28. There is no question that the DMTP will cause a significant increase in the  
7 throughput of fuel oil associated with operation of the DMT. This increase in throughput, in  
8 turn, will lead to an increase in fuel oil spills and attendant costs associated with clean up and  
9 restoration. The DEIS predicts that fuel oil spills will increase by 22 – 71 gallons per year. This,  
10 in turn, represents an economic cost of between \$22,000 and \$71,000 per year. These costs  
11 translate into an annualized marine pollution cost of \$61,529 over the life of the DMTP. A  
12 detailed discussion of how we arrived at this figure is included in Section 4.2 of Appendix C and  
13 Section 4.3 of Appendix B.

14 29. By increasing fuel oil used by the mine, by vessels traveling to and from  
15 Singapore, and by vessels carrying extra lead-zinc concentrate and by requiring significant  
16 quantities of fuel oil during construction the DMTP will cause an increase in carbon emissions.  
17 This is another externalized cost omitted from the DIFR and BCA. Using the best information  
18 available to us on year by year DMTP fuel use and by applying marginal damage cost figures for  
19 carbon dioxide emissions reported in a meta-analysis of peer reviewed studies we estimate that  
20 the DMTP will generate \$1,272,720 in carbon emissions damage each year annualized over the  
21 life of the project. A detailed discussion of how we arrived at this figure is included in Section  
22 4.4 of Appendix C.

1           30. In Section 1.3 of Appendix C we reviewed several non-market valuation methods  
2 the Corps can employ to measure the non-market costs associated with loss or degradation of  
3 marine ecosystems. Given the remoteness of the DMTP region, the most appropriate method is  
4 contingent valuation (CV) since a large portion of the economic value of marine ecosystems in  
5 the DMTP area is passive use values placed on preservation of these ecosystems by those who  
6 may never actually visit. A recent Corps' analysis neatly defined passive use values:  
7 "[e]conomists generally recognize that there is a benefit associated with knowing that a resource  
8 exists, even if no use is made of it. These values are typically referred to as passive use, non-use,  
9 or existence values."<sup>17</sup>

10           31. In the context of NED analysis, the Corps' planning guidance explicitly endorses  
11 the use of contingent valuation surveys to quantify passive use values, at least in terms of  
12 recreation activities (WRC, 1983). To estimate the loss of passive use values associated with the  
13 DMTP we conducted an original contingent valuation survey of Alaska residents. Our results  
14 suggest that households in our sample are willing to pay on average \$21.44 per year to protect  
15 the marine ecosystems near the DMT (or avoid damage caused by the DMTP), a value that is  
16 similar to other estimates reported in the literature. Using conservative assumptions about how  
17 to extrapolate this estimate to all Alaskan households, we estimate a mid point for annual loss of  
18 passive use values to be \$4,254,365 per year. This translates into an annualized cost of  
19 \$5,373,755 omitted from the DIFR and BCA. A detailed discussion of how we arrived at this  
20 figure is included in Section 4.5 of Appendix C.

21           32. As planned, the DMTP has the potential to alter the geographic pattern of hunting  
22 and fishing by native villagers in Kivalina and other nearby communities and reduce the number

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<sup>17</sup> Army Corps of Engineers (ACOE, 2002a). Lower Snake River Juvenile Salmon Migration Feasibility Report/  
Environmental Impact Statement. Appendix I at ES-20. Walla Walla, WA: U.S. Army Corps of Engineers.

1 of animals taken for subsistence use. This represents another kind of non-market economic cost,  
2 but, unlike the costs addressed by our contingent valuation survey, these costs are incurred by  
3 active users of the DMTP impact area. In Section 4.6 of Appendix C we present an estimate of  
4 the possible magnitude of these costs incurred by hunters and fishers in Kivalina based on a  
5 survey of villagers conducted in the summer of 2003. The data gathered from this survey  
6 implies that Kivalina hunters and fishers could spend an additional \$251,822 pursuing beluga  
7 whales, bearded seals, and Dolly Varden trout at more distant locations as a result of DMTP  
8 impacts. Assuming this increased travel cost begins in 2007 and extends throughout the project  
9 life (2061) and by applying the DMTP discount rate of 5 3/8% we convert this value into an  
10 annualized amount of \$318,080. A detailed discussion of how we arrived at this figure appears  
11 in Section 4.6 of Appendix C.

