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Standard Practice for Reporting Visual Observations of Oil on Water[1]

This standard is issued under the fixed designation F 1779; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice covers methods of reporting and recording visual observations of oil on water and related activities and phenomena.

1.2 This practice applies only to visual observations of oil on water from an airplane or helicopter. While a similar set of codes could be used for classifying oil on beaches, this subject is not discussed in this practice. It does not cover the use of remote-sensing equipment from aircraft, which is discussed in a separate standard.

1.3 This practice is applicable for all types of oil under a variety of environmental and geographical situations.

1.4 Visual observations of oil on water from the air involve a number of safety issues associated with the operation of airplanes or helicopters at low altitudes. These are not dealt with in this practice, but the observer should be aware of the hazards of such operations.

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Significance and Use

2.1 This practice can be used by surveillance and tracking staff to report visual observations to the clients of visual observations. The data produced from such observations will provide the basis for preparing maps of the oil-slick location.

2.2 This practice provides a procedure for reporting the visual observation of oil on water in a systematic manner and in a common format that can be readily understood by both observers and users of visual oil-spill observation maps.

2.3 This practice deals with the possibility that materials other than oil might be confused with oil when using visual observation methods.

3. Observational Methods

3.1 The basic information needed from a visual observation program includes the slick size and location, as well as its characteristics and shape. The location and some aspects of the effectiveness of a response operation can be easily determined from an aerial platform. Reports on the presence of wildlife and the proximity of oil to environmentally sensitive areas are useful information that can be generated from overflights.

3.2 Observers of oil on water will generally use either a helicopter or a small fixed-wing airplane. The planes shall be capable of slow-speed flight (120 to 240 km/h; 60 to 120 knots) for extended periods of time and have good forward and side visibility. The aircraft shall have adequate range and endurance consistent with the size and location of the spill.

3.3 If possible, two observers should be used, one on the port and the other on the starboard side of the aircraft. Provision shall be made for the two observers to communicate readily between themselves and with the flight crew. This can be accomplished by using standard aviation headphones and noise-cancelling microphones connected to an aircraft intercom system. Such equipment is readily available on the commercial market.

3.4 Standard maps shall be provided to the observers, so that their data can be easily transferred to a single map or map set for reporting and dissemination. These maps can be based on marine charts, topographic maps or special maps produced for the spill. Useful scales vary from 1:10000 to 1:50000. It is difficult to plot information to the required accuracy using maps of a larger scale.

3.5 The flight path shall be shown on all maps. An initial proposed flight path should be prepared prior to the flight. During the flight, deviations from this plan may be necessary in order to observe the total area of the slick.

3.6 Typical flight altitudes range from (100 to 1000 m (300 to 3000 ft) depending on the nature of the spill and on the cloud ceiling at flight time. There are flight safety considerations associated with low-altitude flying.

3.7 The best angle to observe an oil slick is directly above it looking straight down. This is known as a nadir observation. The flight path should be adjusted, wherever possible, to provide observers with a nadir view of the slick. For most fixed-wing aircraft, it is not possible to observe directly downwards, and therefore the flight path should be chosen to allow for observation of the spill at as near the vertical as possible.

4. Methods of Reporting

4.1 *Reporting Needs*—There are a number of characteristics of the slick that shall be reported in order to provide the user

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of visual observations with the appropriate amount of information. The following characteristics shall be reported for each slick that is observed during a reconnaissance flight. These observations are a snap-shot in time. Both the location and characteristics of an oil slick change rapidly. In order to be useful for responders, the information should be available a short time after it is obtained (typically less than 3 h).

4.2 *Color of Slick*—This shall be reported as a color code, as follows:

4.2.1 *Brown or Black*—*B*.

4.2.2 Brown or Black with a red tinge signifying presence of an *Emulsion* or mousse—*E*.

4.2.3 *Rainbow* sheen—*R*.

4.2.4 *Grey* or Silver Grey sheen—*G*.

4.3 *Percentage Coverage and Character of Slick*—Percentage of area as described that is covered by oil.

4.4 The character of the slick shall be noted such as follows:

4.4.1 *Windrows*—*W*.

4.4.2 *Continuous*—*C*.

4.4.3 *Tar Balls*—*T*.

4.4.4 *Pancakes*—*P*.

4.5 The eight parameters in 4.2 and 4.4 give a description of the oil slick.

4.6 *Slick Features*—If the leading edge of the slick can be identified, is should be noted as a heavy line.

