

## UNCC/F4 : PUBLIC HEALTH CLAIMS

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### Introduction

Public health claims represent a small segment of the “environmental damage” compensated by the UNCC: of the total F4 awards of \$5.26 billion, compensation awarded to Claimant Governments for public health expenditures amount to \$61.4 million only; i.e., a little over 1%. Yet, the specific legal issues that arose in this context, and their comparative novelty in international law and environmental law in particular, would seem to warrant more detailed review in retrospect.

The F4 Panel was faced with five types of health-related claims against Iraq, submitted by the five principal Claimant Governments in the region affected by the 1991 Gulf War (Iran, Jordan, Kuwait, Saudi Arabia, and Syria):

- (1) claims for their nationals’ loss of lives or reduced quality of life as a result of the environmental damage caused by Iraq (mainly, air pollution from the oil well fires in Kuwait);
- (2) claims for the public costs of healthcare for persons suffering from such pollution;
- (3) claims for the costs of monitoring and assessment for the purpose of investigating and combating the public health risks posed by such environmental pollution;
- (4) claims for public expenditures in providing healthcare to foreign refugees from the war areas; and
- (5) claims for the public costs of medical treatment for persons injured by mines and ordnance left behind after the war.

The overall volume of the claims submitted in these five categories was about \$25 billion; i.e., almost 30% of the total amount of compensation claimed before the F4 Panel. Given the complexities and uncertainties of many of these claims, the Panel decided to defer consideration of all substantive public health issues to the very end of its recommendations for compensation, but – in light of a 1998 UNCC Governing Council decision – to give priority to claims for the funding of monitoring and assessment (“M&A”, the third category listed above), so as to reduce the factual and scientific uncertainties as much as possible.<sup>1</sup> As a result, most public health M&A claims were dealt with in the very first instalment report of the F4 Panel (presented to the Governing Council at its 40<sup>th</sup> session in June 2001),<sup>2</sup> whereas all substantive public health claims were finalized in the Panel’s very last instalment report only (presented to the Governing Council at its 56<sup>th</sup> session in June 2005), also with a view to making optimal use of the monitoring and assessment results obtained in the interval.

A striking difference between the public health M&A claims on the one hand, and the substantive public health claims on the other, was the ratio between the amounts claimed and the recommended amounts ultimately awarded: Unlike the F4 average ratio (of about 6%), more than half of the amounts claimed for M&A in the field of public health was actually awarded – whereas only less than 0.1% of the amounts claimed for substantive public health damages was compensated in the end. As the analysis of specific claims shows, that apparent paradox may be explained by the perceived overriding need to generate the necessary data for a meaningful fact-finding process in the first place,<sup>3</sup> which consequently required different evidentiary standards;<sup>4</sup> and by the subsequent sobering realization that even with optimal monitoring and assessment methods, the data so generated in the majority of cases turned out to be insufficient to meet reasonable evidentiary standards.

**TABLE 1 : OVERALL VOLUME OF PUBLIC HEALTH CLAIMS**

<b>Monitoring &amp; Assessment</b>		
<i>Claimant Government</i>	<i>Claims (in \$US)</i>	<i>Awards (in \$US)</i>
Iran	4,635,339	2,486,344
Kuwait	27,888,773	20,809,171
Saudi Arabia	55,937,743	27,396,069
Syria	1,394,200	264,600
<i>Sub-total</i>	<i>89,856,055</i>	<i>50,956,184</i>
<b>Substantive</b>		
Iran	2,569,816,299	2,217,353
Jordan	884,781,830	nil
Kuwait	1,476,336,427	8,264,246
Saudi Arabia	19,861,782,707	nil
Syria	104,233,079	nil
<i>Sub-total</i>	<i>24,896,950,342</i>	<i>10,481,599</i>
<b>TOTAL</b>	<b>24,986,806,397</b>	<b>61,437,783</b>