## 12 **V. Reanalysis of the Benefit-Cost Ratio**

13 33. In this Section, I discuss how the benefit-cost ratio for the DMTP is likely to  
14 change if unwarranted assumptions, errors, and omissions identified in Sections III and IV of this  
15 declaration are addressed. Because the revised benefit and cost figures used in our modifications  
16 are simply ballpark estimates of what the Corps may find should it investigate factors excluded  
17 from consideration in the DEIS and DIFR in a rigorous manner, they are clearly subject to  
18 debate. Different assumptions, methods, and sources of information may yield considerably  
19 different results. However, there is little doubt that the types of modifications we suggest are  
20 strongly recommended if not explicitly required by the Corps own guidance for evaluating the  
21 contribution of civil works projects to national economic development.

22 34. After correcting an apparent error in the calculation of village fuel savings  
23 benefits, we estimate the project's initial benefit-cost ratio to be 1.2160 to 1 or \$27,165,406/

1 22,339,308. Beginning with this value, pages A1-1 to A1-3 of Appendix C provide a sequential  
2 reanalysis of the benefit-cost ratio as each of the modifications to the BCA suggested in Sections  
3 III and IV are incorporated. Below, I summarize the results.

4 35. Although the Corps did not disclose how it arrived at estimates of interest during  
5 construction, there appears to be an error in the calculations as compared with the precise  
6 formula for doing so set forth in Corps regulations. By properly compounding costs, we estimate  
7 total annualized costs to be \$23,527,672. This lowers the benefit-cost ratio to 1.1546 to 1 or  
8  $\$27,165,406 / \$23,527,672$ .

9 36. The DIFR and DEIS assume that the Red Dog Mine will be in operation through  
10 the end of 2041. However, as discussed in Section 3.6 of Appendix C, information published on  
11 Teck-Cominco's website indicates that the mine will shut down in 2029. Recalculating the  
12 benefit stream to terminate in year 2029 rather than year 2041 reduces the maximum annualized  
13 benefits resulting from the DMTP from \$27,165,406 to 22,670,388 and the benefit-cost ratio to  
14 .9636 to 1 or  $\$22,670,388 / \$23,527,672$ .

15 37. The DIFR's benefit cost analysis assumes regional diesel fuel prices remaining  
16 near \$1.40 per gallon for fuel used in marine operations, by the mine, and by regional villages for  
17 home heating and electrical generation. Incorporating EIA's most recent fuel price projections  
18 lowers the benefit-cost ratio further to .8275 to 1 or  $\$19,955,947 / \$24,115,887$ .

19 38. Modeling the expected value of the village fuel savings benefit stream under an  
20 "uncertain" scenario where the probability that the benefit will be generated is 50% reduces the  
21 expected value of the annualized village fuel delivery savings benefit from \$4,622,912 to  
22  $\$2,311,434$  and the benefit-cost ratio to .7317 to 1 or  $\$17,644,469 / \$24,115,887$ .

1           39. By dramatically increasing the throughput of fuel oil at Portsite, the DMTP will  
2 increase the risk of marine pollution. We estimate the annualized external costs of marine  
3 pollution induced by the DMTP to be \$61,529 over the life of the project. By adding this figure  
4 to total project costs, the benefit-cost ratio falls to .7298 to 1 or \$17,644,469/ \$24,177,416.

5           40. The DMTP will induce a significant increase in carbon emissions over and above  
6 the without project scenario. We estimate the annualized external costs of carbon emissions  
7 induced by the DMTP to be \$1,272,720. Adding this cost reduces the DMTP benefit-cost ratio  
8 to .6933 to 1 or \$17,644,469/ 25,450,136.

9           41. The DMTP will also generate annualized external costs of roughly \$5,373,755 in  
10 the form of lost passive use values. Including this cost lowers the benefit-cost ratio to .5724 to 1  
11 or \$17,644,469/ \$30,823,891.

12           42. The DMTP will also generate annualized external costs of \$318,080 in the form  
13 of increased travel costs to Kivalina hunters and fishers who would have to substitute more  
14 distant hunting and fishing sites for sites nearby as a result of DMTP induced impacts to marine  
15 and terrestrial ecosystems. Including this cost lowers the benefit cost ratio to .5666 to 1 or  
16 \$17,644,469/ \$31,141,971.

