APPLYING THE INCIDENT COMMAND SYSTEM (ICS) TO OIL SPILL RESPONSE PLANNING IN LATIN AMERICA; CASE STUDIES FROM ARGENTINA AND VENEZUELA

Erich R. Gundlach, Ph.D.
E-Tech International Inc.
P.O. Box 2976
Acton, MA 01720 USA
ErichEti@cs.com

Julio Fumagalli, Lic.
Base 365
Lavalle 472, Piso 2, Of. 209
(1047) Buenos Aires
Argentina

In 1996, the U.S. Coast Guard followed the leadership of the U.S. petroleum industry and adopted the Incident Command System (ICS) as the management system to be used for emergency response. This paper presents the key elements of Standard ICS and highlights the ICS developed specifically for major oil spills by a government/industry task force. The support that ICS has received from both the petroleum industry and the U.S. government indicates its inherent viability in providing a structure and process to effectively manage all emergency situations. Lessons learned during contingency planning using ICS in Argentina and Venezuela are also discussed.

What is the Incident Command System?

The Incident Command System is a method of management that contains a number of key features critical for an effective emergency response. These include a modular organization, common terminology, integrated communications, a unified command structure, a manageable span of control, the designation of incident facilities, and the means for comprehensive resource management. The ICS has broad application for managing both planned events, such as celebrations and parades, as well as emergency incidents. Outside of the petroleum industry, ICS has been successfully used during a variety of emergency responses in the United States that have received international attention, including the search and rescue efforts following the 1995 bombing of a government building in Oklahoma City, Oklahoma.

The ICS developed out of requirements described in the early 1970's to fight large forest fires that could extend over thousands of hectares and cross several western jurisdictional boundaries. In these cases, various fire departments having no prior experience of working together would be called upon to respond. As at most emergencies, as responders arrived onscene, it became obvious that experience, training, job titles, and managerial responsibilities differed substantially among organizations. Recognizing the need for coordination and integration of these resources, an interagency task force called FIRESCOPE (FIrefighting RESources of California Organized for Potential Emergencies) was formed in 1976 and through which the Incident Command System was developed. In 1980, ICS became part of a U.S. national program called the National Interagency Incident Management System (NIIMS), which guided federal agencies having wildland fire management responsibilities. NIIMS added other important features to the ICS including the development of a standardized qualification and training programs, control and management of ICS publications, and the mechanism to review and integrate supporting technology.

During the development of the ICS, four essential requirements for such a system were recognized.

1. The system must be organizationally flexible to meet the needs of incidents that could vary by size and type.

2. Agencies must be able to use the system on a day-to-day basis for routine situations as well as for major emergencies to ensure a working knowledge of the response system.

3. The system must be sufficiently standardized to enable personnel from various backgrounds, positions, and locations to rapidly meld into a common management structure.

4. The system must be cost effective.

While the ICS was first utilized to combat large forest fires in the 1980's, it took many years for it to be actively applied to oil spill response. The catalyst in the United States was clearly the *Exxon Valdez* oil spill in 1989, which involved over 10,000 responders, various state, local, and national agencies, as well as numerous private contractors in addition to Exxon. Lacking such a systemic method to integrate responders, separate government and industry command posts were set up causing numerous instances of overlapping responsibilities and a duplication of field activities. As a result, conflicts between organizations, oftentimes aired in public, erupted over the handling of the spill. Clearly there was a better way.

Following *Exxon Valdez* many oil and gas companies developed so-called "hybrid" systems of ICS, utilizing those elements and nomenclature of the ICS that were appropriate to the particular company. Standard ICS organizational titles and responsibilities were altered depending on company requirements. In 1994, a government/industry task force called STORMS (STandard Oil Response Management System) was formed to assist the development of a standardized system, able to be used by government agencies, the petroleum industry, and oil spill response organizations. This Task Force agreed upon a uniform ICS format and developed a handbook called the "Field Operations Guide" which forms the basis of a unified government-industry approach to ICS for oil spill incidents. Importantly, the Task Force adopted the ICS of the National Interagency Incident Management System, thereby accessing an extensive source of pre-prepared and low-cost manuals, documentation, standardized forms, and training programs.

The ICS Organizational Structure

The ICS organizational structure is modular, flexible and can be expanded to meet complex situations or reduced for minor incidents. The objective of the organizational structure is to obtain and then maintain an appropriate span of control over all incident personnel.

The standard ICS organizational structure is provided in Figure 1. It is based on the five major management activities or functions that must be performed during every incident: Command, Planning, Operations, Logistics, and Finance/Administration. Command has overall responsibility for the incident, determines objectives and establishes priorities based on the

nature of the incident, available resources and company/agency policy. Planning develops an Incident Action Plan to accomplish the objectives, collects and evaluates information, and maintains the status of assigned resources. Operations develops the tactical organization and directs all resources to carry out the Incident Action Plan. Logistics provides the resources and all other services needed to support the organization. Finance/Administration monitors costs related to the incident, provides accounting, procurement, time recording, cost analysis, and overall fiscal guidance. On small incidents, these five activities may be managed by a single individual. Large incidents usually require each of these activities to be established as separate sections within the organization.

For large incidents, the command function includes the positions of the Incident Commander and key support staff: the Safety Officer, Liaison Officer, Information Officer, and four Section Chiefs (Operations, Planning, Logistics, and Finance/Administration).