## I. Public Health Damage in the Context of the F4 Panel

### 1. Mandate for Public Health Claims

The overall mandate of the F4 panel, as laid down in the UNCC Governing Council's *Provisional Rules for Claims Procedure* (1992),<sup>5</sup> was focused on the ascertainment of "environmental damage" attributable to Iraq pursuant to UN Security Council Resolution 687 (1991), as further defined in Governing Council decision 7 (17 March 1992).<sup>6</sup> In its definition of environmental damage, the Governing Council had included "reasonable monitoring of public health and performing medical screening for the purposes of investigating and combating increased health risks as a result of the environmental damage".<sup>7</sup> That specification is probably the closest the UNCC ever came to endorsing the "precautionary approach" in international environmental law.<sup>8</sup> It also is the only explicit reference to public health in the mandate of the F4 Panel. Yet, the Panel repeatedly made it clear that it considered the costs of (remedial or preventive) public health measures to be included *eo ipso* in the UNCC's comprehensive general definition of environmental damage as extending to "all damage and losses related to the environment and any consequences of such damage that can reasonably be attributed directly to Iraq's invasion and occupation of Kuwait".<sup>9</sup> In this regard, it deliberately departed from the jurisprudence of the International Oil Pollution Compensation Funds (IOPC), which considers claims relating to health risks, anxiety and loss of environmental amenities "not to fall within the definition of pollution damage".<sup>10</sup> With regard to medical treatment and healthcare for post-conflict injuries from mines and ordnance (the fifth category of claims listed above), UNCC Governing Council decision 7 clearly provided that the consequential damage so defined included any loss suffered as a

result of “military operations by either side” during the period of the conflict (August 1990 to March 1991).<sup>11</sup> Accordingly, the mandate of the F4 Panel extended to claims for post-conflict damage regardless of the origin of the ordnance; hence, also including injuries and health problems attributable to cluster bombs and remnants of depleted uranium ordnance left behind by the Allied Forces.<sup>12</sup>

## *2. Standing for Health Claims Submission*

It will be recalled that the UNCC also received and processed a large number of individual claims for personal injuries, health impairment or death, which were dealt with by other panels under the “B”, “C” and “D” claims categories, by way of private compensation awards to the individuals concerned (if in part channelled through their Governments).<sup>13</sup> In contrast, the claims before the F4 Panel were solely submitted by Governments, for public health expenditures consequential to the environmental damage caused by Iraq, and for health damage to their nationals that had not otherwise been compensated.

In response to Iraq’s contention that these Governments lacked legal standing to bring claims for health damage or loss of life incurred by their citizens, the Panel found that under Security Council Resolution 687 (1991) and related resolutions and decisions, as well as under the general rules of international law, there was nothing to prevent States from bringing intergovernmental claims against Iraq for damage to their nationals,<sup>14</sup> so long as the claims were otherwise in conformity with the criteria established under the UNCC process, and so long as there was no duplication in compensation awarded for the same injury or damage in this process.<sup>15</sup> With this condition in mind, the Panel therefore instructed its secretariat to undertake a careful search in the available UNCC records to ensure that none of the public health claims duplicated any of the awards made by other panels. Prior to finalizing its 2005 recommendations, the Panel reviewed the detailed research reports received from the

secretariat, and confirmed its agreement that there was no appreciable risk of such duplication.<sup>16</sup>

The F4 Panel did, however, restrict the admissibility of claims for mental pain and anguish in relation to Iraq's invasion and occupation of Kuwait. Taking into account UNCC Governing Council decisions 3 (23 October 1991) and 8 (27 January 1992) – regarding the categories of persons entitled to claim, the criteria to be met, and the limits of compensation,<sup>17</sup> – the Panel found that such claims could only be brought by individuals who satisfied the criteria so established by the Governing Council, and consequently denied the Government of Jordan standing to bring a claim under that heading.<sup>18</sup>

### *3. Evidentiary Standards*

Common evidentiary requirements for all UNCC panels were laid down in article 35(1) of the *Rules for Claims Procedures*,<sup>19</sup> as follows:

“Each claimant is responsible for submitting documents and other evidence which demonstrate satisfactorily that a particular claim or group of claims is eligible for compensation pursuant to Security Council Resolution 687 (1991). Each panel will determine the admissibility, relevance, materiality and weight of any documents and other evidence submitted.”

With regard to governmental claims in particular (such as the F4 public health claims), article 35 (3) of the Rules provided that “claims must be supported by documentary and other appropriate evidence sufficient to demonstrate the circumstances and amount of the claimed loss” (rule reiterated in UNCC Governing Council decision 7, para. 37).<sup>20</sup> Governing Council decision 46 (2 February 1998) further specified that “no loss shall be compensated by the Commission solely on the basis of an explanatory statement provided by the claimant”, and

that the compensation amounts recommended by a category F panel “can only be approved when they are in accordance with this decision”.<sup>21</sup>