4.7 The preceding data complete the description of the slick, as it would be placed on a base map.

4.8 *Other Properties*—There are a number of secondary related features that can be easily observed during a reconnaissance flight, and should be reported on the surveillance map, if appropriate. This recording of such information yields additional useful data from a surveillance flight, but should not be regarded as a primary function of the flight. These observations include:

4.8.1 Mechanical response operations (such as booms and skimmers)—*M*.

4.8.2 Dispersant or chemical response operations—*D*.

4.8.3 In-situ burning (Fire) response operations—*F*.

4.8.4 Shoreline cleanup in the area—*S*.

4.8.5 Animals or birds seen in area—*A*.

4.8.6 Wildlife Habitat in area—*H*.

4.8.7 Ocean features—*O*.

4.8.8 EXtra features such as ice, debris—*X*.

4.9 Each element shall be separated by a forward slash (/) except for other properties which are included as a group. Thus a slick could be described as **B/50/W/M**. This can be decoded as a slick containing Black oil with a 50 % coverage. The oil is in *W*indrows and a *M*echanical response operation is being undertaken.

5. Voice Communications

5.1 *Need for Voice Communications*—Since timeliness is very important, rapid communication of observations is essential. There are many situations that require the use of voice communications, either by radio or telephone to describe an oil slick. In this case, sufficient information shall be communicated in order to allow the recipient to produce a map of the observations.

5.2 *Location of Observation*—This location shall be reported in latitude and longitude of the apparent centre of the oil slick being observed. If the leading edge of the slick can be located, its position should be reported. This data can be determined using the aircraft navigation instruments or using a portable GPS receiver. It shall be reported in degrees, minutes and seconds or in degrees, minutes with two decimal points. If it is not possible to obtain the latitude and longitude of the location, an estimate of the range and bearing, from a properly identified geographical reference, shall be used. Alternately, aircraft navigation instruments such as VOR/DME or Loran can be used, if available.

5.3 *Size and Shape of Slick*—The size and shape of the slick shall be reported. The units used shall be kilometres or metres and represent the major and minor axis of the slick.

5.4 *Orientation of Slick*—The orientation of the major axis shall be given using degrees from North. In the case of a slick of complex shape, it shall be divided into a number of smaller slicks of simple geometry.

5.5 *Sequence of Data*—Many telephone lines and radio communications are very noisy. This is especially true of transmission from small aircraft and helicopters used for oil-spill surveillance. To promote brevity and standardize the transmission of data, the following sequence should be used. If plain language can be used, it should be but the sequence of transmission should be maintained. This means that a strict sequence must be observed in the transmission of surveillance data. This sequence is:

5.5.1 Latitude of slick centre—*N* or *S*,

5.5.2 Longitude of slick centre—*E* or *W*,

5.5.3 Leading edge-Longitude—*N* or *S* or *N*one,

5.5.4 Leading edge-Latitude—*N* or *S* or *N*one,

5.5.5 Length of major axis in kilometres,

5.5.6 Length of minor axis in kilometres,

5.5.7 Orientation of major axis in degrees from North,

5.5.8 Color of slick—*B, E, R, G*,

5.5.9 Percentage coverage—*Percent*,

5.5.10 Character of slick—*W, C, T, P*,

5.5.11 Other properties—*M, D, F, S, A, H, O, X*, and

5.5.12 END.

5.6 If an element is not present, a dash (−) shall be used. At a minimum, the first eight parameters shall be transmitted and as many as needed of the ninth parameter (Other properties) as a single group. The transmission shall be terminated by the word END.

5.6.1 Thus, a slick could be described as follows: Latitude of Slick Centre 58°23′05″ N (slash) Longitude of slick centre 176°12′15″ *W* (slash) Latitude of Leading Edge 58°23′40″ *N* (slash) Longitude of Leading Edge 176°10′20″ *W* (slash) 3 km (slash) 1 km (slash) 40 (slash) *B* (slash) 50 (slash) *C* (slash) *M* (slash) END. This means that there is a 3 by 1 km slick oriented north-east (40°) containing Black oil with a 50 % coverage. The oil is in Continuous and there is a Mechanical response operation in the area. Another example is the description Latitude of Slick Centre 58°23′05″ *N* (slash) Longitude of slick centre 176°12′15″ *W* (slash) *N*one (slash) *N*one (slash) 3 km (slash) 1 km (slash) 40 (slash) dash (slash) dash (slash) dash (slash) *M* (Slash) END, where visibility was poor and the nature of the slick could not be determined.

6. Mapping

6.1 There are three different styles of maps typically produced during the operation of a visual flight program in the response to an incident. These are: preparation of a base map, conducting the overflight and preparation of a map during the flight, and finally, preparation of a computer-generated map for presentation purposes based on the overflight hand-prepared map. Standards for computer-generated maps are not included in this practice.