In the United States, Incident Command is jointly shared by the federal and state governments and the responsible party. Together, they form a Unified Command to ensure an integrated industry / government response. However, U.S. industry is mandated to take the lead in responding to their spill, with government providing support as needed to effectively handle the incident. The integration of Argentine industry and government into a coordinated response organization is valid and would serve to increase the flow of needed information, avoid possible conflicts in priorities, and assist the effective placement of limited resources.

Within Sections are Branches, Groups, and Units, dependent on the nature and complexity of the spill incident and the number of personnel involved. In the Planning Section, the Standard ICS structure shown in Figure 1 designates the following Units: Situation, Resources, Documentation, Decontamination, and Technical Specialists. Specific to spill-related emergencies, the STORMS Task Force developed the response structure indicated in Figure 2. Several Technical Specialists are specifically defined; these include Disposal Specialist, Scientific Support Coordinator, Alternative Response Technology Specialist (e.g. in-situ burning and dispersants), and Legal Specialist. Several positions in the Situation Unit are also added, including Display Processor, Field Observer, Trajectory Analysis Specialist, Geographic Information Specialist, and Resources at Risk Specialist. Response plans of the U.S. petroleum industry have also included several other Technical Specialists and may show an entire Environmental Unit under Planning, completely separate from the Situation Unit. However, these differences are relatively minor.

In the Operations Section, there are also several newly developed positions based on petroleum industry experience (Figure 3). Three Branches are named (Recovery and Protection, Emergency Response, and Wildlife) in addition to Air Operations. There are also various Groups designated below each Branch (e.g., the Recovery & Protection Branch contains Protection, On Water Recovery, Shoreside Recovery, Disposal, and Decontamination Groups). Well-formulated industry response plans generally show entities having similar functions.

The Logistics Section for oil spills is similar to that for Standard ICS, being composed of two Branches: Services and Support (Figure 4). Services has three units: Communications, Medical, and Food, while the Support Branch has Supply, Facilities, and Ground Support. Special for

spill-related emergencies is the addition of a Vessel Support Unit and two subdivisions of the Supply Unit: Personnel and Equipment / Materials.

Lastly, the Finance Section consists of the same four units indicated in Figure 1: Time, Procurement, Compensation/Claims, and Cost. This is consistent under both standard ICS and that utilized for spill response.

Use of Standardized Forms

A series of standardized, non-proprietary forms have been tested and developed to reduce startup time during emergencies. These forms, listed in Table 1, assist with spill management and the creation of Incident Action Plans which are prepared for each operational period and govern the entire response effort. These forms, able to be copied or computer-based, do much to focus the effort externally on combating the incident rather than internally on worrying about form format and distribution procedures.

Use of Planning Cycles to Manage the Response

The management system used in the Incident Command System provides the means to quickly transition the response from the initial "emergency" phase to a more methodical "project" phase. As with most emergencies, the magnitude of impact is unknown and resources are limited during the initial stages of a spill. Application of the ICS management process enables the appropriate resources to be effectively brought onscene and utilized such that the reactionary nature of the event, becomes routine, predictable, and therefore manageable.

The primary management tool used to gain control of the event is the planning cycle. As it involves all personnel, it is tightly coordinated between the Incident Commander, the Command Staff and the four Sections. The planning process begins with gaining an understanding of the situation and establishing incident objectives and strategies. The Incident Commander is solely responsible for setting the objectives. Command staff then develop the tactical direction to attain the objectives and strategies and assign the incident resources as needed. Once collated, the incident objectives, organization assignments, tactical work assignments plus other supporting forms become the Incident Action Plan to be approved by the Incident Commanders. The plan is then implemented and evaluated during the next operational period to determine it's effectiveness and the cycle repeats itself through successive operational periods until the response is complete.

The duration of the planning cycle is determined by the particular requirements of the incident. The cycle may be 6 hours, 12 hours, 48 hours, etc., although a 4-6 hour planning cycle is common at the onset or "emergency" phase of a oil spill response. The duration of the planning cycle is likely to change as the incident progresses from the emergency phase to the "project" phase. In the early stages of the project phase, 24 hours is a typical length. In later stages, it may increase to several days or even a week. The length of the planning cycle is determined solely by the particular character and needs of each incident.

Several meetings are prescribed and are necessary to sustain an effective planning cycle. Each meeting is specific in purpose and will remain short providing attendees come prepared and maintain a focus on the meeting's specific objective. Other meetings are called only as needed. As the incident matures into its project phase, the planning cycle and meetings will fall into a predictable pattern.

Even though tactical operations often cease at night for safety reasons, the planning cycle continues over 24 hours using two 12-hour shift periods. The evening and nighttime hours provide an excellent opportunity to catch up on the previous day's events and complete the planning for the next day's activities. Shift changes are often staggered among Sections and Incident Command to maintain continuity and avoid excessive confusion caused by a complete change in personnel at one time.

Integrating ICS Forms and Meetings into the Planning Cycle

To sustain an effective planning cycle, information is exchanged on a regular basis through forms and meetings. Special diagrams, called planning cycle guides, are used to indicate the planning cycle schedule with respect to information exchange. Planning cycle guides have been developed for each Section as well as for Command and General Staff. The planning cycle guide for the Planning Section is provided in Figure 5. The other four guides are also available from the authors. These guides, when used in conjunction with Table 1, contain the sequence of form input and output and indicate the respective preparer or receiver in relation to the planning cycle.