The F4 Panel recognized, however, that the monitoring and assessment claims, by their very nature, required a more differentiated approach. As explained in the Panel’s first instalment report, these special claims inevitably had to be reviewed and awarded at a point in time “where it may not have been established that environmental damage or depletion of natural resources occurred as a result of Iraq’s invasion and occupation of Kuwait”; i.e., “without prior proof that environmental damage has in fact occurred”.<sup>22</sup>

In the case of M&A claims, therefore, the Panel did not require conclusive evidence of environmental damage (the establishment of which was indeed one of the very objectives of monitoring and assessment), but instead formulated a set of *prima facie* criteria to determine the “reasonability” of the M&A activities proposed, and their “nexus” with environmental damage or risk of damage attributable to Iraq, taking into account, inter alia:

- “(a) Whether there is a possibility that environmental damage or depletion of natural resources could have been caused as a result of Iraq’s invasion and occupation of Kuwait. This entails an inquiry regarding the plausibility that pollutants released as a result of Iraq’s invasion and occupation of Kuwait, or other effects of the invasion, could have impacted the territories of the Claimants;
- (b) Whether the particular areas or resources in respect of which the monitoring and assessment activity is undertaken could have been affected by pollutants released as a result of Iraq’s invasion and occupation of Kuwait, or other effects of the invasion. This entails, in appropriate cases, an examination of the possible pathways and media by which pollutants resulting from Iraq’s invasion and occupation of Kuwait could have reached the areas or resources concerned;
- (c) Whether there is evidence of environmental damage or risk of such damage as a result of Iraq’s invasion and occupation of Kuwait; and

(d) Whether, having regard to the stated purpose of the monitoring and assessment activity and the methodologies to be used, there is a reasonable prospect that the activity will produce results that can assist the Panel in reviewing any related substantive claims.”<sup>23</sup>

This more permissive approach to the eligibility of M&A claims – which in part explains the higher “success rate” of those claims<sup>24</sup> – was motivated both by the Panel’s procedural fact-finding needs (further detailed in technical recommendations annexed to the initial panel report in 2001),<sup>25</sup> and by a public policy concern to ascertain and preclude environmental risks. One of the consequences of this approach was indeed the creation of a sub-category of “stand-alone” M&A claims that were not related to any substantive claim for compensation. Under certain circumstances, long-term precautionary monitoring and assessment could thus very well be the most reasonable (or even the only reasonable) response to certain public health risks, regardless of any eventual proof of harm,<sup>26</sup> so long as the program was otherwise appropriate in terms of methodology, technical quality, and cost estimates.<sup>27</sup>

Nonetheless, the F4 Panel expressed “the view that compensation should not be awarded for monitoring and assessment activities that are purely theoretical or speculative, or which have only a tenuous link with damage resulting from Iraq’s invasion and occupation of Kuwait”,<sup>28</sup> and accordingly rejected several M&A claims in its first instalment report as unreasonable or unsubstantiated.<sup>29</sup> The importance of adhering to the general evidentiary standards of the UNCC became a predominant concern when the Panel later had to turn to the substantive public health claims in its fifth and final instalment report.<sup>30</sup>

## **II. Valuation of Environment-Related Damage to Public Health**

In its interpretation of “environmental damage”, the F4 Panel repeatedly emphasized that the definition of the term by the UNCC Governing Council was non-exhaustive,<sup>31</sup> and that international law does not prescribe any specific or exclusive methods of valuation regarding awards of damages for internationally wrongful acts by States.<sup>32</sup> Citing the *Chorzow Factory* and *Trail Smelter* cases in support,<sup>33</sup> the Panel considered that even in the absence of precise rules or prescriptions on the methods for evaluating damage, it was entitled and required to evaluate damage and determine appropriate compensation, relying on general principles for guidance; particularly the principle that reparation must, as far as possible, wipe out all the consequences of the illegal act.<sup>34</sup>

At the beginning of its deliberations in Geneva, the Panel held a series of informal seminar sessions with leading academic and professional experts on contemporary methodologies and national practice in the quantification and valuation of large-scale environmental damage, thus setting the stage for subsequent formal review of the claims.<sup>35</sup> In the field of public health – and partly in light of the results of earlier monitoring and assessment programs awarded on the basis of the first instalment report,<sup>36</sup> – three Claimant Governments (Iran, Kuwait, and Saudi Arabia) submitted substantive compensation claims relying on novel techniques of quantifying health risks, on three main topics:

- (A) Modelling of exposure to air pollution attributable to the 1991 Gulf War;
- (B) Estimates of increased mortality due to such pollution; and
- (C) Calculation of increased incidence of post-traumatic stress disorder (PTSD) due to the war, and consequential loss of well-being.