6.2 A base map should be prepared that covers the area of the spill. If the spill is very large, more than one base map may be required. They should have sufficient detail to guide the observer in the aircraft. The area covered should be consistent with the size of the spill, but should probably not exceed 100 km by 100 km. A typical example of a base map is shown in Fig. 1. This map should include the location of the spill [xcirc], the command centre and other geographic features that will assist the user in the understanding of the map. Any information that is common to all maps should be placed on the base map.

6.3 The next type of map uses the base map and the concise notation described earlier to record data obtained during an overflight. This map is hand-drawn. It is the combined responsibility of the observers and the generator of the computer map to produce the final map which correctly describes the observational data. An example of an overflight map is shown in Fig. 2.

6.4 Users of visual observations may well request an estimate of the amount of oil on the water. While this cannot be done with any degree of accuracy, Table 1 provides a guide for undispersed oil.

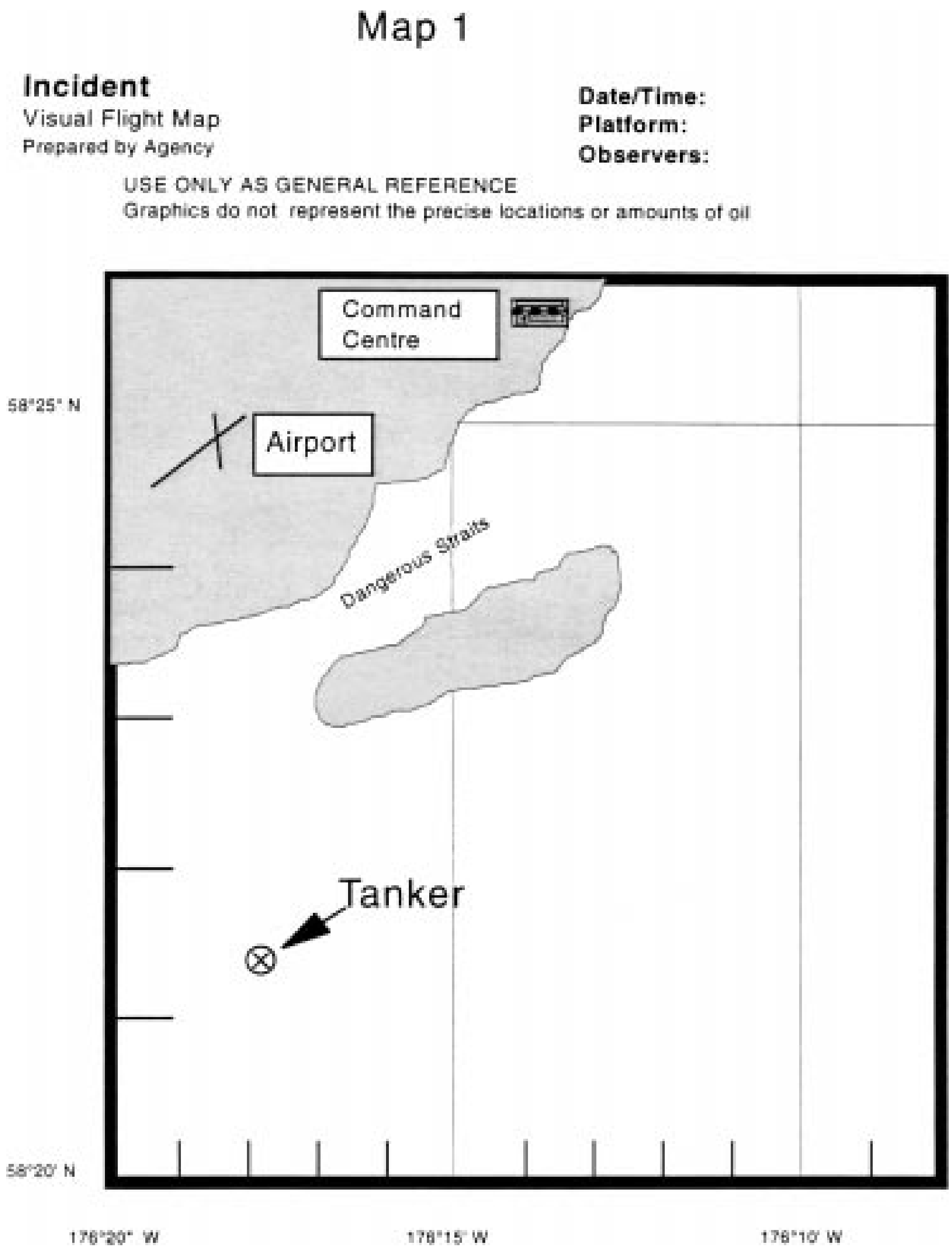

FIG. 1 Typical Example of Base Map

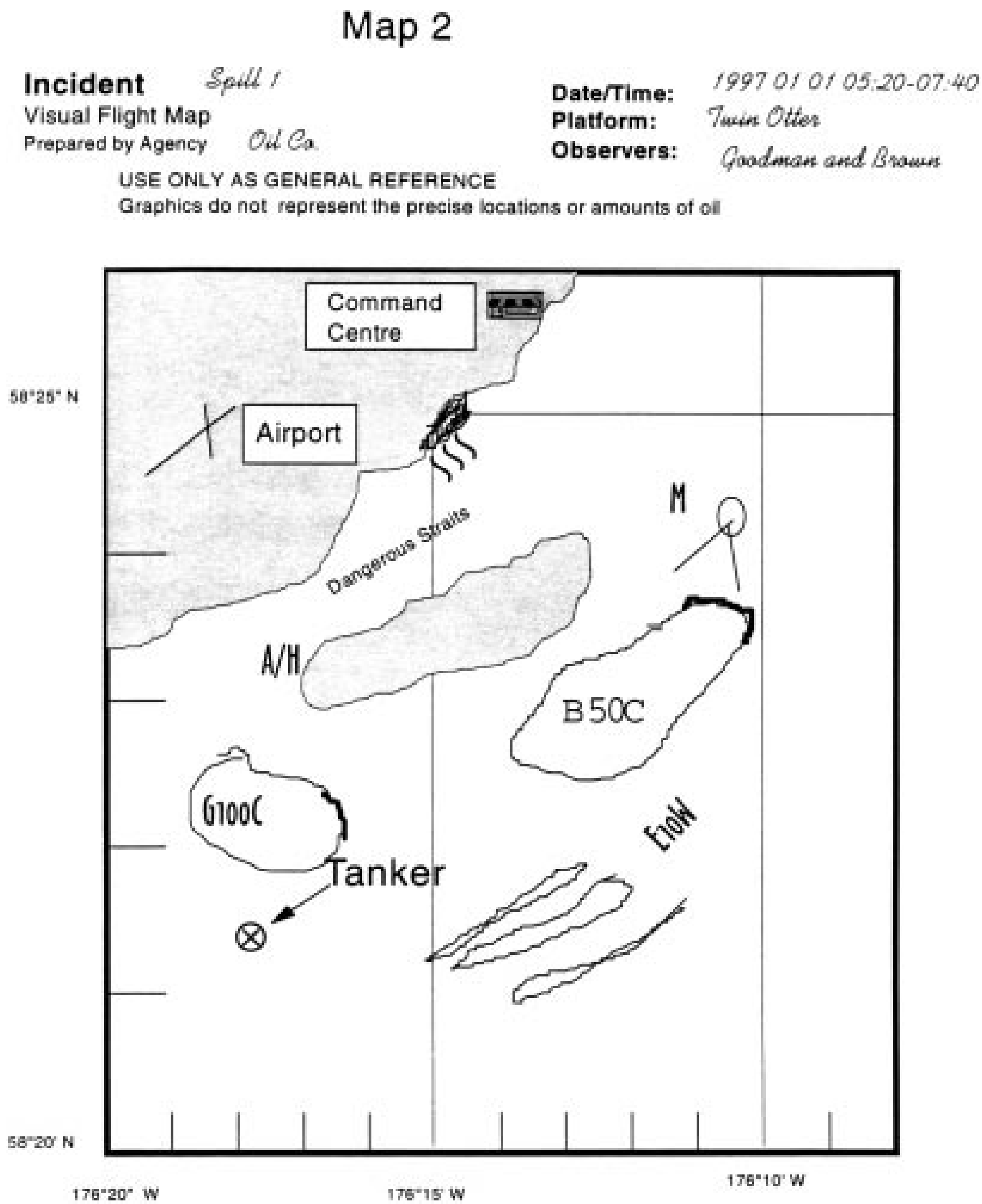

FIG. 2 Overflight Map

TABLE 1 Visual Observations and Estimating Volume of Undispersed Oil

Oil Color	Code	Thickness Range, µm[A]	m^3 of oil per km^2
Brown or Black	B	50–5000	50–5000
Emulsion	E	200–10 000	200–10 000[B]
Rainbow	R	0.15–2.0	0.15–2.0
Grey or Silver Grey	G	0.04–0.15	0.04–0.15

[A] The thickness in microns (µm) has the same value as the volume in m^3 per km^2. These values assume continuous coverage of surface and should be adjusted for situations where the oil covers only a fraction of the area.

[B] This refers to the volume of the fluid. The water-to-oil ratio in many emulsions is as high as 4:1.