The planning cycle guides indicate a sequence but not a time clock because the duration of a planning cycle may vary. The circle can be entered at any point to initiate a cycle. Numbers 0, 3, 6 and 9 around the circles in Figures 5 indicate the sequence based on a 12 hour operational period. All guides contain the following general format. Entry into any of the five cycle guides at the "0" position indicates the meetings held and forms completed to prepare for the Planning Meetings. At the "3" position, Planning Meetings are held to set the course for the next operational period. Moving clockwise, assigned staff members complete the detailed planning and the necessary forms that make up the Incident Action Plan. The plan is completed and submitted to the Incident Commander at the "10" position, and approved, promulgated and briefed during an Operations Briefing between the "9" and "0" positions**.** The cycle then begins anew.

Figure 5 also provides an example of how the planning cycle guides and the ICS forms of Table 1 interact. A double-headed arrow labeled "OS-231 Planning Meeting (PSC)" is shown at the "3" position (the OS signifies a specially-developed Oil Spill form). Note that for these forms, the ICS position listed within parentheses associated with arrows exiting the circle indicates the form's preparer. If a meeting is involved, it indicates the facilitator. In the example above, the double-headed arrow indicates that the Planning Meeting is facilitated by the Planning Section Chief (PSC) and that other positions within the Planning Section also attend.

Continuing with the Planning Section Planning Cycle Guide in Figure 5, the double-headed arrow past the "6" position contains the label "202 (PSC), 203 (R.U.L.), 204 [R.U.L. (Assist by OPS)], OS-232 [S.U.L. (Assist by SSC & RAR)] and Incident Maps (S.U.L.)".

These notations used in conjunction with Table 1 indicate that:

- Form 202, Response Objectives, is prepared by the Planning Section Chief and is used by the Planning Section as part of the Incident Action Plan;
- Form 203, Organization Assignment List, is prepared by the Resource Unit Leader (Planning Section) and is used by the Planning Section as a part of the Incident Action Plan;
- Form 204, Division Assignment List, is prepared by the Resource Unit Leader (Planning Section) with the help of the Operations Section Chief and is used by the Planning Section as a part of the Incident Action Plan;
- Form OS-232, Resources at Risk, is prepared by the Situation Unit Leader (Planning Section) with assistance from the Scientific Support Coordinator and Resources at Risk Specialist and is used by the Planning Section as a part of the Incident Action Plan; and the
- Incident Maps are assembled by the Situation Unit Leader (Planning Section) and are used by the Planning Section as a part of the Incident Action Plan.

The guides serve to transition the response to the "project" phase quicker and to increase overall response efficiency. They are valid for both training and during the emergency response. While this at first appears somewhat complicated, training and practice will enable the efficient and rapid completion of the planning process and lead to increased effectiveness in implementing the developed Incident Action Plan.

Training and Simulation Exercises

As with all response plans, training and simulation exercises provide the means to become efficient in the application of the Incident Command System. Fortunately, as ICS has been in practice for over a decade, the procedures and levels of training are well defined and supported by specially designed curricula and training materials. As illustrated in Table 2, the ICS training program is divided into four categories, each having a series of related modules. Table 2 also provides the estimated number of classroom hours associated with each program.

The first level (I-100) is a general introduction to ICS designed for those who may be assigned to a response but have minimal requirements for knowing ICS. The second level (I-200) introduces the principals of ICS in greater detail, and includes special instruction on organization, facilities, resource terminology, and assigned responsibilities. This program level is designed for those that can reasonably be expected to actively participate in the response, both supervisory and technical personnel, and will need to know the basics of ICS to adequately perform their response task. The I-100 course takes on the order of 2 hours while 12 hours is minimally necessary to sufficiently cover the I-200 series. Many U.S. petroleum companies present the I-200 series prior to conducting a day-and-a half simulation exercise which serves to reinforces the material learned.

The next level of training, designated as I-300 Intermediate ICS, includes several more advanced modules on organization, resource management, planning, and air operations. It also covers the

steps in organizing the response as the incident develops. Designated personnel filling the response leadership roles, including Command and General Staff and Unit Leaders, would take this series. Additional modules are available as part of the series for several intermediate level positions, e.g. Documentation Unit Leader, Situation Unit Leader, etc. The last level, I-400 Advanced ICS, covers the development of large-scale response organizations, the role of Command and General Staff in such organizations, and planning, logistical, operational, and financial considerations. This level would assist the petroleum company's response managers in preparing for major events. Additional training is available on coordinating with government, and the I-400 series also includes training modules specific for positions within the Command and General Staff. The usual time allotments for the base I-300 and I-400 series are 27 and 22 hours, respectively.

Simulation exercises are an integral part of the training program. Simulations can vary greatly in size and complexity. There are now U.S. requirements that all facilities have to conduct a tabletop spill management team exercise on a annual basis. There are also larger scale exercises conducted on a regional level that commonly involve several hundred persons from the sponsoring petroleum company, government, and affected stakeholders. These exercises do much to improve internal response coordination and offer an excellent means of acquainting the interested public with the company's response capabilities. The active participation of the government and local community is considered necessary for effective emergency response planning.