#### **A. Modelling of exposure to air pollution**

Iran and Saudi Arabia submitted claims for public health damages associated with exposure to smoke from the oil fires in Kuwait. Iran’s claim relied on the results of an

atmospheric and air quality model supported by satellite imagery and black rain measurements that showed contaminants from the oil fires were transported to 10 of its western provinces.<sup>37</sup> Based on data from local and provincial health officials, it reported increases in 1990 and 1991 in the number of treated cases of 13 diseases (including respiratory ailments, streptococcal pharyngitis, conjunctivitis, typhoid and paratyphoid, viral hepatitis, skin diseases, anaemia, hypertension, ischemic heart disease, ictus, mental disorders, tuberculosis, and malaria), all claimed to be attributable to contaminants from the oil fires.<sup>38</sup> [will move this sentence to last section showing Panel's comments]

In addition, Iran claimed compensation for costs associated with an increase in pulmonary and respiratory diseases among children (from birth through age 12 at time of exposure). These costs included the costs of past and future medical treatment, transportation for care, care-givers' time, opportunity costs of illness, and compensation for reduced well-being of those suffering respiratory disease. This claim was based on the results of a monitoring and assessment study in which 15,162 Iranian residents between the ages of 10 and 24 were interviewed. According to Iran, results of the study showed that individuals who resided within 200 km of Kuwait during the period of the oil fires had a greater chance of being diagnosed with pulmonary or respiratory disease than those living more than 200 km from Kuwait. In addition, there was some evidence that individuals living between 200 and 400 km from Kuwait had a slightly higher risk of being diagnosed than those living more than 400 km from Kuwait. In total, Iran claimed that 3,263 additional cases of respiratory diseases were a direct result of pollutants from the oil well fires. Iran sought compensation for expenses incurred in treating these additional cases; indirect costs such as transportation; costs incurred by caregivers; opportunity costs; and estimated costs of future medical care. Iran also sought monetary compensation for the reduced well-being of its citizens who suffered from respiratory diseases.<sup>39</sup>

Saudi Arabia claimed compensation for treatment of an increased number of cases of cardiovascular, respiratory and systemic diseases (including diabetes, gastrointestinal and kidney diseases) between 1990 and 2030, attributed to exposure to air pollutants from the oil fires, disturbance of desert areas by military activities, and emissions from diesel-fueled military vehicles<sup>40</sup> The claim was based on a comparison of measured levels of fine particulates (PM<sub>10</sub>, which have aerodynamic diameter less than 10 microns) at several sites in eastern Saudi Arabia during the invasion and occupation, with levels at those sites for the same months during the three year periods preceding and following the conflict. Analysis of these measurements found that concentrations of PM<sub>10</sub> were substantially greater during the period of the oil fires than in prior or subsequent years. In addition, measurements showed a high degree of correlation between sites at the same time, implying that the region could be treated as a single airshed and so pollution at locations without monitors could be reasonably estimated as similar to pollution at areas with measurements. This conclusion was claimed to be supported by estimates of pollutant dispersion from the U.S. National Oceanic and Atmospheric Administration's HYSPLIT (HYbrid Single-Particle Lagrangian Integrated Trajectory) model.<sup>41</sup>

Estimates of the public health effects of these exposures in Saudi Arabia were based on the results of an Exposure and Health Survey (EHS), through which approximately 20,000 residents, living in areas exposed and unexposed to pollution from the oil fires and to military activities and movements, were interviewed beginning in 2003. Respondents were asked to report their exposure to pollutants and the health status of family members during the period of the Iraqi invasion and occupation, more than 10 years earlier. Health care visits attributable to the pollution were estimated using data on use of health care facilities over the period 1990-2000 from annual reports of the Saudi Ministry of Health. According to Saudi Arabia, the EHS demonstrated that there was an increased number of cases of disease in the exposed areas.<sup>42</sup>

## B. Increased mortality

Kuwait and Saudi Arabia submitted claims for fatalities associated with exposure to the oil-fire smoke and, in the case of Saudi Arabia, other air pollution occurring during the invasion and occupation. The numbers of fatalities were estimated using similar approaches, though with important differences in detail. Although there is strong epidemiological evidence from many countries that links exposure to fine particulate matter to mortality risk, specific deaths cannot be attributed to exposure to air pollution. Because the individuals who died from exposure to PM cannot be identified, estimates of the incremental number of deaths are calculated by combining information on exposure and the rate at which mortality risk increases with exposure.