17           43. The DMTP will also generate \$61,207,985 in annualized direct, indirect, and  
18 induced losses of economic activity in the Puget Sound region associated with diversion of fuel  
19 oil purchases to Singapore. Including this cost in lowers the benefit-cost ratio to .1911 to 1 or  
20 \$17,644,469/ \$92,349,956.

21           44. Thus, by correcting errors, omissions, and unwarranted assumptions, the Corps is  
22 likely to find a benefit-cost ratio for the DMTP far below 1:1 – the threshold for federal  
23 involvement. In fact, our analysis suggests that costs may exceed benefits by a factor of 5.

1 **VI. Conclusions**

2 45. Based on the foregoing, and based upon the information presented in Appendices  
3 B and C to this declaration, I have the following conclusions to offer.

4 46. First, in the DIFR and DEIS, the Corps has failed to establish that the DMTP  
5 meets the minimum thresholds for federal involvement. The only alleged public benefit  
6 associated with the project is the village fuel savings benefit. However, there is nothing in the  
7 DIFR or DEIS that demonstrates that this benefit will manifest, especially in light of recent fuel  
8 price projections, acceleration of alternative energy sources, reduced Red Dog Mine life, and  
9 other factors that would tend to make this benefit even more unlikely to occur.

10 47. As discussed in Section V of this declaration, federal involvement is also  
11 unwarranted because the true benefit-cost ratio for the DMTP is likely far below the minimum  
12 1:1 threshold.

13 48. Second, it is clear that the Corps has failed to follow procedures set forth in 40  
14 CFR § 1508.23 and the Water Resources Council regulations for incorporating benefit-cost  
15 analyses into NEPA documents. In particular, the Corps has failed to prepare three of the four  
16 accounts specified by its own regulations as necessary for meeting NEPA's mandate – a  
17 Regional Economic Development account (RED), an Environmental Quality Account (EQ), and  
18 an Other Social Effect account (OSE).

19 49. The Corps has also failed to include any other discussion meeting CEQ's mandate  
20 to discuss the relationship between the BCA and any analyses of unquantified environmental  
21 impacts, values, and amenities as required by 40 CFR § 1502.23. Instead, the BCA presented in  
22 the DIFR was merely incorporated into the DEIS by reference without any other discussion.

1           50. By omitting RED, EQ, and OSE accounts and otherwise omitting a discussion of  
2 the BCA's relationship to unquantified environmental impacts, values, and amenities the DEIS  
3 fails to consider significant and reasonably foreseeable economic, environmental, and social  
4 costs of the project which are clearly pertinent to the agency's consideration of alternatives for  
5 the project. Failure to consider these costs renders the DEIS's discussion of economic impacts  
6 heavily skewed, and unsuitable as a basis for decision making.

7           51. Third, the DEIS fails to include a meaningful analysis of cumulative economic  
8 impacts. In particular, the DEIS fails to quantify benefits and costs associated with past, present,  
9 and reasonably foreseeable actions that have bearing on the economic feasibility of the DMTP.  
10 Failure to incorporate reasonable estimates of cumulative economic costs and benefits renders  
11 the DEIS's discussion of economic impacts heavily skewed and unsuitable as a basis for decision  
12 making.

13           52. Fourth, the BCA presented in the DIFR and incorporated by reference into the  
14 DEIS contains a number of unwarranted assumptions, errors, and omissions that tend to  
15 significantly inflate DMTP benefits and reduce DMTP costs. Unwarranted assumptions include  
16 a Red Dog Mine life to 2041, fuel prices remaining near \$1.40 over the life of the project, and a  
17 100% certainty that DMT will be developed as a regional fuel distribution center. Apparent  
18 errors involve the calculation of interest charges during construction. Key omissions include the  
19 costs associated with diversion of fuel oil purchases from Puget Sound to Singapore and  
20 externalized costs associated with marine pollution, carbon emissions, passive uses, and  
21 subsistence. By making more realistic assumptions, correcting apparent errors, and including  
22 these omitted costs, we estimate that the benefit-cost ratio for the DMTP could be as low as  
23 .1911 to 1, suggesting that costs may exceed benefits by a factor of five.

1                   53. Pursuant to 28 USC § 1746 I declare under penalty of perjury that the foregoing is  
2 true and correct. Executed this 26<sup>th</sup> day of January, 2007, at Santa Fe, New Mexico.

3  
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5 \_\_\_\_\_  
6 John Talberth