Using the Incident Command System in Argentina and Venezuela

There are several advantages of utilizing ICS for response management in the Argentine and Venezuelan petroleum sector. ICS now has the support of the emergency response organization of the U.S. government, therefore ensuring the continued development of low-cost training guides, curricula, forms, and manuals. Similarly, its adoption by most of the major oil producers and transporters in the United States, many with overseas operations, equally ensures that additional material and training programs will be specifically designed for application to the oil industry. As both government and industry have found that ICS is the most efficient emergency management system available today, its use provides the most effective method to integrate government resources into industry's planning and response process. This is increasingly important in Argentina as provincial and national agencies assume more oversight of industrial activities occurring within their area of responsibility.

In Argentina, incorporating the ICS organizational structure into the contingency plans required by Res. SE 342/93 is not difficult. As indicated during our work with contingency plan development in the Neuquen basin, changes in organization and a new definition of responsibilities, are relatively easy to perform. However, the implementation of the complete Incident Command System across an entire petroleum company, including its associated organizational structure and training requirements, takes a concerted effort by management to foresee that this system is both cost effective and practical, not only for oil spills but for all emergency situations (fires, blowouts, tank rupture, pipeline breaks, hazardous materials spills, etc). Having an effective emergency response system will show long-term benefits in enhanced

financial performance and better public perception. As yet, most petroleum companies in Argentina have not utilized the ICS to its full advantage, but this is likely to change.

In Venezuela, the ICS is utilized in a limited manner with certain installation-based fire departments. However, due to the "apertura" or opening of the petroleum industry in Venezuela, the National Contingency Plan, including the manner and organization of local, regional, and national spill response, is undergoing complete revision. An inherent part of this review is the analysis of the current organization and means to improve it. To this end, components of the ICS organizational structure has been recommended and is likely to be incorporated into the revised National Contingency Plan. As in Argentine, using the organizational structure is only a first stage and represents only one part of ICS. Fairly extensive training programs will be needed to utilize the full benefits of this system,

Sources for ICS Material

California Office of Emergency Services, Operations Coordination Center, P.O. Box 55157, Riverside CA 92517. For Firescope ICS publication and materials. Phone (909) 782-4174, Fax (909) 782-4239.

Fire Protection Publications, IFSTA Headquarters, Attn: Customer Service, Oklahoma State University, Stillwater, OK 74078-0118. For commercial ICS publications and manuals. Phone (800) 654-4055, Fax (405) 744-8204.

National Interagency Fire Center, Attn: Supply, 3833 S Development Avenue, Boise, ID 83705. For ICS publications and materials. Phone (208) 387-5542, Fax (208) 387-5573.

ICS Forms Catalog, National Wildfire Coordinating Group, 1995, Available from E. Gundlach in Word 6.0 format via email address etech@tiac.net, approx. 60 pp.

Oil Spill Field Operations Guide (FOG), ICS-OS-420-1, STORMS Task Force, 1996. approx. 120 pp. Available through U.S. Coast Guard Headquarters home page: (http://www.dot.gov/dotinfo/uscg/hq/g-m/gmhome.htm).

Figures and Tables (Follow):