Saudi Arabia estimated the relationship between PM exposure and mortality risk by conducting a meta-analysis of daily time series studies that estimate the statistical relationship between daily PM<sub>10</sub> concentration and daily mortality from all causes excluding accidents. Such studies have been conducted for many locations world-wide, yielding reasonably consistent results. Saudi Arabia identified 31 studies that met inclusion criteria including publication in the peer-reviewed literature. Combining these estimates under alternative statistical models yielded summary estimates of a 2.5 or 3.4 percent increase in non-accidental mortality per 50 mg/m<sup>3</sup> increase in PM<sub>10</sub>.<sup>43</sup> The increase in PM<sub>10</sub> associated with the oil fires and military operations was estimated as 94 µg/m<sup>3</sup> for the Eastern Region of Saudi Arabia during the period May – October 1991 and about 60 µg/m<sup>3</sup> for the period December 1991 – June 1992. For the remaining part of the exposed region to the west, the incremental exposure was estimated as 75 µg/m<sup>3</sup> for the period May – October 1991.<sup>44</sup> Combining these estimates with estimates of the effect of

exposure on mortality implies that exposure to incremental  $PM_{10}$  increases mortality by about 3 percent or more during these time periods.

The baseline non-accidental mortality rate to which these increases apply were estimated by combining information on: (a) the number of deaths recorded at Ministry of Health hospitals in 2000, from Ministry of Health reports; (b) the total number of deaths of Saudi residents in 2000, estimated from World Health Organization life tables; (c) changes in the population of Saudi Arabia between 1991 and 1992 and 2000, assuming a constant annual growth rate; and (d) the fractions of Saudi deaths occurring in different Ministry of Health regions, assumed to be the same in 1991-1992 as the fractions of deaths in Ministry of Health hospitals in those regions in 1998-1999, the years for which data were available from the Ministry.<sup>45</sup> Combining these estimates of exposure, the incremental effect of exposure on mortality, population, and the mortality rate yields an estimate of 1,397 deaths.<sup>46</sup>

Kuwait's claim for increased mortality associated with air pollution was also based on a risk assessment calculation combining estimates of incremental exposure to  $PM_{10}$  with the estimated effect of  $PM_{10}$  exposure on mortality risk. In addition, an enumeration survey was conducted to determine whether information from Kuwait Ministry of Finance files about the number and location of Kuwait residents who were in the country during the period of the oil fires was accurate. The survey, which included interviews with 1,373 Kuwaitis, concluded that the Ministry of Finance information was accurate.

Kuwait's primary estimate of the increased concentration of  $PM_{10}$  was based on results from the HYSPLIT model that were calculated for the U.S. Department of Defense in order to estimate exposure to military personnel operating in Kuwait. These model runs used a low-resolution grid to cover the entire territory of Kuwait and did not provide sufficient resolution to characterize exposure in the coastal region, where most of the population resides. Hence Kuwait supplemented these estimates with estimates from a

more detailed analysis using an alternative model for simulating pollutant dispersal, CALPUFF (CALifornia Lagrangian PUFF). In contrast to the HYSPLIT analysis, the CALPUFF analysis used a more detailed grid in the populated coastal region, accounted for the effects of coastal winds, and included emissions from burning oil pools in addition to those from burning wells. These more refined estimates suggested that incremental population exposure averaged 40-50  $\mu\text{g}/\text{m}^3$ , substantially greater than the 10  $\mu\text{g}/\text{m}^3$  estimated using HYSPLIT.<sup>47</sup>

To estimate the increase in mortality risk associated with incremental  $\text{PM}_{10}$  exposure, Kuwait relied on the results of the two primary cohort studies of air pollution and mortality, the Harvard Six Cities and American Cancer Society studies.<sup>48</sup> In contrast to the daily time series studies relied on by Saudi Arabia, the cohort studies include effects on mortality that occur over longer periods and estimate a larger effect of air pollution on mortality. Kuwait supplemented these estimates by sponsoring an expert judgment study, in which six leading experts on health effects of air pollution (including epidemiologists and toxicologists) individually provided their judgments about the additional number of deaths among Kuwait residents likely to have occurred because of the specific pattern and composition of incremental exposure to  $\text{PM}_{10}$  associated with the oil fires.<sup>49</sup>

Kuwait's primary estimate of the incremental number of fatalities attributable to the oil fires was 35 additional deaths, with an uncertainty range of 0 to 116.<sup>50</sup> This estimate is based on the estimated incremental exposure to  $\text{PM}_{10}$  of 10  $\mu\text{g}/\text{m}^3$  from the HYSPLIT model and the estimated effect of  $\text{PM}_{10}$  on mortality of 0.4 percent per  $\mu\text{g}/\text{m}^3$  from the American Cancer Society study (which is the smaller than the corresponding estimate from the Harvard Six Cities study). The six experts provided central estimates of the incremental number of deaths of 12, 32, 54, 134, 164, and 2874.<sup>51</sup> Using the higher exposure estimates from the more refined CALPUFF model would increase these estimates by a factor of about four to five.