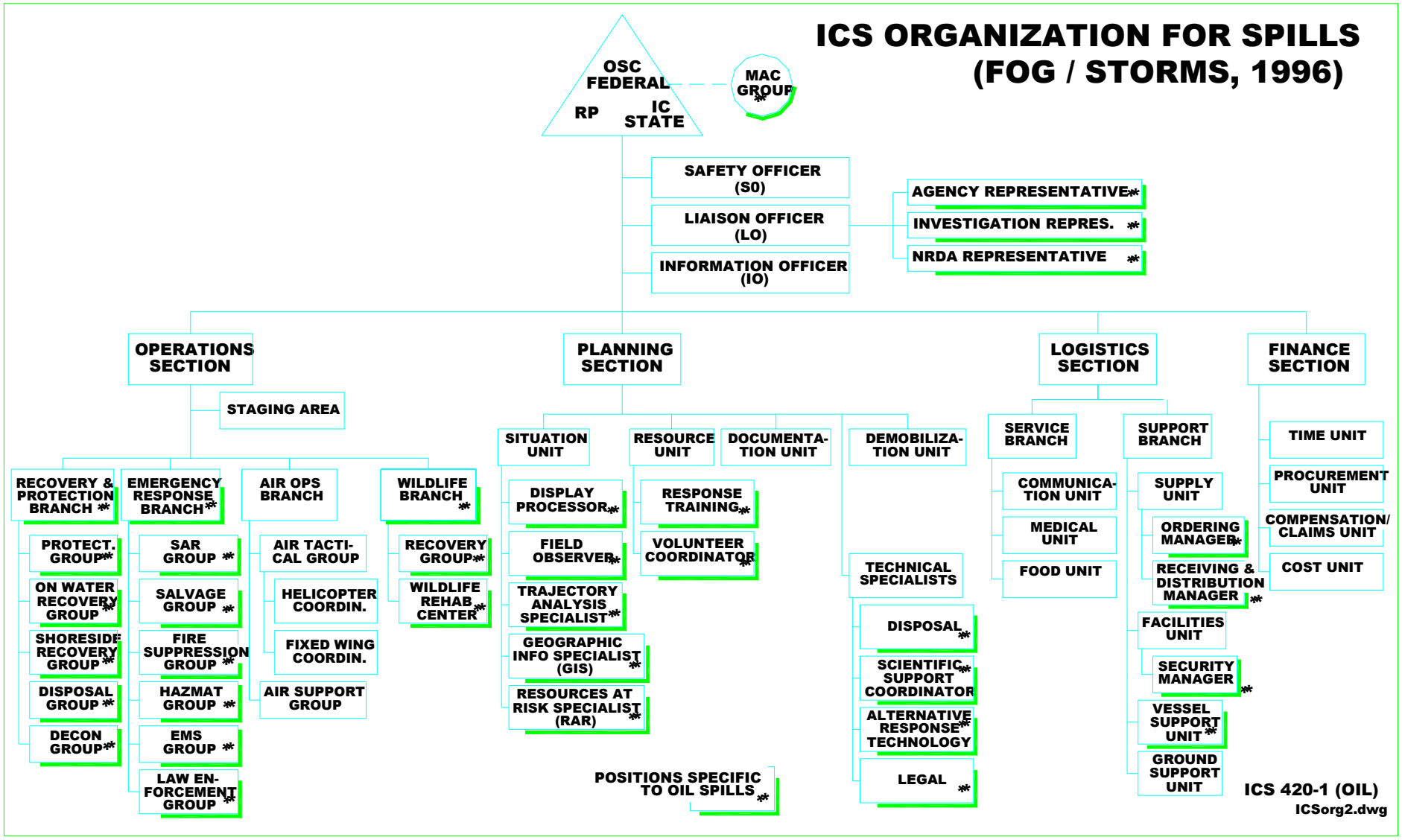


Figure 1. The Standard ICS (for oil spills) organizational structure.

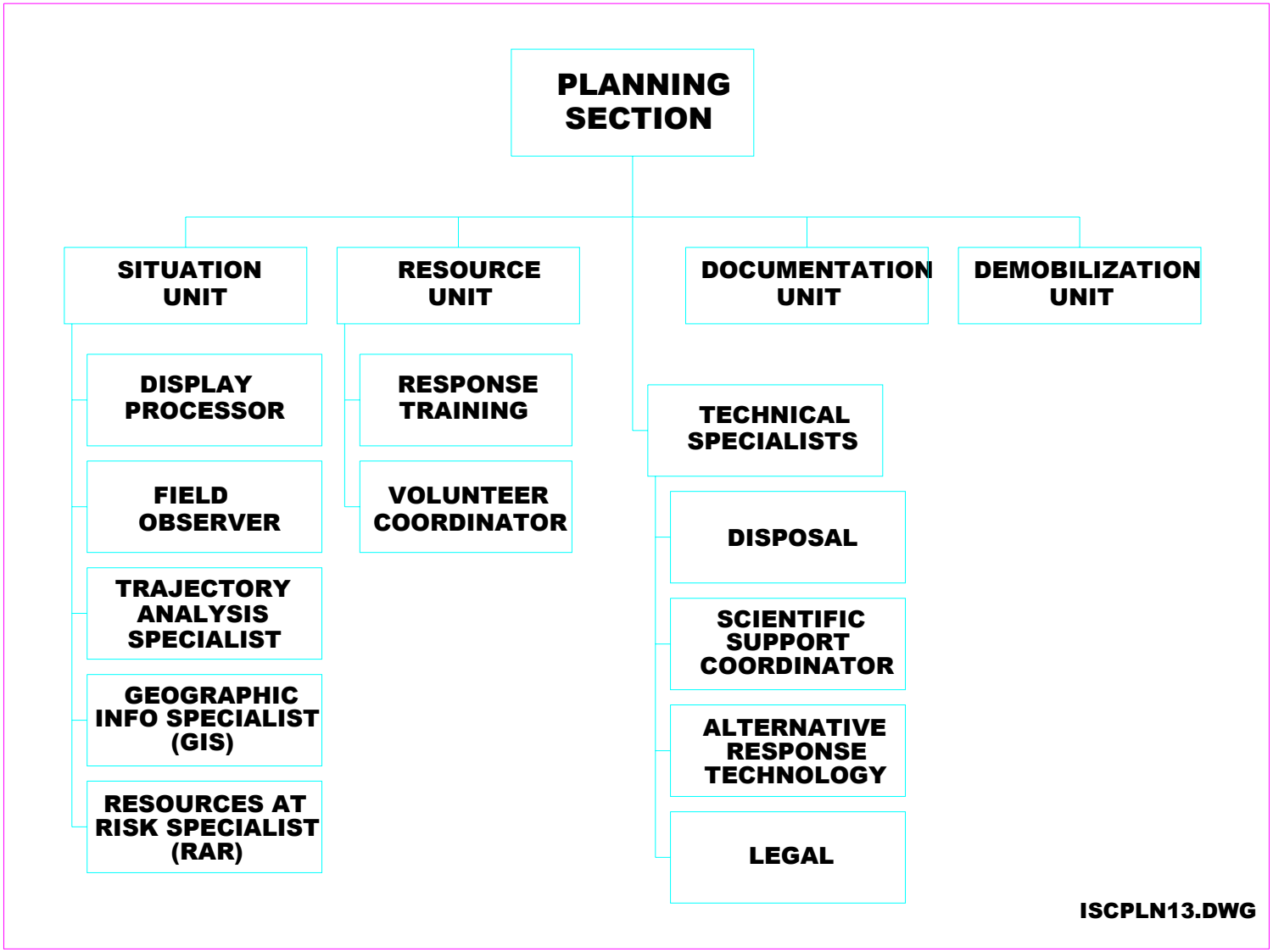


Figure 2. The ICS Planning Section organizational structure developed for major oil spills.

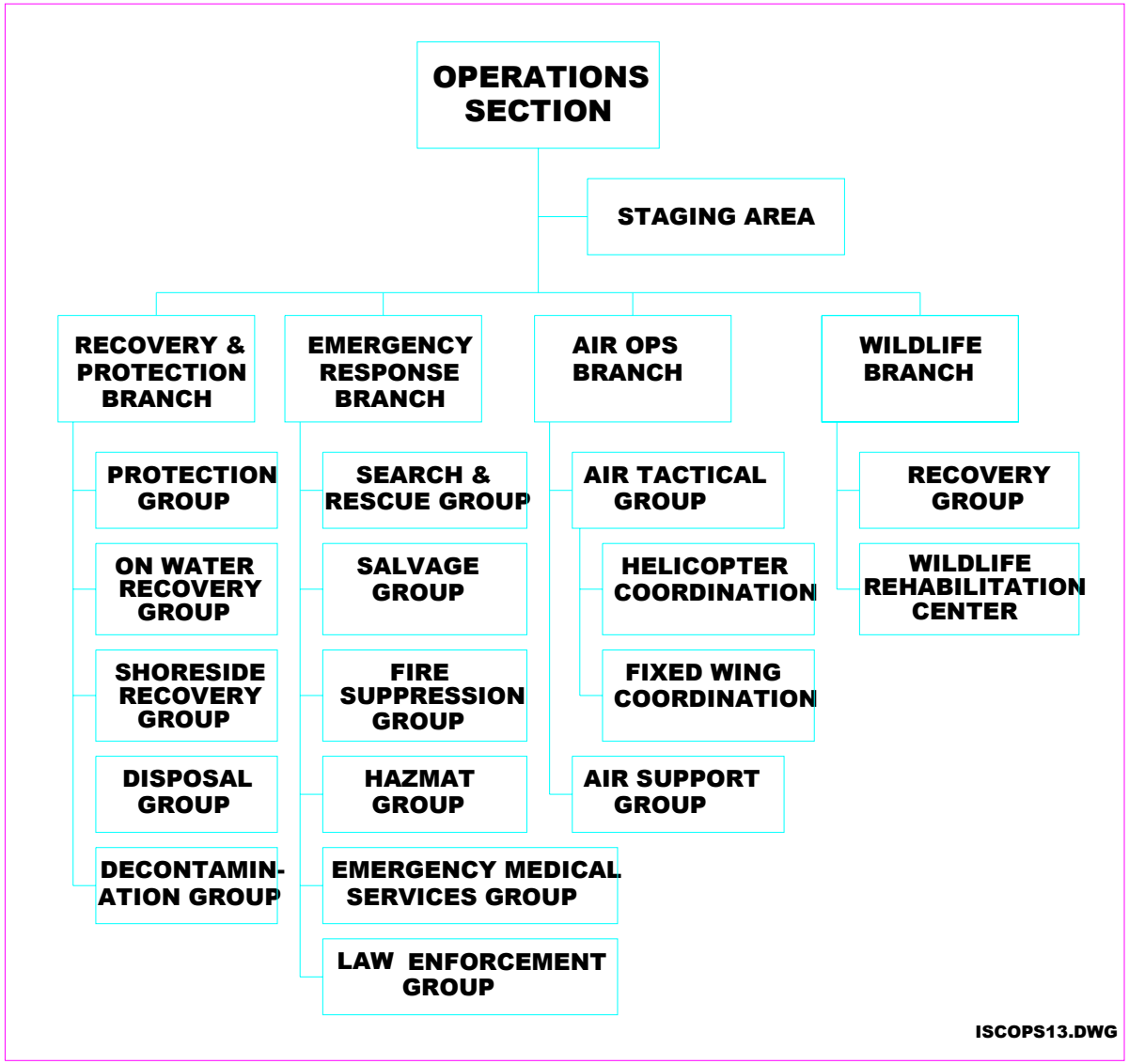


Figure 3. The ICS Operations Section organizational structure developed for major oil spills.