### **C. Increased incidence of PTSD, and loss of well-being**

Kuwait, Saudi Arabia, and Iran presented claims for treatment costs and loss of well-being associated with post-traumatic stress disorder (PTSD). Kuwait based its claim on sample surveys undertaken in 1993 and 1998, in which individuals were classified as suffering from PTSD or not on the basis of their responses to a standard set of diagnostic questions. The 1993 survey of nearly 3000 respondents found that about 22 percent of adults and 15 percent of children suffered from PTSD, much higher than the rates anticipated in the absence of the Iraqi invasion and occupation. The probability that an individual was classified as suffering from PTSD was associated with the time they had spent in Kuwait during the conflict: among adult respondents, about 25 percent of those who remained in country for the entire period were classified as having PTSD, in contrast to about 15 percent of those who were outside Kuwait for the entire period and about 20 percent of those who were in Kuwait for only part of the period. The 1998 survey re-assessed the status of about 1500 of those who had participated in the 1993 survey and found that almost half of those classified as having PTSD in 1993 continued to suffer from the condition in 1998.<sup>52</sup>

Kuwait's claim included two components: compensation for treatment costs and compensation for loss of well-being associated with PTSD. Treatment costs were estimated using information on the number of Kuwaiti nationals who sought treatment for PTSD (estimated as 6.5 percent of those afflicted by the condition), the average number of treatment visits (4.65 per person over five years), and the average cost per visit (US\$378). These estimates were based on treatment at the Al-Riggae Specialized Centre for Treatment of War Victims in Kuwait.<sup>53</sup>

Estimates of the loss in well-being were based on the estimated disability-adjusted life years (DALYs) associated with PTSD combined with an estimate of the monetary value per DALY. Disability-adjusted life years are a measure developed and used by the World Health Organization to quantify the burden of illness in a population.<sup>54</sup> Like the closely-related concept of quality-adjusted life years (QALYs) that are widely used to assess the cost-effectiveness of medical and public health interventions,<sup>55</sup> DALYs integrate longevity and health status by weighting each year of life by a factor between zero and one that reflects the degree of disability experienced. The WHO estimated that a typical individual suffering from PTSD experiences symptoms for 2.5 years and that these years are valued 10 percent less than if the individual were in full health; multiplying the duration and disability weight yields a value of 0.25 DALYs associated with a case of PTSD.<sup>56</sup> This result implies that an individual who experiences a typical case of PTSD loses as much as if he remained healthy but died 0.25 years earlier. In order to convert this estimate into a monetary value of compensation, Kuwait assumed that the value of a year of healthy life was US\$50,000, yielding a monetary value of the loss in well-being of \$12,500 per case of PTSD. The value of \$50,000 is often used as a benchmark in judging whether medical and public-health interventions that improve health or longevity are worth their costs; interventions that improve health and longevity at a cost of less than \$50,000 per DALY (or QALY) are often judged to be good uses of social resources while those that cost more are considered possibly too expensive. Other evidence concerning the monetary value of longevity suggests that values per life year may be larger, perhaps US\$500,000 or more.<sup>57</sup>

Saudi Arabia submitted a claim for treatment costs associated with an increased number of cases of PTSD together with additional cases of other psychiatric illnesses including depression, generalized anxiety disorder, panic disorder, and other neurotic disorders resulting from the invasion and occupation. Its estimates of the increased prevalence of

these conditions were obtained by comparing rates measured by the Exposure and Health Survey (EHS) described above in the population groups living in areas that were exposed and not exposed to smoke, military activities and movements associated with the invasion and occupation. Affliction with PTSD was measured using two separate instruments administered as part of the EHS, a primary PTSD screen and a PTSD checklist. The primary screen showed that the risk of having PTSD was twice as large among individuals exposed to the invasion and occupation than among those not exposed; the PTSD checklist showed a five-fold increase.<sup>58</sup>