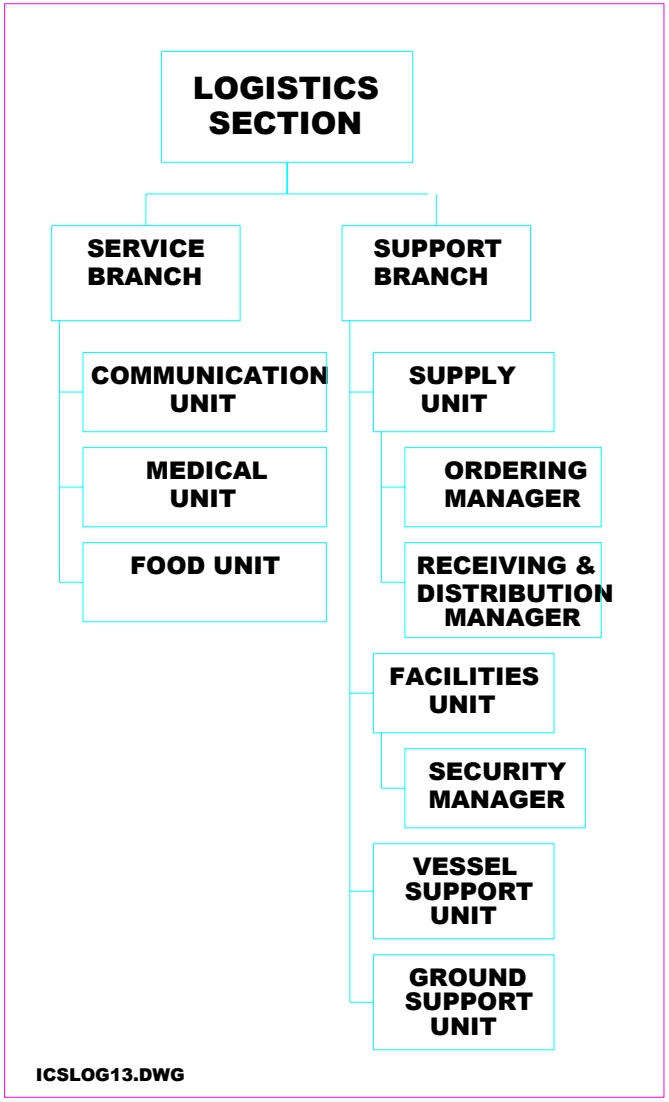
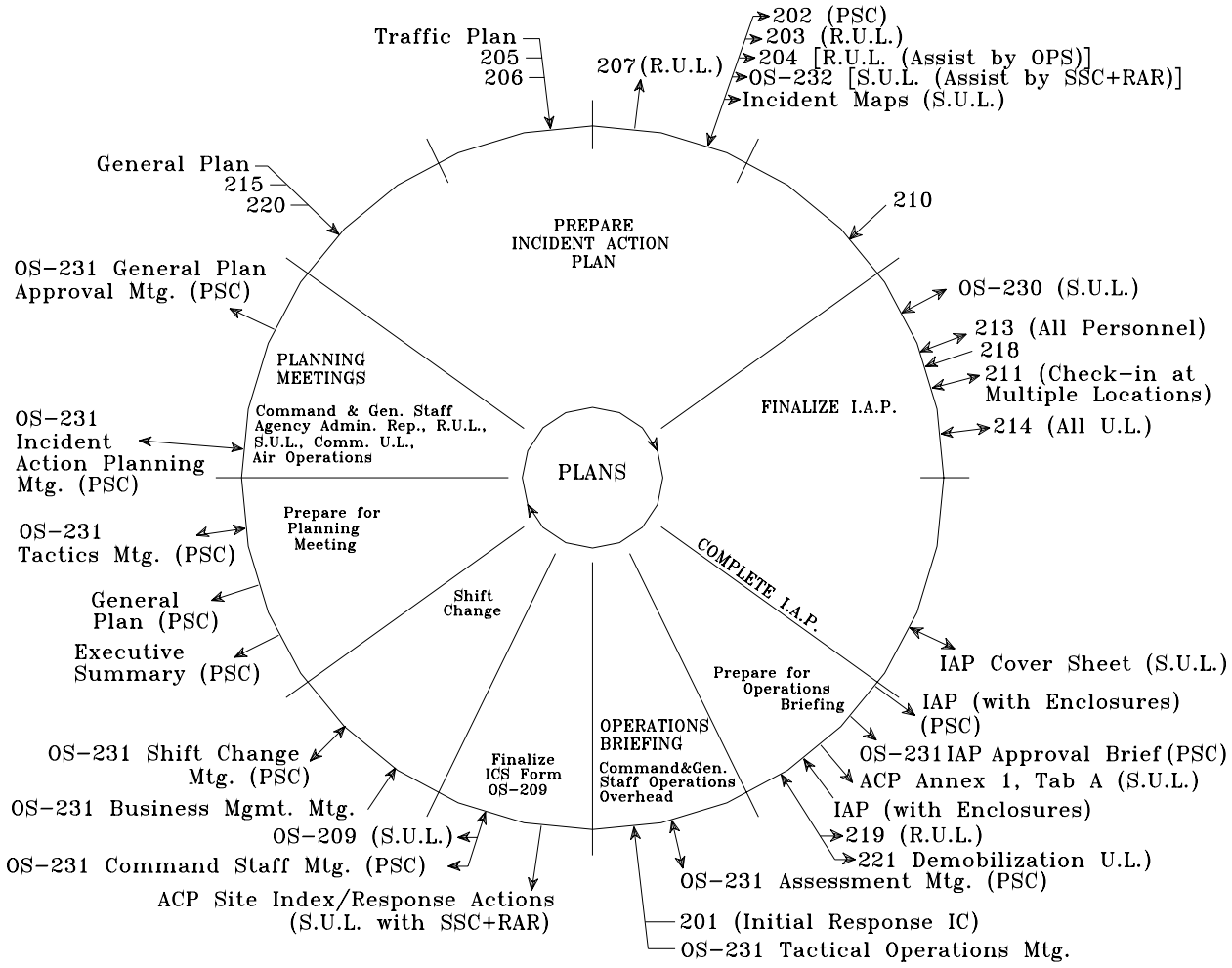


Figure 4. The ICS Logistics Section organizational structure developed for major oil spills.



ABBREVIATIONS & ACRONYMS

ACP: Area Contingency Plan
Branch Dir.: Branch Director

Gen.: General
IAP: Incident Action Plan
IC: Incident Commander
IO: Information Officer
LO: Liason Officer
Mtg.: Meeting

Ops: Operations
OPS: Operations Section
PSC: Planning Section Chief

R.U.L.: Resources Unit Leader
SO: Safety Officer

S.U.L. Situation Unit Leader
UC: Unified Command
U.L: Unit Leader

Figure 5. Planning Section planning cycle guide indicating activities and schedule of form input and output. Parentheses associated with an arrow exiting the cycle indicate the form preparer or meeting facilitator.

Table 1. Standard ICS forms for oil spills indicating preparer and addressees.

ICS FORM NUMBER	FORM TITLE	PREPARED BY	PRIMARY ADDRESSEE	INFO ADDRESSEE
201 #	Incident Briefing	Initial Respondee Incident Command	Relieving Incident Com-mand/Unified Command, General Staff	Command Staff, Appropriate Supervisory Staff
202 #	Response Objectives *	Planning Section Chief	Incident Action Plan	All Supervisory Personnel
203 #	Organization Assignment List *	Resources Unit Leader	Incident Action Plan	--
204 #	Division Assignment List *	Operations Section Chief & Resources Unit Leader	Incident Action Plan	--
205	Incident Radio Communications Plan	Communications Unit Leader	Incident Action Plan, Communications Center Manager	--
206	Medical Plan *	Medical Unit Leader	Incident Action Plan, (or incorporated into 202/204)	--
207	Organization Chart	Resources Unit Leader	Incident Command Post	--
OS-209 +	Incident Status Summary	Situation Unit Leader	General Staff	Incident Commander, Command Staff, Incident Command Post, Joint Information Center, Planning Section Unit Leaders
210	Status Change Card	Communications Center	Resources Unit Leader	Communications Unit Leader

ICS FORM NUMBER	FORM TITLE	PREPARED BY	PRIMARY ADDRESSEE	INFO ADDRESSEE
211	Check-in List	Resources Unit at Multiple Locations	Resources Unit Leader, Finance/ Administration Section Chief	--
213	General Message Form	Any Message Originator	Message Addressee	--
214	Unit Log	All Positions	Documentation Unit Leader	--
215	Operational Planning Worksheet	Operations Section Chief & Planning Section Chief	Resources Unit Leader	--
216	Radio Requirements Worksheet	Communications Unit Leader	Communications Unit Leader	--
217	Radio Frequency Assignment	Communications Unit Leader	Communications Unit Leader	--
218	Support Vehicle Inventory	Ground Support Unit Leader	Resources Unit Leader	--
219	Resources Status Card	Resources Unit Leader	Resources Unit Leader	Documentation Unit Leader (at demobilization)
220 #	Air Operations Summary	Operations Section Chief	Air Operations Personnel	Resources Unit Leader
221	Demobilization Checkout	Demobilization Unit Leader	Individual Resources	Demobilization Unit Leader
OS-230 **	Daily Meeting Schedule	Situation Unit Leader	Incident Command Post	All Supervisory Personnel
OS-231 **	Meeting Description	Meeting Facilitator	Incident Command Post	Appropriate Meeting Attendees

ICS FORM NUMBER	FORM TITLE	PREPARED BY	PRIMARY ADDRESSEE	INFO ADDRESSEE
OS-232 **	Resources at Risk Summary *	Situation Unit Leader	Incident Action Plan	Scientific Support Coordinator
**	General Plan	Planning Section Chief	Appropriate Division/Group/ Unit Personnel	---
**	Executive Summary	Planning Section Chief	Incident Command Post	Command & General Staff, Joint Information Center
**	ICS Incident Action Plan Cover *	Situation Unit Leader	Incident Action Plan	--
**	ACP Site Index/ Response Actions	Situation Unit Leader	Incident Command Post	--
**	Initial Notification Sheet/ Incident Information (ACP, Annex 1, Tab A)	Person receiving initial report. Updated by Situation Unit Leader	Incident Commander	Command & General Staff, Incident Command Post, Joint Information Center

ICS form has been slightly modified for oil spills, either version can be used.

** No ICS form equivalent.

* Commonly used in written Incident Action Plans (IAP).

+ Form is significantly changed from the original ICS version.

Table 2. Summary of the ICS training program and associated modules.

MODULE	COURSE TITLE	EST. HOURS
I-100	**INTRODUCTION TO ICS**	*(2 total)*
1	ICS Orientation	2
I-200	**BASIC ICS**	*(12 total)*
2	Principles and Features of ICS	2
3	Organizational Overview	4
4	Incident Facilities	2
5	Incident Resources	2
6	Common Responsibilities	2
+	Additional courses for lower ICS positions (manager)	
I-300	**INTERMEDIATE ICS**	*(27 Total)*
7	Organization and Staffing	6
8	Organizing for Incidents or Events	5
9	Incident Resources Management	4
10	Air Operations	4
11	Incident and Event Planning	8
+	Additional courses for Unit Leaders/Supervisors	
I-400	**ADVANCED ICS**	*(22 Total)*
12	Command and General Staff	6
13	Unified Command	6
14	Major Incident Management	4
15	Area Command	6
+	Additional courses for Command and General Staff positions	
++	Special courses for Multi-Agency Coordination and ICS for Executives	