Although Iranian residents were not directly exposed to the invasion and occupation, Iran claimed compensation for treatment costs, loss of workplace productivity, and other costs associated with increases in PTSD and panic disorder cases among its citizens. Iran claimed that residents of Khuzestan and Bushehr provinces, who had been previously traumatized by the Iran-Iraq conflict, suffered increased rates of PTSD and panic disorder as a result of stressors including fear of air strikes, chemical or biological attacks, chemical contamination, accidental missile strikes or harm from Iraqi or American aircraft flying over Iran. The increased rates of these conditions were estimated using the monitoring and assessment study described above.<sup>59</sup>

## NOTES

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<sup>1</sup> See *Report and Recommendations made by the Panel of Commissioners Concerning the First Instalment of „F4“ Claims (F4/1 Report)*, U.N. Doc. S/AC.26/2001/16 (22 June 2001), para. 17; see also chapters 2 and 8 in this volume.

<sup>2</sup> The only exception was Iran's claim for cancer monitoring. Given the latency period of 15 to 20 years between exposure to carcinogens (in 1991) and expected clinical evidence of cancers, the Panel considered monitoring premature in 2001 and postponed consideration of the claim; see F4/1 Report, para. 290. After the claim was amended (also to include cancer types with shorter latency periods), the revised claim was granted in 2005; see *Report and Recommendations made by the Panel of Commissioners Concerning the Fifth Instalment of „F4“ Claims (F4/5 Report)*, U.N. Doc. S/AC.26/2005/10 (4 April 2005), para. 309.

<sup>3</sup> F4/1 Report, para. 39.

<sup>4</sup> See notes 22-23 below.

<sup>5</sup> Adopted by UNCC Governing Council decision 10, S/AC.26/1992/Inf.1 (26 June 1992); see Michael Raboin, *The Provisional Rules for Claims Procedures of the United Nations Compensation Commission: A Practical Approach to Mass Claims Proceedings*, in THE UNITED NATIONS COMPENSATION COMMISSION: A HANDBOOK, 119 (Richard B. Lillich ed., Kluwer Law International 1995).

<sup>6</sup> S.C. Res. 687 (3 April 1991), reprinted in 30 I.L.M. 846 (1991); and UNCC Governing Council decisions, reprinted in *Basic Documents of the United Nations Compensation Commission*, U.N. Doc. S/AC/SER.A/1 (2001).

<sup>7</sup> UNCC Governing Council decision 7, S/AC.26/1991/7/Rev.1 (28 November 1991, as revised 17 March 1992), para. 35 (d).

<sup>8</sup> See Peter H. Sand, *Compensation for Environmental Damage from the 1991 Gulf War*, 35 ENVIRONMENTAL POLICY AND LAW 244, at 246, 248 (2005); and Peter H. Sand, *The*

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*Precautionary Principle: Coping with Risk*, 40:1 INDIAN JOURNAL OF INTERNATIONAL LAW 1 (2000).

<sup>9</sup> F4/5 Report, para. 67. In this regard, the Panel emphasized that the specifications of environmental damage in paras. 34 and 35 of Governing Council decision 7 (1991) were illustrative rather than limitative; F4/2 Report, paras. 22-23.

<sup>10</sup> See EDWARD H.P. Brans, LIABILITY FOR DAMAGE TO PUBLIC NATURAL RESOURCES: STANDING, DAMAGE, AND DAMAGE ASSESSMENT 132 (Kluwer Law International 2001); see also Philippe Gautier, *Environmental Damage and the United Nations Claims Commission: New Directions for Future International Environmental Cases?*, in LAW OF THE SEA, ENVIRONMENTAL LAW AND SETTLEMENT OF DISPUTES: LIBER AMICORUM JUDGE THOMAS A. MENSAH 176, 204 (Tafsir M. Ndiaye & Rüdiger Wolfrum eds., Martinus Nijhoff Publishers 2007).

<sup>11</sup> Decision 7 (note 7 above), para. 6(a).

<sup>12</sup> See F4/5 Report, para. 498.

<sup>13</sup> See vol. 3 of this book, Part I Ch. 2/2 (“Eligible Persons”), and Part III (“Claims of Individuals”).

<sup>14</sup> See Gautier (note 10 above) 204-205.

<sup>15</sup> F4/5 Report, paras. 69, 70 and 515.

<sup>16</sup> F4/5 Report, paras. 97, 235 and 499.

<sup>17</sup> UNCC Governing Council decision 3, U.N. Doc. S/AC.26/1991/3 (23 October 1991); and decision 8, U.N. Doc. S/AC.26/1992/8 (27 January 1992).

<sup>18</sup> F4/5 Report, paras. 71 and 404.

<sup>19</sup> See note 5 above.

<sup>20</sup> See note 7 above.

<sup>21</sup> UNCC Governing Council decision 46, U.N. Doc. S/AC.26/1998/46 (2 February 1998).

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<sup>22</sup> F4/1 Report, para. 29.

<sup>23</sup> F4/1 Report, para. 31.

<sup>24</sup> See Table 1 above

<sup>25</sup> See the introduction to the technical annexes of the F4/1 Report, and Annexes XXV, XXXI and XXXVI.

<sup>26</sup> See F4/1 Report, para. 40; and F4/5 Report para. 93. – In a subsequent audit report by the UN Office of Internal Oversight Services (OIOS), a “stand-alone” F4 award for long-term public health monitoring was criticized for being unconnected to a substantive public health claim (OIOS Audit Report No. 2005/820/01 of 8 June 2005, paras. 84 and 87). That criticism was expressly refuted as erroneous by the UNCC (*ibid.*, paras. 85-86).

<sup>27</sup> When rejecting a \$100 million long-term epidemiological study and medical screening program proposed by Kuwait to identify potential additional health risks, the Panel acknowledged the scientific merits of the proposal, but found the information submitted by the Claimant insufficient to evaluate the technical merits of the program and to assess the costs claimed; F4/5 Report, para. 530.

<sup>28</sup> F4/1 Report, para. 31.

<sup>29</sup> F4/1 Report, paras. 270, 274.

<sup>30</sup> F4/5 Report, paras. 29-31, 272, 280, 289, 517, 524, 699, 708, 715, 761.

<sup>31</sup> See note 9 above, and chapter 8 in this volume.

<sup>32</sup> F4/5 Report, para. 80.

<sup>33</sup> Case concerning the Factory at Chorzów (Germany vs. Poland), Permanent Court of International Justice Reports Series A/No.17, 47 (1928); and Trail Smelter Arbitration (United States vs. Canada), 3 Reports of International Arbitral Awards 1020 (1941).

<sup>34</sup> F4/5 Report, paras. 49 and 80.

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<sup>35</sup> Including professors David W. Pearce (London †), Robert Costanza (Vermont), and practitioners from the Norwegian Institute for Air Research (NILU) and the U.S. National Oceanic and Atmospheric Administration (NOAA).

<sup>36</sup> In particular, see F4/1 Report, paras. 512, 517, 684 and 689,.

<sup>37</sup> F4/5 Report, paras. 200-201.

<sup>38</sup> F4/5 Report, paras. 263-271.

<sup>39</sup> F4/5 Report, paras. 274-277.

<sup>40</sup> F4/5 Report, paras. 687-688.

<sup>41</sup> See Patrick N. Breyse et al., *Air Pollution Levels in Saudi Arabia Related to the 1991 Gulf War*, 16:5 EPIDEMIOLOGY S80 (2005); see also Ronald H. White et al., *Premature Mortality in the Kingdom of Saudi Arabia Associated with Particulate Matter Air Pollution from the 1991 Gulf War*, 14 HUMAN AND ECOLOGICAL RISK ASSESSMENT 645 (2008).

<sup>42</sup> F4/5 Report, paras. 689-692; see J. Morel Symons et al., *Epidemiological Survey of Adverse Health Effects in the Population of Saudi Arabia Associated with the 1991 Gulf War*, 16:5 EPIDEMIOLOGY S94 (2005); and White et al. (note 42 above).

<sup>43</sup> Ronald H. White et al., *Premature Mortality in the Kingdom of Saudi Arabia Associated with Particulate Matter Air Pollution from the 1991 Gulf War*, 14 HUMAN AND ECOLOGICAL RISK ASSESSMENT 645-664 (2008).

<sup>44</sup> Ronald H. White et al., *Premature Mortality in the Kingdom of Saudi Arabia Associated with Particulate Matter Air Pollution from the 1991 Gulf War*, 14 HUMAN AND ECOLOGICAL RISK ASSESSMENT 645-664 (2008).

<sup>45</sup> Ronald H. White et al., *Premature Mortality in the Kingdom of Saudi Arabia Associated with Particulate Matter Air Pollution from the 1991 Gulf War*, 14 HUMAN AND ECOLOGICAL RISK ASSESSMENT 645-664 (2008).

<sup>46</sup> F4/5 Report, paras. 710-713.